Janus Fire Systems FK-5-1-12 Hydraulic Flow Calculation Program
Result Printout
Calculation Program Version 3.17.1.16

Calculated by: SI INGENIERIA A SAS
CRA57 No 131A-49
Bogota - Colombia
Phone: +573102232887
Designed By: Edgar Lafaurie

Project Name: GOBERNACION DEL META
Project Number: VVV-8896-SI-INGENIERIA-COL-FK5112

System Constraints

Name of Hazard	DATA CENTER GOBERNACION DEL META		
Storage Pressure (kg/sq.cm.):	34.5 BAR	Calculation Report Date:	1/20/2026
Initial Cyl. Storage Temperature (C):	21.1°	Calculation Revision:	
Qty of Main Cylinders:	1	Mid Discharge Cyl.Pressure:	19.7 BAR
Qty of Reserve Cylinders:	0	Cylinder Fill Density (kg/cu.m.):	741.32
Total Amount of Agent (Kgs):	126.55	Percent of Agent in Pipe	15.32%
Altitude Relative to Sea Level (M):	467	Average Discharge Time (sec):	9.97
Type of Cylinder:	Mv 420 Cylinder	Cyl. Volume (liters):	171.03

Hazard Characteristics

Enclosure Name:	Data Center	Fire Type:	Class C Fire
Design Concentration:	4.5	Min Hazard Temp (C):	18.3
		Max Hazard Temp (C):	23.9

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Hazard Characteristics (Continued)

Nozzle(s) Used: 301 - 360° Nozzle, Brass
302 - 360° Nozzle, Brass

Dimensions (M): 13.67 X 3.7 X 3.4
Total Volume (Cu.m.): 171.969
Tot Agent Req'd @ 18.3 (C): 107.21 kgs
Voltage at Discharge: <= 480V

Enclosure Name: Piso Falso
Design Concentration: 4.5

Fire Type: Class C Fire
Min Hazard Temp (C): 18.3
Max Hazard Temp (C): 23.9

Nozzle(s) Used: 303 - 360° Nozzle, Brass
304 - 360° Nozzle, Brass

Dimensions (M): 13.67 X 3.7 X 0.6
Total Volume (Cu.m.): 30.347
Tot Agent Req'd @ 18.3 (C): 18.92 kgs
Voltage at Discharge: <= 480V

Piping Network Input

-- Section --		Cyl.	Pipe						Tee or	Cplng/	Nozzle
Start	End	Qty	Length	Elevation	Sched.	Size	90's	Bends	Valve	Union	Weight
1	2	1	0.00	1.58	SCH 40	50	0	0	None	0	0.000
2	3	1	3.97	2.12	SCH 40	0	1	0	None	0	0.000
3	4	0	1.85	1.00	SCH 40	0	1	0	Thru	0	0.000
4	5	0	2.80	0.00	SCH 40	0	1	0	None	0	0.000
5	6	0	1.10	0.00	SCH 40	0	1	0	Side	0	0.000

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Piping Network Input (Continued)

-- Section -- Start	End	Cyl. Qty	Pipe Length	Elevation	Sched.	Size	90's	Bends	Tee or Valve	Cplng/ Union	Nozzle Weight
6	301	0	0.50	-0.50	SCH 40	0	1	0	None	0	53.605
5	7	0	1.10	0.00	SCH 40	0	1	0	Side	0	0.000
7	302	0	0.50	-0.50	SCH 40	0	1	0	None	0	53.605
3	8	0	4.40	-3.40	SCH 40	0	1	0	Side	0	0.000
8	9	0	2.80	0.00	SCH 40	0	1	0	None	0	0.000
9	10	0	1.10	0.00	SCH 40	0	0	0	Side	0	0.000
10	303	0	0.50	-0.50	SCH 40	0	1	0	None	0	9.460
9	11	0	1.10	0.00	SCH 40	0	0	0	Side	0	0.000
11	304	0	0.50	-0.50	SCH 40	0	1	0	None	0	9.460

Piping Network Results

Section Start	End	Pipe Size in(mm) sch	Length (M)	Elevation (M)	EQL (M)	Tee or Valve	Start (BAR)	Term (BAR)	Flow (kgs/sec)
1	2	2 (50) - SCH 40	.00	1.58	3.66	None	19.7	19.1	13.00
2	3	1-1/4 (32) - SCH 40	3.97	2.12	5.02	None	19.1	16.7	13.00
3	4	1-1/4 (32) - SCH 40	1.85	1.00	3.60	Thru	16.7	15.8	11.02
4	5	1-1/4 (32) - SCH 40	2.80	.00	3.85	None	15.8	15.0	11.02
5	6	1 (25) - SCH 40	1.10	.00	3.50	Bull	15.0	14.1	5.51
6	301	1 (25) - SCH 40	.50	-.50	1.30	None	14.1	13.8	5.51
5	7	1 (25) - SCH 40	1.10	.00	3.50	Bull	15.0	14.1	5.51
7	302	1 (25) - SCH 40	.50	-.50	1.30	None	14.1	13.8	5.51
3	8	1/2 (15) - SCH 40	4.40	-3.40	5.82	Side	16.7	12.5	1.98
8	9	1/2 (15) - SCH 40	2.80	.00	3.28	None	12.5	10.0	1.98
9	10	3/8 (10) - SCH 40	1.10	.00	1.85	Bull	10.0	8.5	.99
10	303	3/8 (10) - SCH 40	.50	-.50	.88	None	8.5	7.9	.99
9	11	3/8 (10) - SCH 40	1.10	.00	1.85	Bull	10.0	8.5	.99

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Piping Network Results (Continued)

Section Start	Section End	Pipe Size in(mm) sch	Length (M)	Elevation (M)	EQL (M)	Tee or Valve	Start (BAR)	Term (BAR)	Flow (kgs/sec)
11	304	3/8 (10) - SCH 40	.50	-.50	.88	None	8.5	7.9	.99

Nozzle Performance

Nozzle ID	Nozzle Size mm (in)	Stock Number	Nozzle Type	Drill Dia (inches)	Drill Size	Total Orifice Area (sq.cm.)	Discharged (kgs)
301	25 mm (1")	19532-062	360° Nozzle, Brass	0.2210	2	1.980	53.71
302	25 mm (1")	19532-062	360° Nozzle, Brass	0.2210	2	1.980	53.71
303	10 mm (3/8")	19529-027	360° Nozzle, Brass	0.1250	1/8	.633	9.57
304	10 mm (3/8")	19529-027	360° Nozzle, Brass	0.1250	1/8	.633	9.57

Hazard Concentration Summary

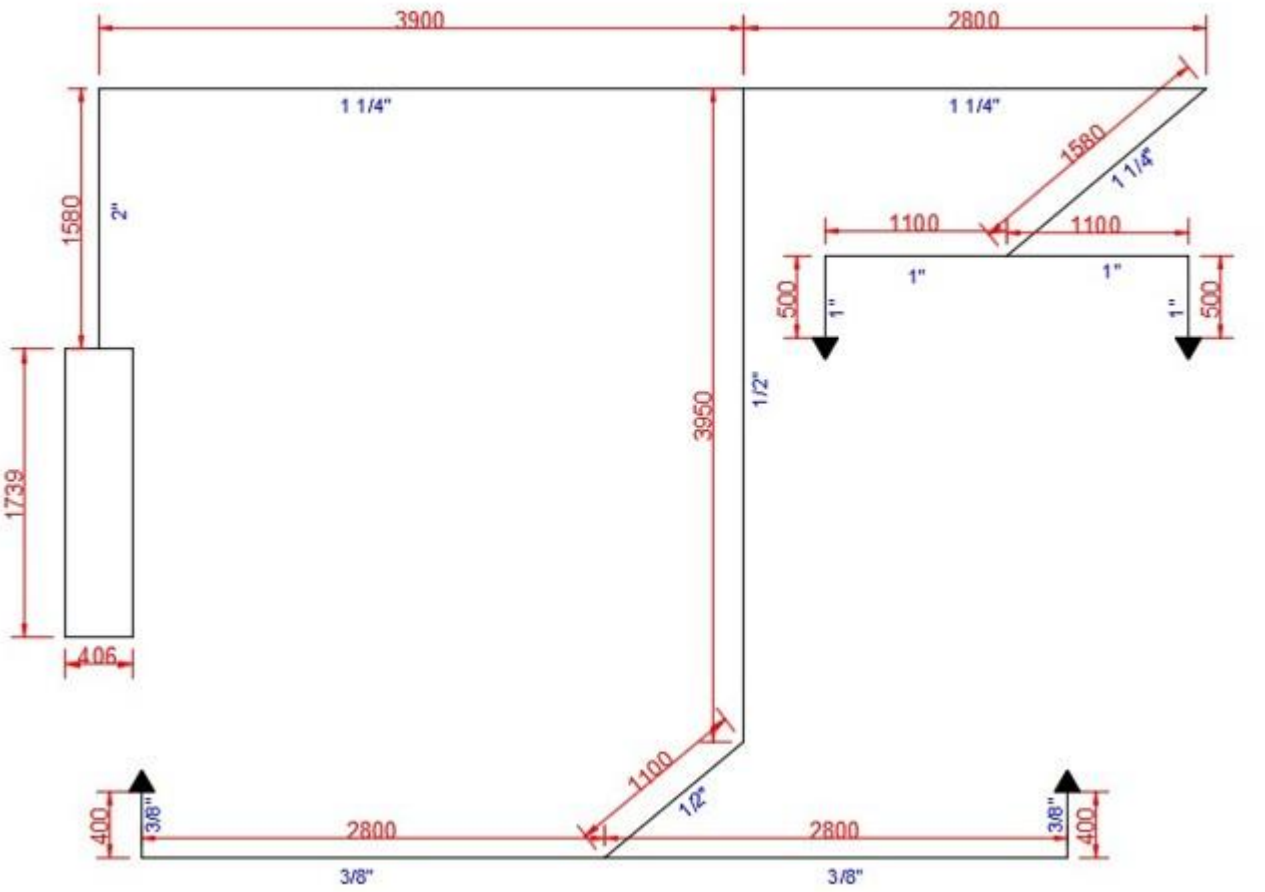
Enclosure Name	Enclosure Volume (cu.m)	Agent Req'd (kgs)	Agent Disch (kgs)	Conc. Req'd	Concentration Achieved @ Min.Temp / Max.Temp	Pass or Fail
Data Center	171.97	107.21	107.42	4.50	4.50 / 4.60	Pass
Piso Falso	30.35	18.92	19.14	4.50	4.55 / 4.64	Pass

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Venting Estimate

Enclosure Name	Leakage Area Known	Relative Humidity	Safety Factor	Max. Positive Pressure - Pa	Max. Negative Pressure - Pa	Pos. ELA (sq.cm)	Neg. ELA (sq.cm)
Data Center	No	36%	1	239	239	181.29	1322.58
Piso Falso	No	36%	1	239	239	32.26	236.13

Design / Error Messages

1. - Hydraulic calculation was successful.
2. - Version dated 12/31/2023
3. The designer has determined that additional gas for tees, per NFPA 2001 7.3.3.1 is not required.
4. - * System is designed to meet Factory Mutual & Underwriters Laboratory design criteria.
5. - All agent requirements were calculated based on NFPA 2001, 2022 edition, Table A.7.3.1(b)
6. THIS SYSTEM IS DESIGNED TO BE USED ONLY WITH THE 3M BRANDED OR JANUS FIRE SYSTEMS SUPPLIED FK-5-1-12 AGENT.

Statistics of Piping Used

(Note: Only U.S Standard Values are used by the math module)

Piping information for Pipe Type: -SCH 40

Pipe Size (in)	Metric Size (mm)	English ID (in)	Metric ID (mm)	English lbs/ft	Metric kgs/M	Type of Joint
3/8	10	0.493	12.5222	0.57	0.8483	Threaded

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Statistics of Piping Used (Continued)

(Note: Only U.S Standard Values are used by the math module)

Pipe Size (in)	Metric Size (mm)	English ID (in)	Metric ID (mm)	English lbs/ft	Metric kgs/M	Type of Joint
1/2	15	0.622	15.7988	0.85	1.2649	Threaded
1	25	1.049	26.6446	1.68	2.5001	Threaded
1-1/4	32	1.38	35.052	2.27	3.3781	Threaded
2	50	2.067	52.5018	3.65	5.4318	Threaded

Note: For Pipe Schedule(s): -SCH 40; these Pipes conform to ANSI A-53/A-106, grade A-ERW or better

Data File: C:\Users\User\Documents\VVV-8896-SI-INGENIERIA-COL-FK5112.JDN

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Janus Fire Systems FK-5-1-12 Hydraulic Flow Calculation Program
Agent Calculation Requirements
Calculation Program Version 3.17.1.16

Calculated by: SI INGENIERIA A SAS
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Bogota - Colombia
Phone: +573102232887
Designed By: Edgar Lafaurie

Project Name: **GOBERNACION DEL META**

Project Number: **VVV-8896-SI-INGENIERIA-COL-FK5112**

Hazard Agent Requirements

Enclosure Name:	DATA CENTER: Data Center
Design Concentration:	4.5
Fire Type:	Class C Fire
Min Hazard Temp (C):	18.3
Max Hazard Temp (C):	23.9
Total Volume (Cu.m.):	171.969
Altitude:	1532
Voltage at Discharge:	<= 480V

Agent Requirement Formula for FK-5-1-12:

W = (V/s (C/(100 - C))) * Altitude Correction Factor

Where:

W = Weight of agent required
V = Volume (Cu.m.)
s = 0.0664 + 0.0002741(t)
t = Temperature (C)
C = Design Concentration
s = 0.0664 + 0.0002741(18.3) = 0.07141603
Altitude Correction Factor: 0.9448425

For Altitude Correction factors outside of those listed in NFPA-2001 Table 7.3.3.3, the following formula is used. Ref. Appendix A.7.7.3.3:

(((-0.000036) * altitude) + 1) = 0.9448425

W = 171.969 / 0.07141603 (4.5 / (100 - 4.5)) * 0.9448425

Total quantity of FK-5-1-12 required @ Min Temp is: **101.30 Kgs**

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Hazard Agent Requirements (Continued)

Enclosure Name:	DATA CENTER: Piso Falso
Design Concentration:	4.5
Fire Type:	Class C Fire
Min Hazard Temp (C):	18.3
Max Hazard Temp (C):	23.9
Total Volume (Cu.m.):	30.347
Altitude:	1532
Voltage at Discharge:	<= 480V

Agent Requirement Formula for FK-5-1-12:

W = (V/s (C/(100 - C))) * Altitude Correction Factor

Where:

W = Weight of agent required
V = Volume (Cu.m.)
s = 0.0664 + 0.0002741(t)
t = Temperature (C)
C = Design Concentration
s = 0.0664 + 0.0002741(18.3) = 0.07141603
Altitude Correction Factor: 0.9448425

For Altitude Correction factors outside of those listed in NFPA-2001 Table 7.3.3.3, the following formula is used. Ref. Appendix A.7.7.3.3:

(((-0.000036) * altitude) + 1) = 0.9448425

W = 30.347 / 0.07141603 (4.5 / (100 - 4.5)) * 0.9448425

Total quantity of FK-5-1-12 required @ Min Temp is: **17.88 Kgs**

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Janus Fire Systems FK-5-1-12 Hydraulic Flow Calculation Program
Piping Bill of Material
Calculation Program Version 3.17.1.16

Piping and Nozzle Bill of Material:

Item Type	Style	Size (mm)	Drill Dia	Qty
Piping	- SCH 40	10	N/A	3.2 M
Piping	- SCH 40	15	N/A	7.2 M
Piping	- SCH 40	25	N/A	3.2 M
Piping	- SCH 40	32	N/A	8.62 M
Elbow	Class 300 MI - ANSI B16.3	10	N/A	2 (Ea)
Elbow	Class 300 MI - ANSI B16.3	15	N/A	2 (Ea)
Elbow	Class 300 MI - ANSI B16.3	25	N/A	4 (Ea)
Elbow	Class 300 MI - ANSI B16.3	32	N/A	3 (Ea)
Tee, Straight	Class 300 MI - ANSI B16.3	15	N/A	1 (Ea)
Tee, Straight	Class 300 MI - ANSI B16.3	32	N/A	2 (Ea)
Reducer, Concentric	Class 300 MI - ANSI B16.3	15 x 10	N/A	2 (Ea)
Reducer, Concentric	Class 300 MI - ANSI B16.3	32 x 15	N/A	1 (Ea)
Reducer, Concentric	Class 300 MI - ANSI B16.3	32 x 25	N/A	2 (Ea)
Nozzle (S/N: 19529-027)	360° Nozzle, Brass	10 mm (3/8")	0.125	2 (Ea)
Nozzle (S/N: 19532-062)	360° Nozzle, Brass	25 mm (1")	0.221	2 (Ea)

The above list of pipe and fittings was generated based on the information provided to the calculation program. Any additional equivalent length, inputted as elbows, will appear as elbows in this list. This list is NOT intended as a buy list, and should be field verified. All piping purchased should adhere to the requirements set forth in NFPA 2001, Latest Edition. Where Concentric Reducers are called for, Hex Bushings may be used. These bushings are to be Class 2000 Forged Steel, ANSI B16.11

Where tubing is called out, the tubing material should be softer than the fitting material. For instance, SS Tubing should use SS compression fittings and ferrells.

Statistics of Piping Used

(Note: Only U.S Standard Values are used by the math module)

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Statistics of Piping Used (Continued)

(Note: Only U.S Standard Values are used by the math module)

Piping information for Pipe Type: -SCH 40

Pipe Size (in)	Metric Size (mm)	English ID (in)	Metric ID (mm)	English lbs/ft	Metric kgs/M	Type of Joint
3/8	10	0.493	12.5222	0.57	0.8483	Threaded
1/2	15	0.622	15.7988	0.85	1.2649	Threaded
1	25	1.049	26.6446	1.68	2.5001	Threaded
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