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PazdelRío
ES COLOMBIA

REPORTE DE CALIDAD

FECHA: Belencito, 15.05.2025
HORA: 21:08:48
PÁGINA: 1 / 1

PRODUCTO: 6098049 - BARRA CORR N.6X12m NTC 2289 G60
CLIENTE: /
DIRECCIÓN:

REPORTE: 71.555
ORDEN DE ENTREGA: 8091238586
PLACA: SXR681

	COMPOSICIÓN QUIMICA (%)												PROPIEDADES MECÁNICAS					DIMENSIONES			
Especifca / Req.Norma:	%C	%Mn	%P	%S	%Si	%Nb	%Cu	%Cr	%Ni	%Mo	% V	%Ceq %	Rs(MPa) MPa	Fl (MPa) MPa	R/F Pieza	AL(%) %	DOBLADO	P/metro Kg	Esp.Res. mm	Alt. Res. mm	Anc.Vena mm
Mínimo:	0,00	0,00	0,000	0,000	0,00								550,00	420	1,25	14,00		2,1		0,97	
Máximo:	0,30	1,50	0,035	0,045	0,50							0,550		540					13,27		7,27

Lote/Colada	%C	%Mn	%P	%S	%Si	%Nb	%Cu	%Cr	%Ni	%Mo	% V	%Ceq %	Rs(MPa) MPa	Fl (MPa) MPa	R/F Pieza	AL(%) %	DOBLADO	P/metro Kg	Esp.Res. mm	Alt. Res. mm	Anc.Vena mm
B63354-25	0,27	1,19	0,025	0,034	0,19	0,000	0,036	0,017	0,017	0,003	0,018	0,470	630,05	467,09	1,35	18,51	B	2,211	12,37	1,13	4,71

Características: Rs(MPa) - RESISTENCIA Fl (MPa) - FLUENCIA R/F - RELACIÓN R/F AL(%) - ELONGACION (%) DOBLADO - B: BUENO

Método Determinación composición química: Espectrómetro de Emisión NTC 5192
Método Determinación Propiedades Mecánicas Rollo y barra corrugada: Tracción NTC-3353,Doblado, Peso Masa NTC - 2289.
Método Determinación Propiedades Mecánicas Rollo liso: Tracción NTC - 2, Doblado NTC - 1
Método Medición dimensional: Alambrón NTC - 330
Muestreo: Manual por Colada en Rollo y barra corrugada NTC 2289.
Muestreo: Manual por Colada en Alambrón.
Muestreo: Manual por Colada en Rollo Liso NTC 161.

Nota 1: Declaramos que los productos descritos, fueron inspeccionados y analizados conforme a lo especificado y los resultados cumplen con la norma citada. Los análisis aquí reportados corresponden a la muestra del lote Reportado.
Nota 2: Prohibida la reproducción parcial o total de éste documento, sin previa autorización de Acerías Paz del Río S.A.
Nota 3: Material libre de radiactividad,

Firma Autorizada: ING STELLA PATRICIA ZAMORA RANGEL
Coordinador Calidad Productos
Firma Autorizada vigente a partir de: 08.10.2021

Firma Autorizada: ING YENNY LILIANA MEDINA
Coordinador Seguridad Industrial
Firma Autorizada vigente a partir de: 04.05.2022

PazdelRío
ES COLOMBIA

REPORTE DE CALIDAD

FECHA: Belencito, 21.03.2025
HORA: 07:20:48
PÁGINA: 1 / 1

PRODUCTO: 6098049 - BARRA CORR N.6X12m NTC 2289 G60
CLIENTE: /
DIRECCIÓN:

REPORTE: 67071
ORDEN DE ENTREGA: 8091221873
PLACA: KZX652

	COMPOSICIÓN QUIMICA (%)												PROPIEDADES MECÁNICAS					DIMENSIONES			
Especifca / Req.Norma:	%C	%Mn	%P	%S	%Si	%Nb	%Cu	%Cr	%Ni	%Mo	% V	%Ceq %	Rs(MPa) MPa	Fl (MPa) MPa	R/F Pieza	AL(%) %	DOBLADO	P/metro Kg	Esp.Res. mm	Alt. Res. mm	Anc.Vena mm
Mínimo:	0,00	0,00	0,000	0,000	0,00								550,00	420	1,25	14,00		2,1		0,97	
Máximo:	0,30	1,50	0,035	0,045	0,50							0,550		540					13,27		7,27

Lote/Colada	%C	%Mn	%P	%S	%Si	%Nb	%Cu	%Cr	%Ni	%Mo	% V	%Ceq %	Rs(MPa) MPa	Fl (MPa) MPa	R/F Pieza	AL(%) %	DOBLADO	P/metro Kg	Esp.Res. mm	Alt. Res. mm	Anc.Vena mm
E31067-25	0,26	1,28	0,028	0,036	0,19	0,000	0,447	0,117	0,082	0,008	0,018	0,498	640,03	474,49	1,35	17,86	B	2,232	12,56	1,28	3,92

Características: Rs(MPa) - RESISTENCIA Fl (MPa) - FLUENCIA R/F - RELACIÓN R/F AL(%) - ELONGACION (%) DOBLADO - B: BUENO

Método Determinación composición química: Espectrómetro de Emisión NTC 5192
Método Determinación Propiedades Mecánicas Rollo y barra corrugada: Tracción NTC-3353,Doblado, Peso Masa NTC - 2289.
Método Determinación Propiedades Mecánicas Rollo liso: Tracción NTC - 2, Doblado NTC - 1
Método Medición dimensional: Alambrón NTC - 330
Muestreo: Manual por Colada en Rollo y barra corrugada NTC 2289.
Muestreo: Manual por Colada en Alambrón.
Muestreo: Manual por Colada en Rollo Liso NTC 161.

Nota 1: Declaramos que los productos descritos, fueron inspeccionados y analizados conforme a lo especificado y los resultados cumplen con la norma citada. Los análisis aquí reportados corresponden a la muestra del lote Reportado.
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Nota 3: Material libre de radiactividad,

Firma Autorizada: ING STELLA PATRICIA ZAMORA RANGEL
Coordinador Calidad Productos
Firma Autorizada vigente a partir de: 08.10.2021

Firma Autorizada: ING YENNY LILIANA MEDINA
Coordinador Seguridad Industrial
Firma Autorizada vigente a partir de: 04.05.2022

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PazdelRío
ES COLOMBIA

REPORTE DE CALIDAD

FECHA: Belencito, 26.06.2024
HORA: 07:50:04
PÁGINA: 1 / 1

PRODUCTO: 6098046 - BARRA CORR N.5X12m NTC 2289 G60
CLIENTE: /
DIRECCIÓN:

REPORTE: 57492
ORDEN DE ENTREGA: 8091187355
PLACA: SKL449

	COMPOSICIÓN QUIMICA (%)												PROPIEDADES MECÁNICAS					DIMENSIONES			
Especifca / Req.Norma:	%C	%Mn	%P	%S	%Si	%Nb	%Cu	%Cr	%Ni	%Mo	% V	%Ceq %	Rs(MPa) MPa	Fl (MPa) MPa	R/F Pieza	AL(%) %	DOBLADO	P/metro Kg	Esp.Res. mm	Alt. Res. mm	Anc.Veha mm
Mínimo:													550,00	420	1,25	14,00		1,459			
Máximo:	0,30	1,50	0,035	0,045	0,50							0,550		540					11,1	0,71	6,1

Lote/Colada	%C	%Mn	%P	%S	%Si	%Nb	%Cu	%Cr	%Ni	%Mo	% V	%Ceq %	Rs(MPa) MPa	Fl (MPa) MPa	R/F Pieza	AL(%) %	DOBLADO	P/metro Kg	Esp.Res. mm	Alt. Res. mm	Anc.Vena mm
E29166-24	0,27	1,28	0,022	0,024	0,18	0,000	0,270	0,094	0,074	0,013	0,018	0,495	622,30	470,08	1,32	17,05	B	1,54	10,78	1,13	3,70

Características: Rs(MPa) - RESISTENCIA Fl (MPa) - FLUENCIA R/F - RELACIÓN R/F AL(%) - ELONGACION (%) DOBLADO - B: BUENO

Método Determinación composición química: Espectrómetro de Emisión NTC 5192
Método Determinación Propiedades Mecánicas Rollo y barra corrugada: Tracción NTC-3353,Doblado, Peso Masa NTC - 2289.
Método Determinación Propiedades Mecánicas Rollo liso: Tracción NTC - 2, Doblado NTC - 1
Método Medición dimensional: Alambrón NTC - 330
Muestreo: Manual por Colada en Rollo y barra corrugada NTC 2289.
Muestreo: Manual por Colada en Alambrón.
Muestreo: Manual por Colada en Rollo Liso NTC 161.

Nota 1: Declaramos que los productos descritos, fueron inspeccionados y analizados conforme a lo especificado y los resultados cumplen con la norma citada. Los análisis aquí reportados corresponden a la muestra del lote Reportado.
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Nota 3: Material libre de radiactividad,

Firma Autorizada: ING STELLA PATRICIA ZAMORA RANGEL
Coordinador Calidad Productos
Firma Autorizada vigente a partir de: 08.10.2021

Firma Autorizada: ING YENNY LILIANA MEDINA
Coordinador Seguridad Industrial
Firma Autorizada vigente a partir de: 04.05.2022

ALMASA

GESTIÓN INTEGRAL

FORMATO

DECLARACIÓN DE CONFORMIDAD BARRA CORRUGADA Y FIGURADOS

FACTURA(S): 126431
CARTILLA: 65239

FECHA INFORME:
CONSECUTIVO:

DIÁMETRO	1/4"			3/8"			1/2"			5/8"			3/4"			7/8"			1"				
COLADA	-	-	-	-	-	-	A011862315	A011826706	-	A011836803	A011837911	-	A011807911	-	-	-	-	-	-	-	-	-	-
FABRICANTE	-	-	-	-	-	-	TERNIUM	TERNIUM	-	TERNIUM	TERNIUM	-	TERNIUM	-	-	-	-	-	-	-	-	-	-

NORMA APLICADA: NTC 2289

No. Designación Barra Acero	PROPIEDADES MECÁNICAS					PROPIEDADES QUÍMICAS % MÁXIMO											PROPIEDADES DIMENSIONALES							
	Fluencia (kgf/mm²)	Resistencia (kgf/mm²)	Fluencia (PSI)	Fluencia (MPa)	% Elongación (200mm)	C	Mn	Si	P	S	Co	Ni	Cr	Mo	V	Carbono Equivalente	Peso metro (kg)		Altura de resaltes (mm)		Espaciamiento (mm)		Separación extremos resaltes (mm)	
MIN	42,00	56,00	60000	420	(1/4" a 3/4" 14%)	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	LIMITES MIN	Valor	LIMITES MIN	Valor	LIMITES MAX	Valor	LIMITES MAX	Valor
MAX	55,00	N.E.	78000	540	(7/8" a 1 1/4" 12%)	0,33	1,56	0,55	0,043	0,053	N.E.	N.E.	N.E.	N.E.	N.E.	0,55								
1/4 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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3/8 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/2 "	51,09	67,30	72 664	501	16,0	0,26	0,86	0,16	0,012	0,018	-	-	-	-	-	0,43	0,934	1,024	0,51	0,89	9,9	8,2	4,9	2,9
	49,35	64,34	70 198	484	20,0	0,29	0,87	0,17	0,016	0,026	-	-	-	-	-	0,45		0,972		1,06		8,2		2,6
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-		-
5/8 "	52,11	65,67	74 115	511	16,0	0,27	0,83	0,17	0,019	0,019	-	-	-	-	-	0,44	1,459	1,530	0,71	1,40	11,1	10,4	6,1	3,2
	47,21	61,49	67 153	463	15,0	0,25	0,94	0,21	0,019	0,025	-	-	-	-	-	0,43		1,518		1,22		10,3		3,3
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3/4 "	47,01	63,94	66 863	461	16,0	0,29	0,84	0,19	0,016	0,022	-	-	-	-	-	0,45	2,101	2,148	0,97	1,21	13,3	12,6	7,3	3,3
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N.E. : NO ESPECIFICA N.D. : NO DISPONIBLE

OBSERVACIONES:

Oscar Villanueva	**Pablo Cesar Tibocha Murcia**
Elaboró	**Aprobó**

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ALMASA	GESTIÓN INTEGRAL	
	FORMATO	VERSIÓN:
	DECLARACIÓN DE CONFORMIDAD BARRA CORRUGADA Y FIGURADOS	FECHA: 2023-[illegible]

FACTURA(S): 126430
CARTILLA: 65106

FECHA INFORME: 2026-[illegible]
CONSECUTIVO: MTF-26[illegible]

DIÁMETRO	1/4"			3/8"			1/2"			5/8"			3/4"			7/8"			1"			1 1/4"	
COLADA	-	-	-	-	-	-	2403582	-	-	A011840117	A011790009	-	-	-	-	-	-	-	A011800916	A011682614	-	A011544116	-
FABRICANTE	-	-	-	-	-	-	FORMULA ACERO	-	-	TERNIUM	TERNIUM	-	-	-	-	-	-	-	TERNIUM	TERNIUM	-	TERNIUM	-

NORMA APLICADA: NTC 2289

No. Designación Barra Acero	PROPIEDADES MECÁNICAS					PROPIEDADES QUÍMICAS % MÁXIMO											PROPIEDADES DIMENSIONALES							
	Fluencia (kgf/mm²)	Resistencia (kgf/mm²)	Fluencia (PSI)	Fluencia (MPa)	% Elongación (200mm)	C	Mn	Si	P	S	Co	Ni	Cr	Mo	V	Carbono Equivalente	Peso metro (kg)		Altura de resaltes (mm)		Espaciamiento (mm)		Separación extremos resaltes (mm)	
MIN	42,00	56,00	60000	420	(1/4" a 3/4" 14%)	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	LIMITES	Valor	LIMITES	Valor	LIMITES	Valor	LIMITES	Valor
MAX	55,00	N.E.	78000	540	(7/8" a 1 1/4" 12%)	0,33	1,56	0,55	0,043	0,053	N.E.	N.E.	N.E.	N.E.	N.E.	0,55	MIN		MIN		MAX		MAX	
1/4 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/8 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/2 "	46,40	63,33	65 996	455	15,3	0,21	1,06	0,18	0,014	0,008	-	-	-	-	-	0,41	0,934	0,961	0,51	0,53	9,9	8,7	4,9	4,2
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-		-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-		-
5/8 "	48,13	64,04	68 458	472	19,0	0,27	0,86	0,16	0,019	0,032	-	-	-	-	-	0,44	1,459	1,562	0,71	1,13	11,1	10,4	6,1	3,2
	50,68	66,49	72 084	497	15,0	0,28	0,90	0,18	0,020	0,021	-	-	-	-	-	0,46		1,522		1,08		10,3		3,7
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-		-
3/4 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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7/8 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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1 "	49,86	66,08	70 923	489	15,0	0,29	0,89	0,18	0,013	0,021	-	-	-	-	-	0,46	3,735	3,875	1,27	1,53	17,8	17,0	9,7	6,5
	49,05	62,82	69 764	481	17,0	0,27	0,86	0,17	0,009	0,025	-	-	-	-	-	0,43		3,958		1,84		16,9		6,9
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-		-
1 1/4 "	43,85	62,00	62 367	430	20,0	0,26	1,09	0,20	0,021	0,025	-	-	-	-	-	0,47	6,020	6,168	1,63	1,74	22,6	21,3	12,4	9,2
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-		-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-		-

N.E. : NO ESPECIFICA N.D. : NO DISPONIBLE

OBSERVACIONES:

Oscar Villanueva	Pablo Cesar Tibocha Murcia
Elaboró	Aprobó

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PROTUNELES S.A.S.

COLOMBIA

Arcore, 20/06/2025

CERTIFICADO DE CONFORMIDAD

Con el siguiente certificado declaramos que el producto:

tubo de drenaje ranurado en PVC DURVINIL RFS diam. 43/50mm con lote de producción: T12/20/25

ha sido fabricado de acuerdo a la normativa UNI EN ISO 9001 : 2015 implementada en nuestra empresa y ha sido sometido a control de calidad interno.

Las características del producto acabo son conformes a la ficha técnica emitida.

Sireg Geotech

Gabriele Balconi

Test Report

DIN EN 10204: 3.1

Batch No.:PI24172CYQ	**Certificate No.** : QC24723
Producer: Guizhou Sinodrills Equipment Co.,Ltd	**Customer:** JG REPRESENTACIONES S.A.S .

R32N/21 x L3m anchor bar

Product	R32N/21 anchor bar	**Quantity**	1000PCS
Ref. Drawing No.	GSE-R32N/21	**Material**	DIN 41Cr4
Steel type	EN 10083-1	**Date of Delivery**	21.02.2025

Dimension Inspection

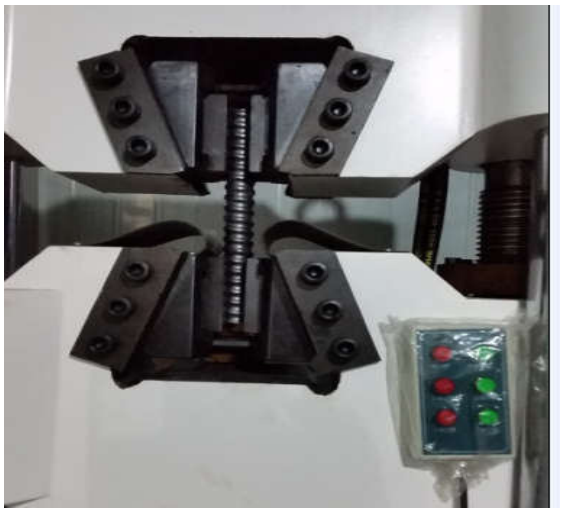
No	**Size**	**Required(mm)**		**Test result(mm)**			**Conclusion**
1	R32N/21	Out diameter(mm)	31.34mm	31.25	31.18	31.17	Qualified
		Thread pitch(mm)	12.7mm	12.7	12.7	12.7	

Chemical Composition

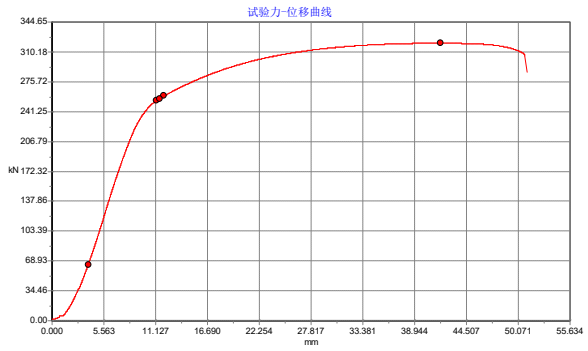
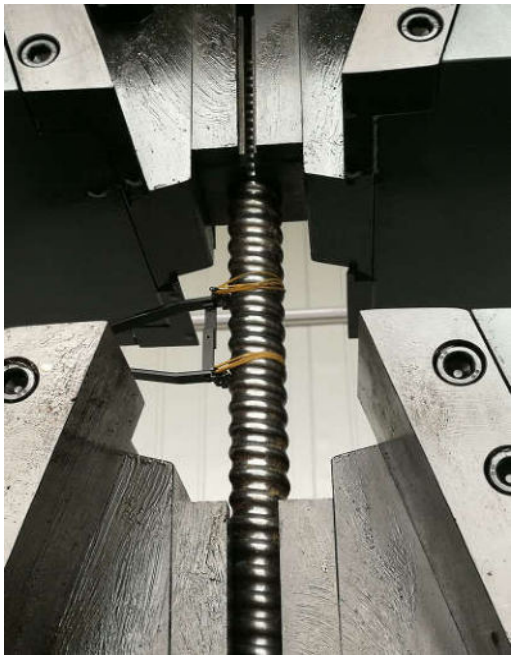
Required	C	Si	Mn	Cr	Ni	Cu	**Conclusion**
(wt%)	0.37~0.45	0.17~0.37	0.5~0.8	0.8~1.1	≤0.030	≤0.030	Qualified
Test result	0.38	0.19	0.72	0.91	0.02	0.02	

Mechanical Properties

Test Machine	
Test standard	GB/T228-2002
	PC Metal Material Test Hydraulic Machine with screen, capacity <= 1000 kN

Test method	
Each specimen cut from different bars in length of 300mm is installed into the test machine each end held by a metal clamp. A gradually increasing tensile load is applied to each specimen till facture. Test results are processed into data by computers.	

Test result

Tensile Curve	Tensile curve of sample
	

The anchor bar before breaking	The anchor bar after breaking
	

No	Size	Required (KN)		Test Result(KN)			Conclusion
1	R32N/21	Ultimate load	≥280KN	319KN	321KN	319KN	Qualified
		Yield point	≥230KN	254KN	262KN	257KN	Qualified
Elongation (%)		≥8%		10%	10%	10%	Qualified
Agt (%)		>5%		6.9%	6.3%	6.5%	Qualified

Conclusion

The Products are qualified, so allow delivering the goods.

Inspector: 刘涛 Verifier: 贵州中钻机械设备有限公司 GUIZHOU SINODRILLS EQUIPMENT CO.,LTD 杨代文 Date: 21.02.2025

Test Report

DIN EN 10204: 3.1

Batch No.:PI24172CYQ	**Certificate No.** : QC24723
Producer: Guizhou Sinodrills Equipment Co.,Ltd	**Customer:** JG REPRESENTACIONES S.A.S .

R32 Hex Nuts

Product	R32 Hex nuts
Quantity	1000PCS
Ref. Drawing No.	GSEHNR3245
Material	DIN 41Cr4/40Cr
Heat Treatment No.	SD2412201-1
Date of Delivery	21.02.2025

Dimension Inspecting

No	Size	Required	Test result(mm*mm)			Conclusion
1	R32*L45	SW46*L45	45.9*45.1	45.9*45.1	45.8.0*45.0	Qualified

Chemical composition: (%)

	C	Si	Mn	Cr	Ni	Cu	Conclusion
Required	0.37~0.45	0.17~0.37	0.5~0.8	0.8~1.1	≤0.030	≤0.030	Qualified
Test result	0.38	0.19	0.73	0.90	0.02	0.02	

Mechanical Properties

Required	Test Result	Conclusion
Hardness 20~25HRC	25HRC-24HRC-24HRC	Qualified
Breaking load≥360KN	374KN-368KN-366KN	Qualified

Heat Treatment

Nuts are heated to 840 centigrade, then quenched into water 1~ 2 minutes and tempered at 450 centigrade during 2.5 hours.

Conclusion

The Products are qualified, so allow delivering the goods.

Inspector: 刘涛 Verifier: 贵州中钻机械设备有限公司 GUIZHOU SINODRILLS EQUIPMENT CO.,LTD 杨代文 Date: 21.02.2025

Test Report

DIN EN 10204: 3.1

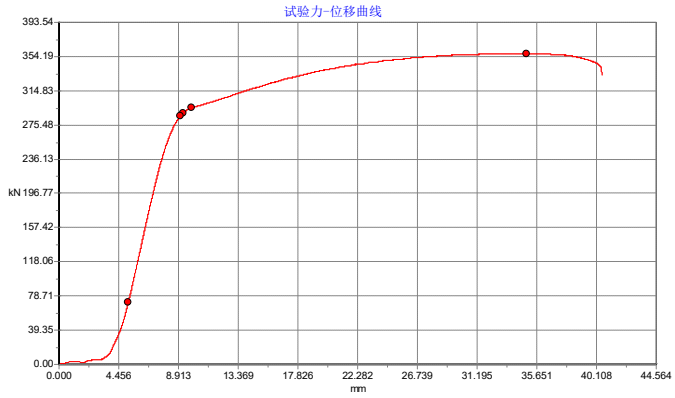
Batch No.:PI24172CYQ	**Certificate No.** : QC24723
Producer: Guizhou Sinodrills Equipment Co.,Ltd	**Customer:** JG REPRESENTACIONES S.A.S .

R32 Coupling

Product	R32 Coupling
Quantity	4000PCS
Ref. Drawing No.	GSECPR32160
Material	DIN 41Cr4/40Cr
Heat Treatment No.	SD2412201-2
Date of Delivery	21.02.2025

Tensile Test





Limit of elasticity:	**367KN**

Manufacturing process

First Step	Fix size of coupling, cutting steel pipe in required length
Second Step	Heat treatment
Third Step	Turning thread
Forth step	Painting

Inspector: 刘涛 Verifier: 贵州中钻机械设备有限公司 GUIZHOU SINODRILLS EQUIPMENT CO.,LTD 杨代文 Date: 21.02.2025

Test Report

DIN EN 10204: 3.1

Batch No.: PI24172CYQ	**Certificate No. :** QC24723
Producer: Guizhou Sinodrills Equipment Co.,Ltd	**Customer:** JG REPRESENTACIONES S.A.S .

R32 - Ø51 hardened steel button bit

Product	R32- Ø51 hardened steel button bit
Quantity	1000PCS
Ref. Drawing No.	GSER32ES51
Material	DIN 41Cr4/40Cr
Heat Treatment No.	SD2412201-3
Date of Delivery	21.02.2025

Dimension Inspecting

No	Size	Required	Test result(mm*mm)			Conclusion
1	R32*51mm	Ø51mm	Ø51.2mm	Ø51.2mm	Ø51.1mm	Qualified

Chemical composition: (%)

	C	Si	Mn	Cr	Ni	Cu	Conclusion
Required	0.37~0.45	0.17~0.37	0.5~0.8	0.8~1.1	≤0.030	≤0.030	Qualified
Test result	0.41	0.20	0.76	0.90	0.02	0.02	

Mechanical Properties

Required	Test Result	Conclusion
Hardness 48~55HRC	49.8HRC-49.6HRC-49.7HRC	Qualified

Heat Treatment

Button bits are heated to 840 centigrade, then quenched into water 1~ 2 minutes and tempered at 450 centigrade during 2.5 hours.

Conclusion

The Products are qualified, so allow delivering the goods.

Inspector: 刘涛 Verifier: 杨代文 Date: 21.02.2025

贵州中钻机械设备有限公司
GUIZHOU SINODRILLS EQUIPMENT CO.,LTD

Test Report

DIN EN 10204: 3.1

Batch No.: PI24122CYQ	**Certificate No.** : QC24541
Producer: Guizhou Sinodrills Equipment Co.,Ltd	**Customer:** JG REPRESENTACIONES S.A.S .

R38S/18 x L3m anchor bar

Product	R38S/18 anchor bar	**Quantity**	1400PCS
Ref. Drawing No.	GSE-R38S/18	**Material**	DIN 41Cr4
Steel type	EN 10083-1	**Date of Delivery**	16.10.2024

Dimension Inspection

No	Size	Required(mm)		Test result(mm)			Conclusion
1	R38S/18	Out diameter(mm)	37.99mm	37.78	37.81	37.90	Qualified
		Thread pitch(mm)	12.7mm	12.7	12.7	12.7	

Chemical Composition

Required	C	Si	Mn	Cr	Ni	Cu	Conclusion
(wt%)	0.37~0.45	0.17~0.37	0.5~0.8	0.8~1.1	≤0.030	≤0.030	Qualified
Test result	0.40	0.19	0.74	0.86	0.02	0.02	

Mechanical Properties

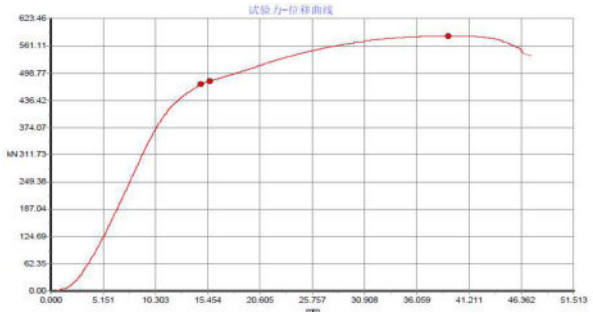
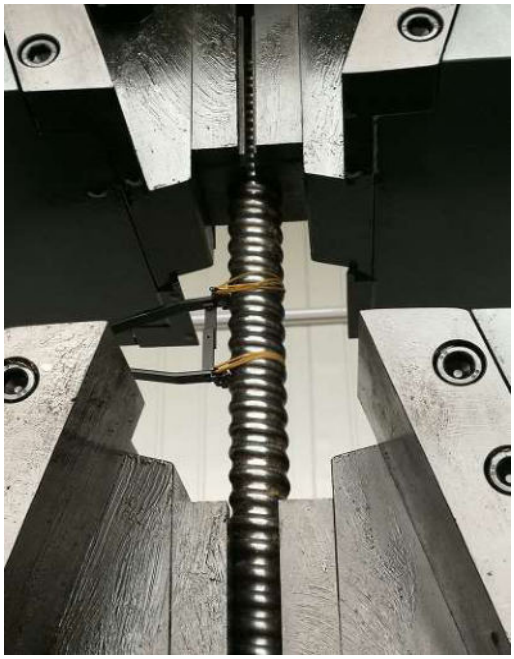
Test Machine	
Test standard	GB/T228-2002
PC Metal Material Test Hydraulic Machine with screen, capacity ≤1000 kN	

Test method

Each specimen cut from different bars in length of 300mm is installed into the test machine each end held by a metal clamp. A gradually increasing tensile load is applied to each specimen till facture. Test results are processed into data by computers.



Test result

Tensile Curve	Tensile curve of sample
	

The anchor bar before breaking	The anchor bar after breaking
	

No	Size	Required (KN)		Test Result(KN)			Conclusion
1	R38S/18	Ultimate load	≥550KN	614KN	610KN	612KN	Qualified
		Yield point	≥450KN	489KN	485KN	487KN	Qualified
Elongation (%)		≥8%		10%	10%	10%	Qualified
Agt (%)		>5%		6.9%	7.1%	7.0%	Qualified

Conclusion

The Products are qualified, so allow delivering the goods.

Inspector: 刘涛 Verifier: 贵州中钻机械设备有限公司 GUIZHOU SINODRILLS EQUIPMENT CO.,LTD 杨代文 Date: 16.10.2024

Test Report

DIN EN 10204: 3.1

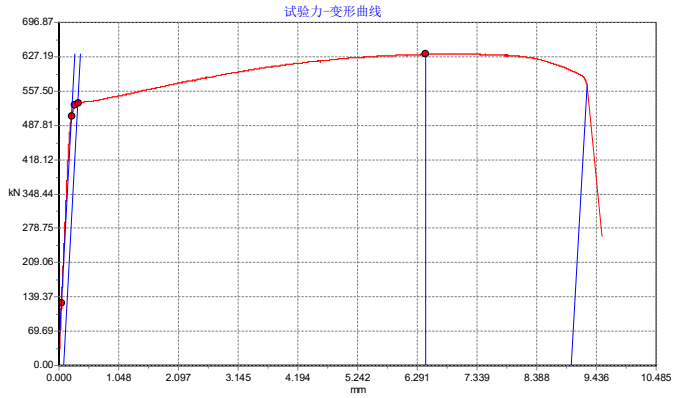
Batch No.: PI24122CYQ	**Certificate No.** : QC24541
Producer: Guizhou Sinodrills Equipment Co.,Ltd	**Customer:** JG REPRESENTACIONES S.A.S .

R38 Coupling

Product	R38 Coupling
Quantity	1400PCS
Ref. Drawing No.	GSECPR38L220
Material	DIN 41Cr4/40Cr
Heat Treatment No.	SD2409275-1
Date of Delivery	16.10.2024

Tensile Test





Limit of elasticity:	**635KN**

Manufacturing process

First Step	Fix size of coupling, cutting steel pipe in required length
Second Step	Heat treatment
Third Step	Turning thread
Forth step	Painting

Inspector: 刘涛 Verifier: 贵州中钻机械设备有限公司 GUIZHOU SINODRILLS EQUIPMENT CO.,LTD 杨代文 Date: 16.10.2024

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05.F.00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: **TALUD K0+800**

FECHA: SEPTIEMBRE 22 2025

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

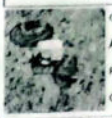
LONGITUD DE ANCLAJE: 20 50 MTS (LB 10)

Supervisor Residente Contratista: MARIO NAM

Supervisor Residente Interventoria:

Supervisor Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Pig²
Recorrido	200	mm
Capacidad	90	Ton

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	10000	mm
L_L (Longitud libre barra R38)	10500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
1	2
5	8
9	16
13	23
17	31
22	40

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.7	Lbs
T (Tensión prueba Barra R38)	85980.4	Lbs
Ag (Area gato)	29.24	Pig²

$P_{trabajo}$	### Lbs/Pig²	P_{prueba}	2941	Lbs/Pig²

LECTURA PARA TENSION DE PRUEBA

Anclaje No		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
H2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	25.0
			816	828	840	854	868				
I2	6	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			928	940	954	970	981				
K2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	25.0
			854	866	879	891	904				
M2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	27.0
			976	988	1002	1016	1030				
H2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	27.0
			816	828	840	855	870				
H2	4	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			928	940	955	968	981				
L2	6	R38	120	602	1203	1805	2407	20.0	48.0	28.0	28.0
			851	867	880	896	907				
N2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	27.0
			916	930	945	957	970				
G2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	32.0
			827	840	852	870	886				
G2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	29.0
			947	960	978	991	1003				
P2	6	R38	120	602	1203	1805	2407	20.0	46.0	26.0	32.0
			816	830	842	860	874				
S2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	31.0
			922	938	950	961	978				
R2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	28.0
			964	968	981	995	1007				
AC2	6	R38	120	602	1203	1805	2407	20.0	48.0	28.0	25.0
			959	971	986	998	1012				
AD2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	28.0
			849	861	876	889	902				

$$\delta_l = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_l= Deformacion elástica teórica mínima [mm]

δ_s= Deformacion elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Modulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo Bo CONTRATISTA
Ing. Alberto [illegible] R

Vo Bo INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD K6+800

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 23 2026

LONGITUD DE ANCLAJE: 20.50 MTS (LB:10)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
1	2
5	8
9	16
13	23
17	31
22	40

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	10000	mm
L_L (Longitud libre barra R38)	10500	mm
E (Modulo de elasticidad barra R38)	20004	kg/mm²
A (Area nominal Barra R 38)	750	mm²

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.7	Lbs
T (Tensión prueba Barra R38)	85980.4	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262	Lbs/Plg²

P_{prueba}	2941	Lbs/Plg²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento a Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
U2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	25.0
			916	927	941	963	987				
T2	6	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			926	946	964	979	981				
V2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	27.0
			963	967	988	993	1008				
W2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	31.0
			973	987	1001	1016	1031				
Y2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	32.0
			827	848	863	868	886				
X2	6	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			928	946	966	968	981				
Z2	6	R38	120	602	1203	1805	2407	20.0	48.0	28.0	30.0
			960	968	981	988	1008				
AB2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	28.0
			816	829	842	864	869				

$$\delta_i = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Libero Arias R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO GESTIÓN PREDIAL SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO) DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACION ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACION VISIÓN 2030

LOCALIZACION: **TALUD K6+800**

FECHA: **SEPTIEMBRE 24 2025**

Supervisor/Residente Contratista: **MARIO NAM**

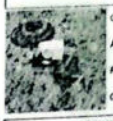
Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: **WILLIAN MANRIQUE**

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

LONGITUD DE ANCLAJE: 20 50 MTS (LB 10)

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29 24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

DEFORMACION ANCLAJE O VARILLA

$\delta = \frac{T * L}{E * A}$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	10000	mm
L_L (Longitud libre barra R38)	10500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500 *	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
1	2
5	8
9	16
13	23
17	31
22	40

PRESION BOMBA

$P = \frac{T}{Ag}$

T (Tensión trabajo Barras R38)	66138 73	Lbs
T (Tensión prueba Barra R38)	85980 35	Lbs
Ag (Area gato)	29 24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²

P_{prueba}	2941	Lbs/Plg²

LECTURA PARA TENSION DE PRUEBA

Anclaje No		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
J2	2	R38	113	565	1131	1696	2262	20 0	47 0	27 0	30 0
			945	959	972	986	1002				
H2	3	R38	113	565	1131	1696	2262	20 0	46 0	26 0	27 0
			828	840	854	870	881				
I2	3	R38	113	565	1131	1696	2262	20 0	45 0	25 0	27 0
			953	967	980	993	1005				
I2	4	R38	113	565	1131	1696	2262	20 0	47 0	27 0	31 0
			973	987	1001	1016	1031				
K2	3	R38	113	565	1131	1696	2262	20 0	47 0	27 0	30 0
			948	962	978	990	1005				
K2	4	R38	113	565	1131	1696	2262	20 0	46 0	26 0	28 0
			828	839	854	867	882				
L2	3	R38	113	565	1131	1696	2262	20 0	48 0	28 0	30 0
			940	958	972	985	998				
M2	4	R38	113	565	1131	1696	2262	20 0	45 0	25 0	26 0
			906	918	930	945	957				
N2	3	R38	113	565	1131	1696	2262	20 0	47 0	27 0	30 0
			837	849	865	880	894				
K2	2	R38	113	565	1131	1696	2262	20 0	47 0	27 0	31 0
			849	862	878	892	907				
O2	6	R38	113	565	1131	1696	2262	20 0	48 0	28 0	30 0
			908	920	936	948	964				
M2	2	R38	113	565	1131	1696	2262	20 0	45 0	25 0	31 0
			922	938	950	961	976				
I2	5	R38	113	565	1131	1696	2262	20 0	47 0	27 0	29 0
			945	958	972	988	1001				
K2	5	R38	113	565	1131	1696	2262	20 0	48 0	28 0	25 0
			960	970	985	998	1013				
M2	5	R38	113	565	1131	1696	2262	20 0	45 0	25 0	28 0
			888	898	878	891	912				
N2	4	R38	113	565	1131	1696	2262	20 0	47 0	27 0	32 0
			812	823	840	852	871				
P2	4	R38	113	565	1131	1696	2262	20 0	45 0	25 0	28 0
			849	861	876	888	902				

$\delta_l = \frac{T_{trab} * (L_E + 0.8L_L)}{A * E}$ $\delta_s = \frac{T_{trab} * (L_E + L_L + 0.5L_B)}{A * E}$

δ_l= Deformacion elastica teórica mínima [mm]

δ_s= Deformacion elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_E= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo Bo CONTRATISTA
Ing Alexis Arcos R

Vo Bo INTERVENTORIA
Ing Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327.CN.PO.05.F.00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: **TALUD 9.3**

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 09 2025

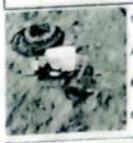
LONGITUD DE ANCLAJE: 30.50 MTS (L.B 15.00)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	3
7	12
13	23
19	34
25	45
32	58

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T	(tensión de Trabajo Barra R38)	30000	kg
T	(tensión Prueba barra R38)	39000	kg
L_B	(Longitud bulbo)	15000	mm
L_L	(Longitud libre barra R38)	15500	mm
E	(Modulo de elasticidad barra R38)	20904	kg/mm²
A	(Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
D	22	R38	113	565	1131	1696	2262	20.0	47.0	27.0	48.0
			865	877	892	918	940				
C	13	R38	113	565	1131	1696	2262	20.0	48.0	28.0	45.0
			975	985	1001	1021	1048				
C	15	R38	113	565	1131	1696	2262	20.0	47.0	27.0	50.0
			852	875	893	911	929				
D	21	R38	113	565	1131	1696	2262	20.0	48.0	28.0	40.0
			912	929	945	963	980				
D	20	R38	113	565	1131	1696	2262	20.0	47.0	27.0	38.0
			875	893	910	926	940				
D	19	R38	113	565	1131	1696	2262	20.0	46.0	26.0	42.0
			902	920	941	955	970				
D	18	R38	113	565	1131	1696	2262	20.0	48.0	28.0	47.0
			955	972	990	1008	1030				
D	17	R38	113	565	1131	1696	2262	20.0	47.0	27.0	45.0
			915	930	950	963	987				
D	16	R38	113	565	1131	1696	2262	20.0	45.0	25.0	48.0
			829	842	863	883	902				
D	15	R38	113	565	1131	1696	2262	20.0	46.0	26.0	51.0
			901	918	940	960	978				
D	14	R38	113	565	1131	1696	2262	20.0	47.0	27.0	53.0
			945	962	982	1003	1025				

PRESION BOMBA

$$P = \frac{T}{4g}$$

T	(Tensión trabajo Barras R38)	66138.7 Lbs
T	(Tensión prueba Barra R38)	85980.4 Lbs
Ag	(Area gato)	29.24 Plg²

$P_{trabajo}$	2262 Lbs/Plg²	P_{prueba}	2941 Lbs/Plg²

$$\delta_i = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327.CN.PO-05-F.00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: **TALUD 8,3**

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 10 2025

LONGITUD DE ANCLAJE: 30.50 MTS (LB 15.00)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Area Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	3
7	12
13	23
19	34
25	45
32	58

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	15000	mm
L_L (Longitud libre barra R38)	15500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

PRESION BOMBA

$$P = \frac{T}{A_g}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²	P_{prueba}	2941	Lbs/Plg²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
E	36	R38	113	565	1131	1696	2262	20.0	47.0	27.0	51.0
			964	978	993	1018	1042				
E	35	R38	113	565	1131	1696	2262	20.0	48.0	28.0	53.0
			965	984	1002	1020	1046				
E	34	R38	113	565	1131	1696	2262	20.0	47.0	27.0	54.0
			802	825	842	861	883				
E	33	R38	113	565	1131	1696	2262	20.0	48.0	28.0	47.0
			910	927	943	963	985				
E	32	R38	113	565	1131	1696	2262	20.0	47.0	27.0	38.0
			875	893	910	926	940				
E	31	R38	113	565	1131	1696	2262	20.0	46.0	26.0	48.0
			912	931	945	957	986				
E	30	R38	113	565	1131	1696	2262	20.0	48.0	28.0	47.0
			856	872	891	909	931				
D	13	R38	113	565	1131	1696	2262	20.0	47.0	27.0	49.0
			915	932	951	965	991				
D	12	R38	113	565	1131	1696	2262	20.0	45.0	25.0	55.0
			818	835	856	873	898				
D	11	R38	113	565	1131	1696	2262	20.0	46.0	26.0	52.0
			902	919	942	963	980				
E	27	R38	113	565	1131	1696	2262	20.0	47.0	27.0	53.0
			946	963	981	1003	1026				
E	28	R38	113	565	1131	1696	2262	20.0	48.0	28.0	51.0
			875	893	914	936	954				
E	29	R38	113	565	1131	1696	2262	20.0	47.0	27.0	50.0
			928	949	970	988	1005				

$$\delta_i = \frac{T_{trab} * (L_C + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_C + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_C= Longitud del gato [mm]

OBSERVACIONES

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Albero Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Revisor

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO: CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: **TALUD 9,3** TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 11 2025 LONGITUD DE ANCLAJE: 30 50 MTS (LB 15.00)

Supervisor/Residente Contratista: MARIO NAN

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	3
7	12
13	23
19	34
25	45
32	58

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T	(tensión de Trabajo Barra R38)	30000	kg
T	(tensión Prueba barra R38)	39000	kg
L_B	(Longitud bulbo)	15000	mm
L_L	(Longitud libre barra R38)	15500	mm
E	(Modulo de elasticidad barra R38)	20904	kg/mm²
A	(Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Puntonamiento Inicial (mm)	Puntonamiento Final (mm)	Puntonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
F	42	R38	113	565	1131	1696	2262	20.0	47.0	27.0	50.0
			866	877	896	918	943				
F	41	R38	113	565	1131	1696	2262	20.0	48.0	28.0	52.0
			935	955	976	997	1015				
F	40	R38	113	565	1131	1696	2262	20.0	47.0	27.0	54.0
			813	832	853	875	894				
F	39	R38	113	565	1131	1696	2262	20.0	48.0	28.0	46.0
			912	930	948	967	986				
F	38	R38	113	565	1131	1696	2262	20.0	47.0	27.0	51.0
			874	896	914	933	952				
F	37	R38	113	565	1131	1696	2262	20.0	46.0	26.0	48.0
			912	931	945	957	986				
F	36	R38	113	565	1131	1696	2262	20.0	48.0	28.0	55.0
			965	986	1006	1025	1048				
F	35	R38	113	565	1131	1696	2262	20.0	47.0	27.0	54.0
			816	837	858	877	897				
F	29	R38	113	565	1131	1696	2262	20.0	45.0	25.0	52.0
			820	838	858	880	897				
F	30	R38	113	565	1131	1696	2262	20.0	46.0	26.0	52.0
			902	919	942	963	980				
F	43	R38	113	565	1131	1696	2262	20.0	47.0	27.0	50.0
			845	862	882	1005	1022				
F	44	R38	113	565	1131	1696	2262	20.0	48.0	28.0	50.0
			874	892	915	936	952				
F	33	R38	113	565	1131	1696	2262	20.0	47.0	27.0	54.0
			826	846	867	889	907				
F	32	R38	113	565	1131	1696	2262	20.0	45.0	25.0	55.0
			917	938	957	978	997				
F	31	R38	113	565	1131	1696	2262	20.0	47.0	27.0	55.0
			908	927	948	970	990				
F	30	R38	113	565	1131	1696	2262	20.0	48.0	28.0	50.0
			837	858	880	899	915				
E	38	R38	113	565	1131	1696	2262	20.0	47.0	27.0	54.0
			968	990	1009	1028	1050				
E	37	R38	113	565	1131	1696	2262	20.0	47.0	27.0	54.0
			964	984	1002	1025	1045				
F	34	R38	113	565	1131	1696	2262	20.0	47.0	27.0	50.0
			928	948	970	988	1005				

PRESION BOMBA

$$P = \frac{T}{A_g}$$

T	(Tensión trabajo Barras R38)	66138.73	Lbs
T	(Tensión prueba Barra R38)	85980.35	Lbs
Ag	(Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²	P_{prueba}	2941	Lbs/Plg²

$$\delta_i = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAN

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

REVISOY

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PG-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: **TALUD 9.2** TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 13 2025 LONGITUD DE ANCLAJE: 30.50 MTS (8.8 15.00)

Supervisor/Residente Consotoria: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Area Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi mm (mm)	δe max (mm)
2	3
7	12
13	23
19	34
25	45
32	58

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	15000	mm
L_L (Longitud libre barra R38)	15500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diametro de Barra	Presion manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
C	7	R38	113	565	1131	1696	2262	0.0	0.0	0.0	49.0
			913	922	935	950	962				
C	3	R38	113	565	1131	1696	2262	0.0	0.0	0.0	54.0
			955	967	978	989	1009				
AD	2	R38	113	565	1131	1696	2262	0.0	0.0	0.0	51.0
			826	838	851	865	877				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²	P_{prueba}	2941	Lbs/Plg²

$$\delta_i = \frac{T_{trab} * (L_C + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_C + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-08
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8

FECHA: Septiembre 16 2025

Supervisor Residente Contratista: MARIO NAM

Supervisor Residente Interventoria:

Supervisor Residente de Tensionamiento: WILLIAN MANRIQUE

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

LONGITUD DE ANCLAJE: 25 50 MTS (LB 12 50)

ESPECIFICACIONES DEL EQUIPO



Gato	MILLTITORON	
Área Efectiva	29.24	Pig²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20004	kg/mm²
A (Area nominal Barra R38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manometro (PSI)-Elongacion en mm					Puntonamiento Inicial (mm)	Puntonamiento Final (mm)	Puntonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
J	46	R38	113	565	1131	1696	2262	20.0	47.0	27.0	36.0
			868	881	900	916	931				
J	47	R38	113	565	1131	1696	2262	20.0	46.0	26.0	33.0
			918	930	942	960	977				
J	48	R38	113	565	1131	1696	2262	20.0	46.0	26.0	32.0
			874	891	901	916	934				
J	49	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			932	946	960	974	990				
J	50	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			875	903	906	922	937				
J	51	R38	113	565	1131	1696	2262	20.0	47.0	27.0	33.0
			982	996	1013	1028	1042				
J	52	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			939	951	965	979	995				
J	53	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			968	981	997	1012	1027				
J	54	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			882	908	926	939	964				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Pig²

$P_{trabajo}$	2262 Lbs/Pig²

P_{prueba}	2941	Lbs/Pig²

$$\delta_i = \frac{T_{trab} * (L_G + 0.5L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Area transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alvaro Arcos R

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Cadavid

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Codigo	327-CN-PO-05-F-00
		Version	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8 — TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: Septiembre 16 2025 — LONGITUD DE ANCLAJE: 25.50 MTS (L.B 12.50)

Supervisor Residente Contratista: NARIO NAN

Supervisor Residente Interventoria:

Supervisor Residente de Tensionamiento: WILLIAN NAVEIQUE

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	Δ Lmin (mm)	Δ Lmax (mm)
113	1500	5%	2	2
565	7500	25%	6	10
1131	15000	50%	11	19
1696	22500	75%	16	28
2262	30000	100%	21	38
2941	39000	130%	27	48

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

DEFORMACION ANCLAJE O VARILLA

$\delta = \frac{T * L}{E * A}$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R 38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diametro de Barra	Presión manométrica (PSI)/Elongación en mm					Puntoamiento Inicial (mm)	Puntoamiento a Final (mm)	Puntoamiento Total (mm)	Elongacion Final
FILA	N		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
I	46	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			866	866	867	815	827				
I	47	R38	113	565	1131	1696	2262	20.0	46.0	26.0	31.0
			836	834	848	862	877				
I	48	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			874	881	1001	1016	1034				
I	49	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			852	846	866	874	898				
E	25	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			875	883	906	922	937				
E	26	R38	113	565	1131	1696	2262	20.0	47.0	27.0	33.0
			862	908	1013	1028	1042				
C	24	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			836	861	865	879	895				
C	26	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			868	881	897	1012	1027				
B	26	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			862	908	925	939	954				

PRESION BOMBA

$P = \frac{T}{A_g}$

T (Tensión trabajo Barra R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$ 2262 Lbs/Plg² — P_{prueba} 2941 Lbs/Plg²

$\delta_1 = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E}$ $\delta_2 = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$

δ_1= Deformación elástica teórica mínima [mm]

δ_2= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

NARIO NAN

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327.CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8 — TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

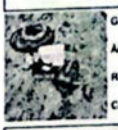
FECHA: Septiembre 17 2025 — LONGITUD DE ANCLAJE: 25.50 MTS (LB 12.50)

Supervisor Residente Contratista: MARIO NAM

Supervisor Residente Interventoria:

Supervisor Residente de Tensionamiento: WILLIAN NARIÑO

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	80	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (Kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
38000	130%

δ min (mm)	δe max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	36000	kg
L_B (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diametro de Barra	Presión manómetro (PSI)/Longitud en mm					Puntzamiento Inicial (mm)	Puntzamiento a Final (mm)	Puntzamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
E	24	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			914	938	947	962	975				
H	52	R38	113	565	1131	1696	2262	20.0	46.0	26.0	36.0
			853	868	881	894	915				
H	51	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			864	881	901	1066	1024				
I	54	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			832	946	968	974	990				
I	53	R38	113	565	1131	1696	2262	20.0	47.0	27.0	29.0
			839	861	965	979	995				
I	52	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			882	889	912	927	941				
H	50	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			838	851	965	979	995				
H	48	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			968	981	997	1012	1027				
I	51	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			961	1008	1026	1040	1053				
H	48	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			837	853	870	885	897				
G	26	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			806	1001	1020	1033	1045				
I	50	R38	113	565	1131	1696	2262	20.0	48.0	28.0	31.0
			853	865	881	894	912				
F	27	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			801	984	1009	1025	1040				
G	27	R38	113	565	1131	1696	2262	20.0	46.0	26.0	31.0
			816	829	841	855	873				
F	26	R38	113	565	1131	1696	2262	20.0	48.0	28.0	30.0
			818	831	848	865	876				
F	24		113	565	1131	1696	2262	20.0	47.0	27.0	28.0
			826	839	852	868	881				
F	25	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			968	982	996	1012	1029				

PRESION BOMBA

$$P = \frac{T}{A_g}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262	Lbs/Plg²

P_{prueba}	2941	Lbs/Plg²

$$\delta_1 = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_2 = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_1= Deformación elástica teórica mínima [mm]

δ_2= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: **TALUD 8** TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: Septiembre 18 2025 LONGITUD DE ANCLAJE: 25.50 MTS (LB 12.50)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAM MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Area Efectiva	29.24	Pig²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000 =	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δe max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_b (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diametro de Barra	Presión manometro (PSI)/Elongacion en mm					Puntzonamiento Inicial (mm)	Puntzonamiento Final (mm)	Puntzonamiento Total (mm)	Elongacion Final
FILA	N		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
A	17	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			914	936	947	962	975				
B	19	R38	113	565	1131	1696	2262	20.0	46.0	26.0	36.0
			853	868	881	904	915				
A	18	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			964	981	991	1006	1024				
D	24	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			932	946	960	974	990				
D	23	R38	113	565	1131	1696	2262	20.0	47.0	27.0	29.0
			939	951	965	979	995				
A	16	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			882	889	912	927	941				
B	18	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			938	951	965	979	995				
C	21	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			968	981	997	1012	1027				
C	22	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			991	1009	1026	1040	1053				

PRESION BOMBA

$$P = \frac{T}{A_g}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Pig²

P_{prueba}	2262 Lbs/Pig²

P_{prueba}	2941	Lbs/Pig²

$$\delta_i = \frac{T_{trab} * (L_C + 0.5L_L)}{A * E} \qquad \delta_2 = \frac{T_{trab} * (L_C + L_L + 0.5L_B)}{A * E}$$

δ_e= Deformación elástica teórica mínima [mm]

δ_e= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	18/03/2024

PROYECTO: CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: Septiembre 19 2025

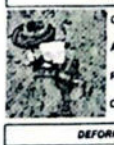
LONGITUD DE ANCLAJE: 25.50 MTS (LB 12.50)

Supervisor/Residente Contratista: MARIO NAN

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



	MULTITORON	
Gato		
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	80	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	19
16	28
21	38
27	48

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diametro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
I	55	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			911	926	944	956	969				
I	56	R38	113	565	1131	1696	2262	20.0	46.0	26.0	32.0
			860	870	890	906	918				
I	57	R38	113	565	1131	1696	2262	20.0	48.0	28.0	30.0
			952	970	980	1005	1018				
A	23	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			971	986	1001	1017	1032				
B	25	R38	113	565	1131	1696	2262	20.0	48.0	28.0	34.0
			872	886	903	919	934				
B	24	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			983	998	1012	1028	1042				
A	22	R38	113	565	1131	1696	2262	20.0	48.0	28.0	34.0
			928	942	958	976	990				
B	23	R38	113	565	1131	1696	2262	20.0	47.0	27.0	36.0
			852	865	880	893	915				
A	21	R38	113	565	1131	1696	2262	20.0	48.0	28.0	34.0
			922	938	952	972	984				
A	19	R38	113	565	1131	1696	2262	20.0	47.0	27.0	37.0
			826	842	860	876	890				
B	21	R38	113	565	1131	1696	2262	20.0	48.0	28.0	31.0
			938	951	967	982	997				
A	20	R38	113	565	1131	1696	2262	20.0	46.0	26.0	35.0
			858	873	894	909	920				
B	22	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			957	970	986	1001	1017				
B	26	R38	113	565	1131	1696	2262	20.0	47.0	27.0	33.0
			939	957	978	986	999				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²

P_{prueba}	2941	Lbs/Plg²

$$\delta_i = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAN

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8 — TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: Septiembre 19 2025 — LONGITUD DE ANCLAJE: 25.50 MTS (LB 12.50)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAM MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
113	1500	5%	2	2
565	7500	25%	6	10
1131	15000	50%	11	19
1696	22500	75%	16	28
2262	30000	100%	21	38
2941	39000	130%	27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T \cdot L}{E \cdot A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No. FILA	N.	Diametro de Barra	Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)	Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
			Presión manómetro (PSI)/Elongacion en mm								
B	17	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			812	827	845	859	870				
D	22	R38	113	565	1131	1696	2262	20.0	46.0	26.0	29.0
			961	976	991	1007	1016				
F	23	R38	113	565	1131	1696	2262	20.0	48.0	28.0	30.0
			952	970	980	1005	1010				
G	25	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			952	966	981	994	1010				

PRESION BOMBA

$$P = \frac{T}{A_g}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²

P_{prueba}	2941	Lbs/Plg²

$$\delta_l = \frac{T_{trab} \cdot (L_G + 0.8 L_L)}{A \cdot E} \qquad \delta_s = \frac{T_{trab} \cdot (L_G + L_L + 0.5 L_B)}{A \cdot E}$$

δ_l = Deformación elástica teórica mínima [mm]

δ_s = Deformación elástica teórica máxima [mm]

A = Área transversal de la barra [mm²]

E = Módulo de elasticidad acero de la barra [kg/mm²]

L_L = Longitud libre del anclaje [mm]

L_B = Longitud del bulbo del anclaje [mm]

L_G = Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo Bo CONTRATISTA
Ing. Alberto Arcos R.

Vo Bo INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD K6+800

TIPO DE ANCLAJE ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 22 2025

LONGITUD DE ANCLAJE 20 50 MTS (LB 10)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29 24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
1	2
5	8
9	16
13	23
17	31
22	40

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	10000	mm
L_L (Longitud libre barra R38)	10500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
H2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	25.0
			816	828	840	854	868				
I2	6	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			928	940	954	970	981				
K2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	25.0
			854	866	879	891	904				
M2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	27.0
			976	988	1002	1016	1030				
H2	5	R38	120	602	1203	1805	2407	20.0	47.0	27.0	27.0
			816	828	840	855	870				
H2	4	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			928	940	955	968	981				
L2	5	R38	120	602	1203	1805	2407	20.0	48.0	28.0	28.0
			851	867	880	895	907				
N2	5	R38	120	602	1203	1805	2407	20.0	45.0	25.0	27.0
			918	930	945	957	970				
Q2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	32.0
			827	840	852	870	886				
O2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	29.0
			947	960	978	991	1003				
P2	5	R38	120	602	1203	1805	2407	20.0	46.0	26.0	32.0
			816	830	842	860	874				
S2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	31.0
			922	938	950	961	978				
R2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	26.0
			954	968	981	995	1007				
AC2	6	R38	120	602	1203	1805	2407	20.0	48.0	28.0	25.0
			959	971	986	998	1012				
AD2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	28.0
			849	861	876	889	902				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138 7	Lbs
T (Tensión prueba Barra R38)	85980 4	Lbs
Ag (Area gato)	29 24	Plg²

$P_{trabajo}$	### Lbs/Plg²	P_{prueba}	2941	Lbs/Plg²

$$\delta_i = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δs= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

TK6+800

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-08
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD K6+800

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 23 2025

LONGITUD DE ANCLAJE: 20 50 MTS (L8:10)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
1	2
5	8
9	16
13	23
17	31
22	40

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	10000	mm
L_L (Longitud libre barra R38)	10500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
U2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	25.0
			915	927	941	953	967				
T2	6	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			928	940	954	970	981				
V2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	27.0
			963	987	980	993	1006				
W2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	31.0
			973	987	1001	1016	1031				
Y2	6	R38	120	602	1203	1805	2407	20.0	47.0	27.0	32.0
			827	840	853	868	886				
X2	6	R38	120	602	1203	1805	2407	20.0	46.0	26.0	27.0
			928	940	956	968	981				
Z2	6	R38	120	602	1203	1805	2407	20.0	48.0	28.0	30.0
			960	968	981	986	1008				
AB2	6	R38	120	602	1203	1805	2407	20.0	45.0	25.0	28.0
			916	929	942	954	969				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.7	Lbs
T (Tensión prueba Barra R38)	85980.4	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	### Lbs/Plg²

P_{prueba}	2941	Lbs/Plg²

$$\delta_l = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD K6+800

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 24 2025

LONGITUD DE ANCLAJE: 20 50 MTS (LB 10)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

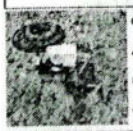
Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500 *	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
1	2
5	8
9	16
13	23
17	31
22	40

LECTURA PARA TENSION DE PRUEBA

Anclaje No		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
J2	2	R38	113	565	1131	1696	2262	20.0	47.0	27.0	30.0
			945	959	972	986	1002				
H2	3	R38	113	565	1131	1696	2262	20.0	46.0	26.0	27.0
			928	940	954	970	981				
I2	3	R38	113	565	1131	1696	2262	20.0	45.0	25.0	27.0
			953	967	980	993	1005				
I2	4	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			973	987	1001	1016	1031				
K2	3	R38	113	565	1131	1696	2262	20.0	47.0	27.0	30.0
			948	962	978	990	1005				
K2	4	R38	113	565	1131	1696	2262	20.0	46.0	26.0	28.0
			828	839	854	867	882				
L2	3	R38	113	565	1131	1696	2262	20.0	48.0	28.0	30.0
			940	958	972	985	998				
M2	4	R38	113	565	1131	1696	2262	20.0	45.0	25.0	26.0
			906	918	930	945	957				
N2	3	R38	113	565	1131	1696	2262	20.0	47.0	27.0	30.0
			837	849	865	880	894				
K2	2	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			849	862	878	892	907				
O2	5	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			808	820	835	849	864				
M2	2	R38	113	565	1131	1696	2262	20.0	45.0	25.0	31.0
			922	938	950	961	978				
I2	5	R38	113	565	1131	1696	2262	20.0	47.0	27.0	29.0
			945	958	972	988	1001				
K2	5	R38	113	565	1131	1696	2262	20.0	48.0	28.0	25.0
			960	970	985	999	1013				
M2	5	R38	113	565	1131	1696	2262	20.0	45.0	25.0	28.0
			869	885	879	891	912				
N2	4	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			812	825	840	852	871				
P2	4	R38	113	565	1131	1696	2262	20.0	45.0	25.0	28.0
			849	861	876	889	902				

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	10000	mm
L_L (Longitud libre barra R38)	10500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²	P_{prueba}	2941	Lbs/Plg²

$$\delta_l = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_l= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo Bo CONTRATISTA
Ing. Alberto Arcos R.

Vo Bo INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD B.3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: SEPTIEMBRE 09 2025

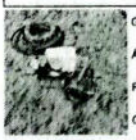
LONGITUD DE ANCLAJE: 30.50 MTS (LB 15.00)

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
2	3
7	12
13	23
19	34
25	45
32	58

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	15000	mm
L_L (Longitud libre barra R38)	15500	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
D	22	R38	113	565	1131	1696	2262	20.0	47.0	27.0	48.0
			865	877	892	916	940				
C	13	R38	113	565	1131	1696	2262	20.0	48.0	28.0	45.0
			975	985	1001	1021	1048				
C	15	R38	113	565	1131	1696	2262	20.0	47.0	27.0	50.0
			852	875	893	911	929				
D	21	R38	113	565	1131	1696	2262	20.0	48.0	28.0	40.0
			912	929	945	963	980				
D	20	R38	113	565	1131	1696	2262	20.0	47.0	27.0	38.0
			875	893	910	926	940				
D	19	R38	113	565	1131	1696	2262	20.0	46.0	26.0	42.0
			902	920	941	955	970				
D	18	R38	113	565	1131	1696	2262	20.0	48.0	28.0	47.0
			955	972	990	1008	1030				
D	17	R38	113	565	1131	1696	2262	20.0	47.0	27.0	45.0
			915	930	950	963	987				
D	16	R38	113	565	1131	1696	2262	20.0	45.0	25.0	48.0
			829	842	863	883	902				
D	15	R38	113	565	1131	1696	2262	20.0	46.0	26.0	51.0
			901	918	940	960	978				
D	14	R38	113	565	1131	1696	2262	20.0	47.0	27.0	53.0
			945	962	982	1003	1025				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.7	Lbs
T (Tensión prueba Barra R38)	85980.4	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²	P_{prueba}	2941	Lbs/Plg²

$$\delta_l = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_l= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

6

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 9.2

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

LONGITUD DE ANCLAJE: 30.50 MTS (LB 15.00)

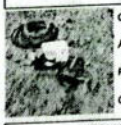
FECHA: SEPTIEMBRE 13 2025

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	15000	mm
L_L (Longitud libre barra R38)	15500	mm
E (Modulo de elesticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	3
7	12
13	23
19	34
25	45
32	58

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$ 2262 Lbs/Plg²

P_{prueba} 2941 Lbs/Plg²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
C	7	R38	113	565	1131	1696	2262	0.0	0.0	0.0	49.0
			913	922	935	950	962				
C	3	R38	113	565	1131	1696	2262	0.0	0.0	0.0	54.0
			955	967	978	989	1009				
AD	2	R38	113	565	1131	1696	2262	0.0	0.0	0.0	51.0
			826	839	851	865	877				

$$\delta_i = \frac{T_{trab} * (L_C + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_C + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elesticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F 00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: Septiembre 18 2025

LONGITUD DE ANCLAJE: 25 50 MTS (LB 12.50)

Supervisor/Residente Contratista: MARIO NAVI

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Pig²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T	(tensión de Trabajo Barra R38)	30000	kg
T	(tensión Prueba barra R38)	39000	kg
L_B	(Longitud bulbo)	12500	mm
L_L	(Longitud libre barra R38)	13000	mm
E	(Modulo de elasticidad barra R38)	20904	kg/mm²
A	(Area nominal Barra R38)	750	mm²

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T	(Tensión trabajo Barras R38)	66138.73	Lbs
T	(Tensión prueba Barra R38)	85980.35	Lbs
Ag	(Area gato)	29.24	Pig²

$P_{trabajo}$ 2262 Lbs/Pig² | P_{prueba} 2941 Lbs/Pig²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
J	46	R38	113	565	1131	1696	2262	20.0	47.0	27.0	36.0
			868	881	900	915	931				
J	47	R38	113	565	1131	1696	2262	20.0	46.0	26.0	33.0
			918	930	942	960	977				
J	48	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			874	891	901	916	934				
J	49	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			932	948	960	974	990				
J	50	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			875	883	906	922	937				
J	51	R38	113	565	1131	1696	2262	20.0	47.0	27.0	33.0
			982	998	1013	1028	1042				
J	52	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			938	951	966	979	995				
J	53	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			966	981	997	1012	1027				
J	54	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			892	908	925	939	954				

$$\delta_l = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_l= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAVI

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Cadavon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

LONGITUD DE ANCLAJE: 25.50 MTS (LB 12.50)

FECHA: Septiembre 16 2025

Supervisor/Residente Contratista: Mario Nan

Supervisor/Residente Interventoría:

Supervisor/Residente de Tensionamiento: Willan Manrique

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Area Efectiva	29.24	Pig²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T	(tensión de Trabajo Barra R38)	30000	kg
T	(tensión Prueba barra R38)	39000	kg
L_B	(Longitud bulbo)	12500	mm
L_L	(Longitud libre barra R38)	13000	mm
E	(Modulo de elasticidad barra R38)	20904	kg/mm²
A	(Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
I	46	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			866	880	887	915	927				
I	47	R38	113	565	1131	1696	2262	20.0	46.0	26.0	31.0
			920	934	948	962	977				
I	48	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			974	991	1001	1016	1034				
I	49	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			932	946	960	974	990				
E	25	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			876	883	906	922	937				
E	26	R38	113	565	1131	1696	2262	20.0	47.0	27.0	33.0
			982	998	1013	1028	1042				
C	24	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			939	951	965	979	995				
C	26	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			968	981	997	1012	1027				
B	26	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			882	908	925	939	954				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T	(Tensión trabajo Barras R38)	66138.73	Lbs
T	(Tensión prueba Barra R38)	85980.35	Lbs
Ag	(Area gato)	29.24	Pig²

$P_{trabajo}$	2262 Lbs/Pig²

P_{prueba}	2941	Lbs/Pig²

$$\delta_i = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Mario Nan

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: **TALUD 8**

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

LONGITUD DE ANCLAJE: 25.50 MTS (LB 12.50)

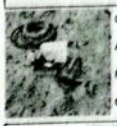
FECHA: Septiembre 17 2025

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoría:

Supervisor/Residente de Tensionamiento: WILLIAN NARIÑO

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Pig²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T	(tensión de Trabajo Barra R38)	30000	kg
T	(tensión Prueba barra R38)	39000	kg
L_B	(Longitud bulbo)	12500	mm
L_L	(Longitud libre barra R38)	13000	mm
E	(Modulo de elasticidad barra R38)	20904	kg/mm²
A	(Area nominal Barra R-38)	750	mm²

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T	(Tensión trabajo Barras R38)	66138.73	Lbs
T	(Tensión prueba Barra R38)	85980.35	Lbs
Ag	(Area gato)	29.24	Pig²

$P_{trabajo}$ 2262 Lbs/Pig² | P_{prueba} 2941 Lbs/Pig²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
E	24	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			914	930	947	962	975				
H	52	R38	113	565	1131	1696	2262	20.0	46.0	26.0	36.0
			853	868	891	904	915				
H	51	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			964	981	991	1006	1024				
I	54	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			932	946	960	974	990				
I	53	R38	113	565	1131	1696	2262	20.0	47.0	27.0	29.0
			939	951	965	979	995				
I	52	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			882	889	912	927	941				
H	50	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			939	951	965	979	995				
H	49	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			968	981	997	1012	1027				
I	51	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			961	1009	1026	1040	1053				
H	48	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			837	853	870	885	897				
G	26	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			986	1001	1020	1033	1045				
I	50	R38	113	565	1131	1696	2262	20.0	48.0	28.0	31.0
			853	866	881	894	912				
F	27	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			981	994	1009	1025	1040				
G	27	R38	113	565	1131	1696	2262	20.0	46.0	26.0	31.0
			816	829	841	855	873				
F	26	R38	113	565	1131	1696	2262	20.0	48.0	28.0	30.0
			918	931	948	965	976				
F	24		113	565	1131	1696	2262	20.0	47.0	27.0	28.0
			926	939	952	968	981				
F	25	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			968	982	998	1013	1029				

$$\delta_i = \frac{T_{trab} * (L_C + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_C + L_L + 0.5L_B)}{A * E}$$

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alvaro Arcos H.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

10

TB-37

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO: CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

LONGITUD DE ANCLAJE: 25.50 MTS (LB:12.50)

FECHA: Septiembre 18 2025

Supervisor/Residente Contratista: MARIO NAM

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento : WILLIAM MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diametro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
A	17	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			914	930	947	962	975				
B	19	R38	113	565	1131	1696	2262	20.0	46.0	26.0	36.0
			853	868	891	904	915				
A	18	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			964	981	991	1006	1024				
D	24	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			932	946	960	974	990				
D	23	R38	113	565	1131	1696	2262	20.0	47.0	27.0	29.0
			939	951	965	979	995				
A	16	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			882	889	912	927	941				
B	18	R38	113	565	1131	1696	2262	20.0	46.0	26.0	30.0
			939	951	965	979	995				
C	21	R38	113	565	1131	1696	2262	20.0	45.0	25.0	34.0
			968	981	997	1012	1027				
C	22	R38	113	565	1131	1696	2262	20.0	47.0	27.0	35.0
			991	1009	1026	1040	1053				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$	2262 Lbs/Plg²	P_{prueba}	2941 Lbs/Plg²

$$\delta_l = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_l= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NAM

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

10

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PUBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 8

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: Septiembre 19 2025

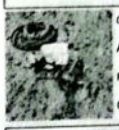
LONGITUD DE ANCLAJE: 25.50 MTS (L.B 12.50)

Supervisor/Residente Contratista: MARIO NATI

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento: WILLIAN MANRIQUE

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	29.24	Plg²
Recorrido	200	mm
Capacidad	90	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
113
565
1131
1696
2262
2941

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
2	2
6	10
11	19
16	28
21	38
27	49

DEFORMACION ANCLAJE O VAPILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	12500	mm
L_L (Longitud libre barra R38)	13000	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Long Inicial (mm) 5%	Long 1 (mm)	Long 2 (mm)	Long 3 (mm)	Long 4 (mm)				
I	55	R38	113	565	1131	1696	2262	20.0	47.0	27.0	31.0
			911	926	944	958	969				
I	56	R38	113	565	1131	1696	2262	20.0	46.0	26.0	32.0
			860	870	890	906	918				
I	57	R38	113	565	1131	1696	2262	20.0	48.0	28.0	30.0
			952	970	980	1005	1010				
A	23	R38	113	565	1131	1696	2262	20.0	47.0	27.0	34.0
			971	986	1001	1017	1032				
B	25	R38	113	565	1131	1696	2262	20.0	48.0	28.0	34.0
			872	886	903	919	934				
B	24	R38	113	565	1131	1696	2262	20.0	47.0	27.0	32.0
			983	998	1012	1028	1042				
A	22	R38	113	565	113'	1696	2262	20.0	48.0	28.0	34.0
			928	942	958	976	990				
B	23	R38	113	565	1131	1696	2262	20.0	47.0	27.0	36.0
			852	865	880	893	915				
A	21	R38	113	565	1131	1696	2262	20.0	48.0	28.0	34.0
			922	938	952	972	984				
A	19	R38	113	565	1131	1696	2262	20.0	47.0	27.0	37.0
			826	842	860	876	890				
B	21	R38	113	565	1131	1696	2262	20.0	48.0	28.0	31.0
			938	951	967	982	997				
A	20	R38	113	565	1131	1696	2262	20.0	46.0	26.0	35.0
			859	873	894	909	920				
B	22	R38	113	565	1131	1696	2262	20.0	48.0	28.0	32.0
			957	970	986	1001	1017				
B	26	R38	113	565	1131	1696	2262	20.0	47.0	27.0	33.0
			939	957	970	986	999				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138.73	Lbs
T (Tensión prueba Barra R38)	85980.35	Lbs
Ag (Area gato)	29.24	Plg²

$P_{trabajo}$ 2262 Lbs/Plg²

P_{prueba} 2941 Lbs/Plg²

$$\delta_l = \frac{T_{trab} * (L_G + 0.8L_L)}{A * E} \qquad \delta_s = \frac{T_{trab} * (L_G + L_L + 0.5L_B)}{A * E}$$

δ_l= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

MARIO NATI

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

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Consorcio San Francisco

CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS

Codigo	327-CIV-PO-05-F-00
Versión	1
Fecha	19/03/2024

PROYECTO: CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA L LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: FALLO 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 11 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

$$\delta = \frac{T * L}{E * A}$$

DEFORMACION ANCLAJE O VARILLA

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
A	1	R38	120	602	1203	1805	2407	67,0	124,0	57,0	32,0
			20	20	32	105	109				
A	2	R38	120	602	1203	1805	2407	60,0	140,0	80,0	22,0
			15	41	10	110	117				
B	1	R38	120	602	1203	1805	2407	60,0	120,0	60,0	38,0
			16	53	110	112	114				
B	2	R38	120	602	1203	1805	2407	60,0	130,0	70,0	21,0
			20	31	53	75	111				
B	3	R38	120	602	1203	1805	2407	60,0	120,0	60,0	23,0
			30	34	53	87	113				
	4	R38	120	602	1203	1805	2407	60,0	100,0	40,0	32,0
			43	60	85	105	115				

$$P = \frac{T}{Ag}$$

PRESION BOMBA

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg

$P_{trabajo}$	2407 Lbs/Plg²

P_{prueba}	3129	Lbs/

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

CSF

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 12 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_s (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
C	8	R38	120	602	1203	1805	2407	60,0	100,0	40,0	23,0
			37	68	70	93	100				
C	7	R38	120	602	1203	1805	2407	60,0	130,0	70,0	32,0
			10	31	68	110	112				
C	6	R38	120	602	1203	1805	2407	60,0	127,0	67,0	23,0
			12	73	77	86	102				
C	5	R38	120	602	1203	1805	2407	60,0	119,0	59,0	22,0
			20	37	61	88	101				
C	4	R38	120	602	1203	1805	2407	60,0	95,0	35,0	21,0
			12	30	48	57	68				
C	3	R38	120	602	1203	1805	2407	60,0	101,0	41,0	26,0
			22	35	50	73	89				
C	2	R38	120	602	1203	1805	2407	60,0	103,0	43,0	29,0
			12	23	33	61	84				
C	1	R38	120	602	1203	1805	2407	60,0	108,0	48,0	31,0
			12	22	32	65	91				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²

P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_s= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

CSF

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-2

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 15 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

$$\delta = \frac{T * L}{E * A}$$

DEFORMACION ANCLAJE O VARILLA

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
C	9	R38	120	602	1203	1805	2407	60,0	130,0	70,0	24,0
			21	42	50	88	115				
B	5	R38	120	602	1203	1805	2407	60,0	144,0	84,0	21,0
			11	37	77	110	116				

$$P = \frac{T}{Ag}$$

PRESION BOMBA

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_l= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

CSF

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 16 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δi min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
B	6	R38	120	602	1203	1805	2407	60,0	139,0	79,0	21,0
			12	33	60	96	112				
B	7	R38	120	602	1203	1805	2407	52,0	112,0	60,0	24,0
			31	43	68	110	115				
B	8	R38	120	602	1203	1805	2407	50,0	123,0	73,0	21,0
			18	54	70	85	110				
B	9	R38	120	602	1203	1805	2407	65,0	136,0	71,0	32,0
			12	28	33	55	115				
B	11	R38	120	602	1203	1805	2407	65,0	143,0	78,0	23,0
			14	56	80	108	115				
B	12	R38	120	602	1203	1805	2407	60,0	129,0	69,0	22,0
			21	45	60	95	112				
B	13	R38	120	602	1203	1805	2407	65,0	128,0	63,0	21,0
			31	62	80	97	115				
B	14	R38	120	602	1203	1805	2407	63,0	150,0	87,0	22,0
			11	36	64	98	120				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²

P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_g= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

CSF

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-5

16

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-0
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 17 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/m
A (Area nominal Barra R-38)	750	mm

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
C	20	R38	120	602	1203	1805	2407	65,0	132,0	67,0	28,0
			18	38	50	80	113				
C	19	R38	120	602	1203	1805	2407	65,0	119,0	54,0	35,0
			23	26	37	110	112				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lb
T (Tensión prueba Barra R38)	85980,4	Lb
Ag (Area gato)	27,48	Pl

$P_{trabajo}$	2407 Lbs/Plg²

P_{prueba}	3129	Lbs

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

CSF

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3 TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 18 SEP 25 LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Pfg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

$$\delta = \frac{T * L}{E * A}$$

DEFORMACION ANCLAJE O VARILLA

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
C	10	R38	120	602	1203	1805	2407	60,0	126,0	66,0	29,0
			20	34	70	108	115				
C	11	R38	120	602	1203	1805	2407	65,0	135,0	70,0	21,0
			24	35	86	110	115				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Pfg²

$P_{trabajo}$	2407 Lbs/Pfg²	P_{prueba}	3129	Lbs/Pfg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

CSF

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-09
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3* TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 19 SEP 25 LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27.48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
C	12	R38	120	602	1203	1805	2407	60,0	102,0	42,0	23,0
			25	30	40	51	90				
C	13	R38	120	602	1203	1805	2407	60,0	130,0	70,0	21,0
			22	38	71	110	113				
C	14	R38	120	602	1203	1805	2407	75,0	135,0	60,0	22,0
			28	44	55	96	110				
C	15	R38	120	602	1203	1805	2407	60,0	112,0	52,0	23,0
			15	30	40	59	90				
C	16	R38	120	602	1203	1805	2407	60,0	127,0	67,0	30,0
			18	29	63	89	115				
C	17	R38	120	602	1203	1805	2407	60,0	135,0	75,0	23,0
			17	22	37	70	115				
C	18	R38	120	602	1203	1805	2407	65,0	148,0	83,0	21,0
			12	23	30	75	116				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27.48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_T= Deformación elástica teórica mínima [mm]

δ_S= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-7

19

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3*

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 23 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
C	21	R38	120	602	1203	1805	2407	70,0	120,0	50,0	33,0
			30	38	58	10	113				
C	22	R38	120	602	1203	1805	2407	60,0	75,0	15,0	25,0
			20	25	30	110	60				

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-8

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-GN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PAPA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 24 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13.25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27.48	Pfg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
C	23	R38	120	602	1203	1805	2407	62,0	83,0	21,0	29,0
			18	25	27	42	68				
C	24	R38	120	602	1203	1805	2407	60,0	125,0	65,0	25,0
			16	20	43	73	106				
C	25	R38	120	602	1203	1805	2407	60,0	128,0	68,0	30,0
			15	22	39	85	113				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	68138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27.48	Pfg²

$P_{trabajo}$	2407 Lbs/Pfg²

P_{prueba}	3129	Lbs/Pfg²

δ_t= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

CSF

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3 9

2

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3*

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 25 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δi min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
D	2	R38	120	602	1203	1805	2407	65,0	133,0	68,0	37,0
			15	56	11	115	120				
D	3	R38	120	602	1203	1805	2407	65,0	110,0	45,0	25,0
			15	20	30	55	85				
D	4	R38	120	602	1203	1805	2407	65,0	110,0	45,0	21,0
			25	40	45	58	91				
D	5	R38	120	602	1203	1805	2407	60,0	108,0	48,0	22,0
			18	20	30	50	88				
D	6	R38	120	602	1203	1805	2407	70,0	92,0	22,0	27,0
			20	28	44	55	69				
D	7	R38	120	602	1203	1805	2407	60,0	85,0	25,0	25,0
			35	40	50	67	85				
D	8	R38	120	602	1203	1805	2407	65,0	75,0	10,0	30,0
			20	42	44	45	60				
D	9	R38	120	602	1203	1805	2407	55,0	70,0	15,0	30,0
			20	25	30	35	65				
D	10	R38	120	602	1203	1805	2407	60,0	100,0	40,0	25,0
			25	45	54	76	90				
D	11	R38	120	602	1203	1805	2407	55,0	90,0	35,0	22,0
			18	24	39	59	75				

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arce R.

CSF

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-10

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 25 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27.48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T	(tensión de Trabajo Barra R38)	30000	kg
T	(tensión Prueba barra R38)	39000	kg
L_s	(Longitud bulbo)	13250	mm
L_L	(Longitud libre barra R38)	13250	mm
E	(Modulo de elasticidad barra R38)	20904	kg/mm²
A	(Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
D	12	R38	120	602	1203	1805	2407	55,0	102,0	47,0	22,0
			19	20	34	60	88				
D	13	R38	120	602	1203	1805	2407	55,0	71,0	16,0	26,0
			20	25	34	47	62				
E	9	R38	2407	3129	0	0	0	60,0	75,0	15,0	21,0
			14	20	24	35	50				
E	8	R38	120	602	1203	1805	2407	60,0	82,0	22,0	27,0
			12	16	25	47	61				
E	7	R38	120	602	1203	1805	2407	70,0	92,0	22,0	22,0
			16	22	28	40	60				
E	6	R38	120	602	1203	1805	2407	70,0	85,0	15,0	26,0
			19	21	26	45	60				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T	(Tensión trabajo Barras R38)	68138,7	Lbs
T	(Tensión prueba Barra R38)	85980,4	Lbs
Ag	(Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_s= Longitud del bulbo del anclaje [mm]

L_g= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arce R.

CSF

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-11

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CN-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 26 SEP 26

LONGITUD DE ANCLAJE 26,50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T	(tensión de Trabajo Barra R38)	30000	kg
T	(tensión Prueba barra R38)	39000	kg
L_s	(Longitud bulbo)	13250	mm
L_L	(Longitud libre barra R38)	13250	mm
E	(Modulo de elasticidad barra R38)	20604	kg/mm²
A	(Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
E	5	R38	120	602	1203	1805	2407	60,0	75,0	15,0	21,0
			19	22	25	32	55				
E	4	R38	120	602	1203	1805	2407	65,0	100,0	35,0	24,0
			15	29	46	56	74				
E	3	R38	120	602	1203	1805	2407	65,0	77,0	12,0	35,0
			20	25	27	35	67				
E	2	R38	120	602	1203	1805	2407	60,0	97,0	37,0	21,0
			20	31	52	60	78				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_s= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-12

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3* TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 27 SEP 25 LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30090	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
D	14	R38	120	602	1203	1805	2407	55,0	115,0	60,0	27,0
			19	28	43	75	106				
D	15	R38	120	602	1203	1805	2407	60,0	100,0	40,0	21,0
			18	18	27	40	77				
D	16	R38	120	602	1203	1805	2407	65,0	122,0	57,0	36,0
			20	31	72	97	113				
D	17	R38	120	602	1203	1805	2407	70,0	115,0	45,0	33,0
			37	43	45	88	115				
D	18	R38	120	602	1203	1805	2407	60,0	91,0	31,0	30,0
			18	23	44	55	79				
D	19	R38	120	602	1203	1805	2407	70,0	80,0	10,0	35,0
			23	36	53	39	68				
D	20	R38	120	602	1203	1805	2407	70,0	82,0	12,0	24,0
			14	21	25	38	50				
D	21	R38	120	602	1203	1805	2407	60,0	98,0	38,0	22,0
			16	27	40	62	76				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²

P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 26 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Pfg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
D	22	R38	120	602	1203	1805	2407	60,0	83,0	23,0	37,0
			19	25	43	60	79				
D	23	R38	120	602	1203	1805	2407	60,0	91,0	31,0	22,0
			16	20	37	50	69				
D	24	R38	120	602	1203	1805	2407	70,0	76,0	6,0	38,0
			15	26	34	39	59				
D	25	R38	120	602	1203	1805	2407	70,0	82,0	12,0	36,0
			13	16	23	41	61				
D	26	R38	120	602	1203	1805	2407	60,0	66,0	6,0	30,0
			24	26	35	45	60				
D	27	R38	120	602	1203	1805	2407	70,0	130,0	60,0	35,0
			20	27	55	85	115				
D	28	R38	120	602	1203	1805	2407	65,0	125,0	60,0	31,0
			18	33	56	91	109				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Pfg²

$P_{trabajo}$	2407 Lbs/Pfg²	P_{prueba}	3129	Lbs/Pfg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-14

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3*

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 29 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δl min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
D	29	R38	120	602	1203	1805	2407	64,0	125,0	61,0	36,0
			19	20	50	103	115				
D	30	R38	120	602	1203	1805	2407	60,0	95,0	35,0	34,0
			13	22	45	65	82				
D	31	R38	120	602	1203	1805	2407	60,0	100,0	40,0	26,0
			22	37	64	76	88				
D	32	R38	120	602	1203	1805	2407	60,0	70,0	10,0	21,0
			5	10	16	28	36				
D	33	R38	120	602	1203	1805	2407	60,0	91,0	31,0	23,0
			14	16	17	31	68				
D	34	R38	120	602	1203	1805	2407	60,0	79,0	19,0	24,0
			15	21	28	45	58				
E	35	R38	120	602	1203	1805	2407	70,0	111,0	41,0	34,0
			19	31	55	78	94				
E	34	R38	120	602	1203	1805	2407	60,0	113,0	53,0	30,0
			21	33	47	75	104				
E	33	R38	120	602	1203	1805	2407	65,0	75,0	10,0	35,0
			45	60	72	80	90				
E	32	R38	120	602	1203	1805	2407	65,0	128,0	63,0	21,0
			15	22	49	72	99				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_e= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORÍA
Ing. Luis Vicente Calderon

T3-15

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CSI-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3*

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 29 SEP 25

LONGITUD DE ANCLAJE 26.60 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27.48	Pfg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δl min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)-Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
E	31	R38	120	602	1203	1805	2407	75,0	87,0	12,0	37,0
			46	49	57	65	95				
E	30	R38	120	602	1203	1805	2407	60,0	62,0	2,0	33,0
			10	20	21	33	45				
E	29	R38	120	602	1203	1805	2407	60,0	98,0	38,0	21,0
			36	57	74	92	95				
E	28	R38	120	602	1203	1805	2407	65,0	110,0	45,0	25,0
			26	40	61	72	96				
E	27	R38	120	602	1203	1805	2407	65,0	126,0	61,0	23,0
			28	33	35	92	112				
E	26	R38	120	602	1203	1805	2407	62,0	133,0	71,0	26,0
			18	20	21	75	115				
E	25	R38	120	602	1203	1805	2407	62,0	103,0	41,0	23,0
			18	22	37	55	82				
E	24	R38	120	602	1203	1805	2407	60,0	92,0	32,0	37,0
			20	25	40	61	89				
E	23	R38	120	602	1203	1805	2407	65,0	78,0	13,0	29,0
			12	20	30	40	54				
E	22	R38	120	602	1203	1805	2407	63,0	104,0	41,0	32,0
			16	23	43	73	89				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Pfg²

$P_{trabajo}$	2407 Lbs/Pfg²	P_{prueba}	3129	Lbs/Pfg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-16

28

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3*

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 29 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)	Carga (kg)	% Carga	δi min (mm)	δs max (mm)
120	1500	5%	2	2
602	7500	25%	6	10
1203	15000	50%	11	20
1805	22500	75%	16	29
2407	30000	100%	21	39
3129	39000	130%	27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
E	21	R38	120	602	1203	1805	2407	70,0	86,0	17,0	21,0
			10	19	25	37	47				
E	20	R38	120	602	1203	1805	2407	80,0	120,0	40,0	33,0
			15	24	38	64	88				
E	19	R38	120	602	1203	1805	2407	65,0	90,0	25,0	35,0
			10	31	42	55	70				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85960,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

CSF

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-1

29

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3 — TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 30 SEP 25 — LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
E	18	R38	120	602	1203	1805	2407	68,0	79,0	11,0	30,0
			14	22	35	42	55				
E	17	R38	120	602	1203	1805	2407	67,0	73,0	6,0	34,0
			15	26	40	45	56				
E	16	R38	120	602	1203	1805	2407	72,0	86,0	14,0	36,0
			19	31	42	55	69				
E	15	R38	120	602	1203	1805	2407	62,0	108,0	46,0	37,0
			20	37	53	77	103				
E	14	R38	120	602	1203	1805	2407	60,0	116,0	56,0	37,0
			17	45	66	88	110				
E	13	R38	120	602	1203	1805	2407	60,0	109,0	49,0	21,0
			20	39	54	78	90				
E	12	R38	120	602	1203	1805	2407	60,0	71,0	11,0	24,0
			10	22	25	32	45				
E	11	R38	120	602	1203	1805	2407	62,0	87,0	25,0	21,0
			11	19	20	38	57				
E	10	R38	120	602	1203	1805	2407	60,0	91,0	31,0	25,0
			19	22	36	58	75				
A	5	R38	120	602	1203	1805	2407	60,0	148,0	88,0	23,0
			14	22	30	89	125				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²

P_{prueba}	3129	Lbs/Plg²

δi= Deformación elástica teórica mínima [mm]

δs= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Albeiro Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

30

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CIV-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: *TALUD 3*

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 30 SEP 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13,25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES

Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_B (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20904	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI) Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
A	4	R38	120	602	1203	1805	2407	70,0	150,0	80,0	25,0
			45	88	108	117	150				
B	10	R38	120	602	1203	1805	2407	60,0	70,0	10,0	21,0
			12	16	24	35	43				
B	15	R38	120	602	1203	1805	2407	60,0	130,0	70,0	21,0
			15	26	48	68	106				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	68138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²

P_{prueba}	3129	Lbs/Plg²

δ_i= Deformación elástica teórica mínima [mm]

δ_s= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_B= Longitud del bulbo del anclaje [mm]

L_G= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

CSF

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-19

3\

Consorcio San Francisco	CONTROL TECNICO DE ACTIVIDADES DE CONSTRUCCIÓN TENSIONAMIENTO DE ANCLAJES ACTIVOS	Código	327-CM-PO-05-F-00
		Versión	1
		Fecha	19/03/2024

PROYECTO:	CONSTRUCCIÓN, MEJORAMIENTO Y MANTENIMIENTO, GESTIÓN PREDIAL, SOCIAL Y AMBIENTAL SOSTENIBLE DE LA VARIANTE SAN FRANCISCO MOCOA TRAMO 2 (FRENTE SAN FRANCISCO), DEPARTAMENTO DE PUTUMAYO, EN MARCO DE LA REACTIVACIÓN ECONÓMICA, MEDIANTE EL PROGRAMA DE OBRA PÚBLICA "VIAS PARA LA LEGALIDAD Y REACTIVACIÓN VISIÓN 2030

LOCALIZACION: TALUD 3

TIPO DE ANCLAJE: ACTIVO CON BARRA AUTOPERFORANTE R38

FECHA: 02 OCT 25

LONGITUD DE ANCLAJE 26.50 LBULBO: 13.25 MTS

Supervisor/Residente Contratista:

Supervisor/Residente Interventoria:

Supervisor/Residente de Tensionamiento :

ESPECIFICACIONES DEL EQUIPO



Gato	MULTITORON	
Área Efectiva	27,48	Plg²
Recorrido	50	mm
Capacidad	100	Ton

CALCULO DE DEFORMACIONES



Esfuerzo (psi)
120
602
1203
1805
2407
3129

Carga (kg)	% Carga
1500	5%
7500	25%
15000	50%
22500	75%
30000	100%
39000	130%

δi min (mm)	δs max (mm)
2	2
6	10
11	20
16	29
21	39
27	50

DEFORMACION ANCLAJE O VARILLA

$$\delta = \frac{T * L}{E * A}$$

T (tensión de Trabajo Barra R38)	30000	kg
T (tensión Prueba barra R38)	39000	kg
L_s (Longitud bulbo)	13250	mm
L_L (Longitud libre barra R38)	13250	mm
E (Modulo de elasticidad barra R38)	20604	kg/mm²
A (Area nominal Barra R-38)	750	mm²

LECTURA PARA TENSION DE PRUEBA

Anclaje No.		Diámetro de Barra	Presión manómetro (PSI)/Elongacion en mm					Punzonamiento Inicial (mm)	Punzonamiento Final (mm)	Punzonamiento Total (mm)	Elongacion Final
FILA	N.		Lect Inicial (mm) 5%	Lect. 2 (25%)	Lect. 3 (50%)	Lect. 4 (75%)	Lect. 5 (100%)				
B	26	R38	120	602	1203	1805	2407	60,0	140,0	80,0	23,0
			12	20	35	75	115				
B	10	R38	120	602	1203	1805	2407	60,0	138,0	78,0	22,0
			20	60	90	90	120				

PRESION BOMBA

$$P = \frac{T}{Ag}$$

T (Tensión trabajo Barras R38)	66138,7	Lbs
T (Tensión prueba Barra R38)	85980,4	Lbs
Ag (Area gato)	27,48	Plg²

$P_{trabajo}$	2407 Lbs/Plg²	P_{prueba}	3129	Lbs/Plg²

δi= Deformación elástica teórica mínima [mm]

δs= Deformación elástica teórica máxima [mm]

A= Área transversal de la barra [mm²]

E= Módulo de elasticidad acero de la barra [kg/mm²]

L_L= Longitud libre del anclaje [mm]

L_s= Longitud del bulbo del anclaje [mm]

L_g= Longitud del gato [mm]

OBSERVACIONES:

Vo. Bo. CONTRATISTA
Ing. Alberto Arcos R.

Vo. Bo. INTERVENTORIA
Ing. Luis Vicente Calderon

T3-20

Integrity-NDT

Integrity & NDT Solutions SAS

CERTIFICADO DE CALIBRACIÓN
HB ESTRUCTURAS METÁLICAS S.A.S
EQUIPO: OMNISCAN X 3, S/N: QC-0092924
MODULO PA S/N: OMNIX3-PA1664PR

Certificamos que el equipo anteriormente mencionado ha mantenido y se ajusta a los estándares de referencia especificados en los Reportes 2504-LAP-014-Linealidad Altura de Pantalla, 2504-VLH-014-Verificación de Linealidad Horizontal y 2504-LCA-014-Linealidad Control de Amplitud.
El palpador S/N XAAB-0167 Z1674 cumple con el estándar ASTM E2491-18 según el reporte 2504-2.25L16-014 y se encuentra en estado operativo.

Certificado Número: CAL-UT-2504-014

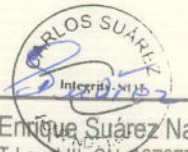
Fecha de Calibración: 07 de Abril de 2025

Fecha de expiración: 07 de Abril de 2026

Lugar de calibración: Calle 127D #56-42 Bogotá D.C.



Ing. Julián Andrés Reina
Ultrasonic Testing Level II CN: UT-II-2408-011
operativa@integrity-ndt.com



Ing. Carlos Enrique Suárez Navas
ASNT NDT Level III. CN: 187377
csuarez@integrity-ndt.com

Integrity-NDT	REPORTE DE VERIFICACIÓN DE DESEMPEÑO - PALPADOR PHASED ARRAY	PG-HSEQ-01 Rev. 0 V.02

Rev.0	CAL-UT-2504-014	Reporte No. 2504-2.25L16-014

Ubicación	Calle 127D #56-42 Bogotá D.C - Colombia	Operador:	Ing. Julián Andrés Reina

Estándar de referencia:	**ASTM E2491:2018 Evaluating Performance Characteristics of Phased-Array Ultrasonic Testing Instruments and Systems.** **Par. A.3 Determination of Phased Array Element Activity.Cumple o excede con: ASME SEC V : 2021**

Fabricante	**OLYMPUS**	Modelo	**OMNISCAN X3**
Frontal S/N.	QC-0092924	Módulo S/N.	OMNIX3-PA1664PR
Voltage (V):	40 V	Ancho del pulso:	100 ns
Frecuencia de digitalización (MHz)	100 MHz	Banda de Frecuencia:	Ninguna
Promedio A-Scan:	1	Filtro smooting:	Apagado
Desviación màxima permitida de FSH *80%:*	±2 dB	Técnica empleada:	**PHASED ARRAY**

PALPADOR	FRECUENCIA	NUMERO DE ELEMENTOS	PITCH	ELEVACION	APERTURA	SERIAL No.
2.25L16-	2.25 MHz	16	0.6	10 mm	9,6 MM	XAAB-0167 Z1674

Dimensiones externas del palpador	Largo: 23 mm, Ancho: 16 mm, Alto: 20 mm	Bloque empleado:	ASTM E317 FIG 1 BLOCK METRIC 1018 STEEL S/N 77286

Elemento No.	Ganancia (dB)	Desviación (dB)	OBSERVACIONES
1	27.2	0.10	OK
2	27.3	0.10	OK
3	27.4	0.00	OK
4	27.4	0.10	OK
5	27.3	0.00	OK
6	27.3	0.00	OK
7	27.3	0.10	OK
8	27.2	0.10	OK
9	27.3	0.00	OK
10	27.3	0.00	OK
11	27.3	0.00	OK
12	27.3	0.00	OK
13	27.3	0.00	OK
14	27.3	0.20	OK
15	27.5	0.10	OK
16	27.4	0.10	OK



Resultados: El palpador S/N: OLYMPUS 2.255L16-AWS1 NO presenta elementos fuera del rango establecido en el estandar ASTM E2491-2018 que sugiere una tolerancia del 25%.El palpador cumple con los requisitos de la norma y se encuentra operativo.

Aprobado por: Ing. Carlos Enrique Suárez Navas
ASNT NDT Level III. Cert. No. 187377
ISO 9712 Level 3. UT/PA/TOFD No. 17VE01258PO6

Fecha de emisión: 07 de Abril de 2025
Validez de la verificación: 1 año

FIRMA
Ing. Julián Andrés Reina
Ultrasonic Testing Level II
Cert. Nr. UT-II-2408-011

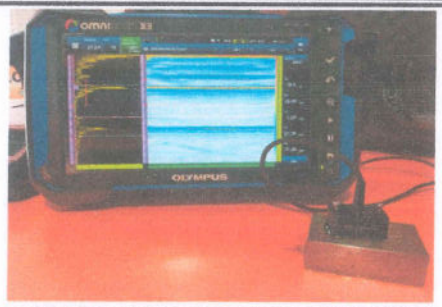
Integrity-NDT	REPORTE DE VERIFICACIÓN DE LINEALIDAD DE CONTROL DE LA AMPLITUD	PG-HSEQ-01 Rev. 0 V.02
Rev.0	CAL-UT-2504-014	Reporte No. 2504-LCA-014

Ubicación:	Calle 127D #56-42 Bogotá D.C - Colombia	Operador:	Ing. Julián Andrés Reina
Estándar de referencia:	**ASTM E2491**:2018 *Evaluating Performance Characteristics of Phased-Array Ultrasonic Testing Instruments and Systems. Par. A7.4 Amplitude Control Linearity.* Cumple o excede con: ASME B&PVC Sec V : 2021, Art 4, Apéndice Mandatorio II		

Fabricante	**OLYMPUS**	Modelo	**OMNISCAN X3**
Frontal S/N	QC-0092924	Módulo PA S/N	OMNIX3-PA1664PR
Voltage (V)	40 V	Ancho del pulso:	100 ns
Frecuencia de digitalización (MHz)	100 MHz	Banda de Frecuencia (recepción):	Ninguna
Promedio A Scan:	1	Filtro smoothing:	Apagado
Desviación máxima permitida (80 % FSH:)	±3%	Técnica empleada:	**PHASED ARRAY**
Palpador:	2.25L16 AWS1 OLYMPUS	Bloque empleado:	ASTM E317 FIG 1 BLOCK METRIC 1018 STEEL S/N 77286

LECTURAS

Amplitud inicial	40	40	40	40	100	**Resultado**
Variación en dB	+1	+2	+4	+6	-6	
Valor Nominal esperado	45	50	63	80	50	
Rango permitido	42 - 47	48 - 52	60 - 66	77 - 83	47 - 53	
Pulsador No. 1	45.4	50.6	64.1	80.3	50.1	OK
Pulsador No. 2	44.6	50.1	63.1	79.3	49.9	OK
Pulsador No. 3	45.2	50.8	62.8	80.7	50.1	OK
Pulsador No. 4	44.9	50.7	63.9	79.4	50.7	OK
Pulsador No. 5	45.0	50.8	63.8	80.1	50.1	OK
Pulsador No. 6	44.9	50.6	63.6	80.1	49.9	OK
Pulsador No. 7	44.6	50.1	63.2	79.5	50.3	OK
Pulsador No. 8	44.4	50.3	63.9	79.5	50.3	OK
Pulsador No. 9	45.2	50.6	63.3	80.1	49.9	OK
Pulsador No. 10	44.8	50.3	63.2	79.9	50.1	OK
Pulsador No. 11	44.9	50.1	63.9	79.8	50.1	OK
Pulsador No. 12	45.1	50.7	62.8	80.0	50.4	OK
Pulsador No. 13	44.5	50.3	63.8	79.3	50.1	OK
Pulsador No. 14	45.0	50.7	63.7	80.1	50.0	OK
Pulsador No. 15	45.0	50.4	62.9	80.1	50.3	OK
Pulsador No. 16	44.4	50.3	62.9	79.1	50.3	OK



Resultados: Los pulsadores cumplen con los requisitos de Linealidad en el Control de Amplitud establecidos en Parágrafo A7.4.8 de la norma ASTM E2491:2018. El equipo se encuentra operativo.

Aprobado por: Ing. Carlos Enrique Suárez Navas
ASNT NDT Level III. Cert. No. 187377
ISO 9712 Level 3. UT/PA/TOFD No. 17VE01258PO6

FIRMA

Fecha de emisión: 07 de Abril de 2025
Validez de la verificación 1 año

Ing. Julián Andrés Reina
Ultrasonic Testing Level II
Cert. Nr. UT-II-2408-011

Integrity-NDT	REPORTE DE VERIFICACIÓN DE LINEALIDAD DE ALTURA DE PANTALLA	PG-HSEQ-01 Rev. 0 V.02

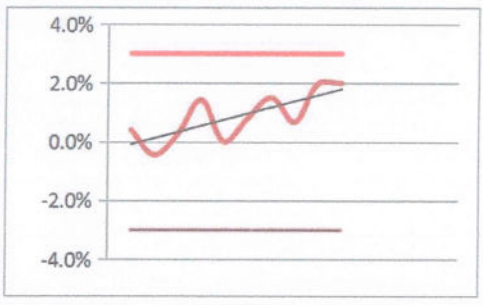
Rev.0	CAL-UT-2504-014	Reporte No. 2504-LAP-014

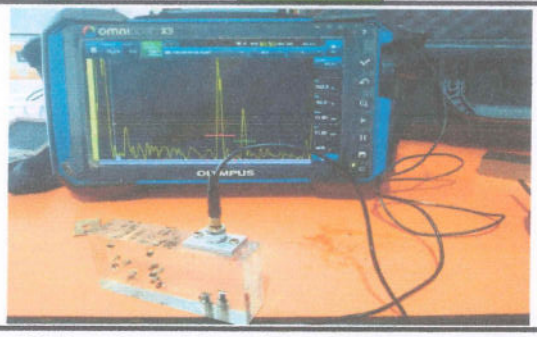
Ubicación:	Calle 127D #56-42 Bogotá D.C - Colombia	Operador:	Ing. Julián Andrés Reina
Estándar de referencia:	**ASTM E2491**:2018 *Evaluating Performance Characteristics of Phased-Array Ultrasonic Testing Instruments and Systems. Par. A7.3 Display Height Linearity .* Cumple o excede con: ASME B&PVC Sec V : 2021, art 4. Apéndice Mandatorio I		

Fabricante	**OLYMPUS**		Modelo		**OMNISCAN X3**
Frontal S/N.	QC-0092924		Módulo PA S/N.		OMNIX3-PA1664PR
Voltage (V):	85 V		Ancho del pulso:		100 ns
Frecuencia de digitalización (MHz)		100 MHz	Banda de Frecuencia (recepción):		Ninguna
Promedio A Scan		1	Filtro smoothing:		Apagado
Desviación máxima permitida:		±3%	Técnica empleada:		**UT CONVENCIONAL**
Palpador:	Panametrics 2,25 MHz 0.25"Ø S/N: 867794		Bloque empleado:	ASTM 2491 SOPORTE FIG A7.1 SN: LBI-PA-001-07K1-015	

LECTURAS

Amplitud señal Mayor	Valor Nominal señal Menor	Rango permitido Señal Menor		Amplitud medida, señal Menor	Desviación obtenida	Observaciones
100	50	48.50	51.50	50.20	0.4%	OK
90	45	43.65	46.35	44.80	-0.4%	OK
80	40	38.80	41.20	40.10	0.3%	OK
70	35	33.95	36.05	35.50	1.4%	OK
60	30	29.10	30.90	30.00	0.0%	OK
50	25	24.25	25.75	25.20	0.8%	OK
40	20	19.40	20.60	20.30	1.5%	OK
30	15	14.55	15.45	15.10	0.7%	OK
20	10	9.70	10.30	10.20	2.0%	OK
10	5	4.85	5.15	5.10	2.0%	OK





Resultados: El equipo cumple con los requisitos de Linealidad en Altura de Pantalla establecidos por ASTM E2491:2018. El equipo se encuentra operativo. Durante la estandarización, se empleó palpador convencional propiedad de Integrity NDT.

Aprobado por: Ing. Carlos Enrique Suárez Navas
ASNT NDT Level III. Cert. No. 187377
ISO 9712 Level 3. UT/PA/TOFD No. 17VE01258PO6

FIRMA

Fecha de emisión 07 de Abril de 2025
Validez de la verificación 1 año

Ing. Julián Andrés Reina
Ultrasonic Testing Level II
Cert. Nr. UT-II-2408-011

Integrity-NDT	REPORTE DE VERIFICACIÓN DE LINEALIDAD HORIZONTAL	PG-HSEQ-01 Rev. 0 V.02

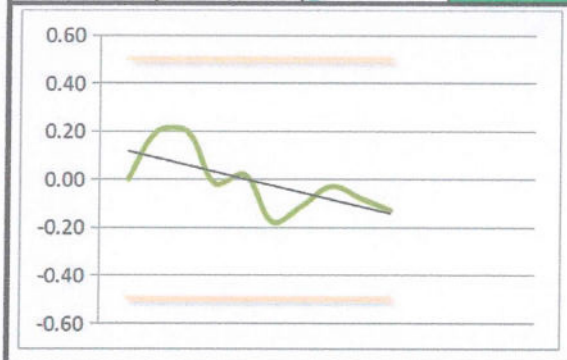
Rev.0	CAL-UT-2504-014	Reporte No. 2504-VLH-014

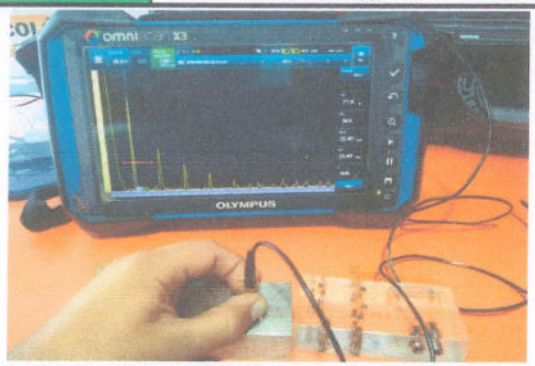
Ubicación:	Calle 127D #56-42 Bogotá D.C.	Operador:	Ing. Julián Andrés Reina
Estándar de referencia:	**ASTM E2491**:2018 *Evaluating Performance Characteristics of Phased-Array Ultrasonic Testing Instruments and Systems. Par. A7.5 Time Base Linearity.* Cumple o excede con: ASTM E317:2016		

Fabricante	**OLYMPUS**	Modelo	**OMNISCAN X3**
Frontal S/N.	QC-0092924	Módulo PA S/N.	OMNIX3-PA1664PR
Voltage (V):	85 V	Ancho del pulso:	100 ns
Frecuencia de digitalización (MHz)	100 MHz	Banda de Frecuencia (recepción):	Ninguna
Promedio A-Scan:	1	Filtro smoothing:	Apagado
Desviación máxima permitida:	±0,5 mm	Técnica empleada:	**UT CONVENCIONAL**
Palpador:	Olympus 7,5 MHz 10mm Ø S/N: 13044	Bloque empleado:	ASTM E317 FIG 1 BLOCK METRIC 1018 STEEL S/N 77286

LECTURAS

Reflexiones múltiples	Recorrido sónico real (mm)	Valor obtenido (mm)	Desviación obtenida (mm)	Observaciones
1	25.0	25.00	0.00	OK
2	50.0	50.20	0.20	OK
3	75.0	75.20	0.20	OK
4	100.0	99.98	-0.02	OK
5	125.0	125.02	0.02	OK
6	150.0	149.82	-0.18	OK
7	175.0	174.89	-0.11	OK
8	200.0	199.97	-0.03	OK
9	225.0	224.92	-0.08	OK
10	250.0	249.87	-0.13	OK





Resultados: El equipo cumple con los requisitos de Linealidad Horizontal establecidos en ASTM E2491:2018. El equipo se encuentra operativo. Durante la estandarización, se empleó palpador convencional Olympus propiedad de Metalpar

Aprobado por: Ing. Carlos Enrique Suárez Navas
ASNT NDT Level III. Cert. No. 187377
ISO 9712 Level 3. UT/PA/TOFD No. 17VE01258PO6

Fecha de emisión 07 de Abril de 2025
Validez de la verificación 1 año

FIRMA
Ing. Julián Andrés Reina
Ultrasonic Testing Level II
Cert. Nr. UT-II-2408-011

Integrity-NDT	REPORTE DE VERIFICACIÓN DE LINEALIDAD DE ALTURA DE PANTALLA	CAL-UT-2503-008 Rev. 0 No LAP 2503-008
Ubicación: Bogotá- Colombia	**Operador:** Ing. JUlián Andrés Reina	
Estándar de referencia:	Asme Sección v, Articulo 4, Apéndice mandatorio I (Screen height linearity).	

Equipo: USM/DMS GO

Numero de serie: GOPLS16050160

Linealidad del sistema: Horizontal: ± 0,5% FSW.

Voltaje: Low

Ajustes del filtro digital: Ancho de banda 1 MHz a 6 MHz.

PRF: 1500Hz

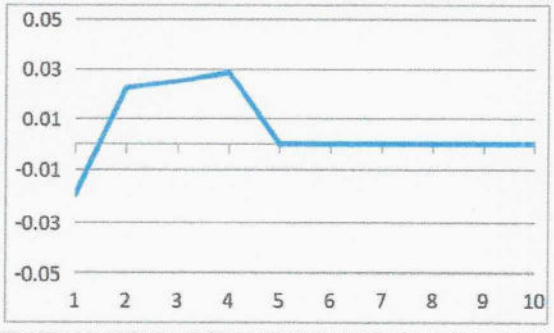
Desviación máxima permitida: ± 5%

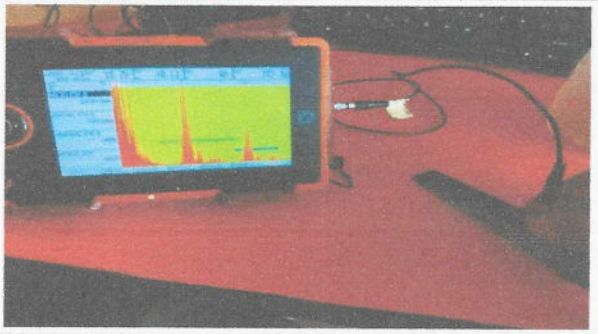
Tecnica empleada: UT convencional.

Palpador: Panametrics-NDT 2.25 Hz SN: 867794

Bloque empleado: ASTM 2491 SOPORTE FIG A7.1 SN: LBI-PA-001-07K1-015

AMPLITUD SEÑAL GRANDE	VALOR NOMINAL SEÑAL PEQUEÑA	RANGO PERMITIDO SEÑAL PEQUEÑA		AMPLITUD MEDIDA SEÑAL PEQUEÑA	DESVIACIÓN OBTENIDA	OBSERVACIONES
100	50	48.5	51.5	49	-0.02	OK
90	45	43.65	46.35	46	0.022222222	OK
80	40	38.8	41.2	41	0.025	OK
70	35	33.95	36.05	36	0.028571429	OK
60	30	29.1	30.9	30	0	OK
50	25	24.25	25.75	25	0	OK
40	20	19.4	20.6	20	0	OK
30	15	14.55	15.45	15	0	OK
20	10	9.7	10.3	10	0	OK
10	5	4.85	5.15	5	0	OK





Resultados: *El equipo cumple con los requisitos de linealidad en altura de pantalla establecidos por Asme Sección v, Articulo 4, Apéndice mandatorio I (Screen height linearity).*

Aprobado por: Ing. Julián Andres Reina
Inspector NDT UT Nivel II

CODIGO CERTIFICADO: CAL-UT-2503-008
Fecha: 08 de Marzo 2025
Validez de la verificación: 1 año.

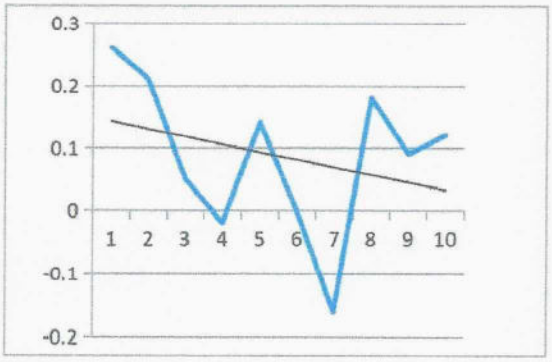
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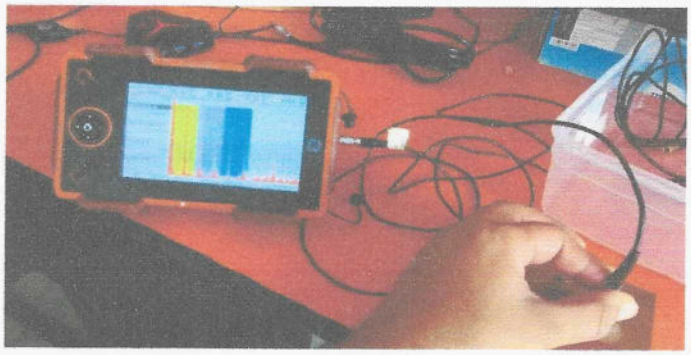
Integrity-NDT	REPORTE DE VERIFICACIÓN DE LINEALIDAD HORIZONTAL	CAL-UT-2503-008 Rev. 0 No VLH 2503-008

Ubicación: Bogotá- Colombia	**Operador:** Ing. Julián Andres Reina
Estándar de referencia:	Cumple o excede con ASTM E317

Equipo: USM/DMS GO	
Numero de serie: GOPLS16050160	
Amortiguación: Low	**Voltaje**: Low
Ajustes del filtro digital: Ancho de banda 1 MHz a 6 MHz.	**PRF:** 1500 Hz
Desviación máxima permitida: ± 0,5 mm	**Tecnica empleada:** UT convencional.
Palpador: Panametrics 5 MHz s/n: 612525	**Bloque empleado:** ASTM E317 SN: 77286

Reflexiones multiples	Recorrido Sonico real (mm)	Valor obtenido	DESVIACIÓN OBTENIDA (mm)	OBSERVACIONES
1	25	25.26	0.26	OK
2	50	50.21	0.21	OK
3	75	75.05	0.05	OK
4	100	99.98	-0.02	OK
5	125	125.14	0.14	OK
6	150	150	0	OK
7	175	174.84	-0.16	OK
8	200	200.18	0.18	OK
9	225	225.09	0.09	OK
10	250	250.12	0.12	OK





Resultados: El equipo cumple con los requisitos de ASTM E317.

Aprobado por: Ing. Julián Andres Reina
Inspector NDT UT Nivel II

CODIGO CERTIFICADO: CAL-UT-2503-008
Fecha: 08 de Marzo 2025
Validez de la verificación: 1 año.

FIRMA

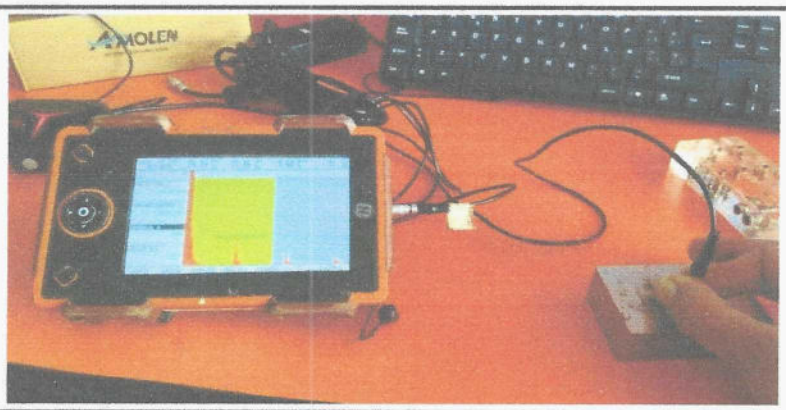
Integrity-NDT	REPORTE DE VERIFICACIÓN DE LINEALIDAD CONTROL AMPLITUD	CAL-UT-2503-008 Rev. 0 No LCA 2503-008

Ubicación: Bogotá- Colombia	**Operador:** Ing. Julián Andrés Reina
Estándar de referencia:	Asme Sección v, Articulo 4, Apéndice mandatorio II (AMPLITUDE CONTROL LINEARITY)

Equipo: USM/DMS GO	
Numero de serie: GOPLS16050160	
Amortiguación: Low	**Voltaje:** Low
Ajustes del filtro digital: Ancho de banda 1 MHz a 6 MHz.	**PRF:** 1500 Hz
Desviación máxima permitida: Ver rango limite de indicación (Asme Sección v, Articulo 4, Apéndice mandatorio II)	**Tecnica empleada:** UT convencional.
Palpador: Panametrics 5 MHz s/n: 612525	**Bloque empleado: ASTM E317 SN: 77286**

Amplitud indicación (%)	Ajuste de ganancia (dB)	Rango permisible Asme sec. V, Art 4, Ap. II (%)	Valor obtenido (%)	Nivel de ganancia obtenido (dB)	OBSERVACIONES
80	-6	32 a 48	40	40.0	OK
80	-12	16 a 24	20	30.6	OK
40	(+) 6	64 a 96	82	43.2	OK
20	(+)12	64 a 96	82	54	OK

Nivel de referencia al llevar la indicación al 80 % : 45 dB



Resultados: El equipo cumple con los requisitos de linealidad control amplitud establecidos por Asme Sección v, Articulo 4, Apéndice mandatorio II (AMPLITUDE CONTROL LINEARITY)

Aprobado por: Ing. Julián Andrés Reina
Inspector NDT UT Nivel II

CODIGO CERTIFICADO: CAL-UT-2503-008
Fecha: 08 de Marzo 2025
Validez de la verificación: 1 año.

FIRMA

Integrity-NDT

Integrity & NDT Solutions SAS

CERTIFICADO DE CALIBRACIÓN
H.B. ESTRUCTURAS METÁLICAS S.A.S.
EQUIPO: GENERAL ELECTRIC – USM/DMS Go
S/N: GOPLS16050160

Certificamos que el equipo mencionado ha mantenido y se ajusta a los Estándares de Referencia especificados en los Reportes 2503-LCA-008-*Linealidad del Control de Amplitud*, Reporte 2503-LAP-008-*Linealidad de Altura de Pantalla* y Reporte 2503-VLH-008-*Verificación de Linealidad Horizontal*.

Certificado Número:	CAL-UT-2503-008
Fecha de Calibración:	08 de Marzo de 2025
Fecha de expiración:	08 de Marzo de 2026
Lugar de calibración:	Bogotá D.C. Colombia
Dirección:	Calle 127 D # 56 - 42

INTEGRITY NDT SOLUTIONS

Ing. Julián Andrés Reina Bautista
Ultrasonic Testing Level II CN: UT-II-2408-011

Ing. Carlos Enrique Suárez Narváez
ASNT NDT Level III. CN: 187377
csuarez@integrity-ndt.com
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PACKING LIST

BHV0000523546

Shipper/Exporter POSCO INTERNATIONAL CORPORATION 165, CONVESIA - DAERO YEONSU-GU INCHEON, 21998, KOREA	**No. & Date** 0000760839 NOV. 16, 2021 **Port of Loading** INCHEON, South Korea **Final Destination** BUENA VENTURA, Colombia **Vessel** GLOBAL TOMORROW **Sailing on/about** NOV. 16, 2021
To Applicant H B ESTRUCTURAS METALICAS S.A.S AVENIDA CARRERA 129 17F 97 BOGOTA D.C COLOMBIA NIT: 860.006.282~8	**Remarks:**
Notify Party H B ESTRUCTURAS METALICAS S.A.S AVENIDA CARRERA 129 17F 97 BOGOTA D.C COLOMBIA NIT: 860.006.282~8	

Marks and Numbers of PKGS	Description of Goods	Quantity/Unit	Net-Weight	Gross Weight	Measurement

-COMMODITY: STEEL PLATE

SPEC	SIZE	PCS	QUANTITY(MT)
A709-50W-T-Z1-B	15.8X2440X6096	18	33.192
A709-50W-T-Z1-B	32X2440X6096	35	130.725
A709-50W-T-Z1-B	50X2440X6096	1	5.836
TOTAL		54	169.753

O S C O POSCO INTERNATIONAL CORPORATION

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240318
		证明书编号 CERTFICATE NO.	240318Z00364		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24401570B	H43170138	H4317114101	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114102	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114201	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114202	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114301	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114302	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115101	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115102	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115201	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115202	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115301	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170139	H4317115302	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	403	557	23	290	275	289	285
			合计(TOTAL)：	12	35,004																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE
A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240318
		证明书编号 CERTFICATE NO.	240318Z00365		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24302500B	H43170136	H4317111101	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317111102	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317111201	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317111202	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317112101	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317112102	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317112201	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170137	H4317112202	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	366	531	24	246	265	272	261
			合计(TOTAL)：	8	35,464																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
		证明书编号 CERTFICATE NO.	240322Z00131		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24401570B	H43200043	H4319238102	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238201	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238202	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238301	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238302	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24104229B	H43200044	H4319240101	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240102	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240201	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240202	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240301	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240302	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43210059	H4320482101	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
			合计(TOTAL)：	12	30,804																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE
A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
		证明书编号 CERTFICATE NO.	240322Z00132		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24104229B	H43210059	H4320482102	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482201	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482202	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482301	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482302	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482303	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
			合计(TOTAL)：	6	15,402																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
		证明书编号 CERTFICATE NO.	240322Z00175		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24401570B	H43170140	H4317116101	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116102	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116201	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116202	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116301	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116302	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116303	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117101	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117102	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117201	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117202	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117301	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
			合计(TOTAL)：	12	30,804																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE
A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
		证明书编号 CERTFICATE NO.	240322Z00176		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24302500B	H43170136	H4317110101	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317110102	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317110201	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317110202	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24401570B	H43170140	H4317117302	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117303	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24302500B	H43200040	H4319234101	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
24302500B	H43200040	H4319234102	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
24302500B	H43200040	H4319234201	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
24302500B	H43200040	H4319234202	38x2438x6096	1	4,433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
			合计(TOTAL)：	10	40,598																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240324
		证明书编号 CERTFICATE NO.	240324Z00432		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24302500B	H43190022	H4318441101	50x2438x6096	1	5,833	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	455	621	25	231	243	248	241
24302500B	H43190022	H4318441102	50x2438x6096	1	5,833	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	455	621	25	231	243	248	241
			合计(TOTAL)：	2	11,666																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，
1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240325
		证明书编号 CERTFICATE NO.	240325Z00081		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24401570B	H43178021	H4317113101	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113102	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113201	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113202	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113302	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
			合计(TOTAL)：	5	14,585																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B UT：ASTM A578/A578M-17	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240325
		证明书编号 CERTFICATE NO.	240325Z00315		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值A J	A 0C012 冲击单值B J	A 0C013 冲击单值C J	A 0C02 冲击均值Ave J	U.T 探伤检验	U.T 探伤等级
							$\times10^{-3}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-4}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-4}$	$\times10^{-4}$									
24302500B	H43210062	H4320485101	100x2438x6096	1	11,667	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	370	549	28.5	274	204	238	239	OK	B
			合计(TOTAL)：	1	11,667																							

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，
1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE
探伤等级：B=B,

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240326
		证明书编号 CERTFICATE NO.	240326Z00330		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24302654D	H43220068	H4321490201	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4321490301	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4321490401	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002101	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002201	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002301	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002401	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43230364	H4323384101	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323384201	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323384301	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323384401	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323385101	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
			合计(TOTAL)：	12	33,600																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240326
		证明书编号 CERTFICATE NO.	240326Z00331		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24302654D	H43230364	H4323385201	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323385301	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323385401	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24104700D	H43230365	H4323386101	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323386201	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323386301	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323386401	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387101	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387201	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387301	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387401	12x2438x12192	1	2,800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
			合计(TOTAL)：	11	30,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240331
		证明书编号 CERTFICATE NO.	240331Z00073		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24401570B	H43200043	H4319238101	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239101	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239102	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239103	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239201	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239202	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239203	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239204	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24302654D	H43220170	H4322133101	22x2438x6096	1	2,567	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	450	569	22.5	204	229	215	216
24302654D	H43220170	H4322133102	22x2438x6096	1	2,567	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	450	569	22.5	204	229	215	216
24302654D	H43220170	H4322133201	22x2438x6096	1	2,567	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	450	569	22.5	204	229	215	216
24302654D	H43220170	H4322133202	22x2438x6096	1	2,567	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	450	569	22.5	204	229	215	216
			合计(TOTAL)：	12	30,804																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE
A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240331
		证明书编号 CERTFICATE NO.	240331Z00074		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-3}	×10^{-4}	×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-4}								
24401570B	H43178021	H4317113301	25x2438x6096	1	2,917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
			合计(TOTAL)：	1	2,917																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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SAMSUNG C AND T CORPORATION
67, SEJONG-DAERO, JUNG-GU
SEOUL, 04514, KOREA

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Rev_240221

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HB ESTRUCTURAS METALICAS SAS
NIT 860.006.282-8
AV.CARRERA 129 #17F-97, BOGOTA, COLOMBIA

* Remark

ORIGIN: YINGKOU, CHINA

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HB ESTRUCTURAS METALICAS SAS
NIT 860.006.282-8
AV.CARRERA 129 #17F-97, BOGOTA, COLOMBIA
TEL: 57 6014224700 EXT127
CONTACT: MARYELY AGUILAR / ANALISTA DE COMERCIO EXTERIOR CEL. +57 3015444528

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BAYUQUAN, CHINA

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BUENAVENTURA, COLOMBIA

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MV JADE PROSPERITY

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MAY.06,2024

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HOT ROLLED STEEL PLATE

SPEC	SIZE(MM)	NO OF PCS	NET/GROSS WEIGHT
A709 GR.50WT-Z1-B	12.00 X 2438 X 12192	23PCS	64.400MT
A709 GR.50WT-Z1-B	22.00 X 2438 X 6096	44PCS	112.948MT
A709 GR.50WT-Z1-B	25.00 X 2438 X 6096	18PCS	52.506MT
A709 GR.50WT-Z1-B	38.00 X 2438 X 6096	16PCS	70.928MT
A709 GR.50WT-Z1-B	50.00 X 2438 X 6096	2PCS	11.666MT
A709 GR.50WT-Z1-B	100.00 X 2438 X 6096	1PCS	11.667MT
G-TOTAL :		104PCS	324.115MT

//

Signed By

DONG KYOON, HAN
Group Leader
SAMSUNG C AND T CORPORATION

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00003		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103768D	S32270133	S3227147202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227147301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227147302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227148101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227148201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227148202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227148301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227148302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227149101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227149201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227149202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227149301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
			合计(TOTAL) :	12	26,592																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00004		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103768D	S32270133	S3227149302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227150101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227150201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227150202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227150301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227150302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227151101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227151201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227151202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270133	S3227151301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	384	554	22.5	165	176	157	166
23103768D	S32270134	S3227151302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	380	548	23.5	222	261	238	240
23103770D	S32270135	S3227152101	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
			合计(TOTAL) :	12	26,592																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00005		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103770D	S32270135	S3227152102	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227152103	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227152201	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227152202	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227154101	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227154201	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227154202	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227154301	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227154302	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
			合计(TOTAL) :	9	19,944																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00127		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103711D	S32280004	S3227268101	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227268102	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227268201	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227268202	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227268301	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227268302	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227268303	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227269101	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227269102	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227269201	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227269202	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227269301	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
			合计(TOTAL) :	12	16,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00128		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103711D	S32280004	S3227269302	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
23103711D	S32280004	S3227269303	12x2438x6095	1	1,400	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	391	574	19.5	147	163	139	150
			合计(TOTAL)：	2	2,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
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野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00129		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103713D	S32280005	S3227270101	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227270102	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227270201	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227270202	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227270301	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227270302	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227270303	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227272101	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280006	S3227275101	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227275102	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227275201	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227275202	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
			合计(TOTAL) :	12	21,000																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00130		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103713D	S32280006	S3227275301	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227275302	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227275303	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103711D	S32280007	S3227276101	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227276102	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227276201	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227276202	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227276301	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227276302	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227276303	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227278101	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227278102	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
			合计(TOTAL)：	12	21,000																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00131		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103711D	S32280007	S3227278201	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227278202	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227278301	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227278302	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103711D	S32280007	S3227278303	15x2438x6095	1	1,750	L	144	324	1321	170	105	319	1700	476	27	6486	30	50	50	387	566	20.5	124	151	157	144
23103713D	S32280008	S3227279101	19x2438x6095	1	2,216	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	585	20.5	169	151	150	157
23103713D	S32280008	S3227279201	19x2438x6095	1	2,216	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	585	20.5	169	151	150	157
23103713D	S32280008	S3227279202	19x2438x6095	1	2,216	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	585	20.5	169	151	150	157
23103713D	S32280008	S3227279301	19x2438x6095	1	2,216	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	585	20.5	169	151	150	157
23103713D	S32280008	S3227279302	19x2438x6095	1	2,216	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	585	20.5	169	151	150	157
			合计(TOTAL) :	10	19,830																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00338		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103713D	S32280005	S3227272102	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227272201	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227272202	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227272301	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227272302	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227272303	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227273101	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227273102	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227273201	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227273202	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227273301	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227273302	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
			合计(TOTAL) :	12	21,000																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00339		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103713D	S32280005	S3227273303	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280006	S3227274101	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227274102	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227274201	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227274202	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227274301	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227274302	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227274303	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
			合计(TOTAL)：	8	14,000																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00427		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103764D	H32270272	H3227231101	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227231102	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227231103	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227231201	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227231202	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227232102	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227232103	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227232201	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227232202	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103707D	H32270273	H3227236102	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227236103	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227236201	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
			合计(TOTAL) :	12	34,992																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00428		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103707D	H32270273	H3227236202	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227237101	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103764D	H32270274	H3227241202	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227243101	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227243201	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227243202	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227243301	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227243302	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227244101	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270275	H3227244201	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	588	19.5	149	156	132	146
23103764D	H32270274	H3227244202	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227244301	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
			合计(TOTAL) :	12	34,992																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00429		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值A J	A 0C012 冲击单值B J	A 0C013 冲击单值C J	A 0C02 冲击均值Ave J
							×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-3}	×10^{-4}	×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-4}							
23103764D	H32270274	H3227244302	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
			合计(TOTAL)：	1	2,916																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
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冶金技术处处长
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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00462		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103768D	S32270132	S3227143101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227143201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227143202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227143301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227144101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227144201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227144202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227144301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227144302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227145101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227145201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227145202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
			合计(TOTAL) :	12	26,592																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00463		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103768D	S32270132	S3227145301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227145302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227146101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227146201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227146202	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227146301	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227146302	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227147101	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
23103768D	S32270132	S3227147201	19x2438x6095	1	2,216	L	144	302	1355	160	62	270	1790	495	24	6225	30	40	50	392	565	23	156	141	158	152
			合计(TOTAL) :	9	19,944																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00468		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103707D	H32270273	H3227236101	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227237201	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227237202	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227237301	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227237302	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227238101	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227238102	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227238103	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227238201	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103707D	H32270273	H3227238202	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	429	592	19.5	153	151	129	144
23103764D	H32270272	H3227241101	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227241102	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
			合计(TOTAL) :	12	34,992																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230301
		证明书编号 CERTFICATE NO.	230301Z00469		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103707D	H32270270	H3227226202	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	395	586	20	211	214	202	209
23103764D	H32270274	H3227241103	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227241201	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227242101	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227242102	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227242103	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227242201	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
23103764D	H32270274	H3227242202	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	413	572	19.5	245	245	253	248
			合计(TOTAL) :	8	24,845																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230302
		证明书编号 CERTFICATE NO.	230302Z00164		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103705D	H32270264	H3227199101	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	571	26.5	292	293	295	293
23103705D	H32270264	H3227199102	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	571	26.5	292	293	295	293
			合计(TOTAL)：	2	11,664																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，
1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230302
		证明书编号 CERTFICATE NO.	230302Z00325		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103705D	H32270264	H3227200101	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	571	26.5	292	293	295	293
23103705D	H32270264	H3227200102	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	571	26.5	292	293	295	293
23103705D	H32270264	H3227203101	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	571	26.5	292	293	295	293
23103705D	H32270264	H3227203102	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	571	26.5	292	293	295	293
23103705D	H32270265	H3227205102	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	404	571	23.5	191	181	172	181
23103705D	H32270265	H3227206101	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	404	571	23.5	191	181	172	181
23103705D	H32270265	H3227206102	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	404	571	23.5	191	181	172	181
23103705D	H32270266	H3227211101	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	575	23	204	204	225	211
23103705D	H32270266	H3227211102	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	410	575	23	204	204	225	211
			合计(TOTAL)：	9	52,488																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，
1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
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野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230302
		证明书编号 CERTFICATE NO.	230302Z00435		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103707D	H32270269	H3227223101	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227223102	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227223103	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227224101	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227224102	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227224103	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227225201	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103764D	H32270272	H3227235101	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227235102	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227235103	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227235201	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
23103764D	H32270272	H3227235202	25x2438x6095	1	2,916	L	155	355	1356	130	46	253	1800	486	24	6125	30	60	50	429	587	19.5	151	168	145	155
			合计(TOTAL) :	12	45,611																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230302
		证明书编号 CERTFICATE NO.	230302Z00436		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103707D	H32270269	H3227225202	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227226101	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
23103707D	H32270269	H3227226201	38x2438x6095	1	4,433	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	390	582	21.5	216	213	216	215
			合计(TOTAL)：	3	13,299																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230303
		证明书编号 CERTFICATE NO.	230303Z00022		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103705D	H32270265	H3227205101	50x2438x6095	1	5,832	L	151	331	1342	200	38	290	1800	492	24	6448	40	60	50	404	571	23.5	191	181	172	181
			合计(TOTAL)：	1	5,832																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230305
		证明书编号 CERTFICATE NO.	230305Z00472		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103770D	S32270135	S3227153101	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103713D	S32280005	S3227271101	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227271102	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227271201	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227271202	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227271301	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
23103713D	S32280005	S3227271302	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
			合计(TOTAL)：	7	12,716																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230306
		证明书编号 CERTFICATE NO.	230306Z00313		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103770D	S32270135	S3227153102	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227153201	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227153202	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103770D	S32270135	S3227153203	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	378	547	22.5	202	205	200	202
23103713D	S32280005	S3227271303	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	403	589	20	132	121	138	130
			合计(TOTAL)：	5	10,614																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230308
		证明书编号 CERTFICATE NO.	230308Z00988		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103713D	S32280006	S3227277101	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227277102	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227277201	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227277202	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227277301	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227277302	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
23103713D	S32280006	S3227277303	15x2438x6095	1	1,750	L	165	345	1366	140	51	264	1820	488	25	6214	30	50	50	406	586	20	169	143	161	158
			合计(TOTAL)：	7	12,250																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230311
		证明书编号 CERTFICATE NO.	230311Z00535		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103770D	H33090063	H3309056101	50x2438x6095	1	5,832	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	413	586	25	280	274	290	281
23103770D	H33090063	H3309056102	50x2438x6095	1	5,832	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	413	586	25	280	274	290	281
			合计(TOTAL)：	2	11,664																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230311
		证明书编号 CERTFICATE NO.	230311Z00555		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值A J	A 0C012 冲击单值B J	A 0C013 冲击单值C J	A 0C02 冲击均值Ave J
							×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-3}	×10^{-4}	×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-4}								
23103770D	H33090063	H3308501102	50x2438x6095	1	5,832	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	413	586	25	280	274	290	281
			合计(TOTAL)：	1	5,832																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230313
		证明书编号 CERTFICATE NO.	230313Z01134		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103770D	S33120029	S3311409101	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	390	563	21.5	164	156	189	170
23103770D	S33120029	S3311409102	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	390	563	21.5	164	156	189	170
23103770D	S33120029	S3311409201	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	390	563	21.5	164	156	189	170
23103770D	S33120029	S3311409202	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	390	563	21.5	164	156	189	170
23103770D	S33120029	S3311409203	19x2438x6095	1	2,216	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	390	563	21.5	164	156	189	170
			合计(TOTAL)：	5	11,080																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230314
		证明书编号 CERTFICATE NO.	230314Z00094		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103770D	H33090063	H3309055101	50x2438x6095	1	5,832	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	413	586	25	280	274	290	281
23103770D	H33090063	H3309055102	50x2438x6095	1	5,832	L	145	363	1390	130	19	278	1720	497	28	6311	40	40	50	413	586	25	280	274	290	281
			合计(TOTAL)：	2	11,664																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230316
		证明书编号 CERTFICATE NO.	230316Z00582		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23104137A	S33140161	S3314411101	30x2438x6095	1	3,499	L	151	388	1346	280	77	286	1620	460	22	6571	30	60	50	396	559	21	212	209	198	206
			合计(TOTAL)：	1	3,499																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN230285001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20230317
		证明书编号 CERTFICATE NO.	230317Z00111		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103707D	H33100229	H3310307101	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	544	697	21.5	222	213	230	222
23103707D	H33100229	H3310307102	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	544	697	21.5	222	213	230	222
23103707D	H33100229	H3310307103	25x2438x6095	1	2,916	L	154	348	1359	190	72	259	1800	478	24	6245	40	60	50	544	697	21.5	222	213	230	222
			合计(TOTAL)：	3	8,748																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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SAMSUNG C AND T CORPORATION
24 TH FL, OLYMPIC-RO-35-GIL 123,
SONGPA-GU, SEOUL, SOUTH KOREA 05510

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658827V01 **APR.05,2023**

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HB ESTRUCTURAS METALICAS SAS
NIT 860.006.282-8
AV. CARRERA 129 #17F-97, BOGOTA, COLOMBIA
TEL. +57 6014224700 EXT 127
CONTACT: MARYELY AGUILAR / ANALISTA DE COMERCIO EXTE
RIOR CEL. +57 3015444528

* Remark

*** CONTRACT NO.: 230213-SADELEC-HRP**
CONTRACT DATE : 2023-02-13

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HB ESTRUCTURAS METALICAS SAS
NIT 860.006.282-8
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RIOR CEL. +57 3015444528

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BAYUQUAN, CHINA

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BUENAVENTURA, COLOMBIA

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APR.05,2022

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HOT ROLLED STEEL PLATE
ASTM A709GR 50WT-Z1-B

SIZE(MM)	NO. OF PIECES	NET /GROSS WEIGHT(MT)
12.00 X 2438 X 6095	14	19.600
15.00 X 2438 X 6095	63	110.250
19.00 X 2438 X 6095	69	152.904
25.00 X 2438 X 6095	52	151.632
30.00 X 2438 X 6095	1	3.499
38.00 X 2438 X 6095	11	48.763
50.00 X 2438 X 6095	17	99.144
G-TOTAL :	227	585.792

Signed by

Sung Uk Kang
General Manager
SAMSUNG C AND T CORPORATION

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240202
		证明书编号 CERTFICATE NO.	240202Z00760		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23208651C	H41290121	H4129124101	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129124102	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129124202	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129124203	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129125101	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129125201	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129125202	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129125203	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129126101	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129126202	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
			合计(TOTAL):	10	14,000																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE
A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240202
		证明书编号 CERTFICATE NO.	240202Z00761		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23121614D	H41290119	H4129121101	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	406	556	22	255	241	259	252
23121614D	H41290119	H4129121201	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	406	556	22	255	241	259	252
23121614D	H41290119	H4129121202	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	406	556	22	255	241	259	252
23116880D	H41290120	H4129122101	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
23116880D	H41290120	H4129122102	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
23116880D	H41290120	H4129122201	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
23116880D	H41290120	H4129122202	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
			合计(TOTAL) :	7	16,569																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240204
		证明书编号 CERTFICATE NO.	240204Z00239		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23208651C	H41290121	H4129124201	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129125102	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129126102	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129126201	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	H41290121	H4129126203	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
			合计(TOTAL):	5	7,000																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240204
		证明书编号 CERTFICATE NO.	240204Z00240		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23121614D	H41290119	H4129121102	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	406	556	22	255	241	259	252
23116880D	H41290120	H4129123101	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
23116880D	H41290120	H4129123102	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
23116880D	H41290120	H4129123201	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
23116880D	H41290120	H4129123202	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	393	551	21	218	236	203	219
			合计(TOTAL):	5	11,435																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE
A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240210
		证明书编号 CERTFICATE NO.	240210Z00094		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B2	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42070033	H4206491101	50x2438x6096	1	5,833	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	436	584	24.5	310	304	315	310
24102102D	H42070033	H4206491102	50x2438x6096	1	5,833	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	436	584	24.5	310	304	315	310
			合计(TOTAL):	2	11,666																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，
1/4位置 1/4 LOCATION，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240211
		证明书编号 CERTFICATE NO.	240211Z00454		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23116880D	H42100258	H4210364101	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210365101	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210365201	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210365202	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100260	H4210368101	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
23116880D	H42100260	H4210368102	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
23116880D	H42100260	H4210368201	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
23116880D	H42100260	H4210368202	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
23116880D	H42100260	H4210369101	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
23116880D	H42100260	H4210369102	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
23116880D	H42100260	H4210369201	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
23116880D	H42100260	H4210369202	19x2438x6096	1	2,217	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	447	580	22	249	228	181	219
			合计(TOTAL):	12	28,004																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240211
		证明书编号 CERTFICATE NO.	240211Z00455		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23116880D	H42100258	H4210366101	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210366102	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210366201	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100259	H4210366202	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	413	571	22	219	183	169	190
23116880D	H42100259	H4210367101	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	413	571	22	219	183	169	190
23116880D	H42100259	H4210367102	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	413	571	22	219	183	169	190
23116880D	H42100259	H4210367201	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	413	571	22	219	183	169	190
23116880D	H42100259	H4210367202	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	413	571	22	219	183	169	190
			合计(TOTAL) :	8	20,536																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240212
		证明书编号 CERTFICATE NO.	240212Z00234		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值A J	A 0C012 冲击单值B J	A 0C013 冲击单值C J	A 0C02 冲击均值Ave J
							$\times 10^{-3}$	$\times 10^{-3}$	$\times 10^{-3}$	$\times 10^{-4}$	$\times 10^{-4}$	$\times 10^{-3}$	$\times 10^{-4}$	$\times 10^{-3}$	$\times 10^{-3}$	$\times 10^{-3}$	$\times 10^{-4}$	$\times 10^{-4}$	$\times 10^{-4}$							
24102104D	H42100262	H4210373101	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
			合计(TOTAL):	1	1,400																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240212
		证明书编号 CERTFICATE NO.	240212Z00235		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23116880D	H42100258	H4210364102	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210364201	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210364202	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210365102	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
			合计(TOTAL):	4	10,268																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240212
		证明书编号 CERTFICATE NO.	240212Z00601		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23121614D	H42100256	H4210359101	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23121614D	H42100256	H4210359102	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23121614D	H42100256	H4210359201	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23121614D	H42100256	H4210359202	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23207959A	H42100257	H4210360101	22x2438x6096	1	2,567	L	142	195	1350	170	48	340	1260	491	14	6314	20	40	40	400	554	21.5	316	298	290	301
23207959A	H42100257	H4210360102	22x2438x6096	1	2,567	L	142	195	1350	170	48	340	1260	491	14	6314	20	40	40	400	554	21.5	316	298	290	301
23207959A	H42100257	H4210360201	22x2438x6096	1	2,567	L	142	195	1350	170	48	340	1260	491	14	6314	20	40	40	400	554	21.5	316	298	290	301
23207959A	H42100257	H4210360202	22x2438x6096	1	2,567	L	142	195	1350	170	48	340	1260	491	14	6314	20	40	40	400	554	21.5	316	298	290	301
23116880D	H42100258	H4210361101	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210361102	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210361201	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210361202	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
			合计(TOTAL):	12	30,804																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240212
		证明书编号 CERTFICATE NO.	240212Z00602		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42100255	H4210357101	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	H42100255	H4210357102	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	H42100255	H4210357201	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	H42100255	H4210357202	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
23116880D	H42100258	H4210362101	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210362102	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210362201	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	H42100258	H4210362202	22x2438x6096	1	2,567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23121614D	H42128006	H4210363101	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
23121614D	H42128006	H4210363102	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
23121614D	H42128006	H4210363201	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
23121614D	H42128006	H4210363202	22x2438x6096	1	2,567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
			合计(TOTAL):	12	32,204																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE
A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240212
		证明书编号 CERTFICATE NO.	240212Z00603		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42100255	H4210358101	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	H42100255	H4210358201	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	H42100255	H4210358202	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
			合计(TOTAL):	3	8,751																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTFICATE NO.	240213Z00474		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102104D	H42100262	H4210371102	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210371103	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210371201	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210371202	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210371203	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210371301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210371302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
23121141A	H42100263	H4210372101	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
23121141A	H42100263	H4210372102	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
23121141A	H42100263	H4210372201	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
23121141A	H42100263	H4210372202	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
24102104D	H42100262	H4210373102	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
			合计(TOTAL):	12	16,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTFICATE NO.	240213Z00475		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102104D	H42100262	H4210373103	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210373201	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210373202	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210373203	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210373301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	H42100262	H4210373302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
			合计(TOTAL):	6	8,400																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTFICATE NO.	240213Z00476		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102104D	H42100261	H4210370101	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	H42100261	H4210370102	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	H42100261	H4210370103	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	H42100261	H4210370201	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	H42100261	H4210370202	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
			合计(TOTAL):	5	11,085																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTFICATE NO.	240213Z00668		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102104D	H42070027	H4206483301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	416	605	23.5	134	108	102	115
24102104D	H42070027	H4206483302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	416	605	23.5	134	108	102	115
24102102D	H42070026	H4206484101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206484102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206484201	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206484202	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206484301	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206484302	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206484401	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206484402	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206485101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206485102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
			合计(TOTAL):	12	16,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTFICATE NO.	240213Z00669		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42070026	H4206485201	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206485202	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206485203	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206485301	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4206485302	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207009101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207009102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207009103	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207009201	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207009202	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207009301	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207009302	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
			合计(TOTAL):	12	16,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTFICATE NO.	240213Z00670		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42070026	H4207010101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207010103	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207010201	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207010202	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070026	H4207010301	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	H42070062	H4207010302	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	394	599	21	172	187	195	185
24102104D	H42100262	H4210371101	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
			合计(TOTAL) :	7	9,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTFICATE NO.	240213Z00671		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102104D	H42070029	H4206487101	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102104D	H42070029	H4206487102	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102104D	H42070029	H4206487201	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102104D	H42070029	H4206487202	19x2438x6096	1	2,217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102102D	H42100255	H4210358102	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
			合计(TOTAL) :	5	11,785																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240216
		证明书编号 CERTFICATE NO.	240216Z00670		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102104D	H42140085	H4214037101	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214037102	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214037103	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214037201	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214037202	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214038101	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214038102	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214038103	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214038201	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214038202	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214038301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214038302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
			合计(TOTAL):	12	16,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240217
		证明书编号 CERTFICATE NO.	240217Z00204		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24201194A	S42150126	S4215246101	9x2438x6096	1	1,050	L	143	355	1340	210	43	283	2880	468	22	6608	10	60	40	376	605	25	53	67	55	58
24201194A	S42150126	S4215246102	9x2438x6096	1	1,050	L	143	355	1340	210	43	283	2880	468	22	6608	10	60	40	376	605	25	53	67	55	58
24201194A	S42150126	S4215246201	9x2438x6096	1	1,050	L	143	355	1340	210	43	283	2880	468	22	6608	10	60	40	376	605	25	53	67	55	58
24201194A	S42150126	S4215246202	9x2438x6096	1	1,050	L	143	355	1340	210	43	283	2880	468	22	6608	10	60	40	376	605	25	53	67	55	58
			合计(TOTAL):	4	4,200																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240217
		证明书编号 CERTFICATE NO.	240217Z00236		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值A J	A 0C012 冲击单值B J	A 0C013 冲击单值C J	A 0C02 冲击均值Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4							
23121141A	S42140012	S4213452101	9x2438x6096	1	1,050	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	378	622	22.5	45	50	54	50
23121141A	S42140012	S4213452201	9x2438x6096	1	1,050	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	378	622	22.5	45	50	54	50
23121141A	S42140012	S4213452202	9x2438x6096	1	1,050	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	378	622	22.5	45	50	54	50
23121141A	S42140012	S4213452301	9x2438x6096	1	1,050	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	378	622	22.5	45	50	54	50
23121141A	S42140012	S4213452302	9x2438x6096	1	1,050	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	378	622	22.5	45	50	54	50
			合计(TOTAL):	5	5,250																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240219
		证明书编号 CERTFICATE NO.	240219Z00181		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102104D	H42140085	H4214037301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	H42140085	H4214037302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
			合计(TOTAL):	2	2,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240219
		证明书编号 CERTFICATE NO.	240219Z00182		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42070030	H4206488101	22x2438x6096	1	2,567	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	387	578	20	230	192	182	201
24102102D	H42070030	H4206488102	22x2438x6096	1	2,567	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	387	578	20	230	192	182	201
24102102D	H42070030	H4206488201	22x2438x6096	1	2,567	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	387	578	20	230	192	182	201
24102102D	H42070030	H4206488202	22x2438x6096	1	2,567	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	387	578	20	230	192	182	201
24102102D	H42070030	H4206488203	22x2438x6096	1	2,567	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	387	578	20	230	192	182	201
24102102D	H42070031	H4206489101	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	402	584	19.5	254	239	206	233
24102102D	H42070031	H4206489102	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	402	584	19.5	254	239	206	233
24102102D	H42070031	H4206489201	25x2438x6096	1	2,917	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	402	584	19.5	254	239	206	233
			合计(TOTAL):	8	21,586																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTFICATE NO.	240224Z00606		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102502A	S42170191	S4217278101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217278102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217278201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217278202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217278203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217279101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217279102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217279201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217279202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217279203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217280201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217283101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
			合计(TOTAL):	12	12,600																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
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Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTFICATE NO.	240224Z00607		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102502A	S42170191	S4217283203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217286101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217286102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217286201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217286202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217286203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
			合计(TOTAL):	6	6,300																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTFICATE NO.	240224Z00671		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102502A	S42170191	S4217280101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217280102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217280202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217280203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217281101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217281102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217281201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217281202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217281203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217282101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217282102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217282201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
			合计(TOTAL):	12	12,600																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTFICATE NO.	240224Z00672		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102502A	S42170191	S4217282202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217282203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217283102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217283201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217283202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217284101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217284102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217284201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217284202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217284203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217285101	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217285102	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
			合计(TOTAL):	12	12,600																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTFICATE NO.	240224Z00673		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102502A	S42170191	S4217285201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217285202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217285203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	464	24	6407	10	60	40	367	648	19	57	63	83	67
			合计(TOTAL):	3	3,150																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTFICATE NO.	240224Z00674		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23119140D	S42070076	S4207186101	22x2438x6096	1	2,567	L	146	341	1324	190	51	269	1320	483	21	6227	30	70	40	427	601	20	160	186	158	168
23119140D	S42070076	S4207186201	22x2438x6096	1	2,567	L	146	341	1324	190	51	269	1320	483	21	6227	30	70	40	427	601	20	160	186	158	168
23119140D	S42070076	S4207186202	22x2438x6096	1	2,567	L	146	341	1324	190	51	269	1320	483	21	6227	30	70	40	427	601	20	160	186	158	168
			合计(TOTAL):	3	7,701																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTFICATE NO.	240224Z00831		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
23103774A	S42140013	S4213453101	9x2438x6096	1	1,050	L	144	321	1382	180	39	266	1740	481	26	6231	40	50	50	377	645	23	50	53	46	50
23103774A	S42140013	S4213453201	9x2438x6096	1	1,050	L	144	321	1382	180	39	266	1740	481	26	6231	40	50	50	377	645	23	50	53	46	50
23103774A	S42140013	S4213453301	9x2438x6096	1	1,050	L	144	321	1382	180	39	266	1740	481	26	6231	40	50	50	377	645	23	50	53	46	50
			合计(TOTAL) :	3	3,150																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240226
		证明书编号 CERTFICATE NO.	240226Z00202		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42070032	H4206490102	38x2438x6096	1	4,433	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	381	541	18.5	279	248	250	259
			合计(TOTAL):	1	4,433																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240228
		证明书编号 CERTFICATE NO.	240228Z00551		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-3}	×10^{-4}	×10^{-3}	×10^{-3}	×10^{-3}	×10^{-4}	×10^{-4}	×10^{-4}								
24102102D	H42070026	H4207010102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
			合计(TOTAL):	1	1,400																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

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辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240302
		证明书编号 CERTFICATE NO.	240302Z00089		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-3	×10^-4	×10^-3	×10^-3	×10^-3	×10^-4	×10^-4	×10^-4								
24102102D	H42070032	H4206490101	38x2438x6096	1	4,433	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	381	541	18.5	279	248	250	259
			合计(TOTAL):	1	4,433																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

PACKING LIST

Shipper / Exporter

HYUNDAI CORPORATION
25, YULGOK-RO 2-GIL, JONGNO-GU,
SEOUL, 03143, KOREA

No. & date of invoice

SP1-40174570K-HB-01 Mar. 31. 2024

Remarks

* CONTRACT NO.: SP1-240109-HBE01

For Account & risk of Messrs.

HB ESTRUCTURAS METALICAS SAS
NIT:860.006.282-8 AVENIDA CARRERA 129 NO.17F-97
FONTIBON, BOGOTA COLOMBIA
TELEFONO: 601 4224700 EXT.127 MARYELY AGUILAR
ANCOMERCIOEXT@HBSADELEC.COM.CO
CEL NO. +57 3015444528/+57 3184277948

Notify party

HB ESTRUCTURAS METALICAS SAS
NIT:860.006.282-8 AVENIDA CARRERA 129 NO.17F-97
FONTIBON, BOGOTA COLOMBIA
TELEFONO: 601 4224700 EXT.127 MARYELY AGUILAR
ANCOMERCIOEXT@HBSADELEC.COM.CO
CEL NO. +57 3015444528/+57 3184277948

Port of loading	Port of Discharge
BAYUQUAN PORT IN CHINA	BUENAVENTURA, COLOMBIA

Vessel Name / Voyage No.	Sailing on or about
PORT KYUSHU / POKY31	Mar. 31. 2024

== DETAILS AS PER ATTACHED RIDER ==

Marks and numbers of pkgs	Description of goods	Quantity /unit	Net-weight	Gross-weight
SHIPPING MARKS :N/M	HOT ROLLED STEEL PLATE			

SPEC	SIZE(MM)			NO. OF PIECES	NET WEIGHT	GROSS WEIGHT
ASTM A709 Gr.50WT-Z1-B	9	2438	6096	57 PCS	59.850MT	59.850MT
ASTM A709 Gr.50WT-Z1-B	12	2438	6096	80 PCS	112.000MT	112.000MT
ASTM A709 Gr.50WT-Z1-B	19	2438	6096	25 PCS	55.425MT	55.425MT
ASTM A709 Gr.50WT-Z1-B	22.2	2438	6096	48 PCS	123.216MT	123.216MT
ASTM A709 Gr.50WT-Z1-B	25	2438	6096	11 PCS	32.087MT	32.087MT
ASTM A709 Gr.50WT-Z1-B	38	2438	6096	2 PCS	8.866MT	8.866MT
ASTM A709 Gr.50WT-Z1-B	50	2438	6096	2 PCS	11.666MT	11.666MT
TOTAL				**225 PCS**	**403.110MT**	**403.110MT**

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HYUNDAI CORPORATION
Jinbyeong Chai / TEAM LEADER
FLAT PRODUCTS TEAM 1 OF STEEL DIVISION

HYUNDAI corporation

Signed b

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240326
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240326Z00330		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻³	Mn ×10⁻²	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻²	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	Ti ×10⁻³	Mo ×10⁻⁴	Ti ×10⁻⁴	Nb ×10⁻⁴	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
24302654D	H43220068	H4321490201	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4321490301	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4321490401	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002101	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002201	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002301	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43220068	H4322002401	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43230364	H4323384101	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	375	600	19.5	225	208	234	222
24302654D	H43230364	H4323384201	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323384301	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323384401	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323385101	12x2438x12192	1	2,800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
			合计(TOTAL):	12	33,600																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 365-24 -01 AL MTR 365-24 -12

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

殷彩刚

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobian district,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGRIZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240326
		证明书编号 CERTIFICATE NO.	240326Z00331		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻³	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	Al ×10⁻³	Mo ×10⁻⁴	Ti ×10⁻⁴	Nb ×10⁻⁴	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % A5	A 0C01 冲击单值A J	A 0C012 冲击单值B J	A 0C013 冲击单值C J	A 0C02 冲击均值 Ave J
24302654D	H43230364	H4323385201	12x2438x12192	1	2.800	L	155	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323385301	12x2438x12192	1	2.800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24302654D	H43230364	H4323385401	12x2438x12192	1	2.800	L	135	332	1380	210	40	312	3070	533	21	6796	20	40	40	383	611	28.5	88	82	79	83
24104700D	H43230365	H4323386101	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323386201	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323386301	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323386401	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387101	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387201	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387301	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
24104700D	H43230365	H4323387401	12x2438x12192	1	2.800	L	150	327	1360	230	40	295	3010	467	22	6670	20	50	40	400	610	22.5	77	72	79	76
			合计(TOTAL):	11	30.800																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

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MTR 366-24 -01 AL MTR 366-24 -11

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240331
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240331Z00073		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻³	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	Al ×10⁻³	Mo ×10⁻⁴	Ti ×10⁻⁴	Nb ×10⁻⁴	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
24401570B	H43200043	H4319238101	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239101	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239102	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239103	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239201	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239202	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239203	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319239204	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24302654D	H43220170	H4322133101	22x2438x6096	1	2.567	L	135	332	1380	210	40	312	3070	533	21	5796	20	40	40	450	569	22.5	204	229	215	216
24302654D	H43220170	H4322133102	22x2438x6096	1	2.567	L	135	332	1380	210	40	312	3070	533	21	5796	20	40	40	450	569	22.5	204	229	215	216
24302654D	H43220170	H4322133201	22x2438x6096	1	2.567	L	135	332	1380	210	40	312	3070	533	21	5796	20	40	40	450	569	22.5	204	229	215	216
24302654D	H43220170	H4322133202	22x2438x6096	1	2.567	L	135	332	1380	210	40	312	3070	533	21	5796	20	40	40	450	569	22.5	204	229	215	216
			合计(TOTAL):	12	30.804																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGELENGTH) Lo=200mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，
近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 367-24 -01 AL MTR 367-24 -12

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MILL TEST / QUALITY CERTIFICATE

GERDAU

PAGE 1 / 1

CUSTOMER	CUSTOMER ORDER	SALES ORDER	DIMENSIONS	DATE
CYRGO SAS	SAW078/20	5296847-000018	31.750mm x 2440mm x 12192mm	12.16.2020

GERDAU AÇOMINAS S.A.
ROD MG 443 KM 7 SN FAZENDA DO CADETE
OURO BRANCO MG
36420-000 BRAZIL

PRODUCT	EDGE TYPE	DELIVERY CONDITION	DOCUMENT NUMBER
PLANCHA GRUESA	Cut edge	Thermal Mech Control Process	0003835E20

SPECIFICATION
ASTM A709 TYPE8 50WT2 2018

Gerdau S.A. certifies that the material herein described is in accordance with the applicable technical specifications. As mutual protection for costumer and supplier, this certificate is considered as confidential and can not be transcribed or reproduced without the written authorization of Gerdau S.A.

PACKAGES

PLATE #	WEIGHT (MT)	HEAT	SAMPLE
3024545801	7.414	28115289	28115289005
			28115289008
3024545801	7.414	28115289	28115289005
			28115289008

PLATE #	WEIGHT (MT)	HEAT	SAMPLE
3025005901 (*)	7.414	28116631	28116631001
			28116631002
3025006001 (*)	7.414	28116631	28116631001
			28116631002

PLATE #	WEIGHT (MT)	HEAT	SAMPLE
3025006101 (*)	7.414	28116631	28116631001
3025006201 (*)	7.414	28116631	28116631001
3025006301 (*)	7.414	28116631	28116631001
3025006401 (*)	7.414	28116631	28116631001

CHEMICAL COMPOSITION

HEAT	C(%)	Mn(%)	Si(%)	P(%)	S(%)	AlT(%)	Cr(%)	Cu(%)	Ti(%)	Mo(%)	Nb(%)	Ni(%)	V(%)	B(%)	Ca(%)	N(%)
28115289	0.10	0.86	0.32	0.017	0.004	0.025	0.49	0.30	0.011	0.02	0.024	0.25	0.031	0.0001	0.0000	0.0048
28116631	0.10	0.84	0.34	0.020	0.004	0.027	0.50	0.30	0.013	0.01	0.025	0.23	0.033	0.0000	0.0002	0.0045

HEAT	CEQ2(%)
28115289	0.39
28116631	0.38

TENSILE TEST

SAMPLE	DIRECTION	POSITION	YS/RE(MPa)	TS/RT(MPa)	ELONG/ALARG(%)
28115289005	Transversal	Corner / Borde	436	536	51.0
28116631001	Transversal	Corner / Borde	466	568	54.0

CHARPY IMPACT TEST

SAMPLE	DIRECTION	POSITION	TEMP/TEMP(°C)	IND EN/EN IND(J)	IND EN/EN IND(J)	IND EN/EN IND(J)	AVG EN/EN MD(J)
28115289008	Longitudinal	Corner / Borde	-13	359	366	373	363
28116631001	Longitudinal	Corner / Borde	-13	267	270	272	270
28116631002	Longitudinal	Corner / Borde	-13	376	380	380	379

TENSILE TEST
GAUGE LENGTH/LONGITUD DE REFERENCIA:
L0: 50 mm

CHARPY IMPACT TEST
SPEC SIZE/DIM MUESTRA: 10X10mm - V 2mm

ABBREVIATIONS

(*) Mother Plate
YS/RE Yield Point
TS/RT Tensile Strength
ELONG/ALARG Elongation
TEMP/TEMP Temperature
IND EN/EN IND Individual Energy
AVG EN/EN MD Average Energy

[redacted] 368 -21-04

[redacted] 368 -21-06

REMARKS

All radiation sources are verified and controlled.
All scrap used at Gerdau Ouro Branco is internally generated.
We certify that this material is free of contamination by radiation.

QUALITY ASSURANCE

THAYENE OLIVEIRA SILOTTI
CREA 249773

SURVEYOR

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet, Laobiandistrict, Yingkou, Liaoning, P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021 ; A709 Gr.50W T-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
		证明书编号 CERTIFICATE NO.	240322Z00131		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 A.A	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻³	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	Ti ×10⁻³	Mo ×10⁻⁴	Ti ×10⁻⁴	Nb ×10⁻⁴	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % A5	A0C01 冲击单值A J	A0C012 冲击单值B J	A0C013 冲击单值C J	A0C02 冲击均值Ave J
24401570B	H43200043	H4319238102	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238201	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238202	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238301	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24401570B	H43200043	H4319238302	22x2438x6096	1	2,567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	441	581	23.5	317	296	303	305
24104229B	H43200044	H4319240101	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240102	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240201	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240202	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240301	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43200044	H4319240302	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	435	587	29.5	206	215	240	220
24104229B	H43210059	H4320482101	22x2438x6096	1	2,567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
			合计 (TOTAL):	12	30,804																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
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B0A03=PRECENTAGE ELONGATION AFTERFRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

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WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 368-24 -01 AL MTR 368-24 -12

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

殷彩刚

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet, Laobiandistrict, Yingkou, Liaoning, P.R. China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGRIZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021 ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
		证明书编号 CERTIFICATE NO.	240322Z00132		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻³	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	Ti ×10⁻³	Mo ×10⁻⁴	Ti ×10⁻⁴	Nb ×10⁻⁴	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % A5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
24104229B	H43210059	H4320482102	22x2438x6096	1	2.567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482201	22x2438x6096	1	2.567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482202	22x2438x6096	1	2.567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482301	22x2438x6096	1	2.567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482302	22x2438x6096	1	2.567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
24104229B	H43210059	H4320482303	22x2438x6096	1	2.567	L	143	339	1350	200	24	254	3200	480	26	6470	10	60	40	453	584	22.5	204	174	259	212
			合计(TOTAL):	6	15.402																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

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MTR 369-24 -01 AL MTR 369-24 -06

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

殷彩刚

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240322Z00175		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Al	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10⁻³	×10⁻³	×10⁻³	×10⁻²	×10⁻⁴	×10⁻³	×10⁻⁴	×10⁻³	×10⁻³	×10⁻³	×10⁻⁶	×10⁻⁴	×10⁻⁴							
24401570B	H43170140	H4317116101	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116102	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116201	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116202	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116301	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116302	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317116303	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117101	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117102	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117201	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117202	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117301	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
			合计(TOTAL):	12	30.804																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，
近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
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A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

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MTR 370-24 -01 AL MTR 370-24 -12

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021 ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240325
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240325Z00081		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Ti	Mo	Ti	Nb	B OA01 屈服强度 MPa Rp0.2	B OA02 抗拉强度 MPa Rm	B OA03 断后伸长率 % A5	A OC01 冲击单值A J	A OC012 冲击单值B J	A OC013 冲击单值C J	A 3C02 冲击均值Ave J
							×10⁻³	×10⁻³	×10⁻³	×10⁻⁴	×10⁻⁴	×10⁻³	×10⁻⁴	×10⁻³	×10⁻³	×10⁻³	×10⁻⁴	×10⁻⁴	×10⁻⁴							
24401570B	H43178021	H4317113101	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113102	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113201	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113202	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
24401570B	H43178021	H4317113302	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	442	584	23	301	259	258	273
			合计(TOTAL):	5	14.585																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，
近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 372-24 -01 AL MTR 372-24 -05

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50W T-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240318
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240318Z00364		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻²	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻⁴	Al ×10⁻³	Mo ×10⁻⁴	Ti ×10⁻⁴	Nb ×10⁻⁴	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % B5	A0C01 冲击单值 A J	A0C012 冲击单值 B J	A0C013 冲击单值 C J	A0C02 冲击均值 Ave J
24401570B	H43170138	H4317114101	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114102	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114201	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114202	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114301	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317114302	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115101	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115102	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115201	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115202	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170138	H4317115301	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	428	572	24	316	304	281	300
24401570B	H43170139	H4317115302	25x2438x6096	1	2.917	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	403	557	23	290	275	289	285
			合计(TOTAL):	12	35.004																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，
近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 373-24 -01 AL MTR 373-24 -12

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
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Yejinstreet,Laobiandistrict, Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021 ; A709 Gr.50W T-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240322
		证明书编号 CERTIFICATE NO.	240322Z00176		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻³	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	Al ×10⁻³	Mo ×10⁻⁴	Ti ×10⁻⁴	Nb ×10⁻⁴	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % B5	A0C01 冲击单值A J	A0C012 冲击单值B J	A0C013 冲击单值C J	A0C02 冲击均值Ave J
24302500B	H43170136	H4317110101	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317110102	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317110201	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317110202	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24401570B	H43170140	H4317117302	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24401570B	H43170140	H4317117303	22x2438x6096	1	2.567	L	143	347	1370	220	22	255	3260	482	25	6531	10	60	40	416	578	20	286	229	234	250
24302500B	H43200040	H4319234101	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
24302500B	H43200040	H4319234102	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
24302500B	H43200040	H4319234201	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
24302500B	H43200040	H4319234202	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	425	584	22.5	227	231	257	238
			合计(TOTAL):	10	40.598																					

注释 NOTES

L：熔炼成分SMELTING COMPOSITION
拉伸标距(GAUGELENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，
近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 374-24 -01AL MTR 374-24 -10

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240285004-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-2021；A709 Gr.50 W T-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240318
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240318Z00365		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Al	Mo	Ti	Nb	B 0A01 屈服强度	B 0A02 抗拉强度	B 0A03 断后伸长率	A 0C01 冲击单值A	A 0C012 冲击单值B	A 0C013 冲击单值C	A 0C02 冲击均值Ave
							×10⁻³	×10⁻³	×10⁻²	×10⁻¹	×10⁻⁴	×10⁻³	×10⁻⁴	×10⁻³	×10⁻³	×10⁻³	×10⁻⁶	×10⁻¹	×10⁻⁴	MPa Rp0.2	MPa Rm	% A5	J	J	J	J
24302500B	H43170136	H4317111101	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317111102	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317111201	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317111202	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317112101	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317112102	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170136	H4317112201	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	367	531	24.5	245	219	268	244
24302500B	H43170137	H4317112202	38x2438x6096	1	4.433	L	141	344	1350	210	36	276	3000	484	25	6595	10	60	40	366	531	24	246	265	272	261
			合计(TOTAL):	8	35.464																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 375-24 -01 AL MTR 375-24 -08

日照营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
Yejin street, Laobiandistrict, Yingkou, Liaoning, P.R.China/115005
TEL:0417-3256051 FAX:0417-3256057 NO.:DY2101361A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品 PRODUCT	桥梁结构钢 Bridge structural steel
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGRIZANN230285001-01
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR) / 签发日期 DATE OF ISSUE 20230314
车号 TRAIN NO.		证明书编号 CERTIFICATE NO.	230314Z00004

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格(MM) DIMENSION	数量 QTY	重量 WEIGHT kg	AA	C ×100	Si ×100	Mn ×100	P ×1000	S ×1000	Cu ×1000	Ni ×1000	Cr ×1000	V ×1000	[illegible]	Alt ×1000	Ti ×1000	Nb ×1000	80A01 YS MPa	80A02 TS MPa	80A03 EL %	A8C01 A	A8C012 B	A8C013 C	A8C02 Avg
23[illegible]	[illegible]	[illegible]101	51x24[illegible]	1	[illegible]	[illegible]	15	36	1350	[illegible]	18	276	1720	437	28	0011	16	17	51	4	[illegible]	2[illegible]	220	2[illegible]4	2[illegible]9	251
23[illegible]	[illegible]	[illegible]102	51x24[illegible]	1	[illegible]	[illegible]	15	35	1350	[illegible]	19	278	1790	437	28	0011	48	11	51	[illegible]8	5[illegible]	[illegible]	220	274	26[illegible]	251
			合计(TOTAL):	2	[illegible]																					

注释 NOTES

1: 熔炼成分 SMELTING COMPOSITION
延伸标距(GAUGE LENGTH) L0=50 mm
A8C冲击试验(IMPACT TEST): -20°C, 纵向(LONGITUDINAL), 1/4位置 1/4 LOCATION, 尺寸(SIZE)10*10*55
80A01=YIELD STRENGTH
80A02=TENSILE STRENGTH
80A03=PRECENTAGE ELONGATION AFTER FRACTURE

A8C01=IMPACT TEST A
A8C012=IMPACT TEST B
A8C013=IMPACT TEST C
A8C02=IMPACT AVERAGE

MTR.410-23--01 MTR.410-23--02

According to EN 10204 3.1

兹证明本产品经检验符合标准要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

质量部

冶金技术处处长 DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 410-23-01
02

日照钢铁营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO., LTD.
Yejinaroad, Laobiandistrict, Yingkou, Liaoning, P.R.China/115005
TEL 0417-3250...   FAX 0417-325...

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION		桥梁结构钢 Bridge structural steel
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同号 CONTRACT NO.	YGRIZANN230283001 01
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控轧状态(CR)
		签发日期 DATE OF ISSUE	20230301
		质量证明书编号 CERTIFICATE NO.	230301Z00388
车号 TRAIN NO.			

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 DIMENSION	数量 QTY	重量 WEIGHT KG	分析类别 AA	C ×100	Si ×100	Mn ×100	P ×1000	S ×1000	Cu ×100	Ni ×100	Cr ×100	Mo ×100	V ×1000	Nb ×1000	Ti ×1000	Alt ×1000	[illegible]	屈服强度 YS MPa	抗拉强度 TS MPa	伸长率 %	冲击 A J	冲击 B J	冲击 C J	平均 Ave J
23101713D	S1228[illegible]	S1227[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1356	140	51	261	1820	488	[illegible]	6211	34	55	52	[illegible]	132	559	22	172	121	138	134
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1368	140	51	261	1820	428	[illegible]	6211	[illegible]	58	53	[illegible]	132	555	[illegible]	134	121	138	134
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	136	345	1366	149	[illegible]	261	1820	488	[illegible]	6211	[illegible]	53	[illegible]	[illegible]	132	545	[illegible]	127	121	138	134
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	[illegible]	345	1356	140	51	264	1821	458	[illegible]	6211	[illegible]	55	56	[illegible]	132	555	[illegible]	112	121	136	130
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1356	[illegible]	51	261	1820	488	[illegible]	6211	[illegible]	58	56	[illegible]	[illegible]	559	[illegible]	131	121	132	[illegible]
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1356	141	51	261	1820	488	[illegible]	6211	[illegible]	58	56	[illegible]	[illegible]	560	[illegible]	112	121	138	134
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1356	140	51	264	1820	428	[illegible]	6211	31	58	55	[illegible]	[illegible]	579	[illegible]	[illegible]	121	138	134
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	136	345	1356	140	51	264	1820	428	[illegible]	6211	[illegible]	58	55	[illegible]	[illegible]	545	[illegible]	117	121	138	134
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1356	140	51	261	1820	428	[illegible]	6211	[illegible]	58	55	[illegible]	[illegible]	525	[illegible]	131	121	133	131
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	133	345	1356	140	51	261	1820	448	[illegible]	6211	[illegible]	58	56	[illegible]	[illegible]	541	[illegible]	[illegible]	121	139	134
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1356	140	[illegible]	261	1820	438	[illegible]	6211	33	58	51	[illegible]	[illegible]	541	[illegible]	132	121	135	132
[illegible]	[illegible]	[illegible]	15x2[illegible]	1	[illegible]750	L	135	345	1356	141	51	264	1820	418	[illegible]	6211	33	58	56	[illegible]	[illegible]	542	[illegible]	132	121	131	134
			合计(TOTAL)	12	[illegible]																						

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸=标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST, -20°C, 纵向LONGITUDINAL,
近表 CLOSE TO SURFACE, 尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PERCENTAGE ELONGATION AFTER FRACTURE
According to EN 10204 3.1

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

MTR. 447-23-01 AL MTR. 447-23-12

本产品已按照标准要求进行检验和试验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

日照

冶金技术部部长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR. 447-23- 12 03 10 04 05 01 02 06 07 08 11 09

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区经济开发区内/115005
Yejin street, Laobian Industrial, Yingkou, Liaoning, P. R. China/115005
TEL:0417-3256043 FAX:0417-3256057 NO.:QTZ181701/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGRIZANN23028S001-01
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控轧控冷(CR)
车号 TRAIN NO.		质量证明书号 CERTIFICATE NO.	230302Z00325
		签发日期 DATE OF ISSUE	20230302

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT KG	分析位置 Ana.	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Al	Nb	Ti	Mo_2	屈服强度 BA01 Rel MPa	抗拉强度 BA02 Rm MPa	伸长率 BA03 A %	冲击值 A0C01 A J	冲击值 A0C012 B J	冲击值 A0C013 C J	冲击值 A0C02 Ave. J
2310037B5D	1132270261	1132270261-01	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	287	283	295	283
2310037B5D	1132270261	1132270261-02	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	292	283	295	283
2310037B5D	1132270261	1132270261-03	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	292	283	295	283
2310037B5D	1132270261	1132270261-04	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	292	283	295	283
2310037B5D	1132270261	1132270261-05	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	292	283	295	283
2310037B5D	1132270261	1132270261-06	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	292	283	295	283
2310037B5D	1132270261	1132270261-07	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	292	283	295	283
2310037B5D	1132270261	1132270261-08	50x2438x6095	1	5,832	L	151	331	1342	708	35	290	1808	402	24	6445	58	69	50	110	571	25.5	292	283	295	283
			合计 TOTAL:	8	57,488																						

注解 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=50 mm
A0C01=冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，
1/4位置 1/4 LOCATION，尺寸SIZE10*10*55
BHA01=YIELD STRENGTH
BHA02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

MTR.453-23--01
AL
MTR.453-23--09

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求。特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 453-23- 01 AL 09

日照钢铁营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD
辽宁省营口市老边区疗养街715005
Yajunstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256381 FAX:0417-3256057 NO:DT31013017A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	SAMSUNG C&T CORPORATION	产品名称 PRODUCT	桥梁结构钢 Bridge structural steel
收货单位 CONSIGNEE	SAMSUNG C&T CORPORATION	合同编号 CONTRACT NO.	YGR17ANN23028S001-01
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M ; A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控轧控冷(CR)
		签发日期 DATE OF ISSUE	20230301
		质量证明书编号 CERTIFICATE NO.	230301Z00428
车号 TRAIN NO			

炉号 HEAT NO	批号 LOT NO	钢板号 PLATE NO	规格 SIZE DIMENSION	数量 QTY	重量 WEIGHT kg	分析 AA	C ×10⁻³	Si ×10⁻³	Mn ×10⁻³	P ×10⁻³	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	[illegible] ×10⁻⁴	[illegible] ×10⁻³	[illegible] ×10⁻³	Mo ×10⁻³	屈服强度 YS MPa R1P25	抗拉强度 TS MPa Rm	伸长率 EL % A	冲击功 A J	冲击功 B J	冲击功 C J	平均值 Ave J
2310537820	1132270275	H3227349202	25x2438x8095	1	2,916	L	184	352	1319	100	32	255	1800	473	31	0244	46	58	10	121	582	19	155	171	129	114
2310537820	1132270275	H3227337101	25x2438x8095	1	2,916	L	184	368	1324	100	32	255	1800	473	27	0244	40	83	86	121	[illegible]	19	155	171	129	114
2310537810	1132270274	H3227241202	25x2138x8095	1	2,917	L	185	355	1316	130	16	257	1800	486	23	0125	36	50	50	[illegible]	522	[illegible]	245	245	253	248
2310537810	1132271271	H3227243101	25x2438x8095	1	2,916	L	185	358	1316	130	16	257	1800	488	21	0125	36	50	50	[illegible]	[illegible]	[illegible]	242	245	253	248
2310537810	1132270271	H3227241301	25x2438x8095	1	2,911	L	185	356	1316	130	16	257	1800	485	21	0125	36	53	51	[illegible]	[illegible]	[illegible]	233	241	253	248
2310537810	1132271271	H3227245202	25x2138x8095	1	2,916	L	185	356	1320	130	46	253	1800	485	21	0125	38	60	51	[illegible]	[illegible]	[illegible]	244	245	253	249
2318537840	1132270271	H3227243301	25x2135x8095	1	2,915	L	151	355	1336	138	46	253	1800	486	21	0125	33	60	58	[illegible]	[illegible]	[illegible]	213	243	213	249
2318537840	1132270271	H3227245302	25x2135x8095	1	2,916	L	151	355	1336	138	46	253	1800	486	21	0125	33	60	58	[illegible]	[illegible]	[illegible]	[illegible]	243	273	249
2318537840	1132270271	H3227241101	25x2135x8095	1	2,916	L	153	355	1336	133	48	253	1800	483	24	0125	33	60	58	13	372	[illegible]	214	247	273	247
2318537310	1132270275	H3227241201	25x2135x8095	1	2,818	[illegible]	153	355	1356	133	46	252	1888	326	24	0125	31	60	53	126	[illegible]	[illegible]	118	156	132	146
2318537310	1132270274	H3227241202	25x2135x8095	1	2,818	[illegible]	155	355	1356	153	46	275	1887	349	24	0125	30	60	53	112	567	[illegible]	216	[illegible]	213	249
2318537310	1132270274	H3227241501	25x2135x8095	1	2,818	[illegible]	155	375	1356	153	46	253	1888	326	24	0125	30	60	53	112	572	[illegible]	216	215	253	248
			合计 TOTAL	12	34,992																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
标距长度(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST: 20℃ , 纵向LONGITUDINAL,
近表 CLOSE TO SURFACE , 尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

According to EN 10204 3.1

A0C011=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

MTR.455-23--01 AL MTR.455-23--12

[illegible].455-23--02

本产品已按照标准要求进行检验，结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 455-23-01 AL 12

冶金技术检验中心 DIRECTOR OF METALLURGICAL DEPARTMENT

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD
Vejie(?) street, Laoshandistrict(?) Yingkou, Liaoning P.R.China

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	CUMIC STEEL USA INC	产品名称 PRODUCT	一般耐候结构钢 General atmospheric corrosion resisting steel
收货单位 CONSIGNEE	CUMIC STEEL USA INC	合同号 CONTRACT NO.	YGRIZANN240285008-01
技术标准/牌号 SPEC./GRADE	ASTM A709/A709M : A709 Gr.50W1-Z2-B	交货状态 DELIVERY CONDITION	热轧(AR)
		签发日期 DATE OF ISSUE	20240512
车号 TRAIN NO.		质量证明书号 CERTIFICATE NO.	240512Z00226

炉号 TRAIN NO.	批号 FL NO.	钢板号 PLATE NO.	规格 DIMENSION	数量 QTY	重量 WEIGHT kg	AA	CHEMICAL ANALYSIS %													Rp0.2 MPa	Rm MPa	A %	A J	B J	C J	Ave J
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL				[illegible]	[illegible]																					



注释 NOTES

- 熔炼成分 SMELTING COMPOSITION
- 标距 GAUGE LENGTH Lo=200mm
- A0C 冲击 IMPACT TEST LONGITUDINAL
- CLOSE TO SURFACE, SIZE 10*7.5*55
- P0A01 YIELD STRENGTH
- P0A02 TENSILE STRENGTH
- P0A03 PERCENTAGE ELONGATION AFTER FRACTURE
- A0C01 IMPACT TEST A
- A0C02 IMPACT TEST B
- A0C03 IMPACT TEST C
- A0C04 IMPACT AVERAGE

According to EN 10204 3.1

MTR 456-24-0001, 02, 03, 04, 05, 06

兹证明本产品按照上述技术标准生产和检验，结果满足要求。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长 DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 456-24-01

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MTR 456-24-06

日钢营口中板有限公司
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辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTIFICATE NO.	240213Z00670		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	Nb	Mo	Ti	Nb	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % A5	A0C01 冲击单值 A J	A0C012 冲击单值 B J	A0C013 冲击单值 C J	A0C02 冲击均值 Ave J
							×10⁻³	×10⁻³	×10⁻³	×10⁻⁴	×10⁻⁴	×10⁻²	×10⁻⁴	×10⁻³	×10⁻²	×10⁻³	×10⁻⁴	×10⁻⁴	×10⁻⁴								
24102102D	1142070026	1142070101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070103	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070201	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070202	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070301	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070062	1142070302	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102104D	1142100262	1142103771101	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
							394	599	21	172	187	195	185													
			合计(TOTAL):	7	9,800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 314-24 -01

AL

MTR 314-24 -07

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel	
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01	
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE: 20240213
车号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240213Z00669	

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WHGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C (×10⁻³)	Si (×10⁻³)	Mn (×10⁻³)	P (×10⁻⁴)	S (×10⁻⁴)	Cu (×10⁻³)	Ni (×10⁻⁴)	Cr (×10⁻³)	V (×10⁻³)	I (×10⁻³)	Mo (×10⁻⁴)	Ti (×10⁻⁴)	Nb (×10⁻⁴)	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
24102102D	1142070026	1142064852O1	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142064852O2	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142064852O3	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142064853O1	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142064853O2	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070091O1	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070091O2	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070091O3	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070092O1	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070092O2	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070093O1	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
24102102D	1142070026	1142070093O2	12x2438x6096	1	1.400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
			合计(TOTAL):	12	16.800																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02='TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 315-24 -01
AL
MTR 315-24 -12

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240213Z00668		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Al	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10⁻³	×10⁻²	×10⁻²	×10⁻³	×10⁻³	×10⁻²	×10⁻³	×10⁻³	×10⁻²	×10⁻³	×10⁻³	×10⁻³	×10⁻³								
241021041D	1142070027	1142061833301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	416	605	23.5	134	108	102	115
241021041D	1142070027	1142061833302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	416	605	23.5	134	108	102	115
241021021D	1142070026	1142061841101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061841102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061841201	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061842102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061843301	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061843302	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061844101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061844102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061851101	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
241021021D	1142070026	1142061851102	12x2438x6096	1	1,400	L	144	350	1340	150	42	268	2690	486	24	6418	20	60	40	415	614	28.5	133	123	149	135
			合计(TOTAL):	12	16,800																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST: 20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE 10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 316-24 -01

MTR 316-24 -12

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240213Z00476		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 ΦMD DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Nb	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10⁻²	×10⁻³	×10⁻³	×10⁻⁴	×10⁻⁴	×10⁻³	×10⁻⁴	×10⁻³	×10⁻³	×10⁻³	×10⁻²	×10⁻⁴	×10⁻¹	×10⁻⁴							
24102104D	1142100261	1142103701D1	19x2438x6096	1	2.217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	1142100261	1142103701D2	19x2438x6096	1	2.217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	1142100261	1142103701D3	19x2438x6096	1	2.217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	1142100261	1142103702D1	19x2438x6096	1	2.217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
24102104D	1142100261	1142103702D2	19x2438x6096	1	2.217	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	436	601	23.5	195	228	216	213
			合计(TOTAL):	5	11.085																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST: 20℃, 纵向LONGITUDINAL, 近表 CLOSE TO SURFACE, 尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 317-24 -01
AL
MTR 317-24 -05

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	品名 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
		证明书编号 CERTIFICATE NO.	240213Z00671		
车号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Nb	Mo	Ti	Nb	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % A5	A0C01 冲击单值 A J	A0C012 冲击单值 B J	A0C013 冲击单值 C J	A0C02 冲击均值 Ave J
							×10⁻³	×10⁻²	×10⁻²	×10⁻²	×10⁻³	×10⁻²	×10⁻²	×10⁻³	×10⁻²	×10⁻²	×10⁻³	×10⁻²	×10⁻²								
24102104D	1142070029	1142006187101	19x2438x6096	1	2.217	L	117	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102104D	1142070029	1142006187102	19x2438x6096	1	2.217	L	117	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102104D	1142070029	1142006187201	19x2438x6096	1	2.217	L	117	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102104D	1142070029	1142006187202	19x2438x6096	1	2.217	L	117	353	1330	160	52	273	2550	488	25	6445	10	60	40	413	595	19.5	180	209	160	183
24102102D	1142100255	1142103581O2	25x2438x6096	1	2.917	L	114	358	1340	150	42	268	2690	486	24	6418	20	60	40	418	601	23	267	283	252	267
			合计 (TOTAL):	5	11.785																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 320-24 -01

AL

MTR 320-24 -05

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	品名 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel	
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01	
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE: 20240212
		证明书编号 CERTIFICATE NO.	240212Z00601	
车号 TRAIN NO.				

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	I	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10⁻³	×10⁻³	×10⁻³	×10⁻⁴	×10⁻⁴	×10⁻²	10⁻⁴	×10⁻³	×10⁻³	×10⁻³	×10⁻⁴	×10⁻⁴	×10⁻⁴							
23121614D	1142100256	114210359101	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23121614D	1142100256	114210359102	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23121614D	1142100256	114210359201	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23121614D	1142100256	114210359202	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	412	588	20.5	270	286	295	284
23207959A	1142100257	114210360101	22x2438x6096	1	2.567	L	112	195	1350	170	48	340	1260	191	14	6314	20	10	40	400	554	21.5	316	298	290	301
23207959A	1142100257	114210360102	22x2438x6096	1	2.567	L	112	195	1350	170	48	340	1260	191	14	6314	20	10	40	400	554	21.5	316	298	290	301
23207959A	1142100257	114210360201	22x2438x6096	1	2.567	L	112	195	1350	170	48	340	1260	191	14	6314	20	10	40	400	554	21.5	316	298	290	301
23207959A	1142100257	114210360202	22x2438x6096	1	2.567	L	112	195	1350	170	48	340	1260	191	14	6314	20	10	40	400	554	21.5	316	298	290	301
23116880D	1142100258	114210361101	22x2438x6096	1	2.567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	1142100258	114210361102	22x2438x6096	1	2.567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	1142100258	114210361201	22x2438x6096	1	2.567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	1142100258	114210361202	22x2438x6096	1	2.567	L	149	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
			合计(TOTAL):	12	30.804																					

注释 NOTES

L: 冶炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTIEST: 20℃, 纵向LONGITUDINAL, 近表 CLOSE TO SURFACE, 尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 323-24 -01

AL

MTR 323-24 -12

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAICORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAICORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240212
		证明书编号 CERTIFICATE NO.	240212Z00602		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Ti	Mo	Ti	Nb	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % B5	A0C01 冲击单值 A J	A0C012 冲击单值 B J	A0C013 冲击单值 C J	A0C02 冲击均值 Ave J
							$\times10^{-3}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-4}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-2}$	$\times10^{-2}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-4}$								
24102102D	1142100255	1142103571O1	25x2438x6096	1	2.917	L	111	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	1142100255	1142103571O2	25x2438x6096	1	2.917	L	111	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	1142100255	1142103572O1	25x2438x6096	1	2.917	L	111	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
24102102D	1142100255	1142103572O2	25x2438x6096	1	2.917	L	111	350	1340	150	42	268	2690	486	24	6418	20	60	40	448	601	23	267	283	252	267
23116880D	1142100258	1142103621O1	22x2438x6096	1	2.567	L	119	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	1142100258	1142103621O2	22x2438x6096	1	2.567	L	119	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	1142100258	1142103622O1	22x2438x6096	1	2.567	L	119	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23116880D	1142100258	1142103622O2	22x2438x6096	1	2.567	L	119	189	1360	180	59	329	1460	487	15	6313	20	30	40	419	577	24.5	245	191	209	215
23121614D	1142128006	1142103631O1	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
23121614D	1142128006	1142103631O2	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
23121614D	1142128006	1142103632O1	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
23121614D	1142128006	1142103632O2	22x2438x6096	1	2.567	L	143	321	1330	250	37	276	3100	496	23	6649	10	50	40	410	583	21	261	268	196	242
		合计(TOTAL):		12	32.204																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 325-24 -01

AL

MTR 325-24 -12

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel	
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01	
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE: 20240212
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240212Z00603	

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Nb	Mo	Ti	N	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % A5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							<0.10	<0.10	<1.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10							
24102102D	1142100255	1142103581O1	25x2438x6096	1	2.917	L	114	350	1340	150	42	268	2690	486	24	6418	20	60	40	118	601	23	267	283	252	267
24102102D	1142100255	1142103582O1	25x2438x6096	1	2.917	L	114	350	1340	150	42	268	2690	486	24	6418	20	60	40	118	601	23	267	283	252	267
24102102D	1142100255	1142103582O2	25x2438x6096	1	2.917	L	114	350	1340	150	42	268	2690	486	24	6418	20	60	40	118	601	23	267	283	252	267
			合计(TOTAL):	3	8.751																					

注释 NOTES

L：冶炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 328-24 -01

AL

MTR 328-24 -03

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

ISF 2AP752L04

注文者
SHIPPER METAL ONE CORPORATION

契約番号 CONTRACT No 2-831 R1-5-X-BX08
船番 SHIP No.

品名
COMMODITY HOT ROLLED STEEL PLATES

規格
SPECIFICATION ASTM A572 21 GRADE 50

需要家
CUSTOMER TERNIUM PROCUREMENT SA

日本製鉄株式会社
NIPPON STEEL CORPORATION

鋼材検査証明書
INSPECTION CERTIFICATE

本社 〒100-8071 東京都千代田区丸の内二丁目6番1号
HEAD OFFICE 2-6-1, MARUNOUCHI, CHIYODA-KU TOKYO, 100-80 JAPAN
東日本製鉄所 鹿島 〒314-0014 茨城県鹿嶋市光3番地
EAST NIPPON WORKS KASHIMA 3, HIKARI, KASHIMA-CITY, IBARAKI-PREF., 314-0014, JAPAN

証明書番号 CERTIFICATE No E22006629
頁 PAGE 1
発行年月日 DATE OF ISSUE 2022-12-21

需要家管理番号 CUSTOMER'S CONTROL No. CO-24234
文書番号 DOCUMENT No.

需要家照合番号 ORDER ITEM No / 寸法 DIMENSION mm, H.inch, F:feet	員数 QUANTITY	質量 MASS KG	製鋼番号 HEAT No / 試験番号 TEST No	製品番号 PLATE No	引張試験 TENSILE TEST 降伏点 YP, YS	引張強さ TS	伸び EL %	衝撃試験 IMPACT TEST 試験温度 TEST TEMP.	吸収エネルギー ABSORBED ENERGY 1	2	3	AVG	化学成分 CHEMICAL COMPOSITION % C 2	Si 2	Mn 2	P 3	S 3	Cu 2	Ni 2	Cr 2	Mo 2	Nb 2	V 2	Sol. Al	CEQ	備考
01 38X2440X6096	3	13308	2B30227	FROM MX0018X01992001 TO X01992003	TCF 57	74	30						L 15	26	113	9	2	1	1	3	0	1	0		H	
01 38X2440X6096	1	4436	2B30227	MX0018X01992101	TCF 57	74	30						L 15	26	113	9	2	1	1	3	0	1	0		H	A
01 38X2440X6096	1	4435	2B30227	MY0018X01992102	TCF 59	77	25						L 15	26	113	9	2	1	1	3	0	1	0		H	A
02 32X2440X6096	1	3735	2A21404	MX0020X60707601	TCF 55	78	27						L 14	28	114	17	1	1	1	2	0	1	0		H	A
02 32X2440X6096	1	3735	2A21404	MY0020X60707602	TCF 59	76	29						L 14	28	114	17	1	1	1	2	0	1	0		H	A
02 32X2440X6096	3	11205	2B30227	FROM MY0018X01992201 TO X01992203	TCF 59	77	25						L 15	26	113	9	2	1	1	3	0	1	0		H	A
02 32X2440X6096	1	3735	2920727	MX0021X60708301	TCF 64	78	26						L 15	27	116	12	2	1	1	2	0	1	0		H	A
02 32X2440X6096	1	3735	2920727	MY0021X60708302	TCF 61	76	28						L 15	27	116	12	2	1	1	2	0	1	0		H	A
02 32X2440X6096	1	3735	2922703	MX0022X60708601	TCF 63	74	26						L 15	27	115	10	2	1	1	2	0	1	0		H	A
02 32X2440X6096	1	3735	2922703	MY0022X60708602	TCF 56	73	29						L 15	27	115	10	2	1	1	2	0	1	0		H	A

注釈 NOTES ※1 試験片熱処理区分 Test piece heat treatment H:試験片熱処理後 Heat treated for test piece. F:なり blank 供給まま As-supplied ※2 位置 Location T:Top B:Bottom ※3 方向 Direction L:圧延方向 Longitudinal C:板厚方向 Transverse Z:板厚方向 Through Thickness R:45°方向 45Deg. to the Longitudinal Axis ※4 厚み位置 Position in thickness F:全厚 Full-thick. S:板厚 Surface B:Bottom surface Q:1/4厚 Quarter-thick. M:1/2厚 Mid-thick. T:1/3厚 Third-thick. A:3/4厚 Three quarter-thick. U:表面下12.5mm 12.5mm-under surface N:半厚 Half-thick ※5 試験片形状 Shape of test specimen R:丸棒 Round type specimen. A:平板 Plate type specimen. ※6 YP:降伏点 Yield Point or Yield Strength TS:引張強さ Tensile Strength EL:伸び Elongation GL:標点距離 Gauge Length W:幅 Width T:厚さ Thickness D:径 Diameter ※7 RA:絞り Reduction of Area YR:降伏比 Yield Ratio ※8 A:合格 Acceptable ※9 引張試験試験片形状 E:50mm Full 2:25mm Sub. 3:38mm Sub. 4:40mm Sub. 6:6.25mm Sub. 7:12.5mm Sub. 8:20mm Sub. 9:10mm Round A:Plate Thickness ※10 分析部分 Analysis L:レードル分析 Ladle P:製品分析 Product ※11 超音波試験 Ultrasonic test A:Acceptable ※12 中径、外径、断面減少率 Dimension Visual Shape Inspection A:Acceptable. ※13 熱処理状態 Condition of supply H:TMCP ※MISC 温度 Temperature:℃ F Pa N/mm² kgf/mm² Air plates are produced by following process. STEEL MAKING:LD Process and Fully-killed practice. 破面性状記号 Fracture Appearance:Shear Fractured CF:混性破面率 Crystallinity Fracture LE:横膨出 Lateral Expansion AGS:オーステナイト粒度 Austenite Grain Size FGS:フェライト粒度 Ferrite Grain Size SR Stress Relieved/PostWeld Heat Treatment

上記注文品は御指定の規格または仕様に従って製造され、その要求事項を満足していることを証明します。

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN MADE IN ACCORDANCE WITH THE RULES OF THE CONTRACT.

MTR.358,23-三10

MTR.358-23-09

HIDENORI FUKAMI
深水 秀範
東日本製鉄所 品質保証室
HEAD OF DEPARTMENT
QUALITY ASSURANCE DEPT
EAST NIPPON WORKS

092*********MF04E

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<Notice>Modification to or unauthorized use of this certificate is strictly prohibited. If you have any questions on the authenticity of this certificate, you can contact us by E-mail: ar-info.ej@nipponsteel.com

MTR.358,23-三09

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240217
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240217Z00204		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 MM DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS% C	Si	Mn	P	S	Cu	Ni	Cr	V	Ti	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							$\times10^{-2}$	$\times10^{-2}$	$\times10^{-1}$	$\times10^{-4}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-4}$	$\times10^{-4}$								
24201194A	S42150126	S4215246101	9x2438x6096	1	1,050	L	14	35	134	21	4	28	28	16	2	66	1	6	4	376	605	25	53	67	55	58
24201194A	S42150126	S4215246102	9x2438x6096	1	1,050	L	14	35	134	21	4	28	28	16	2	66	1	6	4	376	605	25	53	67	55	58
24201194A	S42150126	S4215246201	9x2438x6096	1	1,050	L	14	35	134	21	4	28	28	16	2	66	1	6	4	376	605	25	53	67	55	58
24201194A	S42150126	S4215246202	9x2438x6096	1	1,050	L	14	35	134	21	4	28	28	16	2	66	1	6	4	376	605	25	53	67	55	58
			合计 (TOTAL):	4	4,200																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 304-24 -01

A2

MTR 304-24 -04

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240213Z00475		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Ti	Mo	Ti	Nb	B BA01 屈服强度 MPa Rp0.2	B BA02 抗拉强度 MPa Rm	B BA03 断后伸长率 % B5	A A0C01 冲击单值 A J	A A0C012 冲击单值 B J	A A0C013 冲击单值 C J	A A0C02 冲击均值 Ave J
							×10⁻³	×10⁻³	×10⁻³	×10⁻¹	×10⁻⁴	×10⁻³	×10⁻⁴	×10⁻²	×10⁻³	×10⁻³	×10⁻⁴	×10⁻¹	×10⁻⁴							
24102104D	1142100262	1142103731O3	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	1142103732O1	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	1142103732O2	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	1142103732O3	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	1142103733O1	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	1142103733O2	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
			合计 (TOTAL):	6	8,400																					

注释 NOTES

L: 专炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST: 20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 306-24 -01
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MTR 306-24 -06

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGRIZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240202
		证明书编号 CERTIFICATE NO.	240202Z00760		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 D×W×L DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C (×10⁻³)	Si (×10⁻³)	Mn (×10⁻³)	P (×10⁻⁴)	S (×10⁻⁴)	Cu (×10⁻³)	Ni (×10⁻⁴)	Cr (×10⁻³)	V (×10⁻³)	Ti (×10⁻³)	Mo (×10⁻⁴)	B (×10⁻⁴)	Nb (×10⁻⁴)	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % B5	A0C011 冲击单值 A J	A0C012 冲击单值 B J	A0C013 冲击单值 C J	A0C02 冲击均值 Ave J
23208651C	1141290121	1141291241O1	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291241O2	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291242O2	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291242O3	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291251O1	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291252O1	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291252O2	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291252O3	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291261O1	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	1141291262O1	12x2438x6096	1	1,400	L	140	164	1320	150	58	315	1240	473	11	6131	30	30	40	382	554	21.5	157	144	96	132
			合计(TOTAL):	10	14,000																					

注释 NOTES

L: 炉炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST: 20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明
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冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 307-24 -01

AL

MTR 307-24 -10

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	品名 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240204
		证明书编号 CERTIFICATE NO.	240204Z00239		
车号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (M/M) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Ti	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % A5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							10^{-2}	10^{-3}	10^{-2}	10^{-4}	10^{-4}	10^{-2}	10^{-4}	10^{-3}	10^{-3}	10^{-3}	10^{-4}	10^{-4}	10^{-4}								
23208651C	1141290121	114129124201	12x2438x6096	1	1.400	L	110	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	114129125102	12x2438x6096	1	1.400	L	110	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	114129126102	12x2438x6096	1	1.400	L	110	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	114129126201	12x2438x6096	1	1.400	L	110	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
23208651C	1141290121	114129126203	12x2438x6096	1	1.400	L	110	164	1320	150	58	315	1240	473	14	6131	30	30	40	382	554	21.5	157	144	96	132
			合计(TOTAL):	5	7.000																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST: 20℃, 纵向LONGITUDINAL, 近表 CLOSE TO SURFACE, 尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 306-24 -01
AL
MTR 308-24 -05

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240213
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240213Z00474		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Nb	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % A5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							×10⁻³	×10⁻²	×10⁻²	×10⁻²	×10⁻³	×10⁻²	×10⁻²	×10⁻²	×10⁻²	×10⁻²	×10⁻²	×10⁻²	×10⁻²								
24102104D	1142100262	114210371102	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	114210371103	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	114210371201	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	114210371202	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	114210371203	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	114210371301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
24102104D	1142100262	114210371302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
23121141A	1142100263	114210372101	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
23121141A	1142100263	114210372102	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
23121141A	1142100263	114210372201	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
23121141A	1142100263	114210372202	12x2438x6096	1	1,400	L	135	330	1370	170	51	284	2690	458	25	6474	10	60	40	401	588	24	205	171	156	177
24102104D	1142100262	114210373102	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
			合计 (TOTAL):	12	16,800																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST: 20℃, 纵向LONGITUDINAL, 近表 CLOSE TO SURFACE, 尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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野牛

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 309-24 -01
AL
MTR 309-24 -12

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240212
		证明书编号 CERTIFICATE NO.	240212Z00234		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Ti	Mo	B	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % A5	A 0C01 冲击单值 J A	A 0C012 冲击单值 J B	A 0C013 冲击单值 J C	A 0C02 冲击均值 J Ave
							$\times10^{-2}$	$\times10^{-2}$	$\times10^{-2}$	$\times10^{-4}$	$\times10^{-4}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-3}$	$\times10^{-4}$	$\times10^{-4}$	$\times10^{-4}$								
24102184D	H42100262	H42103731O1	12x2438x6096	1	1.400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	420	617	22.5	103	103	101	102
			合计(TOTAL):	1	1.400																					

注释 NOTES

L：熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST：20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

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冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

野牛

MTR 310-24 -01

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
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TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	品名 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel	
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01	
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE: 20240219
车号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240219Z00181	

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Nb	Mo	Ti	Nb	B0A01 屈服强度 MPa Rp0.2	B0A02 抗拉强度 MPa Rm	B0A03 断后伸长率 % B5	A0C01 冲击单值 A J	A0C012 冲击单值 B J	A0C013 冲击单值 C J	A0C02 冲击均值 Ave J
							<10⁻³	<10⁻³	<10⁻²	<10⁻⁴	<10⁻⁴	<10⁻³	10⁻⁴	<10⁻²	<10⁻²	<10⁻²	<10⁻⁴	<10⁻¹	<10⁻⁴								
24102104D	1142110085	1142110370301	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142110085	1142110370302	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
			合计 (TOTAL):	2	2,800																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACT TEST: 20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 311-24 -01

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

MTR 311-24 -02

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240216
		证明书编号 CERTIFICATE NO.	240216Z00670		
车 号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻³	Si ×10⁻³	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Cu ×10⁻³	Ni ×10⁻⁴	Cr ×10⁻³	V ×10⁻³	Ti ×10⁻³	Mo ×10⁻⁴	B ×10⁻⁴	Nb ×10⁻⁴	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % A5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
24102104D	1142140085	1142140371@1	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140371@2	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140371@3	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140372@1	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140372@2	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140381@1	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140381@2	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140382@1	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140382@2	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140383@1	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
24102104D	1142140085	1142140383@2	12x2438x6096	1	1,400	L	147	353	1330	160	52	273	2550	488	25	6445	10	60	40	404	617	23	56	63	63	61
			合计 (TOTAL):	12	16,800																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C2冲击试验IMPACT TEST: 20℃, 纵向LONGITUDINAL, 近表 CLOSE TO SURFACE, 尺寸 SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

野牛

MTR 313-24 -01
AL

MTR 313-24 -12

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

南冶钢铁 NANSTEEL

湖南南冶钢铁有限公司
Nansteel Manufacturing Co., Ltd.
湖南省长沙市岳麓科技工业园学士路
21ST&22ND FLOOR GOLDEN TOWER, CHANGSHA WEST INTERNATIONAL CENTRAL MANSION, YUELU DISTRICT, CHANGSHA, HUNAN, CHINA

产品质量证明书
MILL TEST CERTIFICATE

(EN 10204 3.1)

生产许可证编号 Production license No: TS2710L40-2018
T:+86 731 8878 7789
E:info@nan-steel.com
Page:www.nan-steel.com

订货单位 Customer	KENNA INTERNATIONAL CORPORATION PTY LTD	合同编号 Contract No	NSCO2497S	总件数 Total PCS	624	出证日期 DATE OF ISSUE	2024.09.26
品种名称 Product Name	角钢/EQUAL ANGLE STEEL	产品要求标准 Technical Specification	ASTM A709 ZONE 1 WT	证书编号 Certificate No	24978-01	交货条件 DELIVERY	热轧Hot Rolling

炉号 Heat No.	尺寸 Size 宽*长*厚W*L*T Specification(mm)	理论 Theoretical Weight(kg/m)	件数 pcs	总长度 total length (m)	总重量 total weight (kg)	钢号 Steel Grade	机械性能Mechanical Property Tensile Strength	Yield Strength	Elongation	冲击试验Impact Test (+20℃) 1	2	3	通径测试 Drift Test	水压试验 Hydrostatic Test	金相检验 Metallographic Test
							Mpa		%	J					
32408310	ANGULO 4*4*3/8*12M	14.60	143	1,716	25,053.60	GR.50	550	385	27.0	54	52	57	-	-	-
32406096	ANGULO 4*4*1/2*12M	19.07	306	3,672	70,025.04	GR.50	510	375	36.0	62	68	57	-	-	-
32407175	ANGULO 4*4*5/8*12M	23.30	89	1,068	24,884.40	GR.50	510	360	29.0	73	69	68	-	-	-
24303773DF2	ANGULO 5*5*1/2*12M	24.13	86	1,032	24,902.16	GR.50	522	370	31.0	114	121	126	-	-	-
Total			624	7,488	144,865.20										

炉号 Heat No	化学成分 Chemical Composition (%) C	Mn	Si	P	S	Cr	Ni	Cu	B	V+Nb+Ti	CE	压扁测试 Flattening Test	硬度 Hardness Test HRC	弯曲试验 Bend Test	非金属夹杂 Non-metallic Inclusions A 细/粗	B 细/粗	C 细/粗	D 细/粗	带状 The Banded Structure	漏磁 Leakage	超声 Ultrasound	外观尺寸及表面 The Size of Surface Appearance
32408310	0.210	1.300	0.360	0.029	0.017	-	-	-	-	-	-	-	-	PASS	-	-	-	-	-	-	-	PASS
32406096	0.180	1.290	0.350	0.028	0.018	-	-	-	-	-	-	-	-	PASS	-	-	-	-	-	-	-	PASS
32407175	0.210	1.320	0.176	0.019	0.017	-	-	-	-	-	-	-	-	PASS	-	-	-	-	-	-	-	PASS
24303773DF2	0.180	1.280	0.310	0.022	0.016	-	-	-	-	-	-	-	-	PASS	-	-	-	-	-	-	-	PASS

注号 Note: 我们证明本文所代表的材料已经过检验和试验，并且符合参考规范和您的采购订单的要求。
We certify that the material represented by this document has been inspected and tested, and is in conformance with the requirements of the referenced specification's and your purchase order.

启运年龄 Starting to take effect

检验 INSPECTOR: Li Yaning　　发货 CONSIGNOR: Mr. Wang　　签批 APPROVAL: Xiang Wang

王翔

FTR003 -25- 01

HS SANDEC
APROBADO
QC 5

FTR003 -25- 04

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240885001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M;A709 Gr.50WT-Z2-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240926
车 号 TRAIN NO.		证明书编号 CERTIFICATE NO.	240926Z01206		

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C ×10⁻²	Si ×10⁻³	Mn ×10⁻³	P ×10⁻⁴	S ×10⁻⁴	Ni ×10⁻⁴	Cr ×10⁻³	Cu ×10⁻³	V ×10⁻³	Mo ×10⁻⁴	Nb ×10⁻⁴	I ×10⁻⁶	Als ×10⁻³	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
24116443D	H49240116	H4924154101	12x2438x12192	1	2,800	L	69	363	1380	170	83	3350	466	317	22	30	130	7	37	373	556	25.5	153	179	153	162
24116443D	H49240116	H4924154201	12x2438x12192	1	2,800	L	69	363	1380	170	83	3350	466	317	22	30	130	7	37	373	556	25.5	153	179	153	162
24116443D	H49240116	H4924154301	12x2438x12192	1	2,800	L	69	363	1380	170	83	3350	466	317	22	30	130	7	37	373	556	25.5	153	179	153	162
24116443D	H49240116	H4924154401	12x2438x12192	1	2,800	L	69	363	1380	170	83	3350	466	317	22	30	130	7	37	373	556	25.5	153	179	153	162
			合计 (TOTAL):	4	11,200																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST：4℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*10*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

野牛

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明。
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

MTR 36 -25-0 AL MTR 36 -25-04

HB SADELEC
APROBADO
QC 5

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

Mill Test Certificate

Certificate No. : 211108-FP01PS-0005A1-0001
Date of Issue : Nov., 25, 2021

posco

Order No. : 01S5221952
PO No. : HB1
Supplier : POSCO INTERNATIONAL CORPORATION
Commodity : STEEL PLATE
Customer : H B ESTRUCTURAS METALICAS
Spec & Type : ASTM A709-50W T-z1-B

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test YP (㎫)	TS	EL (%)	Impact Test V Notch +21℃ Energy (Joule)	Division	Chemical Composition C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Cu (%)	V (%)	Sol-Al (%)
15.8x2440x6096	PC98479801-9802	2	3,688	SB24632	T	372	624	22	1: 149 2: 146 3: 132 A: 142	L	0.0688	0.332	1.300	0.0069	0.0019	0.488	0.351	0.319	0.052	0.032
										P	0.0667	0.337	1.307	0.0074	0.0018	0.488	0.361	0.311	0.053	0.032
15.8x2440x6096	PB62513101-3108	8	14,752	SB24643	T	408	598	23	1: 311 2: 256 3: 271 A: 279	L	0.0705	0.345	1.299	0.0074	0.0022	0.478	0.332	0.324	0.053	0.033
										P	0.0694	0.324	1.290	0.0073	0.0019	0.479	0.338	0.314	0.054	0.034
15.8x2440x6096	PB62513001-3008	8	14,752	SB24645	T	415	625	23	1: 223 2: 195 3: 172 A: 197	L	0.0745	0.359	1.293	0.0075	0.0022	0.482	0.330	0.324	0.052	0.033
										P	0.0702	0.323	1.275	0.0068	0.0020	0.470	0.325	0.322	0.053	0.031
*** Sub Total (010) ***		18	33,192 (kg)		***															
*** Heat Treatment ===> Thermo Mechanical Rolling + Accelerated Cooling																				
32x2440x6096	PB62463601-3604	4	14,940	SB24643	T	475	635	21	1: 308 2: 290 3: 287 A: 295	L	0.0705	0.345	1.299	0.0074	0.0022	0.478	0.332	0.324	0.053	0.033
										P	0.0694	0.324	1.290	0.0073	0.0019	0.479	0.338	0.314	0.054	0.034
32x2440x6096	PB62463501-3502	2	7,470	SB24649	T	511	672	21	1: 327 2: 315 3: 311 A: 318	L	0.0754	0.342	1.290	0.0069	0.0016	0.483	0.330	0.327	0.053	0.035
										P	0.0711	0.328	1.280	0.0069	0.0013	0.476	0.334	0.322	0.053	0.035
32x2440x6096	PB62463504	1	3,735	SB24649	T	511	672	21	1: 327 2: 315 3: 311 A: 318	L	0.0754	0.342	1.290	0.0069	0.0016	0.483	0.330	0.327	0.053	0.035
										P	0.0711	0.328	1.280	0.0069	0.0013	0.476	0.334	0.322	0.053	0.035

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test. Direction : Transversal, Gauge Length : 200 ㎜(Rectangular), YP Method : Upper Point
* Impact Test. Direction : 1/4T Transversal, Full-Size : 10 ㎜X10 ㎜
* Division - L : Ladle Analysis, P : Products Analysis
* Supply Condition : As-Rolled unless otherwise Heat Treated.

We hereby certify that the material herein has been made in accordance with the order and above specification.
This material has been fully killed and made by basic oxygen process. This material is fine grained steel.
This material has been made by vacuum degassing and calcium treated process.
Test Certificate is issued according to ISO 10474/EN 10204 3.1.
Melted and Manufactured in Republic of Korea

Legal sanction can be imposed on forging. Improper use of product can cause safety issues.

MTR 046 -22-03AL

Surveyor To :

MTR 046 -22-06

T.C.BAE

Chief of material testing section

Bae, Tae C

Mill Test Certificate

Certificate No. : 211108-FP01PS-0005A1-0002
Date of Issue : Nov., 25, 2021

POSCO

Order No. : 01S5221952
PO No. : HB1
Supplier : POSCO INTERNATIONAL CORPORATION
Commodity : STEEL PLATE
Customer : H.B ESTRUCTURAS METALICAS
Spec & Type : ASTM A709-50W T-z1-B

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test YP (MPa)	Tensile Test TS (MPa)	Tensile Test EL (%)	Impact Test V Notch +21℃ Energy (Joule)	Division	C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Cu (%)	V (%)	Sol-Al (%)
32x2440x6096	PB62463401-3404	4	14,940	SB24649	T	511	672	21	1: 325 2: 327 3: 325 A: 326	L	0.0754	0.342	1.290	0.0069	0.0016	0.483	0.330	0.327	0.053	0.035
										P	0.0711	0.328	1.280	0.0069	0.0013	0.476	0.334	0.322	0.053	0.035
32x2440x6096	PB62464501-4504	4	14,940	SB24649	T	511	672	21	1: 276 2: 296 3: 300 A: 291	L	0.0754	0.342	1.290	0.0069	0.0016	0.483	0.330	0.327	0.053	0.035
										P	0.0711	0.328	1.280	0.0069	0.0013	0.476	0.334	0.322	0.053	0.035
32x2440x6096	PB62464301-4305	5	18,675	SB24649	T	511	672	21	1: 273 2: 280 3: 297 A: 283	L	0.0754	0.342	1.290	0.0069	0.0016	0.483	0.330	0.327	0.053	0.035
										P	0.0711	0.328	1.280	0.0069	0.0013	0.476	0.334	0.322	0.053	0.035
32x2440x6096	PB62464401-4405	5	18,675	SB24649	T	511	672	21	1: 281 2: 289 3: 259 A: 276	L	0.0754	0.342	1.290	0.0069	0.0016	0.483	0.330	0.327	0.053	0.035
										P	0.0711	0.328	1.280	0.0069	0.0013	0.476	0.334	0.322	0.053	0.035
32x2440x6096	PB62464201-4205	5	18,675	SB24649	T	511	672	21	1: 284 2: 296 3: 303 A: 294	L	0.0754	0.342	1.290	0.0069	0.0016	0.483	0.330	0.327	0.053	0.035
										P	0.0711	0.328	1.280	0.0069	0.0013	0.476	0.334	0.322	0.053	0.035
32x2440x6096	PB62464101-4105	5	18,675	SB24649	T	511	672	21	1: 280 2: 302 3: 282 A: 288											
*** Sub Total (029) ***		35	130,725 (kg)																	
*** Heat Treatment ===> Thermo Mechanical Rolling + Accelerated Cooling ***																				

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test. Direction : Transversal, Gauge Length : 200 ㎜(Rectangular), YP Method : Upper Point
* Impact Test. Direction : 1/4T Transversal, Full-Size : 10 ㎜X10 ㎜
* Division - L : Ladle Analysis, P : Products Analysis
* Supply Condition : As-Rolled unless otherwise Heat Treated.

We hereby certify that the material herein has been made in accordance with the order and above specification.
This material has been fully killed and made by basic oxygen process. This material is fine grained steel.
This material has been made by vacuum degassing and calcium treated process.
Test Certificate is issued according to ISO 10474/EN 10204 3.1.
Melted and Manufactured in Republic of Korea

Legal sanction can be imposed on forging. Improper use of product can cause safety issues.

Surveyor To : KTR 047 -22-04

T.C.BAE

Chief of material testing section Bae, Tae C

POSCO Pohang Works, 6262, Donghaean-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, 37877, Korea

KOCAER

Kocaer Celik San. Ve Tic. A.S.
Address: Yenifoca Yolu Uzeri 3.Km
Aliaga, Izmir/Turkey

www.kocaersteel.com

info@kocaersteel.com
Phone -902326251166
Fax +902326251966

TO : HB ESTRUCTURAS METALICAS SAS
AV. CARRERA 129 No. 17F-97 BOGOTA, COLOMBIA
COLOMBIA

MILL TEST CERTIFICATE

IN ACCORDANCE WITH EN 10204:2004 3.1 | DATE: 12.01.2024 | NO:KCR-179 | PAGE: 1 / 1

* DESCRIPTION OF GOODS :
PRIME QUALITY HOT ROLLED STEEL PROFILES
AS PER QUALITY A572 GR50 TP2, ACCORDING TO ASTM A6
AS PER SALES CONTRACT NO: K-231120 05/SDL-24 DATED: 20.11.2023

HOT ROLLED STEEL C CHANNELS ACC TO ASTM A572-21

SIZE (H x B x wth)	QUALITY	LENGTH (mm)	TOTAL PIECES	QUANTITY (MT)	HEAT NO	MECHANICAL PROPERTIES YIELD STRENGTH (N/mm²)	TENSILE STRENGTH (N/mm²)	% ELONG	BEND TEST 180°	CHEMICAL PROPERTIES (LADLE) C %	Si %	Mn %	P %	S %	Cu %	N (ppm)	V %	Cr %	Ni %	Mo %	CEQ %
C 6 X 8.2	A572 GR50 TP2	6000	22	1,610	23171964	415	595	24	OK	0,20	0,23	0,94	0,035	0,008	0,40	110	0,014	0,140	0,106	0,010	0,42
C 6 X 8.2	A572 GR50 TP2	6000	176	13,028	23280464	457	593	24	OK	0,21	0,18	0,91	0,015	0,010	0,47	90	0,015	0,082	0,127	0,020	0,42

Tolerances on shape and dimensions are fulfilled Acc. to American Standard ASTM A6/A6M-02
Mechanical and chemical requirements are fulfilled Acc. to client specifications and American Standard ASTM A572-21
Standard for surface: EN 10163-3:2004, Class C, Subclass 1
Steel Making Process: Electric Arc Furnace — Deoxidation Method: Killed Steel

Tensile test as per ASTM A370
Chemical test as per CEN/TR 10261
CEQ:C+Mn/6+ (Cr+Mo+V)/5+(Ni+Cu)/15

ISSUED BY

MTR 05324-01
02

MTP 053 24 -01
MTR 053 24 -02

2000038444

KOCAER

Kocaer Celik San. Ve Tic. A.S.
Address: Yenifoca Yolu Uzeri 3.Km
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TO : HB ESTRUCTURAS METALICAS SAS
AV. CARRERA 129 No. 17F-37 BOGOTA, COLOMBIA
COLOMBIA

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MILL TEST CERTIFICATE

IN ACCORDANCE WITH EN 10204:2004 3.1 | DATE : 25.01.2024 | NO :KCR-180 | PAGE : 1 / 1

*** DESCRIPTION OF GOODS :**
PRIME QUALITY HOT ROLLED STEEL PROFILES
AS PER QUALITY A572 GR50 TP2, ACCORDING TO ASTM A6
AS PER SALES CONTRACT NO: KH231120 05/SDL-24 DATED: 20.11.2023

HOT ROLLED STEEL C CHANNELS ACC TO ASTM A572-21

SIZE (in. x lb/ft)	QUALITY	LENGTH (mm)	TOTAL PIECES	QUANTITY (MT)	HEAT NO	MECHANICAL PROPERTIES			BEND TEST 180°	CHEMICAL PROPERTIES (LADLE)											
						YIELD STRENGTH (N/mm²)	TENSILE STRENGTH (N/mm²)	% ELONG.		C %	Si %	Mn %	P %	S %	Cu %	N (ppm)	V %	Cr %	Ni %	Nb %	Ceq %
C 6 X 10.5	A572 GR50 TP2	12000	144	26,952	23171046	398	483	25	OK	0,21	0,22	0,99	0,020	0,012	0,35	100	0,014	0,130	0,110	0,020	0,44
C 6 X 10.5	A572 GR50 TP2	12000	150	28,307	23173994	408	578	25	OK	0,20	0,23	0,94	0,033	0,005	0,40	110	0,014	0,140	0,100	0,010	0,42
C 6 X 11.5	A572 GR50 TP2	12000	120	24,824	23170111	409	581	30	OK	0,21	0,21	0,97	0,023	0,005	0,32	110	0,014	0,140	0,110	0,020	0,44

Tolerances of shape and dimensions are fulfilled Acc. to American Standard ASTM A6/A6M-22
Mechanical and chemical requirements are fulfilled Acc. to client specifications and American Standard ASTM A572-21
Standard for surface: EN 10163-3:2004, Class C, Subclass 1
Steel Making Process: Electric Arc Furnace — Deoxidation Method: Killed Steel

Tensile test as per ASTM A370
Chemical test as per CEN/TR 10261
CEQ=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

ISSUED BY

MTR 064-24 -01
MTR 064-24 -02
MTR 064-24 -03

MTR 064-24-01
02
03

2000032444

KOCAER

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Aliaga, Izmir/Turkey

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Fax +902326251966

TO : HB ESTRUCTURAS METALICAS SAS
AV. CARRERA 129 No. 17F-97 BOGOTA, COLOMBIA
COLOMBIA

MILL TEST CERTIFICATE

IN ACCORDANCE WITH EN 10204:2004 3.1 | DATE: 24.01.2024 | NO: KCR-180-24/CS-1/A

* DESCRIPTION OF GOODS :
PRIME QUALITY HOT ROLLED STEEL PROFILES
AS PER QUALITY A572 GR50 TP2, ACCORDING TO ASTM A6
AS PER SALES CONTRACT NO: KH231120 05/SDL-24 DATED: 20.11.2023

HOT ROLLED STEEL C CHANNELS ACC TO ASTM A572-22

SIZE (in. x lbs/ft.)	QUALITY	LENGTH (mm)	TOTAL PCSS	QUANTITY (MT)	HEAT NO	MECHANICAL PROPERTIES: YIELD STRENGTH (N/mm²)	TENSILE STRENGTH (N/mm²)	% EL 50 mm	BEND TEST 180°	CHEMICAL PROPERTIES (LADLE) C %	Si %	Mn %	P %	S %	Cu %	CE (IIW)	V %	Cr %	Ni %	Mo %	Ceq %
C 6 X 10.5	A572 GR50 TP2	12000	144	26,052	23171946	398	490	25	OK	0,21	0,22	0,99	0,020	0,012	0,35	309	0,014	0,130	0,110	0,020	0,44
C 8 X 10.5	A572 GR50 TP2	12000	130	24,332	23171984	400	578	25	OK	0,20	0,23	0,64	0,033	0,005	0,40	310	0,014	0,140	0,100	0,010	0,42
C 8 X 11.5	A572 GR50 TP2	12000	120	24,624	23172011	406	581	30	OK	0,21	0,21	0,97	0,023	0,005	0,32	310	0,014	0,140	0,110	0,020	0,44

Tolerances on shape and dimensions are fulfilled Acc. to American Standard ASTM A6/A6M-22
Mechanical and chemical requirements are fulfilled Acc. to client specifications and American Standard ASTM A572-21
Standard for surface: EN 10163-3:2004, Class C, Subclass 1

Steel Making Process: Electric Arc Furnace — Deoxidation Method: Killed Steel

* Tensile test as per ASTM A370
Chemical test as per CEN/TR 10261
CE: C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

ISSUED BY

0000036444

INFORME DE ENSAYOS

Ternium

Razón Social:	**Ternium Siderurgica de Caldas**	Página Web:	**www.ternium.com.co**
NIT:	**900174468-4**		
Teléfono:	**01 8000 114 114**		
Dirección:	**Km 2 Vía Termales la Enea. Manizales**		

INFORMACION GENERAL

Cliente:	**FABRICA DE ESTRUCTURAS SADE ELECTRI**	Fecha Impresión	**21/03/30**
Dirección:	**AV CR 129 17F 97 BOGOTA**	No. Remisión:	**82307806**
Teléfono:	**4224700**	Página:	**1 de 4**

DATOS GENERALES / PROPIEDADES QUIMICAS

MATERIAL	DESCRIPCION	LOTE	NORMA	FABRICANTE	% C	% Mn	% Si	% S	% P	% Nb	% Ce	% Cr	% Ni	% Cu
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351707 01	ASTM A572 GR50	Ternium	0.210	0.89	0.19	0.024	0.016	0.002	0.38	0.13	0.07	0.19
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351708 02	ASTM A572 GR50	Ternium	0.210	0.89	0.19	0.024	0.016	0.002	0.38	0.13	0.07	0.19
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351709 03	ASTM A572 GR50	Ternium	0.210	0.89	0.19	0.024	0.016	0.002	0.38	0.13	0.07	0.19
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351713 04	ASTM A572 GR50	Ternium	0.210	0.89	0.19	0.024	0.016	0.002	0.38	0.13	0.07	0.19
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351714 05	ASTM A572 GR50	Ternium	0.210	0.89	0.19	0.024	0.016	0.002	0.38	0.13	0.07	0.19
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351801 06	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351802 07	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351803 08	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351804 09	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351805 10	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351806 11	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351807 12	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351808 13	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351809 14	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351810 15	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351811 16	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351812 17	ASTM A572 GR50	Ternium	0.203	0.88	0.18	0.027	0.017	0.003	0.37	0.15	0.07	0.21

[redacted] 109 -21-01 AL [redacted] 109 -21-17 SI 7092 SOLKSD CC 32561

MTR-109-21-01 AL 17

Eivy Jerez

Autoriza
Eivy Dayan Jerez Salazar
Jefe Sector Verificaciones y Laboratorios

Los datos del presente informe de ensayos, han sido revisados por el área de Verificaciones y Laboratorio.
La conformidad de los resultados de ensayo está basada en aceptación simple.
Los resultados reportados en este informe de ensayos se relacionan únicamente a los materiales ensayados, aquí descritos.
No se debe reproducir información parcial del informe de ensayos, excepto, si se hace en su totalidad con la aprobación escrita del laboratorio emisor.

INFORME DE ENSAYOS

Razón Social: **Ternium Siderurgica de Caldas** Página Web: **www.ternium.com.co**
NIT: **900174468-4**
Teléfono: **01 8000 114 114**
Dirección: **Km 2 Vía Termales la Enea. Manizales**

INFORMACION GENERAL

Cliente: **FABRICA DE ESTRUCTURAS SADE ELECTRI** Fecha Impresión **21/03/30**
Dirección: **AV CR 129 17F 97 BOGOTA** No. Remisión: **82307806**
Teléfono: **4224700** Página: **2 de 4**

DATOS GENERALES					PROPIEDADES QUIMICAS			
MATERIAL	DESCRIPCION	LOTE	NORMA	FABRICANTE	% Sn	% V	% Mo	% Al
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351707	ASTM A572 GR50	Ternium	0.017	0.023	0.019	0.212
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351708	ASTM A572 GR50	Ternium	0.017	0.023	0.019	0.212
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351709	ASTM A572 GR50	Ternium	0.017	0.023	0.019	0.212
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351713	ASTM A572 GR50	Ternium	0.017	0.023	0.019	0.212
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351714	ASTM A572 GR50	Ternium	0.017	0.023	0.019	0.212
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351801	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351802	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351803	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351804	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351805	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351806	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351807	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351808	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351809	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351810	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351811	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351812	ASTM A572 GR50	Ternium	0.018	0.021	0.017	0.209

Autoriza
Eivy Dayan Jerez Salazar
Jefe Sector Verificaciones y Laboratorios

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INFORME DE ENSAYOS

Razón Social: **Ternium Siderurgica de Caldas** Página Web: **www.ternium.com.co**
NIT: **900174468-4**
Teléfono: **01 8000 114 114**
Dirección: **Km 2 Vía Termales la Enea. Manizales**

INFORMACION GENERAL

Cliente: **FABRICA DE ESTRUCTURAS SADE ELECTRI** Fecha Impresión **21/03/30**
Dirección: **AV CR 129 17F 97 BOGOTA** No. Remisión: **82307806**
Teléfono: **4224700** Página: **3 de 4**

DATOS GENERALES					PROPIEDADES FISICAS					
MATERIAL	DESCRIPCION	LOTE	NORMA	FABRICANTE	FLUENCIA	TRACCION	ELONGACION	FLUENCIA(2)	TRACCION(2)	ALARGAMIENTO(2)
					PSI	PSI	%	PSI	PSI	%
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351707	ASTM A572 GR50	Ternium	58443	79909	23.9	58786	80177	22.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351708	ASTM A572 GR50	Ternium	58443	79909	23.9	58786	80177	22.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351709	ASTM A572 GR50	Ternium	58443	79909	23.9	58786	80177	22.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351713	ASTM A572 GR50	Ternium	58443	79909	23.9	58786	80177	22.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351714	ASTM A572 GR50	Ternium	58443	79909	23.9	58786	80177	22.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351801	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351802	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351803	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351804	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351805	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351806	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351807	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351808	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351809	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351810	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5

Eivy Jerez.

Autoriza
Eivy Dayan Jerez Salazar
Jefe Sector Verificaciones y Laboratorios

Los datos del presente informe de ensayos, han sido revisados por el área de Verificaciones y Laboratorio.
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INFORME DE ENSAYOS

Razón Social: **Ternium Siderurgica de Caldas** Página Web: **www.ternium.com.co**
NIT: **900174468-4**
Teléfono: **01 8000 114 114**
Dirección: **Km 2 Vía Termales la Enea. Manizales**

INFORMACION GENERAL

Cliente: **FABRICA DE ESTRUCTURAS SADE ELECTRI** Fecha Impresión: **21/03/30**
Dirección: **AV CR 129 17F 97 BOGOTA** No. Remisión: **82307806**
Teléfono: **4224700** Página: **4 de 4**

DATOS GENERALES / PROPIEDADES FISICAS

MATERIAL	DESCRIPCION	LOTE	NORMA	FABRICANTE	FLUENCIA	TRACCION	ELONGACION	FLUENCIA(2)	TRACCION(2)	ALARGAMIENTO(2)
					PSI	PSI	%	PSI	PSI	%
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351811	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5
8000091	ANGULO 3"x1/4" 12m A572/G50	A009351812	ASTM A572 GR50	Ternium	59393	91023	23.9	59068	80449	23.5

Material	Lote	Ensayo	Norma	Fecha Ensayo
8000091	A0093517	QUÍMICO	NTC 5192	25.03.2021
8000091	A0093518	QUÍMICO	NTC 5192	25.03.2021
8000091	A0093517	TRACCIÓN	NTC 3353	27.03.2021
8000091	A0093518	TRACCIÓN	NTC 3353	27.03.2021

Autoriza
Eivy Dayan Jerez Salazar
Jefe Sector Verificaciones y Laboratorios

Los datos del presente informe de ensayos, han sido revisados por el área de Verificaciones y Laboratorio.
La conformidad de los resultados de ensayo está basada en aceptación simple.
Los resultados reportados en este informe de ensayos se relacionan únicamente a los materiales ensayados, aquí descritos.
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POSCO

Mill Test Certificate

Certificate No. : 211215-FP01PS-0003A1-0006
Date of Issue : Dec., 22, 2021

Order No. : 01S5222016 PO No : HB3

Supplier : POSCO INTERNATIONAL CORPORATION Commodity : STEEL PLATE

Customer : H B ESTRUCTURAS METALICAS Spec & Type : ASTM A709-50W T-z1-B

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test YP (Mpa)	Tensile Test TS	Tensile Test EL (%)	Impact Test V Notch +20 °C Energy (Joule)		Division	Chemical Composition C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Cu (%)	V (%)	Sol-Al (%)
12x2440x6096	PC98899401-9406-4	6	8,406	SF49294	T	351	612	22	1: 153 2: 177 3: 161 A: 164		L P	0.0688 0.0756	0.332 0.336	1.303 1.311	0.0057 0.0062	0.0022 0.0020	0.474 0.476	0.324 0.327	0.270 0.273	0.048 0.051	0.020 0.022
12x2440x6096	PC98899601-9606-2	6	8,406	SF49294	T	351	612	22	1: 164 2: 166 3: 159 A: 163		L P	0.0688 0.0756	0.332 0.336	1.303 1.311	0.0057 0.0062	0.0022 0.0020	0.474 0.476	0.324 0.327	0.270 0.273	0.048 0.051	0.020 0.022
12x2440x6096	PC98899501-9505-3	6	8,406	SF49294	T	351	612	22	1: 147 2: 133 3: 142 A: 141		L P	0.0688 0.0756	0.332 0.336	1.303 1.311	0.0057 0.0062	0.0022 0.0020	0.474 0.476	0.324 0.327	0.270 0.273	0.048 0.051	0.020 0.022
12x2440x6096	PC98496301-04	1	1,401	SF49294	T	351	612	22	1: 266 2: 269 3: 269 A: 268		L P	0.0688 0.0756	0.332 0.336	1.303 1.311	0.0057 0.0062	0.0022 0.0020	0.474 0.476	0.324 0.327	0.270 0.273	0.048 0.051	0.020 0.022
*** Sub Total (020) ***		65	91,065 (kg)																		
15x2440x6096	PB63944001-4010-01	10	17,520	SB35633	T	396	604	25	1: 194 2: 182 3: 171 A: 182		L P	0.0692 0.0670	0.342 0.338	1.291 1.280	0.0070 0.0069	0.0028 0.0025	0.490 0.484	0.341 0.336	0.319 0.315	0.066 0.057	0.029 0.030
15x2440x6096	PC98899301-9305-06	5	8,760	SF49298	T	381	586	24	1: 236 2: 270 3: 273 A: 260		L P	0.0676 0.0719	0.358 0.351	1.307 1.308	0.0057 0.0057	0.0009 0.0014	0.457 0.471	0.326 0.324	0.264 0.258	0.051 0.052	0.033 0.031
*** Sub Total (030) ***		15	26,280 (kg)																		
*** Heat Treatment ===> Thermo Mechanical Rolling + Accelerated Cooling ***																					

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test, Direction : Transversal, Gauge Length : 200 ㎜(Rectangular), YP Method : Upper Point
* Impact Test, Direction : 1/4T Transversal, Full-Size : 10 ㎜X10 ㎜
* Division - L : Ladle Analysis, P : Products Analysis
* Supply Condition : As-Rolled unless otherwise Heat Treated.

01 = 11111
02 = 11111
03 = 11111
04 =
MTR-(99-22-0) = 11111111
06 = MTT11

We hereby certify that the material herein has been made in accordance with the order and above specification.
This material has been fully killed and made by basic oxygen process. This material is fine grained steel.
This material has been made by vacuum degassing and calcium treated process.
Test Certificate is issued according to ISO 10474/EN 10204 3.1.
Melted and Manufactured in Republic of Korea

Legal sanction can be imposed on forging, Improper use of product can cause safety issues.

Surveyor To :

T.C.BAE

MTR 199 -22-01 AL MTR 199 -22-06

posco

Mill Test Certificate

Certificate No. : 211215-FP01PS-0003A1-0011
Date of Issue : Dec., 22, 2021

Order No. : 01S5222016
PO No. : HB3
Supplier : POSCO INTERNATIONAL CORPORATION
Commodity : STEEL PLATE
Customer : H B ESTRUCTURAS METALICAS
Spec & Type : ASTM A709-50W T-z1-B

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test YP (Mpa)	Tensile Test TS	Tensile Test EL (%)	Impact Test V Notch +20 °C Energy (Joule)		Division	Chemical Composition C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Cu (%)	V (%)	Sol-Al (%)
38x2440x6096	PC98897001-7002	2	8,872	SF49294	T	363	550	26	1: 380 2: 384 3: 378 A: 381		L P	0.0688 0.0756	0.332 0.336	1.303 1.311	0.0057 0.0062	0.0022 0.0020	0.474 0.476	0.324 0.327	0.270 0.273	0.048 0.051	0.020 0.022
38x2440x6096	PC98897101-7102	2	8,872	SF49294	T	363	550	26	1: 280 2: 450 3: 340 A: 357		L P	0.0688 0.0756	0.332 0.336	1.303 1.311	0.0057 0.0062	0.0022 0.0020	0.474 0.476	0.324 0.327	0.270 0.273	0.048 0.051	0.020 0.022
38x2440x6096	PC98897201-7202	2	8,872	SF49294	T	363	550	26	1: 268 2: 327 3: 278 A: 291		L P	0.0688 0.0756	0.332 0.336	1.303 1.311	0.0057 0.0062	0.0022 0.0020	0.474 0.476	0.324 0.327	0.270 0.273	0.048 0.051	0.020 0.022
38x2440x6096	PC98696201-6202	2	8,872	SF49298	T	370	548	26	1: 316 2: 329 3: 265 A: 303		L P	0.0676 0.0719	0.358 0.351	1.307 1.308	0.0057 0.0057	0.0009 0.0014	0.467 0.471	0.326 0.324	0.264 0.258	0.051 0.052	0.033 0.031
38x2440x6096	PC98696001-6002	2	8,872	SF49298	T	370	548	26	1: 358 2: 284 3: 291 A: 311		L P	0.0676 0.0719	0.358 0.351	1.307 1.308	0.0057 0.0057	0.0009 0.0014	0.467 0.471	0.326 0.324	0.264 0.258	0.051 0.052	0.033 0.031
38x2440x6096	PC98696101-6102	2	8,872	SF49298	T	370	548	26	1: 240 2: 271 3: 244 A: 252		L P	0.0676 0.0719	0.358 0.351	1.307 1.308	0.0057 0.0057	0.0009 0.0014	0.467 0.471	0.326 0.324	0.264 0.258	0.051 0.052	0.033 0.031
38x2440x6096	PC98772001-2002	2	8,872	SF49298	T	370	548	26	1: 253 2: 323 3: 154 A: 243		L P	0.0676 0.0719	0.358 0.351	1.307 1.308	0.0057 0.0057	0.0009 0.0014	0.467 0.471	0.326 0.324	0.264 0.258	0.051 0.052	0.033 0.031

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test, Direction : Transversal, Gauge Length : 200 ㎜(Rectangular), YP Method : Upper Point
* Impact Test, Direction : 1/4T Transversal, Full-Size : 10 ㎜X10 ㎜
* Division - L : Ladle Analysis, P : Products Analysis
* Supply Condition : As-Rolled unless otherwise Heat Treated.

MAR-2022-22

We hereby certify that the material herein has been made in accordance with the order and above specification.
This material has been fully killed and made by basic oxygen process. This material is fine grained steel.
This material has been made by vacuum degassing and calcium treated process.
Test Certificate is issued according to ISO 10474/EN 10204 3.1.
Melted and Manufactured in Republic of Korea

Legal sanction can be imposed on forging. Improper use of product can cause safety issues.

Surveyor To :

T.C.BAE

MIR 204 -22-01 AL MIR 204 -22-07

KOCAER

Kocaer Celik San. Ve Tic. A.S.
Address: Yenifoca Yolu Uzeri 3.Km
Aliaga, Izmir/Turkey

www.kocaergroup.com.tr

info@kocaergroup.com
Phone +902326251166
Fax +902326251966

TO : HB ESTRUCTURAS METALICAS SAS
AV. CARRERA 129 No. 17F-97 BOGOTA, COLOMBIA
COLOMBIA

MILL TEST CERTIFICATE

IN ACCORDANCE WITH EN 10204:2004 3.1 | DATE : 7.12.2021 | NO :KCR-176 | PAGE : 1 / 1

*** DESCRIPTION OF GOODS :**
PRIME QUALITY HOT ROLLED STEEL MERCHANT BARS
AS PER QUALITY A709 GR50WT Z1TB, ACCORDING TO A6
AS PER SALES CONTRACT NO: KH210910 06/SDL-20 DATED: 20.09.2021 & ADDENDUM NO:1 DATE:23.11.2021

HOT ROLLED STEEL EQUAL ANGLES ACC TO ASTM A709M-18

SIZE: (mm)	QUALITY	LENGTH (mm)	TOTAL PIECES	QUANTITY (MT)	HEAT NO	MECHANICAL PROPERTIES			IMPACT TEST RESULTS Joule						BEND TEST 180°	CHEMICAL PROPERTIES (LADLE)										
						YIELD STRENGTH (N/mm²)	TENSILE STRENGTH (N/mm²)	% ELONG.	SPECIMEN SIZE mm	1	2	3	AVERAGE	at °C	IMPACT ENERGY (J/cm²)		C %	Si %	Mn %	P %	S %	Cu %	N (ppm)	V %	Cr %	Ni %	Mo %	Ceq %
4 X 4 X 5/16	A709 GR50WT Z1TB	12000	120	17,568	21250771	413	570	28	7,5x10x55	100	114	66	93	21	124	OK	0,11	0,22	1,08	0,009	0,013	0,25	87	0,045	0,450	0,110	0,020	0,42
4 X 4 X 5/16	A709 GR50WT Z1TB	12000	577	84,471	21250772	437	590	25	7,5x10x55	67	63	72	67	21	90	OK	0,12	0,22	1,05	0,009	0,006	0,23	85	0,045	0,440	0,140	0,033	0,43
4 X 4 X 3/8	A709 GR50WT Z1TB	12000	90	19,266	21250772	428	599	25	7,5x10x55	64	72	57	64	21	86	OK	0,11	0,22	1,08	0,009	0,011	0,25	87	0,045	0,450	0,110	0,020	0,42
4 X 4 X 3/8	A709 GR50WT Z1TB	12000	322	56,406	21250772	447	584	31	7,5x10x55	57	67	52	62	21	83	OK	0,12	0,22	1,09	0,009	0,008	0,23	85	0,045	0,440	0,140	0,033	0,43

Tolerances on shape and dimensions are fulfilled Acc. to American Standard ASTM A6/6M-19
Mechanical and chemical requirements are fulfilled Acc. to client specifications and American Standard ASTM A709M-18
Standard for surface: EN 10163-3:2004, Class C, Subclass 1
Steel Making Process: Electric Arc Furnace — Deoxidation Method: Fully Killed Steel

Bending Test: quer D=2s< 180°
Tensile test as per ASTM A370
Chemical test as per: CEN/TR 10261
CEQ:C+Mn/6+ (Cr+Mo+V)/5+(Ni+Cu)/15

ISSUED BY

MTR-215-22-01
01
02
03
04

KCR 215 -22-01
AL

KCR 215 -22-04

2000028069

posco

Mill Test Certificate

Certificate No. : 211215-FP01PS-0005A1-0002
Date of Issue : Dec., 22, 2021

Order No. : 01S5221952
PO No. : HB1
Supplier : POSCO INTERNATIONAL CORPORATION
Commodity : STEEL PLATE
Customer : H B ESTRUCTURAS METALICAS
Spec & Type : ASTM A709-50W T-z1-B

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test YP (㎫)	Tensile Test TS (㎫)	Tensile Test EL (%)	Impact Test V Notch +20 ℃ Energy (Joule)		Division	Chemical Composition C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Cu (%)	V (%)	Sol-Al (%)
15.8x2440x6096	PB63881701-1703	3	5,532	SB24645	T	415	625	23	1: 164 2: 167 3: 162 A: 164		L P	0.0745 0.0702	0.359 0.323	1.293 1.275	0.0075 0.0068	0.0022 0.0020	0.482 0.470	0.330 0.325	0.324 0.322	0.052 0.053	0.033 0.031
15.8x2440x6096	PB63881705-1708	4	7,376	SB24645	T	415	625	23	1: 164 2: 167 3: 162 A: 164		L P	0.0745 0.0702	0.359 0.323	1.293 1.275	0.0075 0.0068	0.0022 0.0020	0.482 0.470	0.330 0.325	0.324 0.322	0.052 0.053	0.033 0.031
15.8x2440x6096	PC98775701-5705	5	9,220	SF49296	T	362	601	21	1: 218 2: 199 3: 202 A: 206		L P	0.0664 0.0655	0.337 0.334	1.296 1.279	0.0055 0.0050	0.0010 0.0009	0.472 0.463	0.323 0.318	0.274 0.268	0.051 0.052	0.030 0.031
*** Sub Total (010) ***		12	22,128 (kg)																		
*** Heat Treatment ===> Thermo Mechanical Rolling + Accelerated Cooling ***																					
32x2440x6096	PB63903101-3104	4	14,940	SB24643	T	475	635	21	1: 275 2: 270 3: 274 A: 273		L P	0.0705 0.0694	0.345 0.324	1.299 1.290	0.0074 0.0073	0.0022 0.0019	0.478 0.479	0.332 0.338	0.324 0.314	0.053 0.054	0.033 0.034
32x2440x6096	PB62463503	1	3,735	SB24649	T	511	672	21	1: 327 2: 315 3: 311 A: 318		L P	0.0754 0.0711	0.342 0.328	1.290 1.280	0.0069 0.0069	0.0016 0.0013	0.483 0.476	0.330 0.334	0.327 0.322	0.053 0.053	0.035 0.035
32x2440x6096	PB63440801-0804	4	14,940	SB24649	T	511	672	21	1: 281 2: 294 3: 295 A: 290		L P	0.0754 0.0711	0.342 0.328	1.290 1.280	0.0069 0.0069	0.0016 0.0013	0.483 0.476	0.330 0.334	0.327 0.322	0.053 0.053	0.035 0.035

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test. Direction : Transversal, Gauge Length : 200 ㎜(Rectangular), YP Method : Upper Point
* Impact Test. Direction : 1/4T Transversal, Full-Size : 10 ㎜X10 ㎜
* Division - L : Ladle Analysis, P : Products Analysis
* Supply Condition : As-Rolled unless otherwise Heat Treated.

We hereby certify that the material herein has been made in accordance with the order and above specification.
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Test Certificate is issued according to ISO 10474/EN 10204 3.1.
Melted and Manufactured in Republic of Korea

MIR 231 -22-01 AL MIR 231 -22-06

Legal sanction can be imposed on forging. Improper use of product can cause safety issues.

Surveyor To :

T.C.BAE

日钢营口中板有限公司
RIZHAO STEEL YINGKOU MEDIUM PLATE CO.,LTD.
辽宁省营口市老边区冶金街/115005
Yejinstreet,Laobiandistrict,Yingkou,Liaoning,P.R.China/115005
TEL:0417-3256081 FAX:0417-3256057 NO.:DT2101501/A

产品质量证明书
INSPECTION CERTIFICATE

订货单位 PURCHASER	HYUNDAI CORPORATION	产品名称 PRODUCT	普通耐候结构钢 General atmospheric corrosion resisting steel		
收货单位 CONSIGNEE	HYUNDAI CORPORATION	合同编号 CONTRACT NO.	YGR1ZANN240185001-01		
技术标准/牌号 SPEC/GRADE	ASTM A709/A709M-21;A709 Gr.50WT-Z1-B	交货状态 DELIVERY CONDITION	控制轧制(CR)	签发日期 DATE OF ISSUE	20240224
		证明书编号 CERTIFICATE NO.	240224Z00673		
车号 TRAIN NO.					

炉号 HEAT NO.	批号 LOT NO.	钢板号 PLATE NO.	规格 (MM) DIMENSION	数量 QTY	重量 WEIGHT kg	分析区域 AA	化学成分 CHEMICAL ANALYSIS % C	Si	Mn	P	S	Cu	Ni	Cr	V	Ti	Mo	Ti	Nb	B 0A01 屈服强度 MPa Rp0.2	B 0A02 抗拉强度 MPa Rm	B 0A03 断后伸长率 % B5	A 0C01 冲击单值 A J	A 0C012 冲击单值 B J	A 0C013 冲击单值 C J	A 0C02 冲击均值 Ave J
							<10^-1	<10^-2	<10^-3	<10^-4	<10^-4	<10^-3	10^-4	<10^-3	<10^-3	<10^-3	<10^-4	<10^-4	<10^-4							
24102502A	S42170191	S4217285201	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	164	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217285202	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	164	24	6407	10	60	40	367	648	19	57	63	83	67
24102502A	S42170191	S4217285203	9x2438x6096	1	1,050	L	148	320	1360	170	62	275	2630	164	24	6407	10	60	40	367	648	19	57	63	83	67
			合计(TOTAL):	3	3,150																					

注释 NOTES

L: 熔炼成分 SMELTING COMPOSITION
拉伸标距(GAUGE LENGTH) Lo=200 mm
A0C冲击试验IMPACTTEST: 20℃，纵向LONGITUDINAL，近表 CLOSE TO SURFACE，尺寸SIZE10*7.5*55
B0A01=YIELD STRENGTH
B0A02=TENSILE STRENGTH
B0A03=PRECENTAGE ELONGATION AFTER FRACTURE

A0C01=IMPACT TEST A
A0C012=IMPACT TEST B
A0C013=IMPACT TEST C
A0C02=IMPACT AVERAGE

According to EN 10204 3.1

本产品已按照标准要求进行制造和检验，其结果符合要求，特此证明
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIR EMENTS OF THE ABOVE MATERIAL SPECIFICATION

冶金技术处处长
DIRECTOR OF METALLURGICAL DEPARTMENT

野牛

MTR 298-24 -01

AL

MTR 298-24 -03