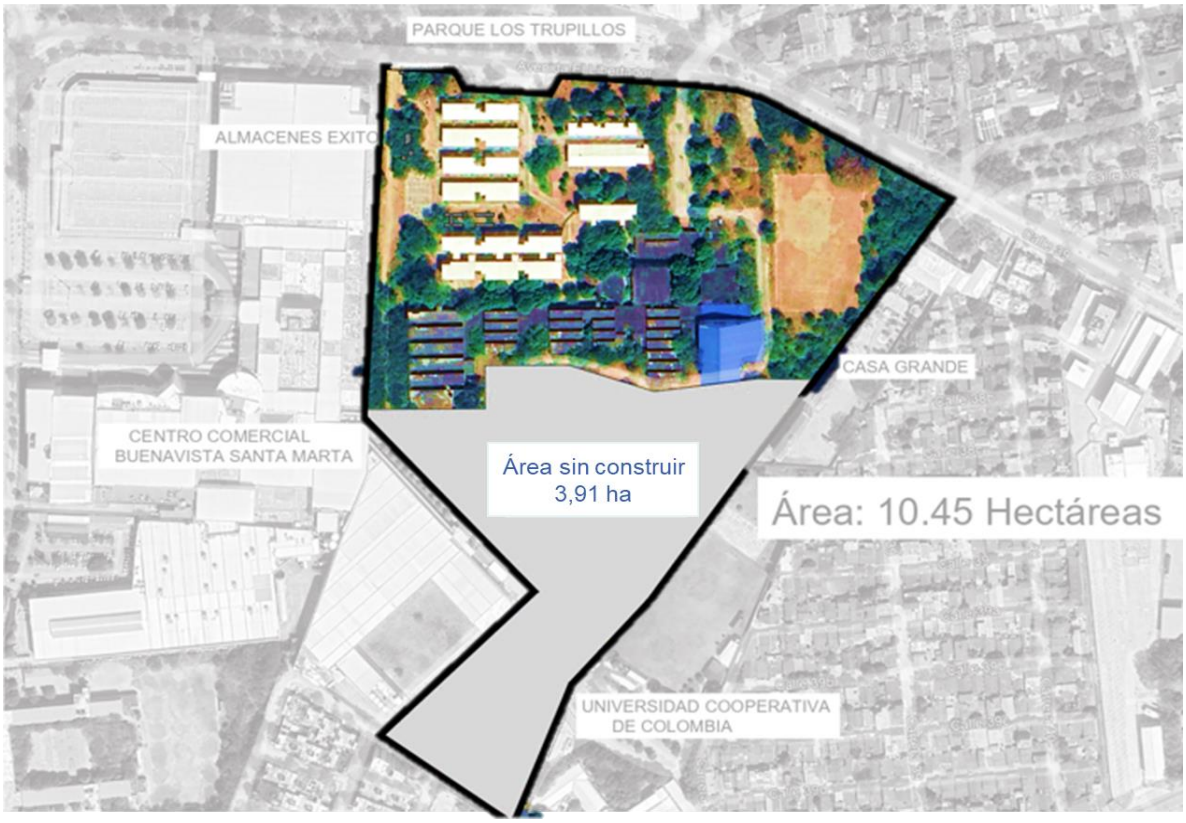


ANEXO 1- PROYECTO TÉCNICO PARA EL DISEÑO DEL SISTEMA DE CLIMATIZACIÓN (REFRIGERACIÓN) DE LOS SALONES DE CLASE DE LA INSTITUCIÓN UNIVERSITARIA DE SANTA MARTA, EN LA CIUDAD DE SANTA MARTA, COLOMBIA.

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1. OBJETO Y ANTECEDENTES

El objeto de este documento es describir y justificar el cumplimiento de los requisitos establecidos por la normativa vigente para el diseño del sistema de climatización, en la modalidad de refrigeración, destinado a los salones de clase de la Universidad de Santa Marta, ubicada en la ciudad de Santa Marta, Colombia.

2. TITULAR DE LA INSTALACIÓN.

El titular de la instalación es la **Institución Universitaria de Santa Marta**, con sede principal en la ciudad de Santa Marta, departamento del Magdalena, Colombia, representada legalmente por las autoridades competentes de la institución.

3. AUTOR DEL PROYECTO

Osvaldo Enrique Salas Martínez, Ingeniero Electricista y Master en Gerencia de Proyectos. Matricula profesional AT205-144706 del Consejo Profesional Nacional de Ingenierías Eléctrica, Mecánica y Profesiones Afines y cédula de ciudadanía 1.140.887.296 de Barranquilla.

4. CONDICIONES DE LA INSTALACIÓN

4.1. DESCRIPCIÓN DE LOS ESPACIOS

La instalación a intervenir está formada por 39 aulas de clase para estudiantes de educación media y universitaria. Las aulas de clase tienen una medida estándar de 7,05 metros de ancho por 9,5 metros de largo y 2,8 metros de altura libre. Los salones de clase están cuentan con paredes de bloque de cemento y cubierta de PVC. Todos están construidos con los mismos materiales. Cuentan con 2 ventanas y 1 puerta que varían su orientación entre sur y norte, como se aprecia en la documentación gráfica correspondiente. La ventana más grande es de 5.4m x 1.5m y la segunda de 4.6m x 1.5m. Son de marco sencillo y cuentan con película polarizada para reducir los efectos de los rayos UV y mejorar su coeficiente de ganancia de calor solar (SHGC). Los techos están fabricados en losa de cemento y se encuentran debidamente impermeabilizados.

5. Superficies por intervenir

Las superficies útiles de las estancias son las siguientes:

Zona	Cantidad de Salones	Superficie útil (m2)
Salónes Bloque C	2	66.8
Salónes Bloque D	2	66.8
Salónes Bloque G	34	66.8
Total superficie a climatizar		**2,538.4**

6. DESCRIPCIÓN DEL PROCESO

Los salones de clase de la Institución Universitaria de Santa Marta son espacios destinados al desarrollo de actividades académicas, tales como talleres, seminarios y sesiones prácticas. En su interior se concentra una cantidad variable de estudiantes y personal docente, generando cargas térmicas internas por la presencia de ocupantes, los equipos electrónicos utilizados como computadores y proyectores, y la iluminación artificial que contribuye con calor al ambiente. Además, la ventilación y la infiltración de aire desde el exterior, a través de ventanas o puertas, influyen en las condiciones térmicas y de humedad del espacio. Durante el desarrollo de las clases, se busca mantener condiciones de confort térmico que permitan concentración y desempeño óptimo, por lo que el diseño del sistema de climatización por refrigeración se orienta a mantener temperaturas adecuadas, controlar la humedad relativa y asegurar una correcta distribución del aire dentro de los salones, considerando la variabilidad de ocupación y el calor generado por los equipos y la iluminación.

7. CONSUMO DE MATÉRIAS PRIMAS Y PRODUCCIÓN ANUAL.

No existe consumo de materias primas ni producción en este tipo de actividad.

8. PERSONAL Y HORARIO

Los salones están diseñados para albergar hasta 40 estudiantes y el profesor.

El horario de la actividad es de 06:00 a 22:00 h.

9. DESCRIPCION DE LAS INSTALACIONES

9.1. INSTALACIÓN DE VENTILACIÓN Y CLIMATIZACION

En esta sección se describen las instalaciones de climatización, justificando el cumplimiento de las exigencias establecidas en la normativa vigente en materia de bienestar e higiene, así como las exigencias de eficiencia energética y seguridad que deben cumplir las instalaciones térmicas.

Dado que se trata de salones de clase de un edificio de pública concurrencia, el diseño se realiza de acuerdo con la Norma Técnica Colombiana NTC 5201 y la regulación vigente del Reglamento Técnico de Instalaciones de Aire Acondicionado y Refrigeración, asegurando la calidad del aire interior y el confort térmico de los ocupantes. Adicionalmente, se toman como referencia las normas internacionales ASHRAE 62.1, relativa a la ventilación y calidad del aire interior, y ASHRAE 90.1, relativa a la eficiencia energética de los sistemas de climatización.

Los salones objeto de este proyecto se encuentran ubicados en las distintas plantas del campus de la Institución Universitaria de Santa Marta, ciudad de Santa Marta, departamento del Magdalena. El objetivo de este capítulo es describir y justificar las instalaciones de climatización referentes a los espacios interiores de las aulas.

Las instalaciones de climatización deberán contar con tomas y accesos que permitan realizar las pruebas de funcionamiento y presión requeridas por la normativa, sin emplear las acometidas generales del edificio para dichos ensayos. Bajo ningún concepto se conectarán los desagües de las instalaciones de climatización a las bajantes pluviales del edificio, debiendo utilizar únicamente las tomas previstas al efecto en cada aula o espacio.

Se dispondrá de registros practicables en los falsos techos o espacios técnicos, que permitan acceder a los equipos instalados con el fin de realizar pruebas, inspecciones y labores de mantenimiento, asegurando la correcta operación del sistema a lo largo de su vida útil.

9.2. Descripción del proceso de cálculo

El dimensionamiento del sistema de climatización para los salones de clase de la Institución Universitaria de Santa Marta se llevó a cabo mediante un proceso de cálculo detallado utilizando el software HAP 5.11 de Carrier, ampliamente reconocido en la industria de HVAC. Este software cuenta con certificaciones de cumplimiento de normas internacionales de cálculo de cargas térmicas y rendimiento energético, incluyendo conformidad con estándares ASHRAE, y permite generar reportes que cumplen con la normativa aplicable. Para el cálculo se tuvieron en cuenta las características arquitectónicas de la envolvente de los edificios, tales como materiales de

construcción, orientación, superficie y tipo de cerramientos, así como las condiciones de iluminación natural y artificial, ocupación promedio y equipos electrónicos presentes en cada aula.

Se consideró la ventilación requerida según ASHRAE 62.1, garantizando una adecuada renovación de aire fresco por ocupante, de acuerdo con los estándares de calidad de aire interior para espacios de trabajo y educativos. El tipo de uso definido para los salones fue trabajo de oficina, ajustando los perfiles horarios diarios y anuales a la realidad de un centro educativo, con variaciones de ocupación durante el día y el año académico. Las condiciones climáticas externas de Santa Marta se definieron con una temperatura ambiente típica de 30 °C y humedad relativa promedio, mientras que la temperatura de diseño de refrigeración se estableció considerando mantener una temperatura de confort de 22 °C dentro de los salones, asegurando el bienestar térmico de los estudiantes y del personal docente.

A partir de estos datos, el software HAP calculó las cargas térmicas internas y externas de cada aula, determinando la capacidad de refrigeración necesaria para garantizar confort térmico, calidad de aire interior y eficiencia energética del sistema. Este proceso permitió seleccionar de manera precisa los equipos LG modelo AVNQ60GM2A5, dimensionar correctamente las tuberías frigoríficas y otros elementos del sistema, asegurando que el diseño cumpla con las exigencias normativas nacionales e internacionales y optimizando el rendimiento energético del conjunto.

Los cálculos y resultados del análisis de cargas térmicas de la instalación se pueden ver en detalle en el Anexo 1. ‘Resultados de cargas térmicas USM’.

9.3. SOLUCION ADOPTADA

Debido a la actividad desarrollada en los salones de clase y basándonos en la experiencia en espacios educativos similares, se diseñó la siguiente instalación. Para la climatización de las aulas, se optó por el uso de aires acondicionados tipo split piso-techo LG, modelo AVNQ60GM2A5, con tecnología INVERTER, permitiendo controlar de manera separada los diferentes salones y optimizar el confort térmico. El aire limpio se distribuirá a través de las unidades de los equipos de climatización. Cada unidad contará con su respectivo control inteligente de temperatura, que incluye termostato, programador semanal y actualización automática del horario invierno/verano, permitiendo una operación eficiente y adaptable a los horarios académicos. Se incorporará un recuperador de calor, cuya función será extraer aire viciado de las aulas y aportar aire limpio a las unidades de los equipos, incrementando la calidad del aire interior y la eficiencia energética del sistema.

Las zonas auxiliares, como almacenes o áreas de servicio, recibirán la aportación de aire requerida por la normativa, y contarán con rejillas de extracción para garantizar la renovación del aire. Los baños disponen de ventanas superiores que permiten una ventilación natural, complementando el sistema de climatización.

Debido al tipo de sistema a utilizar (split piso-techo LG modelo AVNQ60GM2A5), no se requiere suministro de agua fría o caliente. La alimentación frigorífica de los equipos se realizará mediante tuberías de cobre de 3/8" y 3/4", recubiertas con su respectiva cubierta de espuma Armaflex, ubicadas sobre los falsos techos de las aulas, evitando interferencias con la operatividad de los espacios y garantizando la eficiencia térmica y la protección de la instalación.

10. ANÁLISIS DE RESULTADO DE CÁLCULOS

10.1. RESULTADOS GENERALES

Air System Sizing Summary for AA Salón C-01

Project Name: USM - Metric — 09/18/2025
Prepared by: Pineda Arquitectes — 11:47p. m.

Air System Information

Air System Name	AA Salón C-01		Number of zones	1
Equipment Class	SPLT AHU		Floor Area	66,8 m²
Air System Type	SZCAV		Location	Barranquilla, Colombia

Sizing Calculation Information

Calculation Months	Jan to Dec	Zone L/s Sizing	Sum of space airflow rates
Sizing Data	Calculated	Space L/s Sizing	Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load	16,4	kW	Load occurs at	Jul 1600	
Sensible coil load	8,6	kW	OA DB / WB	34,0 / 27,2	°C
Coil L/s at Jul 1600	526	L/s	Entering DB / WB	28,9 / 23,1	°C
Max block L/s	526	L/s	Leaving DB / WB	15,3 / 14,9	°C
Sum of peak zone L/s	526	L/s	Coil ADP	13,8	°C
Sensible heat ratio	0,527		Bypass Factor	0,100	
L/(s kW)	32,1		Resulting RH	59	%
m²/kW	4,1		Design supply temp.	14,4	°C
W/m²	245,3		Zone T-stat Check	1 of 1	OK
Water flow @ 5,6 K rise	N/A		Max zone temperature deviation	0,0	K

Supply Fan Sizing Data

Actual max L/s	526	L/s	Fan motor BHP	0,00	BHP
Standard L/s	524	L/s	Fan motor kW	0,00	kW
Actual max L/(s·m²)	7,87	L/(s·m²)	Fan static	0	Pa

Outdoor Ventilation Air Data

Design airflow L/s	245	L/s	L/s/person	5,98	L/s/person
L/(s·m²)	3,67	L/(s·m²)			

Tabla 1 Resultados de cargas térmicas salón Tipo

La tabla 1 presenta los resultados globales del análisis térmico del salón C-01 que, a efectos de esta memoria se toma como ejemplo de descripción de resultados.

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En la columna de la izquierda se pueden apreciar el periodo de estudio, la carga máxima total de refrigeración requerida, la carga sensible del espacio, y el caudal de aire esperado, entre otros valores; mientras que en la columna de la derecha se encuentran los datos de diseño de la instalación.

De la tabla anterior podemos observar que el salón requerirá de máximo 16,4 kW frigoríficos para llegar a los valores de confort al interior de la instalación. Donde:

1 kW = 3412 BTU/h.

Esto quiere decir que la carga frigorífica máxima en BTU/h de la instalación son 55.900 BTU/h.

Se recomienda entonces instalar una unidad de aire acondicionado con una potencia frigorífica mínima de 60.000 BTU/h, para garantizar así que se presenten las condiciones de confort incluso en los momentos de mayor varga climática; cumpliendo así con los requerimientos máximos arrojados por las simulaciones.

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10.2. RESULTADOS DESGLOSADOS

Air System Design Load Summary for AA Salón C-01

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:47p. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	5941	1443	-	0	0
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	8633	7752	-	-3767	-722
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	-	8633	7753	-	-957	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Tabla 2 Cargas térmicas discriminadas

En esta tabla, que también se encuentra en el correspondiente anexo de cálculos, se pueden apreciar de manera desglosada las diferentes cargas térmicas que tendrán incidencia sobre las instalaciones.

Es prudente mencionar que la mayor parte de la carga térmica de la instalación proviene de los equipos eléctricos instalados en las aulas y del calor emitido por las personas en el interior.

11. CONCLUSIONES Y RECOMENDACIONES

El diseño de climatización desarrollado para las aulas de la Institución Universitaria de Santa Marta responde adecuadamente a las condiciones climáticas de la ciudad y a las necesidades de confort térmico de los estudiantes y docentes. Los resultados de cálculo realizados con el software HAP 5.11 indican que la carga máxima de refrigeración por aula alcanza los 16,4 kW (equivalentes a 55.900 BTU/h), por lo que la selección de equipos de 60.000 BTU/h asegura la cobertura de la demanda térmica incluso en los momentos de mayor exigencia. La instalación propuesta, basada en equipos con tecnología INVERTER, cumple con las normativas nacionales y con los lineamientos internacionales de ASHRAE 62.1 y 90.1, garantizando eficiencia energética, calidad de aire y seguridad en la operación. En conclusión, la solución planteada ofrece una respuesta técnica y sostenible a los requerimientos de climatización por refrigeración de la Institución, favoreciendo el bienestar y el desempeño académico en un entorno confortable y eficiente.

Se recomienda llevar a cabo un plan de mantenimiento preventivo y correctivo de los equipos de climatización tipo piso-techo LG referencia AVNQ60GM2A5, a fin de garantizar su correcto desempeño, prolongar su vida útil y evitar pérdidas de eficiencia energética. Dicho plan debe incluir limpieza periódica de filtros, revisión de la presión del gas refrigerante, verificación de las conexiones eléctricas y comprobación de la integridad del aislamiento en las tuberías de cobre de 3/8” y 3/4” recubiertas con Armaflex. Asimismo, es conveniente establecer protocolos de operación ajustados a los horarios académicos de la Institución Universitaria de Santa Marta, aprovechando la programación inteligente de los equipos para reducir el consumo energético en horas no lectivas. Finalmente, se recomienda monitorear de manera continua la calidad del aire interior y el nivel de humedad relativa, de acuerdo con lo establecido en la ASHRAE 62.1, para asegurar condiciones de confort y salubridad en los espacios educativos.

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12. ANEXO DE CALCULOS

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Air System Sizing Summary for AA Salón C-01

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:47p. m.

Air System Information

Air System Name	**AA Salón C-01**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón C-01

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
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Air System Information

Air System Name ..... **AA Salón C-01**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón C-01	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón C-01

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:47p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón C-01	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón C-01" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón C-01" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

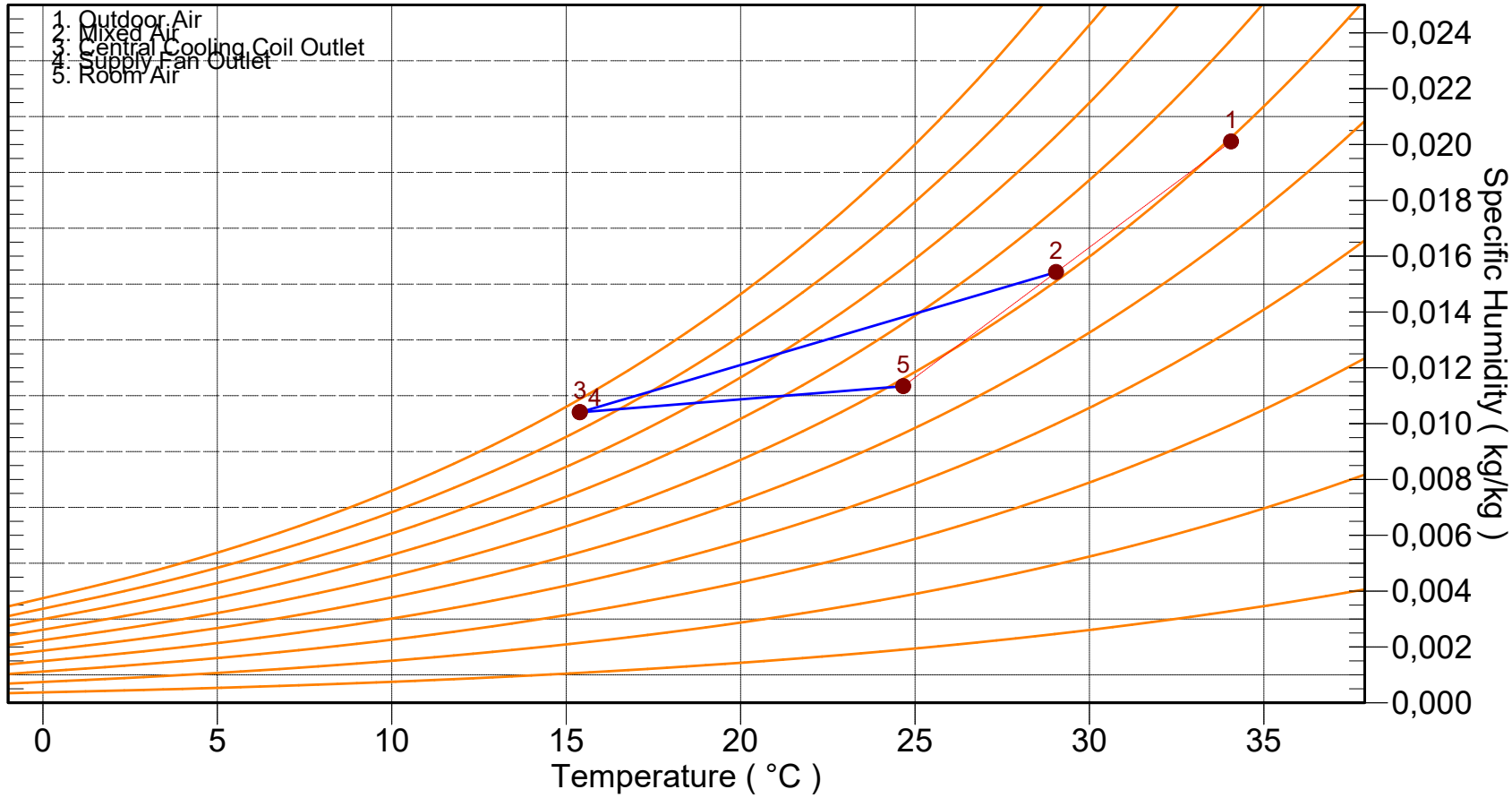
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

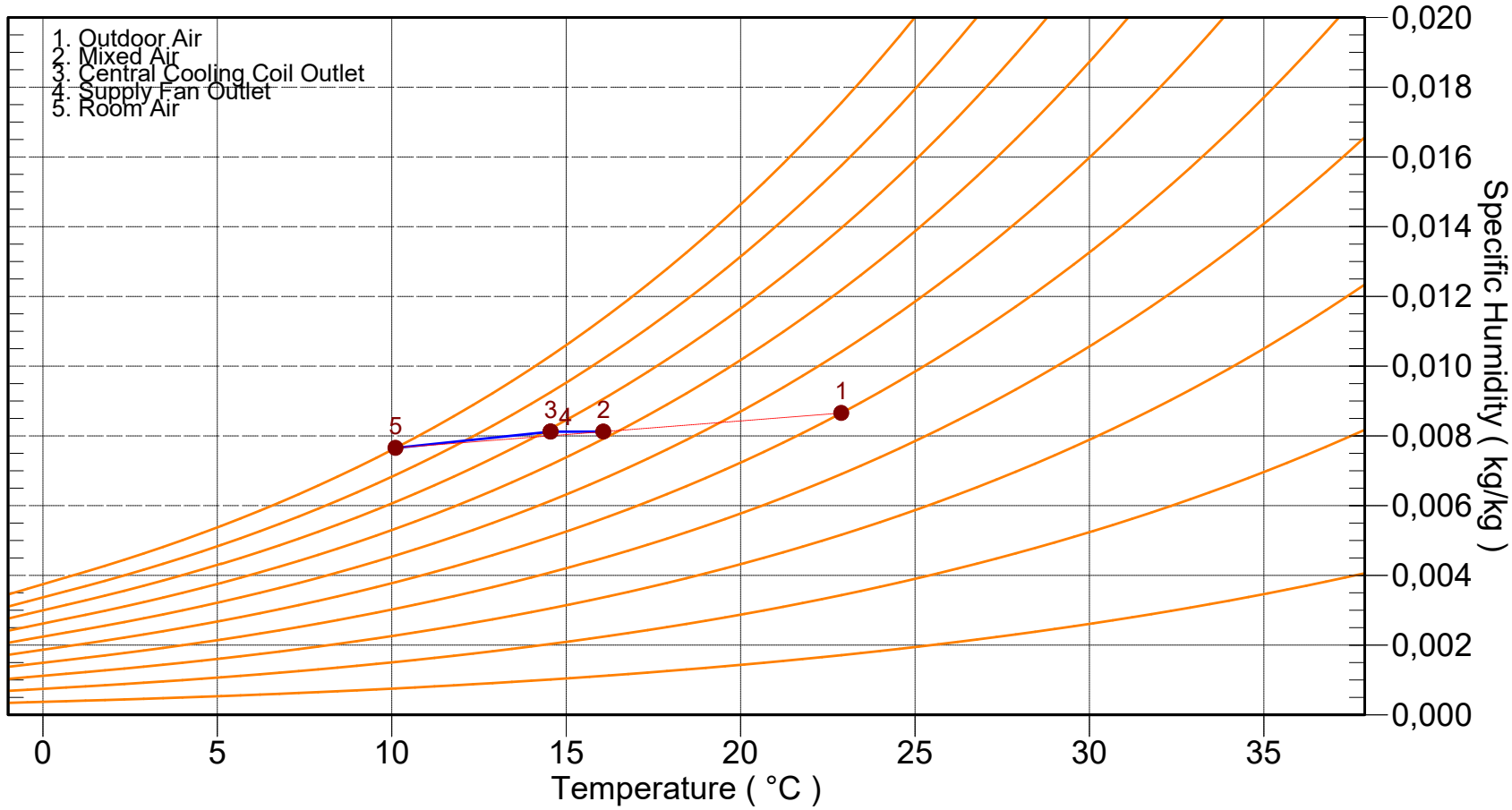
System Psychrometrics for AA Salón C-01

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón C-01

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón C-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

Air System Information

Air System Name	**AA Salón C-02**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón C-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

Air System Information

Air System Name ..... **AA Salón C-02**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón C-02	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón C-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón C-02	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón C-02" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón C-02" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

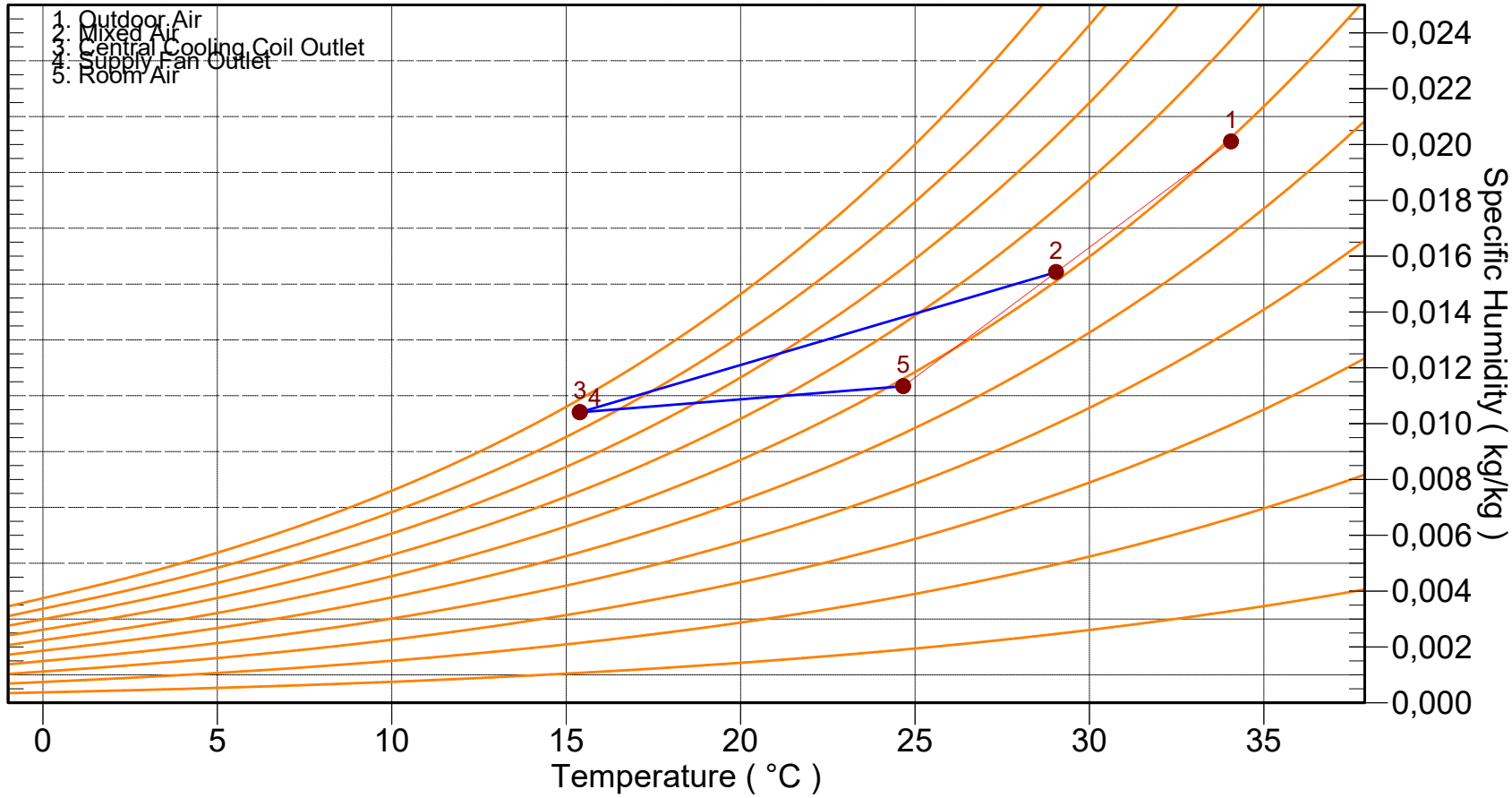
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

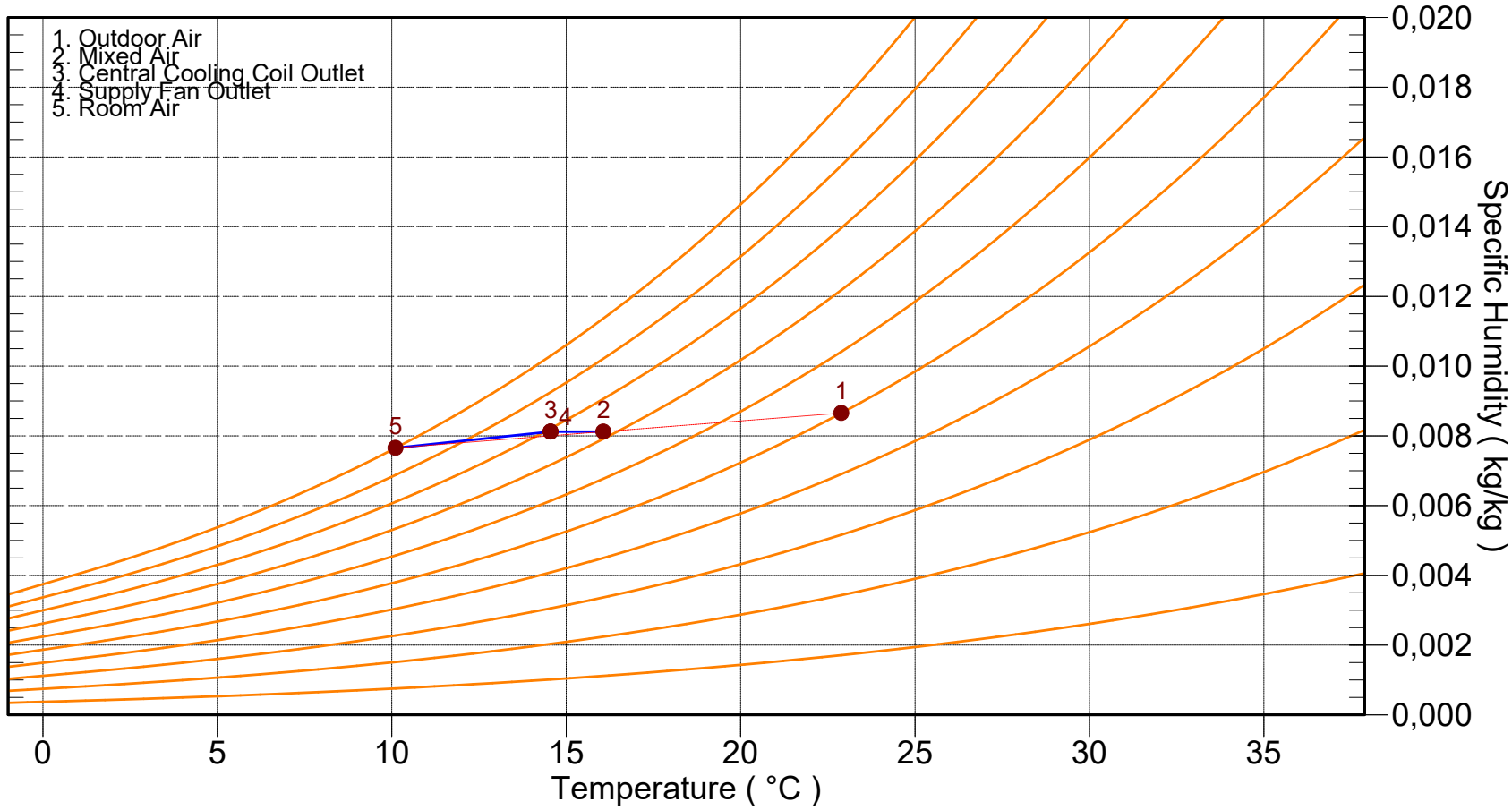
System Psychrometrics for AA Salón C-02

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón C-02

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón D-01

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

Air System Information

Air System Name	**AA Salón D-01**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón D-01

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

Air System Information

Air System Name ..... **AA Salón D-01**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón D-01	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón D-01

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón D-01	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón D-01" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón D-01" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

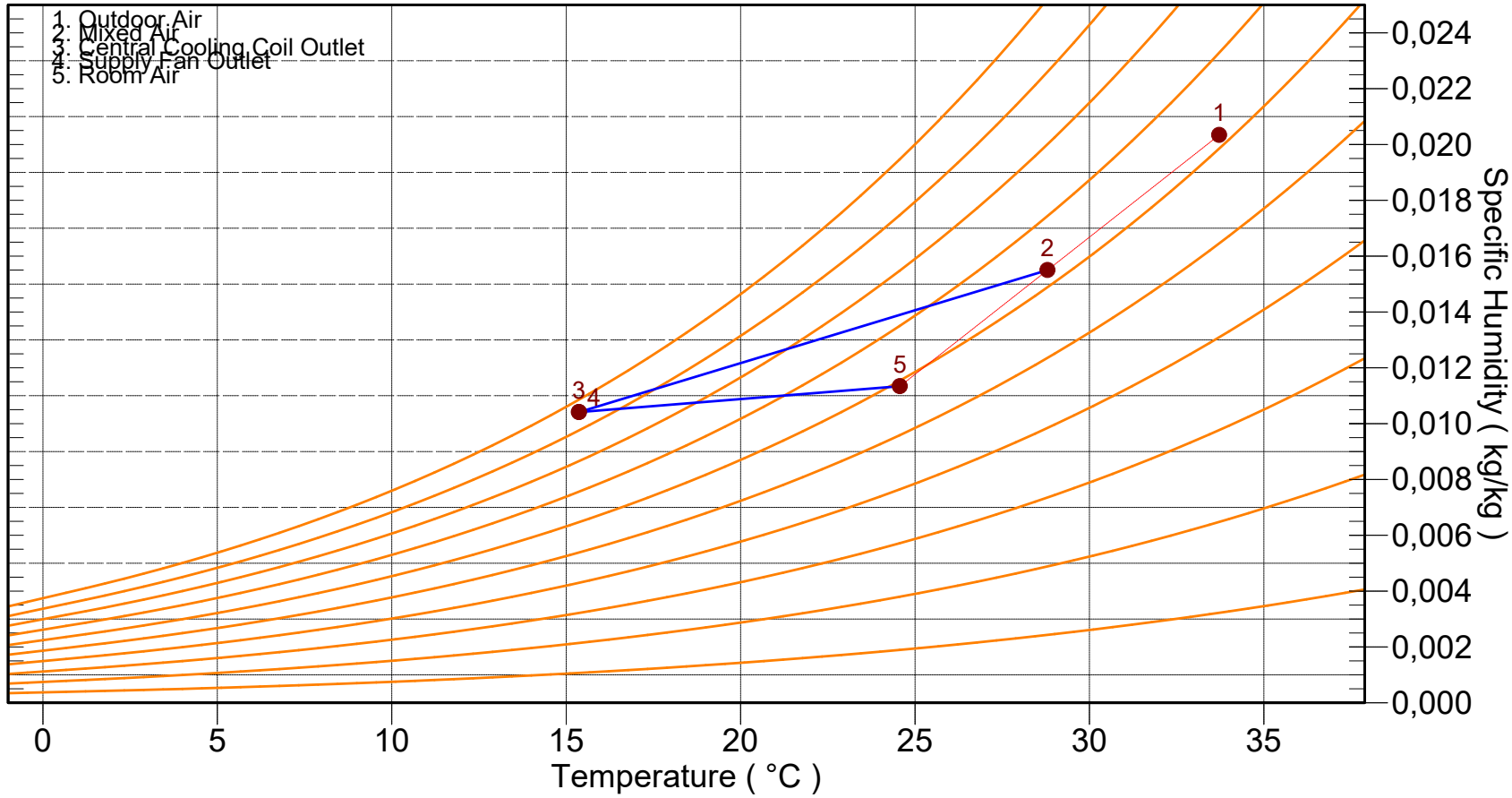
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

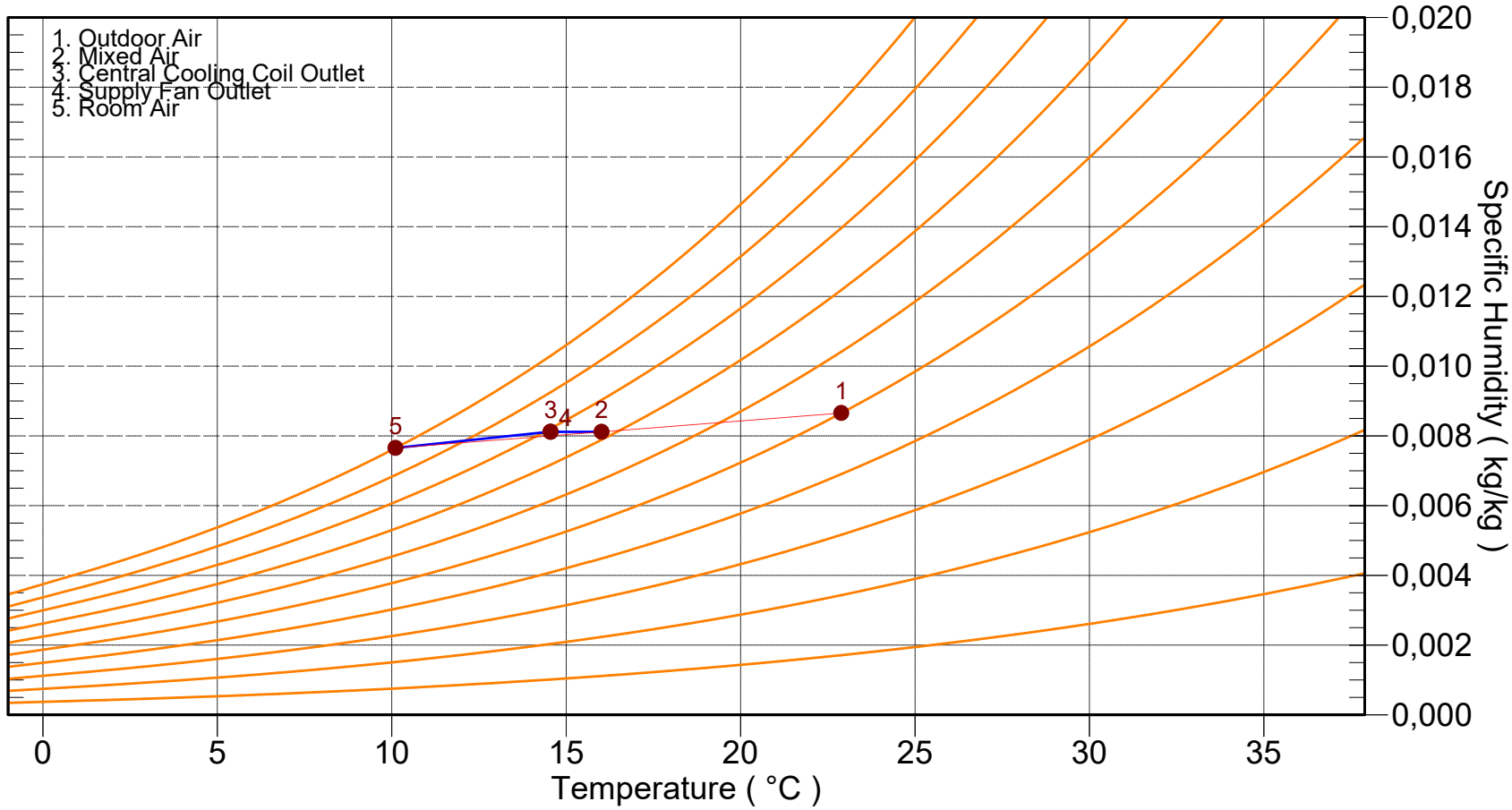
Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón D-01

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón D-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

Air System Information

Air System Name	**AA Salón D-02**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón D-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

Air System Information

Air System Name ..... **AA Salón D-02**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón D-02	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón D-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:48p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón D-02	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón D-02" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón D-02" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

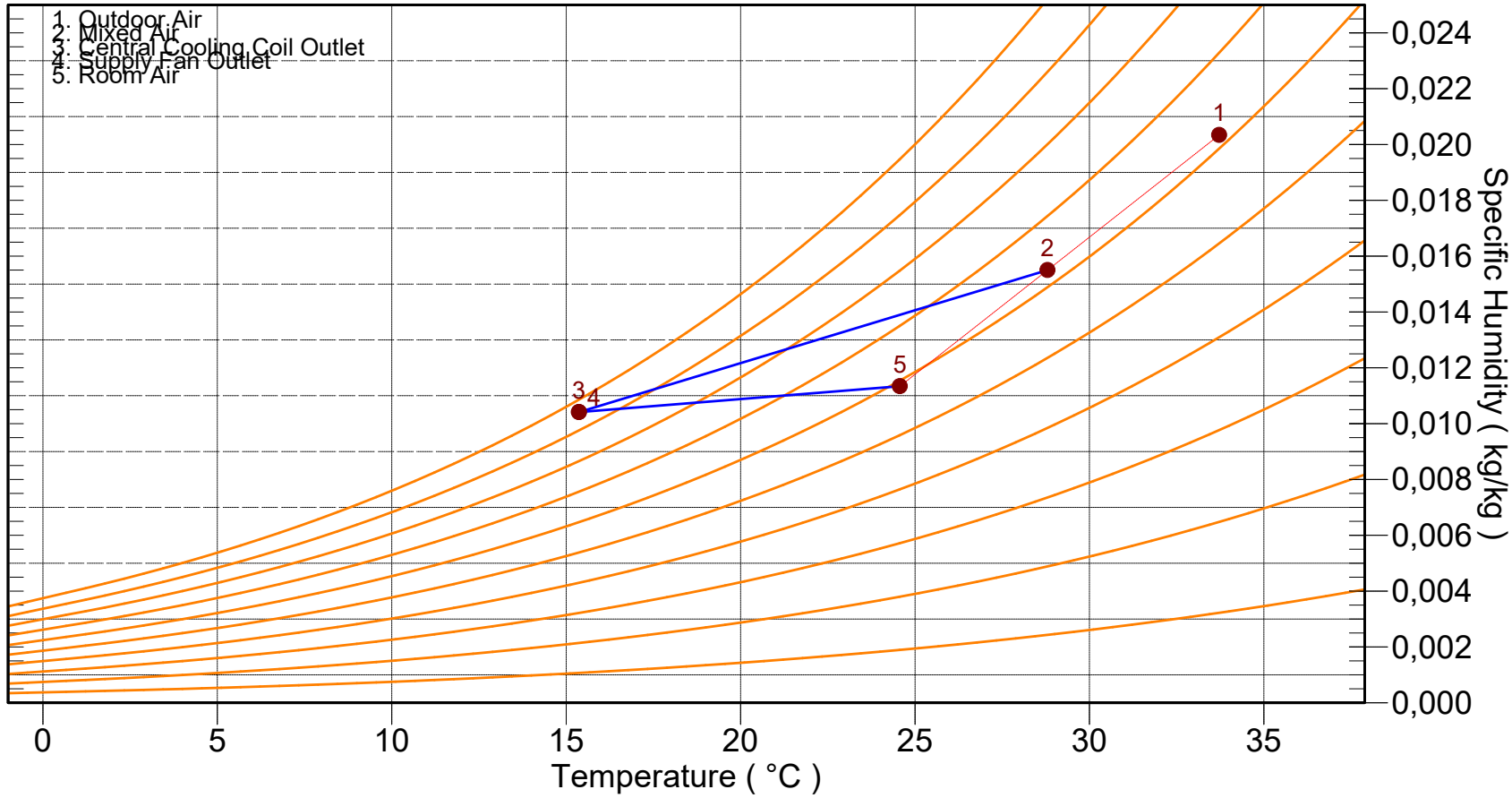
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

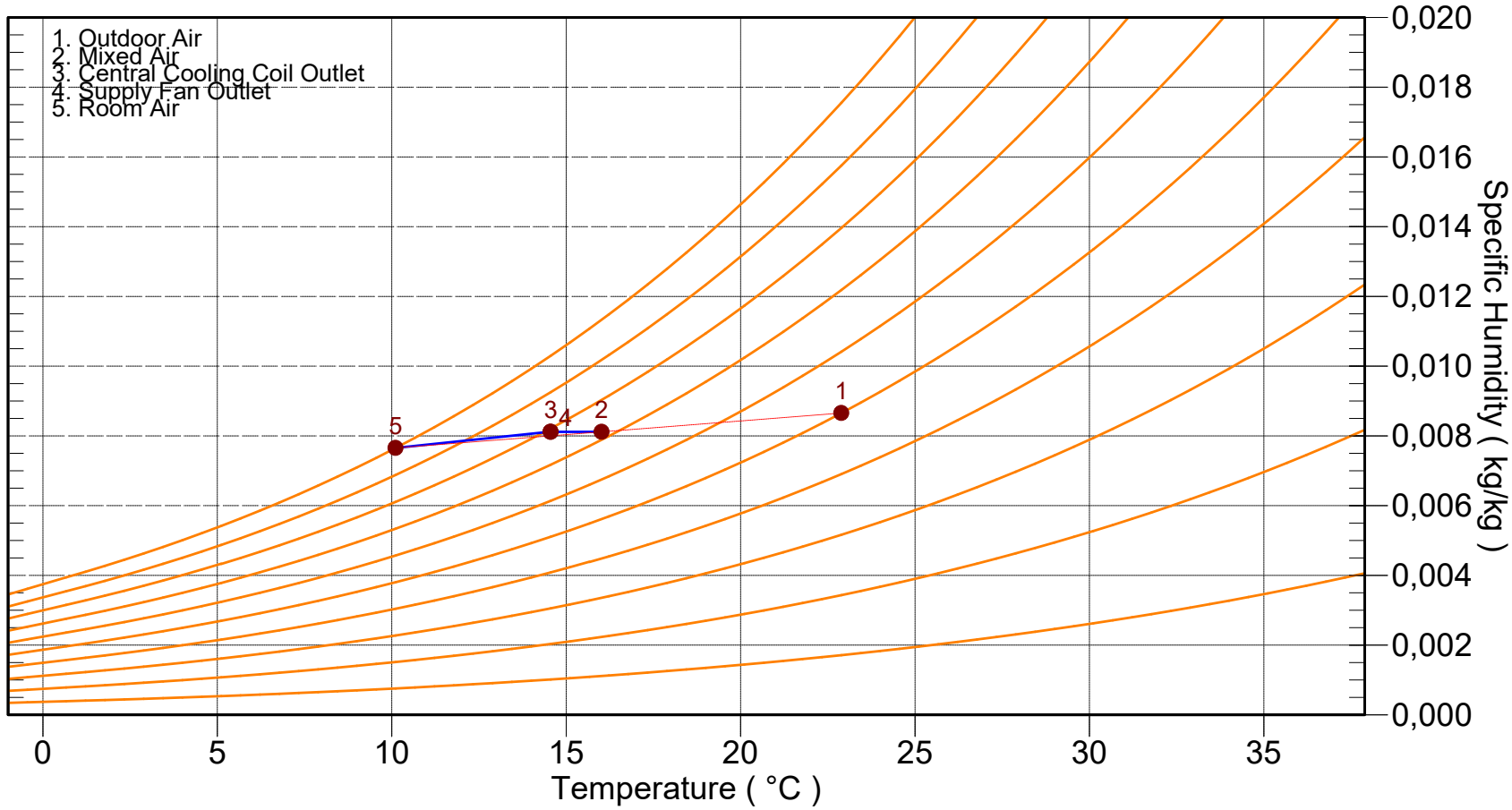
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name	**AA Salón G-02**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**507**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**507**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**507**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**31,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**507**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**506**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,60**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name ..... **AA Salón G-02**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	507	507	7,60	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-02	1	5,8	Jun 1600	507	0,0	66,8	7,60

Ventilation Sizing Summary for AA Salón G-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-02	1	66,8	41,0	507,4	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**507,4**					**245,1**

Air System Design Load Summary for AA Salón G-02

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5721**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5616	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	507 L/s	0	-	507 L/s	0	-
Ventilation Load	245 L/s	2667	6394	245 L/s	-3767	-722
Supply Fan Load	507 L/s	0	-	507 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8282**	**7837**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8282	7837	-	-1055	0
>> Total Conditioning	**-**	**8282**	**7837**	**-**	**-1055**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-02" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	26 m²	61	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5764**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-02" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2667	6394
Vent - Return Mixing	Outlet	28,9	0,01575	507	791	-	-
Central Cooling Coil	Outlet	15,4	0,01049	507	791	8282	7837
Supply Fan	Outlet	15,4	0,01049	507	791	0	-
Cold Supply Duct	Outlet	15,4	0,01049	507	791	-	-
Zone Air	-	24,6	0,01146	507	1156	5616	1443
Return Plenum	Outlet	24,6	0,01146	507	1156	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5721	Cooling	5616	24,6	507	1156	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,2	0,00814	507	408	-	-
Central Cooling Coil	Outlet	14,4	0,00814	507	408	1055	0
Supply Fan	Outlet	14,4	0,00814	507	408	0	-
Cold Supply Duct	Outlet	10,0	0,00814	507	408	-	-
Zone Air	-	10,0	0,00765	507	415	0	0
Return Plenum	Outlet	10,0	0,00765	507	415	0	-

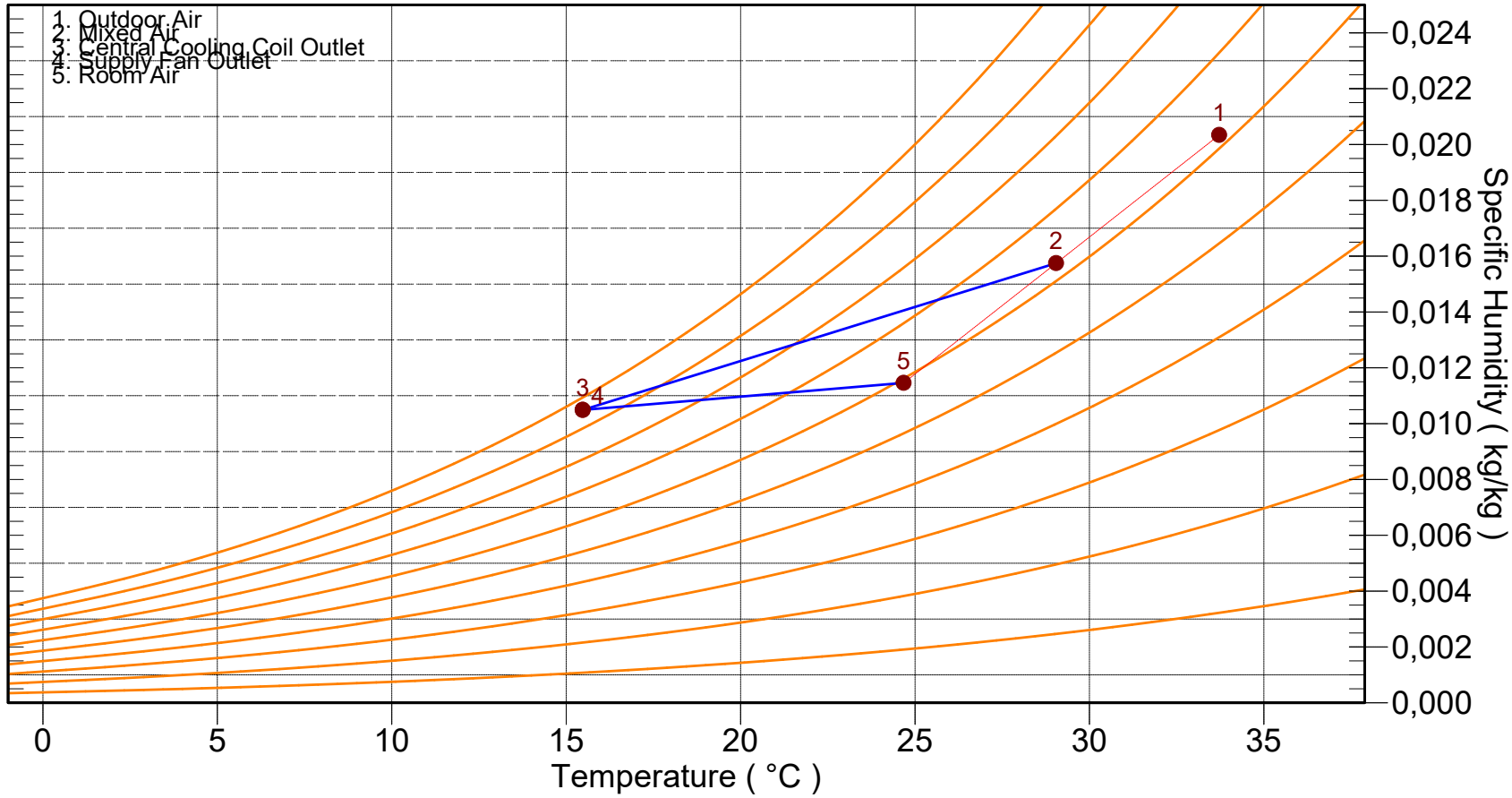
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	507	415	0	0

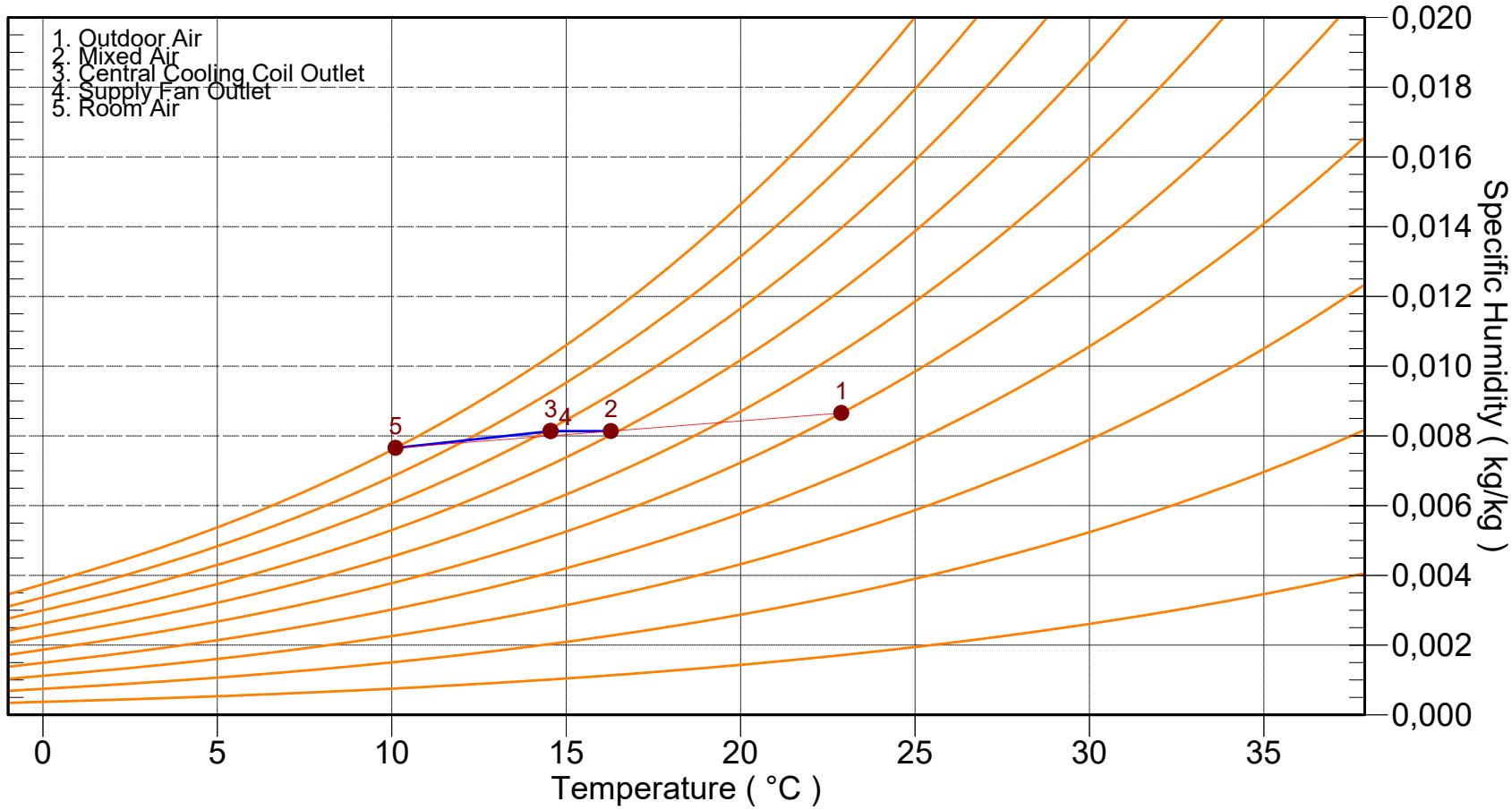
System Psychrometrics for AA Salón G-02

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón G-02

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-03

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name	**AA Salón G-03**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**507**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**507**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**507**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**31,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**507**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**506**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,60**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-03

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name ..... **AA Salón G-03**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	507	507	7,60	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-03	1	5,8	Jun 1600	507	0,0	66,8	7,60

Ventilation Sizing Summary for AA Salón G-03

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-03	1	66,8	41,0	507,4	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**507,4**					**245,1**

Air System Design Load Summary for AA Salón G-03

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5721**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5616	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	507 L/s	0	-	507 L/s	0	-
Ventilation Load	245 L/s	2667	6394	245 L/s	-3767	-722
Supply Fan Load	507 L/s	0	-	507 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8282**	**7837**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8282	7837	-	-1055	0
>> Total Conditioning	**-**	**8282**	**7837**	**-**	**-1055**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-03" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	26 m²	61	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5764**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-03" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2667	6394
Vent - Return Mixing	Outlet	28,9	0,01575	507	791	-	-
Central Cooling Coil	Outlet	15,4	0,01049	507	791	8282	7837
Supply Fan	Outlet	15,4	0,01049	507	791	0	-
Cold Supply Duct	Outlet	15,4	0,01049	507	791	-	-
Zone Air	-	24,6	0,01146	507	1156	5616	1443
Return Plenum	Outlet	24,6	0,01146	507	1156	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5721	Cooling	5616	24,6	507	1156	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

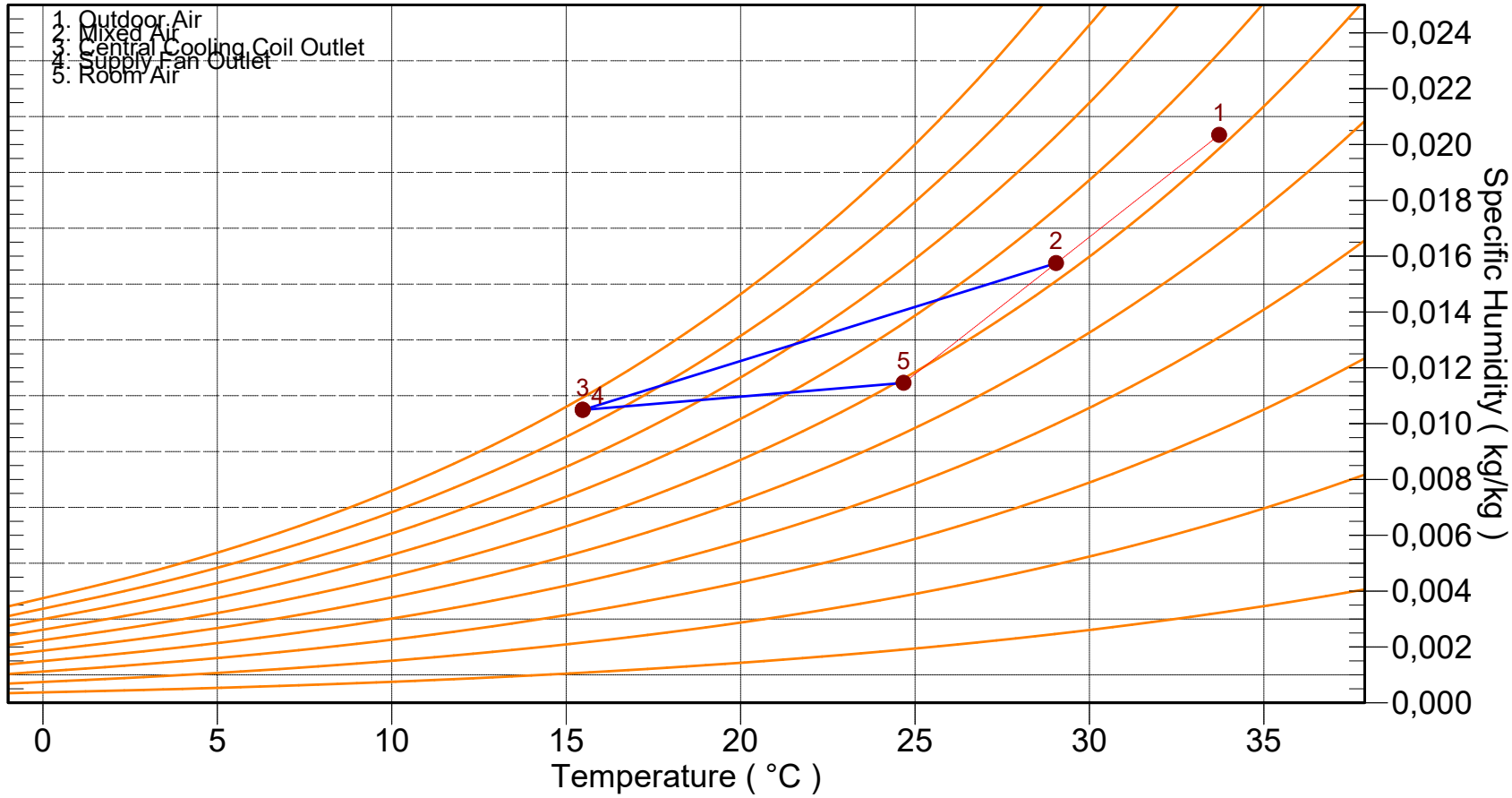
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,2	0,00814	507	408	-	-
Central Cooling Coil	Outlet	14,4	0,00814	507	408	1055	0
Supply Fan	Outlet	14,4	0,00814	507	408	0	-
Cold Supply Duct	Outlet	10,0	0,00814	507	408	-	-
Zone Air	-	10,0	0,00765	507	415	0	0
Return Plenum	Outlet	10,0	0,00765	507	415	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

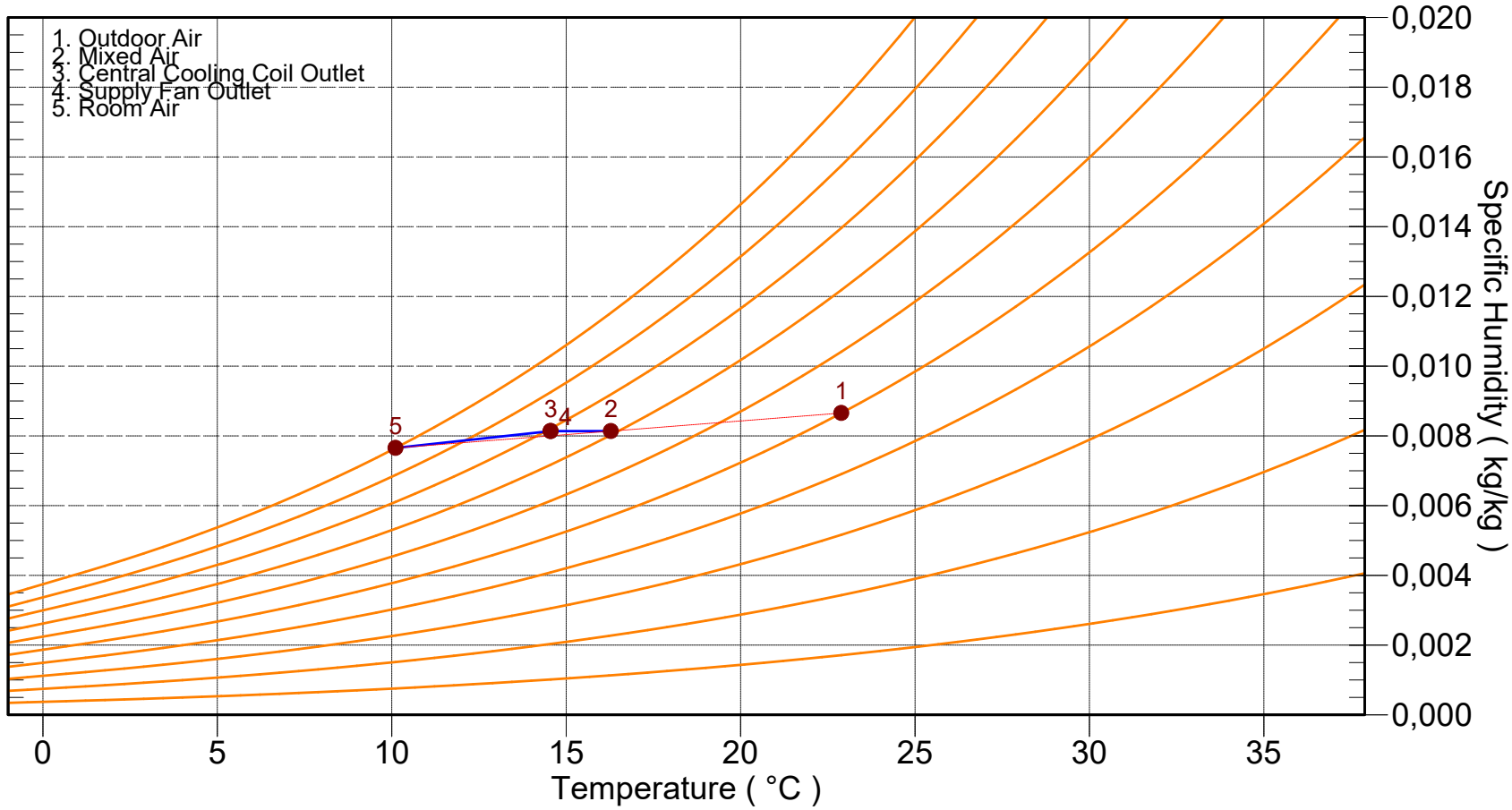
Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	507	415	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón G-03

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-04

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name	**AA Salón G-04**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**507**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**507**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**507**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**31,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**507**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**506**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,60**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-04

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name ..... **AA Salón G-04**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	507	507	7,60	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-04	1	5,8	Jun 1600	507	0,0	66,8	7,60

Ventilation Sizing Summary for AA Salón G-04

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-04	1	66,8	41,0	507,4	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**507,4**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5721**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5616	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	507 L/s	0	-	507 L/s	0	-
Ventilation Load	245 L/s	2667	6394	245 L/s	-3767	-722
Supply Fan Load	507 L/s	0	-	507 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8282**	**7837**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8282	7837	-	-1055	0
>> Total Conditioning	**-**	**8282**	**7837**	**-**	**-1055**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-04" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	26 m²	61	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5764**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-04" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2667	6394
Vent - Return Mixing	Outlet	28,9	0,01575	507	791	-	-
Central Cooling Coil	Outlet	15,4	0,01049	507	791	8282	7837
Supply Fan	Outlet	15,4	0,01049	507	791	0	-
Cold Supply Duct	Outlet	15,4	0,01049	507	791	-	-
Zone Air	-	24,6	0,01146	507	1156	5616	1443
Return Plenum	Outlet	24,6	0,01146	507	1156	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5721	Cooling	5616	24,6	507	1156	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,2	0,00814	507	408	-	-
Central Cooling Coil	Outlet	14,4	0,00814	507	408	1055	0
Supply Fan	Outlet	14,4	0,00814	507	408	0	-
Cold Supply Duct	Outlet	10,0	0,00814	507	408	-	-
Zone Air	-	10,0	0,00765	507	415	0	0
Return Plenum	Outlet	10,0	0,00765	507	415	0	-

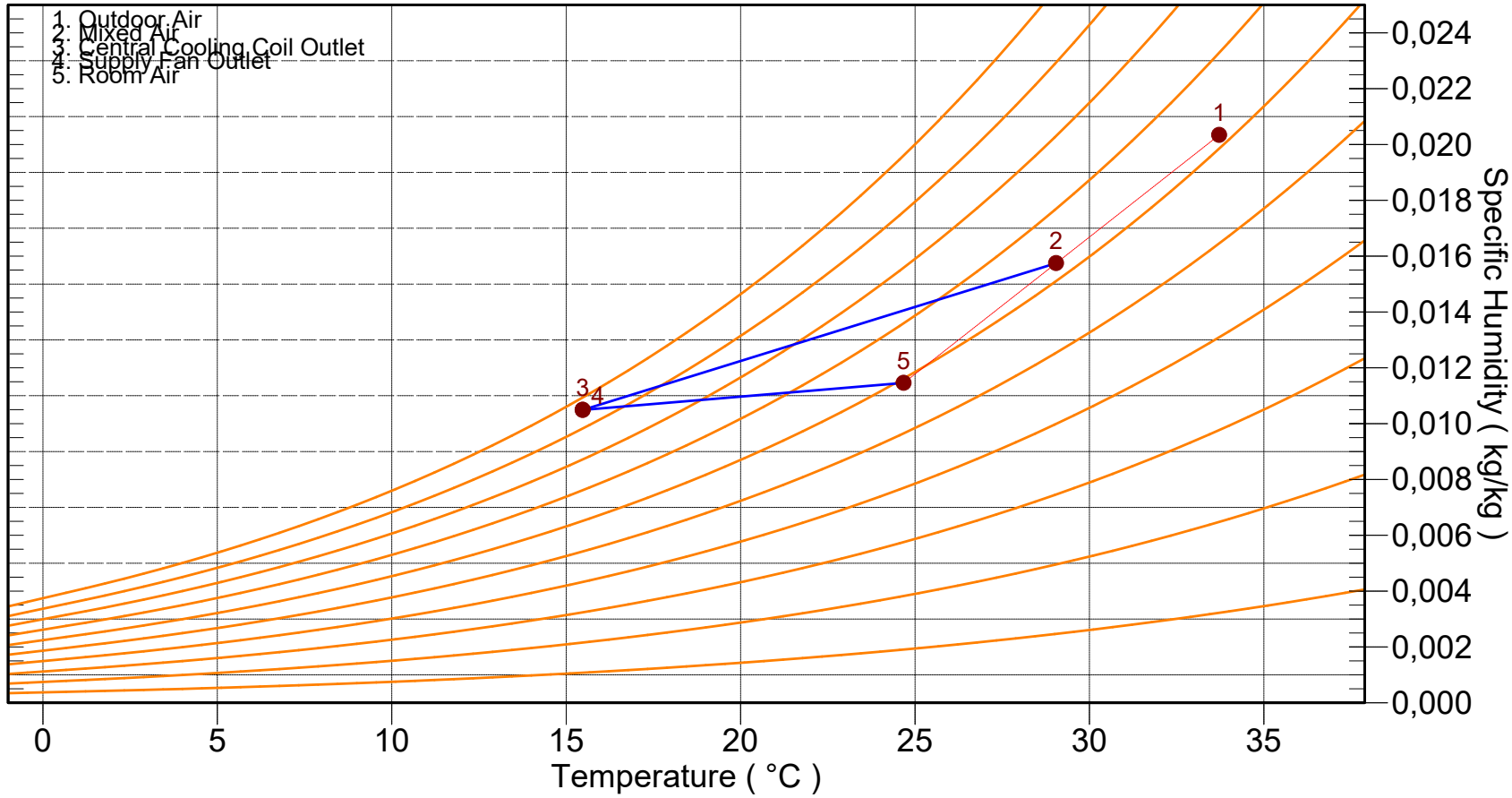
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	507	415	0	0

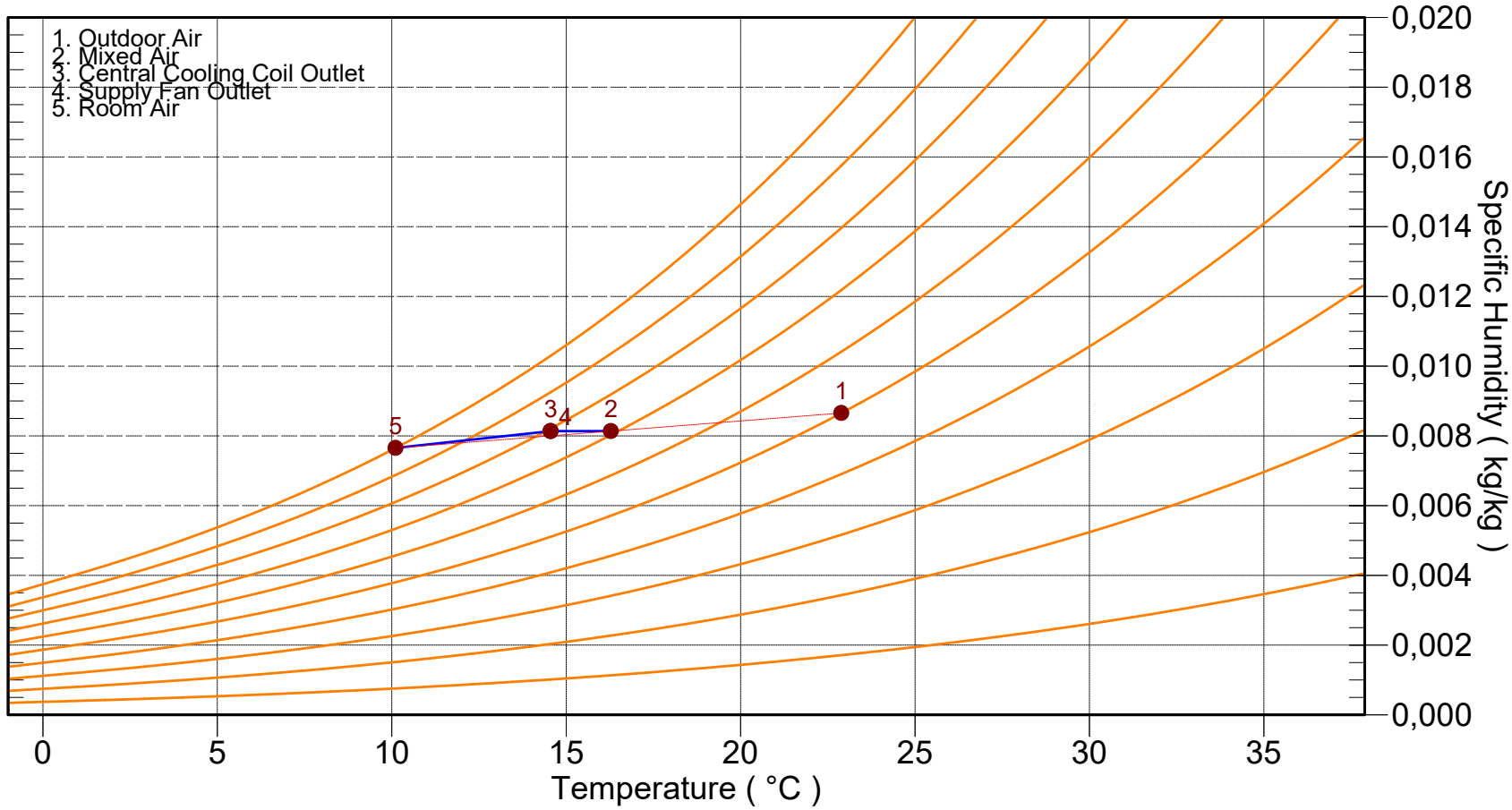
System Psychrometrics for AA Salón G-04

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón G-04

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-05

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name	**AA Salón G-05**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**507**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**507**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**507**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**31,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**507**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**506**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,60**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-05

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

Air System Information

Air System Name ..... **AA Salón G-05**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	507	507	7,60	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-05	1	5,8	Jun 1600	507	0,0	66,8	7,60

Ventilation Sizing Summary for AA Salón G-05

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:04a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-05	1	66,8	41,0	507,4	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**507,4**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5721**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5616	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	507 L/s	0	-	507 L/s	0	-
Ventilation Load	245 L/s	2667	6394	245 L/s	-3767	-722
Supply Fan Load	507 L/s	0	-	507 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8282**	**7837**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8282	7837	-	-1055	0
>> Total Conditioning	**-**	**8282**	**7837**	**-**	**-1055**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-05" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	26 m²	61	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5764**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-05" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2667	6394
Vent - Return Mixing	Outlet	28,9	0,01575	507	791	-	-
Central Cooling Coil	Outlet	15,4	0,01049	507	791	8282	7837
Supply Fan	Outlet	15,4	0,01049	507	791	0	-
Cold Supply Duct	Outlet	15,4	0,01049	507	791	-	-
Zone Air	-	24,6	0,01146	507	1156	5616	1443
Return Plenum	Outlet	24,6	0,01146	507	1156	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5721	Cooling	5616	24,6	507	1156	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

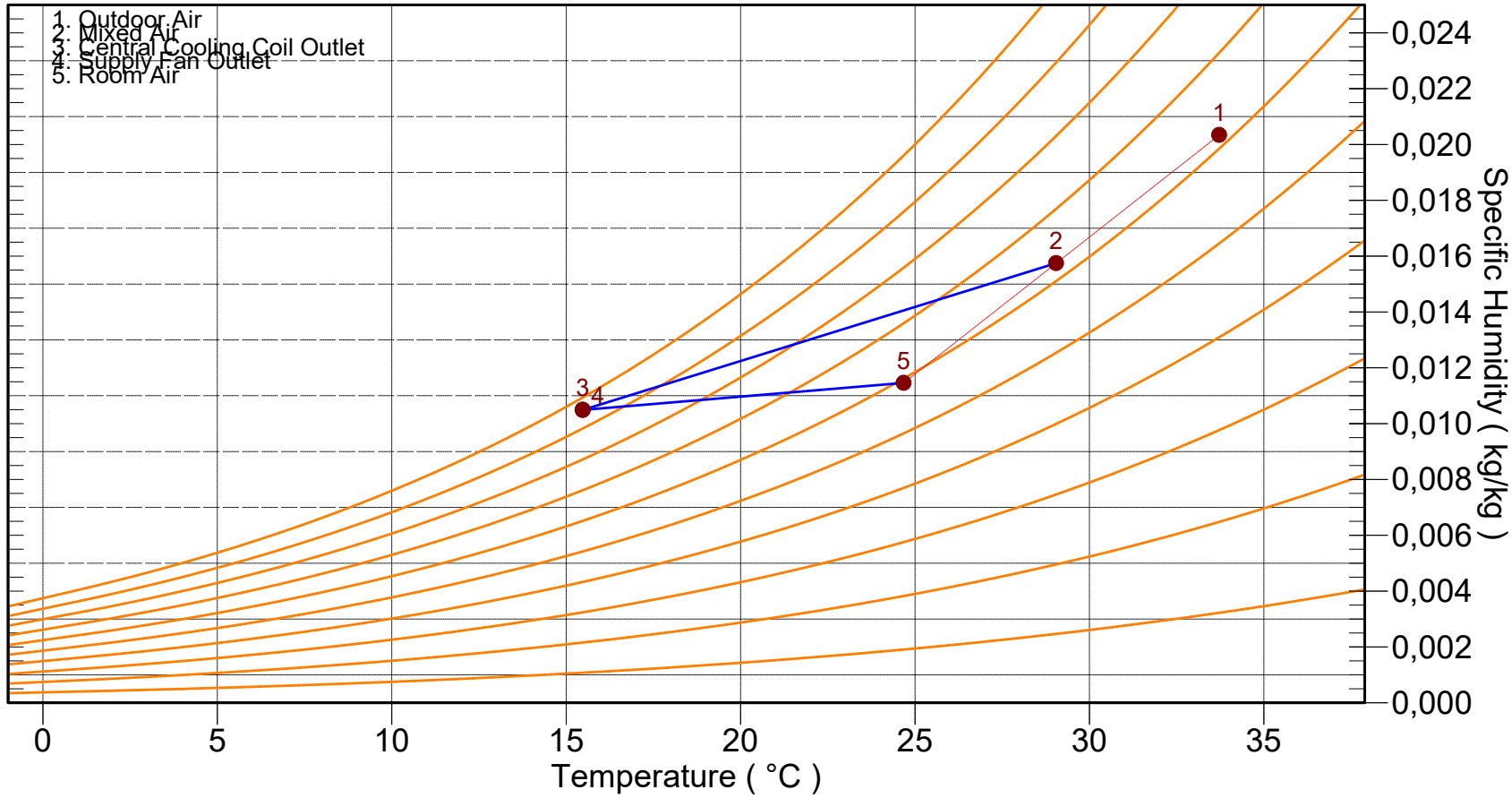
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,2	0,00814	507	408	-	-
Central Cooling Coil	Outlet	14,4	0,00814	507	408	1055	0
Supply Fan	Outlet	14,4	0,00814	507	408	0	-
Cold Supply Duct	Outlet	10,0	0,00814	507	408	-	-
Zone Air	-	10,0	0,00765	507	415	0	0
Return Plenum	Outlet	10,0	0,00765	507	415	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

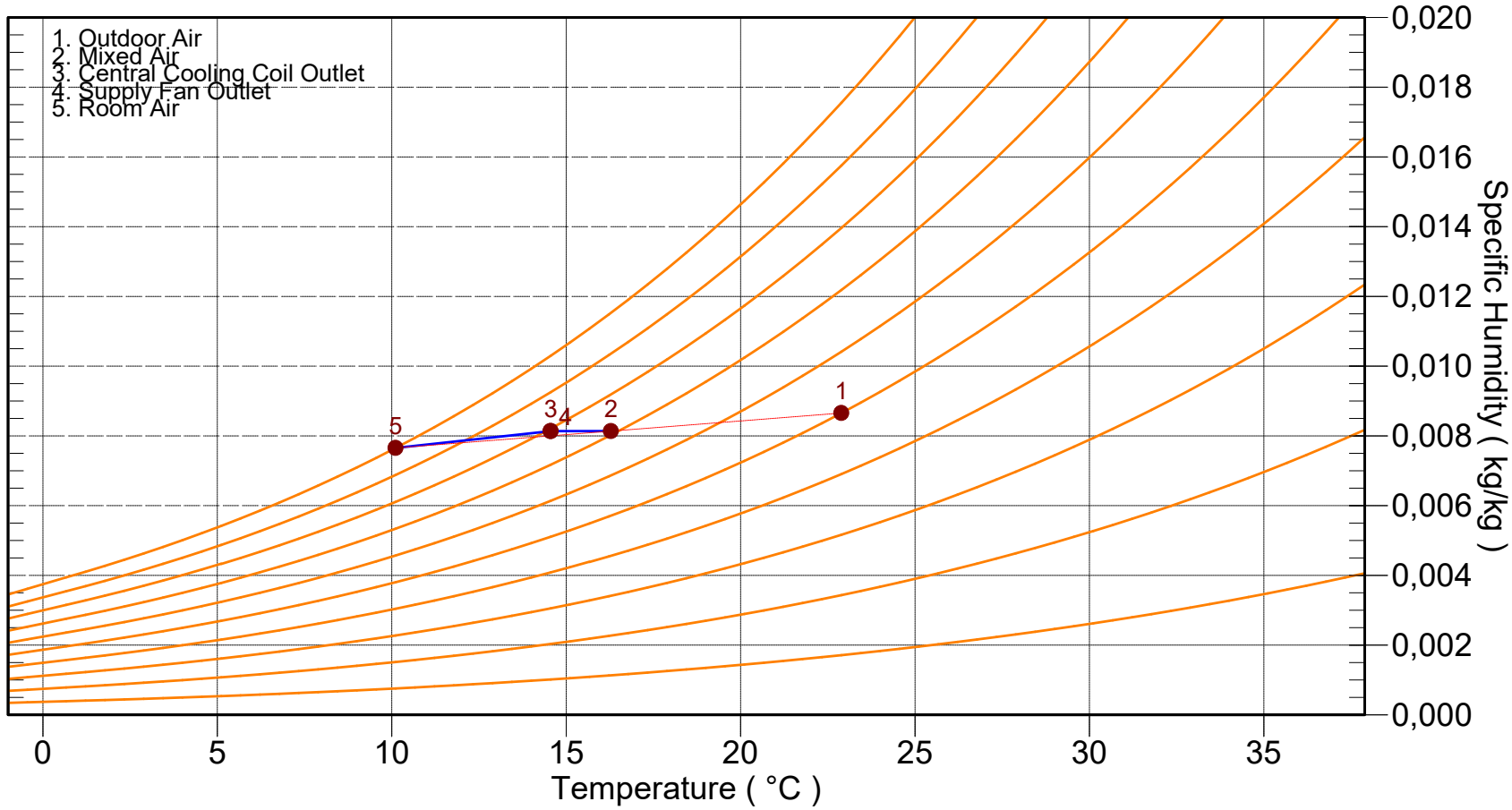
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	507	415	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-06

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name	**AA Salón G-06**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**507**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**507**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**507**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**31,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**507**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**506**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,60**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-06

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name ..... **AA Salón G-06**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	507	507	7,60	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-06	1	5,8	Jun 1600	507	0,0	66,8	7,60

Ventilation Sizing Summary for AA Salón G-06

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-06	1	66,8	41,0	507,4	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**507,4**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5721**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5616	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	507 L/s	0	-	507 L/s	0	-
Ventilation Load	245 L/s	2667	6394	245 L/s	-3767	-722
Supply Fan Load	507 L/s	0	-	507 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8282**	**7837**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8282	7837	-	-1055	0
>> Total Conditioning	**-**	**8282**	**7837**	**-**	**-1055**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-06" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	26 m²	61	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5764**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-06" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2667	6394
Vent - Return Mixing	Outlet	28,9	0,01575	507	791	-	-
Central Cooling Coil	Outlet	15,4	0,01049	507	791	8282	7837
Supply Fan	Outlet	15,4	0,01049	507	791	0	-
Cold Supply Duct	Outlet	15,4	0,01049	507	791	-	-
Zone Air	-	24,6	0,01146	507	1156	5616	1443
Return Plenum	Outlet	24,6	0,01146	507	1156	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5721	Cooling	5616	24,6	507	1156	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

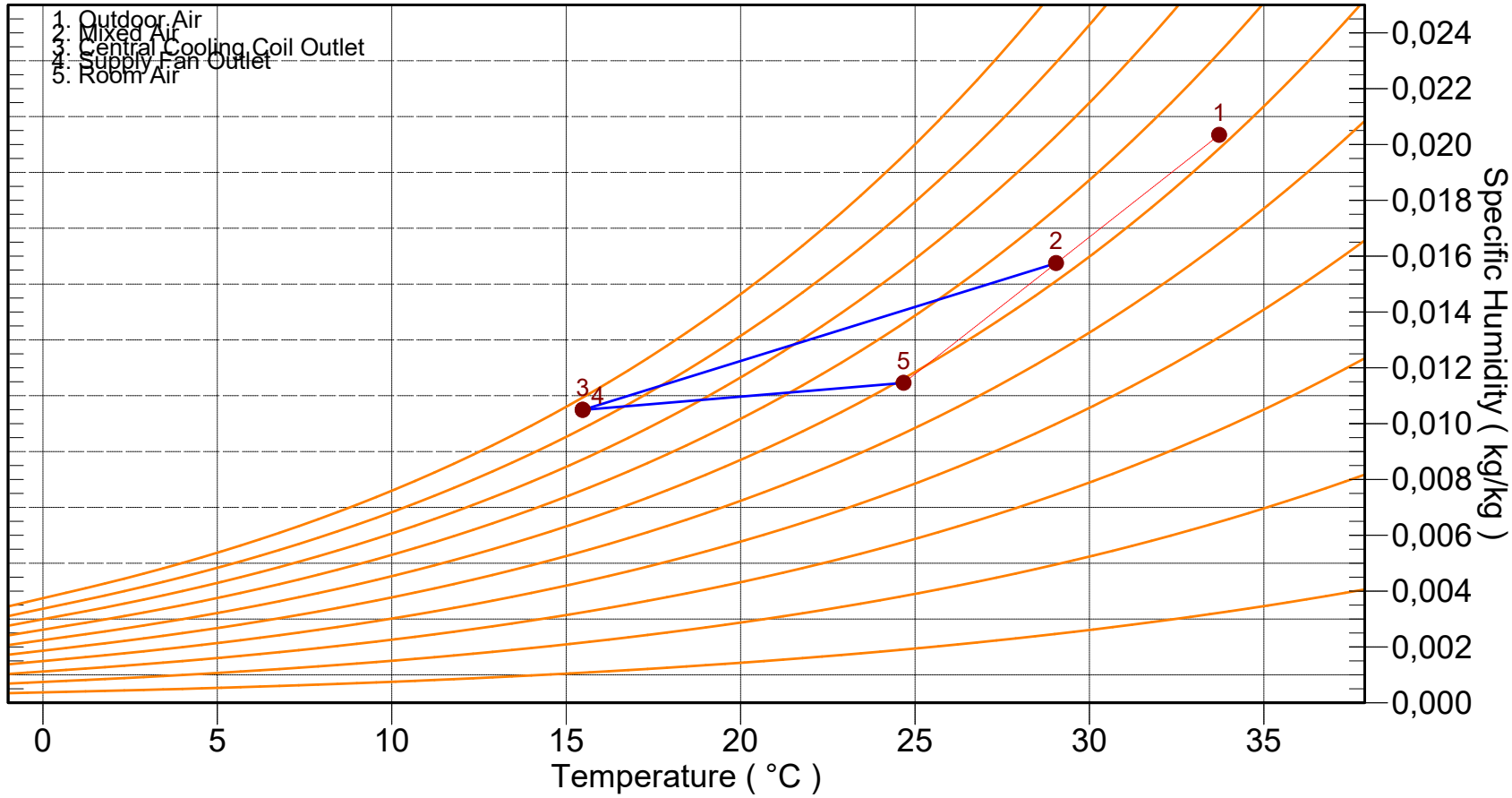
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,2	0,00814	507	408	-	-
Central Cooling Coil	Outlet	14,4	0,00814	507	408	1055	0
Supply Fan	Outlet	14,4	0,00814	507	408	0	-
Cold Supply Duct	Outlet	10,0	0,00814	507	408	-	-
Zone Air	-	10,0	0,00765	507	415	0	0
Return Plenum	Outlet	10,0	0,00765	507	415	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

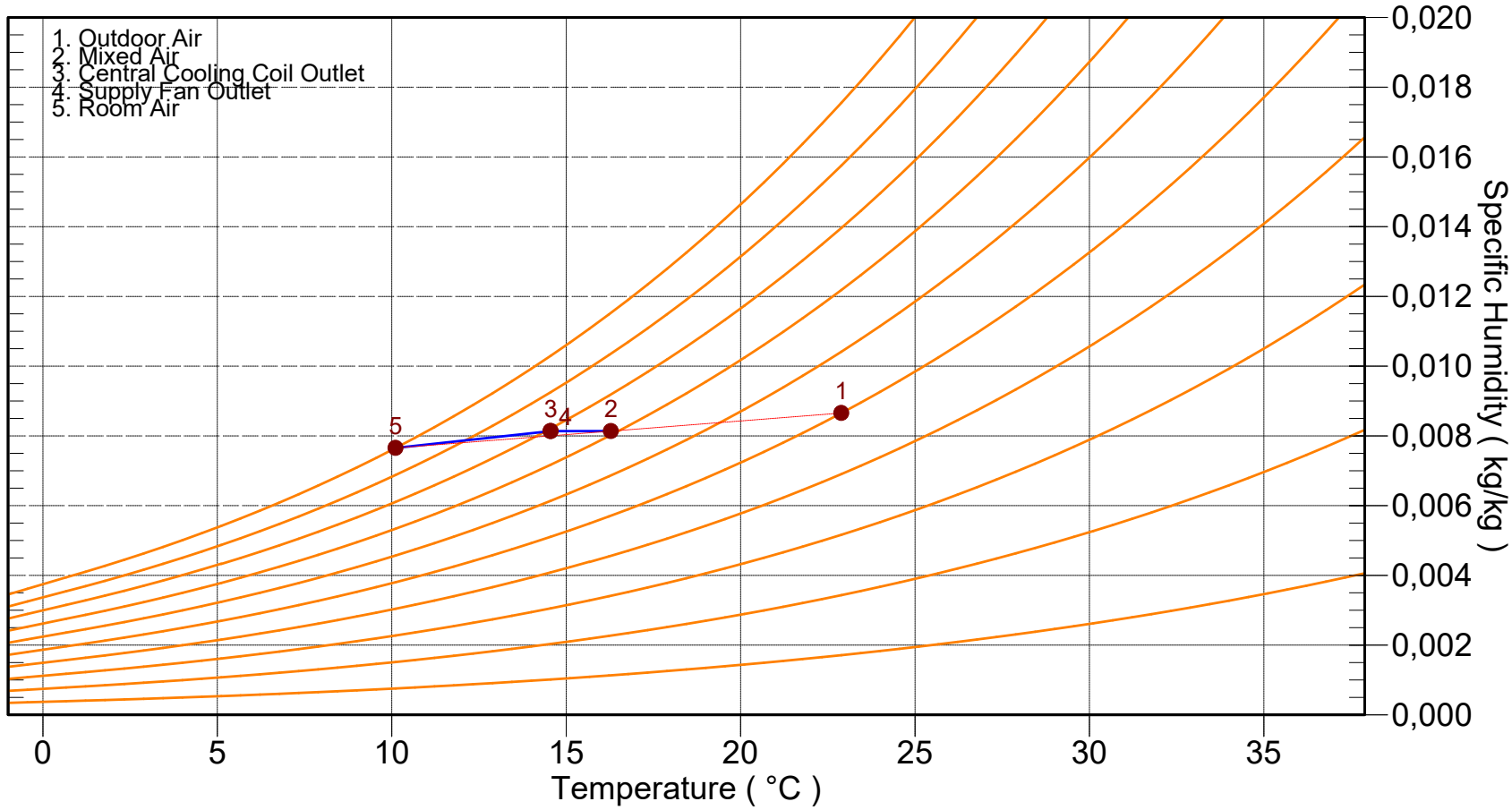
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	507	415	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-07

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name	**AA Salón G-07**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**507**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**507**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**507**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**31,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**507**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**506**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,60**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-07

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name ..... **AA Salón G-07**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	507	507	7,60	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-07	1	5,8	Jun 1600	507	0,0	66,8	7,60

Ventilation Sizing Summary for AA Salón G-07

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-07	1	66,8	41,0	507,4	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**507,4**					**245,1**

Air System Design Load Summary for AA Salón G-07

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5721**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5616	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	507 L/s	0	-	507 L/s	0	-
Ventilation Load	245 L/s	2667	6394	245 L/s	-3767	-722
Supply Fan Load	507 L/s	0	-	507 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8282**	**7837**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8282	7837	-	-1055	0
>> Total Conditioning	**-**	**8282**	**7837**	**-**	**-1055**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-07" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	26 m²	61	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5764**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-07" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0

System Psychrometrics for AA Salón G-07

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2667	6394
Vent - Return Mixing	Outlet	28,9	0,01575	507	791	-	-
Central Cooling Coil	Outlet	15,4	0,01049	507	791	8282	7837
Supply Fan	Outlet	15,4	0,01049	507	791	0	-
Cold Supply Duct	Outlet	15,4	0,01049	507	791	-	-
Zone Air	-	24,6	0,01146	507	1156	5616	1443
Return Plenum	Outlet	24,6	0,01146	507	1156	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5721	Cooling	5616	24,6	507	1156	0	0

System Psychrometrics for AA Salón G-07

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

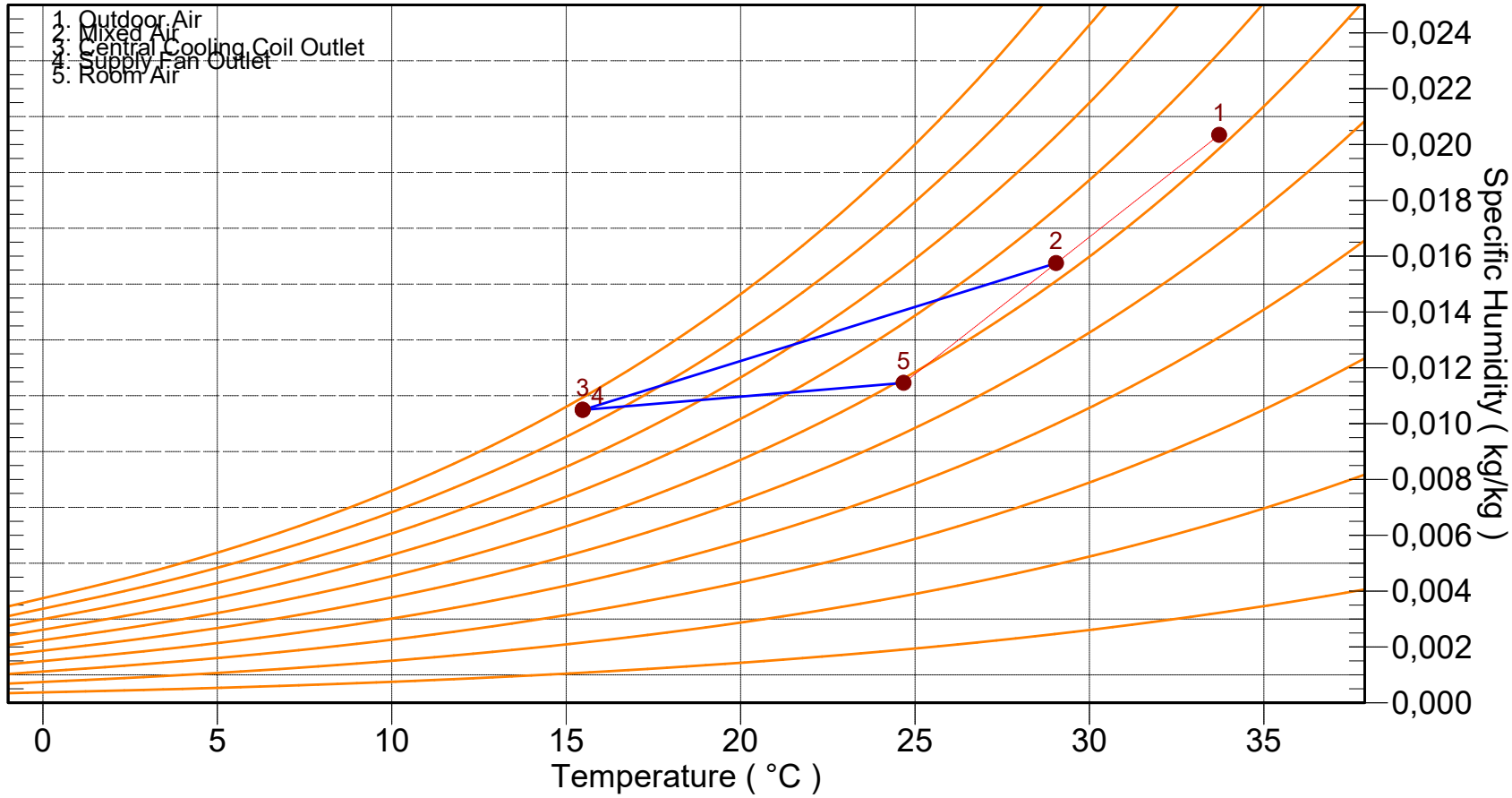
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,2	0,00814	507	408	-	-
Central Cooling Coil	Outlet	14,4	0,00814	507	408	1055	0
Supply Fan	Outlet	14,4	0,00814	507	408	0	-
Cold Supply Duct	Outlet	10,0	0,00814	507	408	-	-
Zone Air	-	10,0	0,00765	507	415	0	0
Return Plenum	Outlet	10,0	0,00765	507	415	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

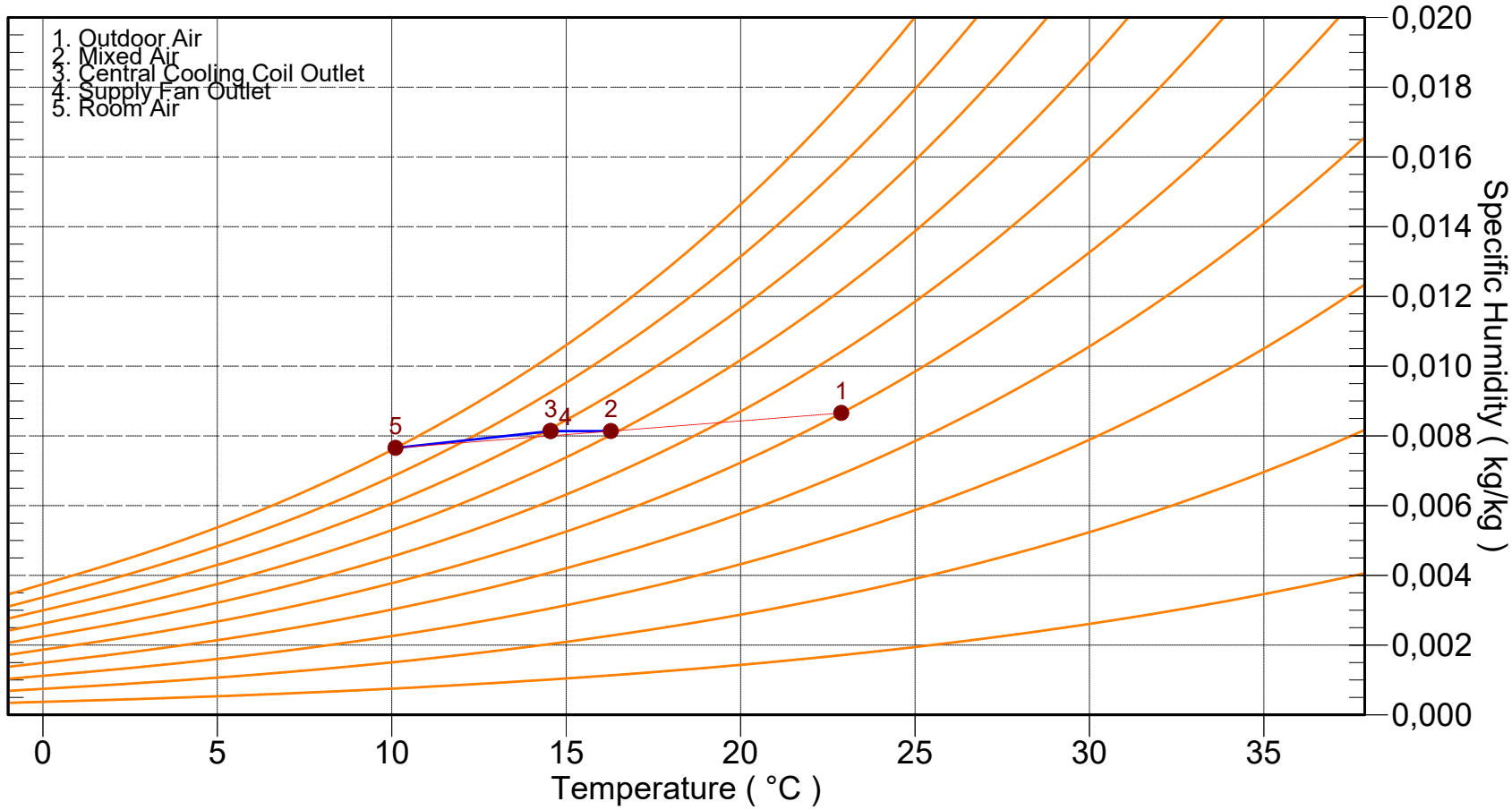
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	507	415	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-08

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name	**AA Salón G-08**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**507**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**507**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**507**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**31,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**507**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**506**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,60**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-08

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name ..... **AA Salón G-08**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	507	507	7,60	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-08	1	5,8	Jun 1600	507	0,0	66,8	7,60

Ventilation Sizing Summary for AA Salón G-08

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-08	1	66,8	41,0	507,4	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**507,4**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5721**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5616	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	507 L/s	0	-	507 L/s	0	-
Ventilation Load	245 L/s	2667	6394	245 L/s	-3767	-722
Supply Fan Load	507 L/s	0	-	507 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8282**	**7837**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8282	7837	-	-1055	0
>> Total Conditioning	**-**	**8282**	**7837**	**-**	**-1055**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-08" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	26 m²	61	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5764**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-08" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2667	6394
Vent - Return Mixing	Outlet	28,9	0,01575	507	791	-	-
Central Cooling Coil	Outlet	15,4	0,01049	507	791	8282	7837
Supply Fan	Outlet	15,4	0,01049	507	791	0	-
Cold Supply Duct	Outlet	15,4	0,01049	507	791	-	-
Zone Air	-	24,6	0,01146	507	1156	5616	1443
Return Plenum	Outlet	24,6	0,01146	507	1156	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5721	Cooling	5616	24,6	507	1156	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

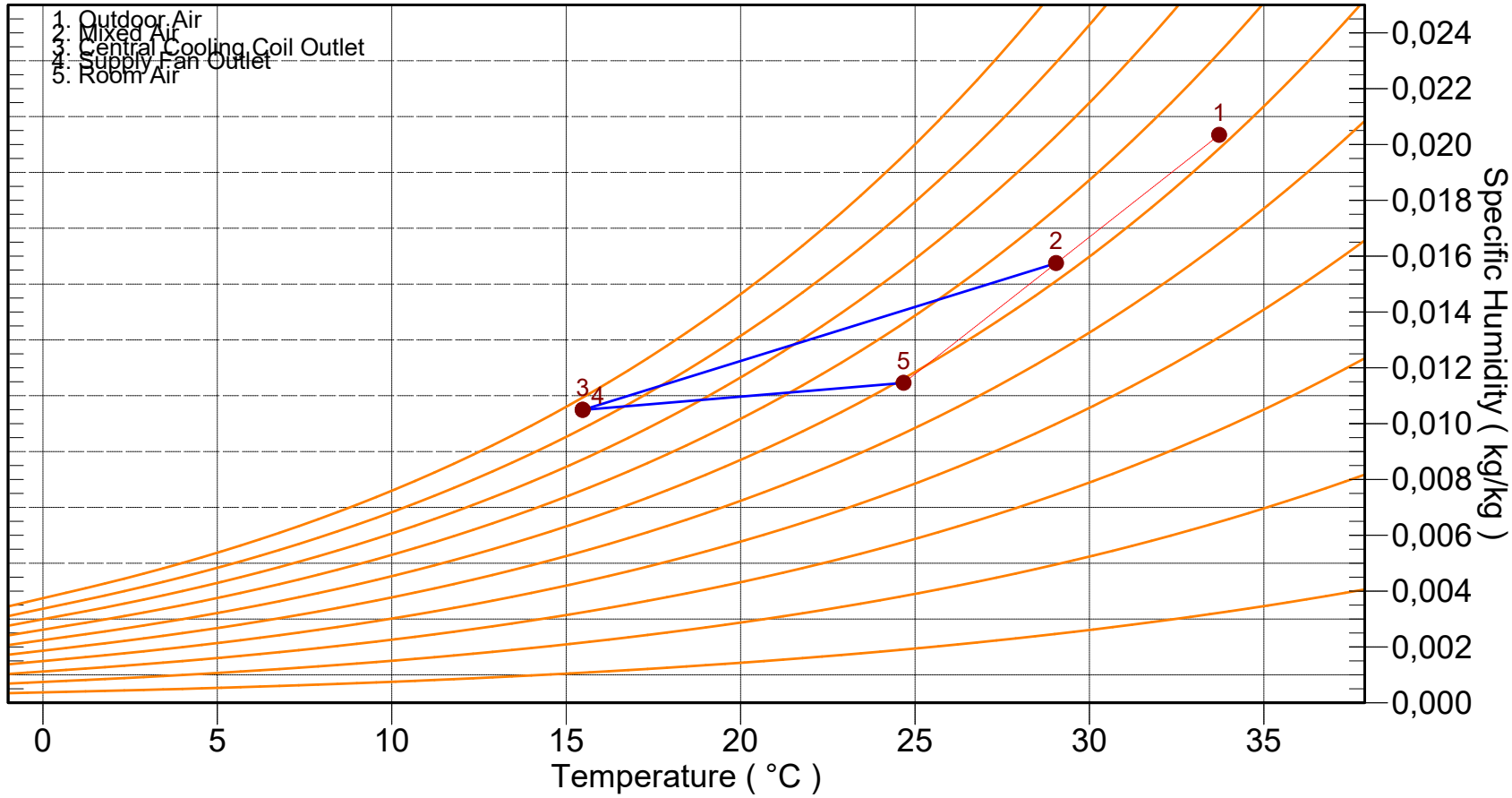
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,2	0,00814	507	408	-	-
Central Cooling Coil	Outlet	14,4	0,00814	507	408	1055	0
Supply Fan	Outlet	14,4	0,00814	507	408	0	-
Cold Supply Duct	Outlet	10,0	0,00814	507	408	-	-
Zone Air	-	10,0	0,00765	507	415	0	0
Return Plenum	Outlet	10,0	0,00765	507	415	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

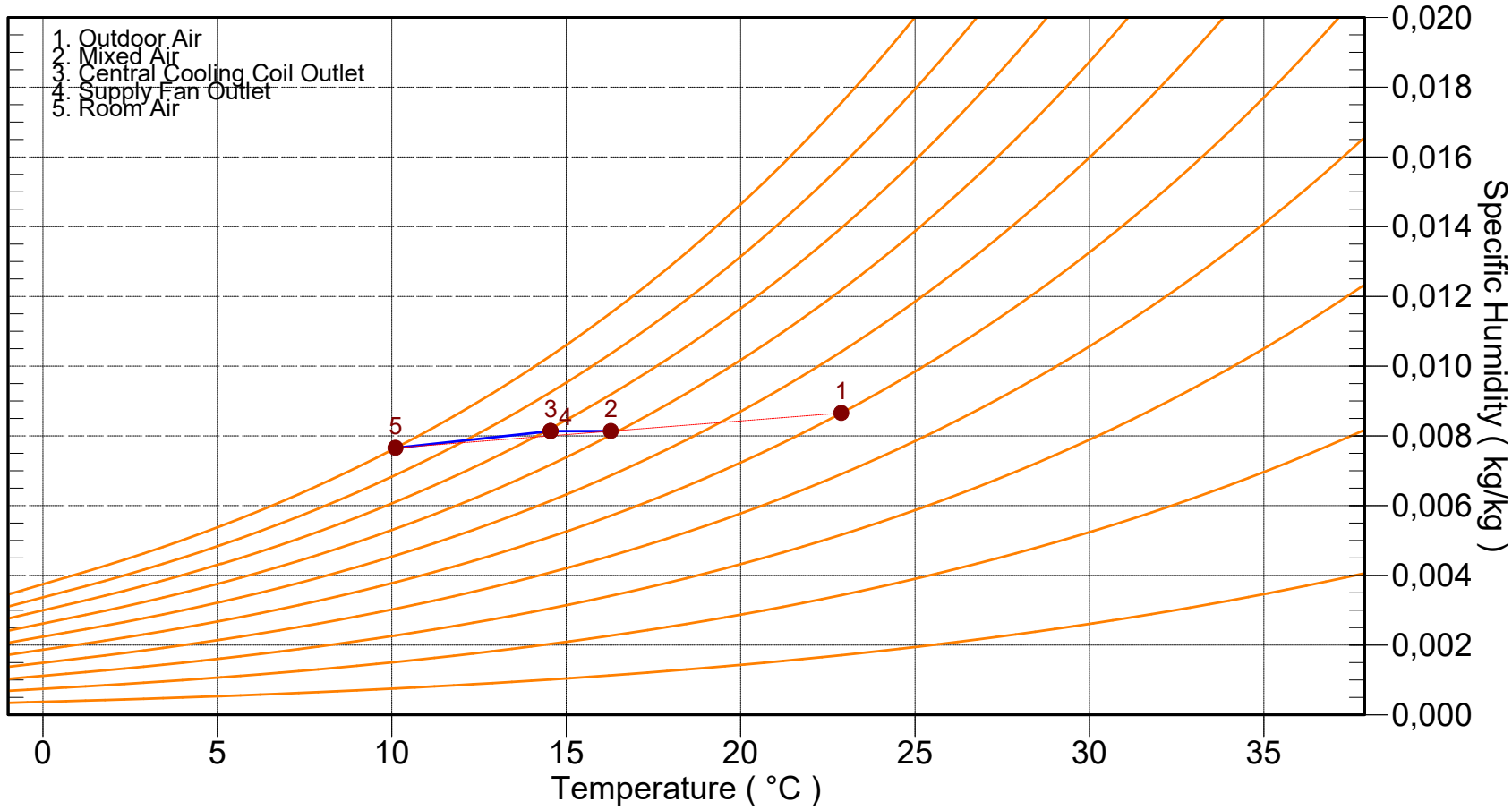
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	507	415	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-09

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name	**AA Salón G-09**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,3**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,4**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**513**	L/s	Entering DB / WB	**28,8 / 23,2**	°C
Max block L/s	**513**	L/s	Leaving DB / WB	**15,2 / 14,8**	°C
Sum of peak zone L/s	**513**	L/s	Coil ADP	**13,7**	°C
Sensible heat ratio	**0,515**		Bypass Factor	**0,100**	
L/(s kW)	**31,4**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**244,6**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**513**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,69**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-09

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name ..... **AA Salón G-09**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	513	513	7,69	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-09	1	5,8	Jun 1600	513	0,0	66,8	7,69

Ventilation Sizing Summary for AA Salón G-09

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-09	1	66,8	41,0	513,5	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**513,5**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	55 m²	121	-	55 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5784**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5720	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	513 L/s	0	-	513 L/s	0	-
Ventilation Load	245 L/s	2697	6480	245 L/s	-3767	-722
Supply Fan Load	513 L/s	0	-	513 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8417**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8417	7924	-	-1022	0
>> Total Conditioning	**-**	**8417**	**7924**	**-**	**-1022**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-09" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	55 m²	131	-	55 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5834**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-09" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0
W EXPOSURE						
WALL	29	0,331	-	70	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2697	6480
Vent - Return Mixing	Outlet	28,8	0,01564	513	793	-	-
Central Cooling Coil	Outlet	15,2	0,01038	513	793	8417	7924
Supply Fan	Outlet	15,2	0,01038	513	793	0	-
Cold Supply Duct	Outlet	15,2	0,01038	513	793	-	-
Zone Air	-	24,5	0,01134	513	1152	5720	1443
Return Plenum	Outlet	24,5	0,01134	513	1152	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5784	Cooling	5720	24,5	513	1152	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

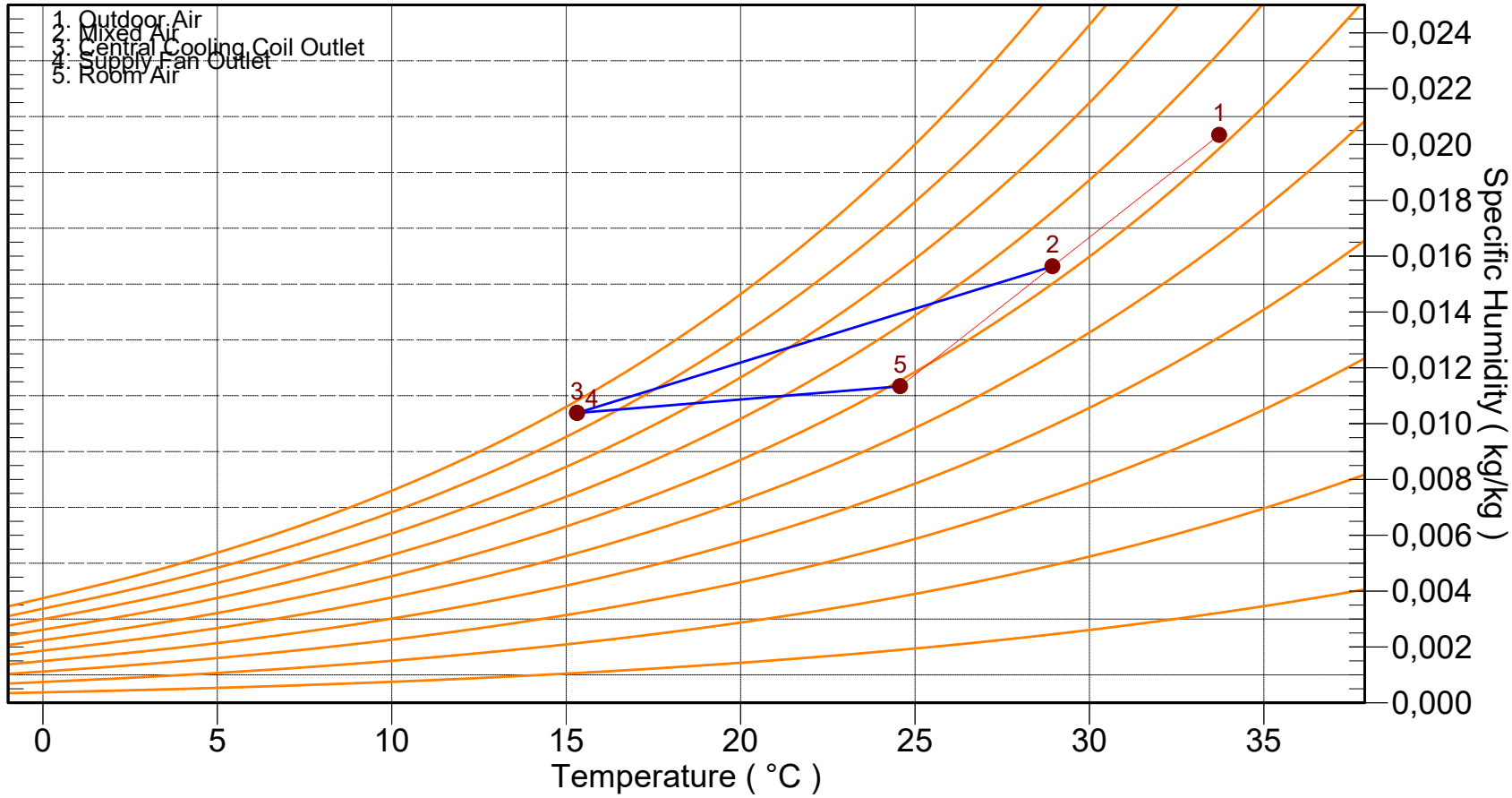
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	513	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	513	408	1022	0
Supply Fan	Outlet	14,4	0,00813	513	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	513	408	-	-
Zone Air	-	10,0	0,00765	513	416	0	0
Return Plenum	Outlet	10,0	0,00765	513	416	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

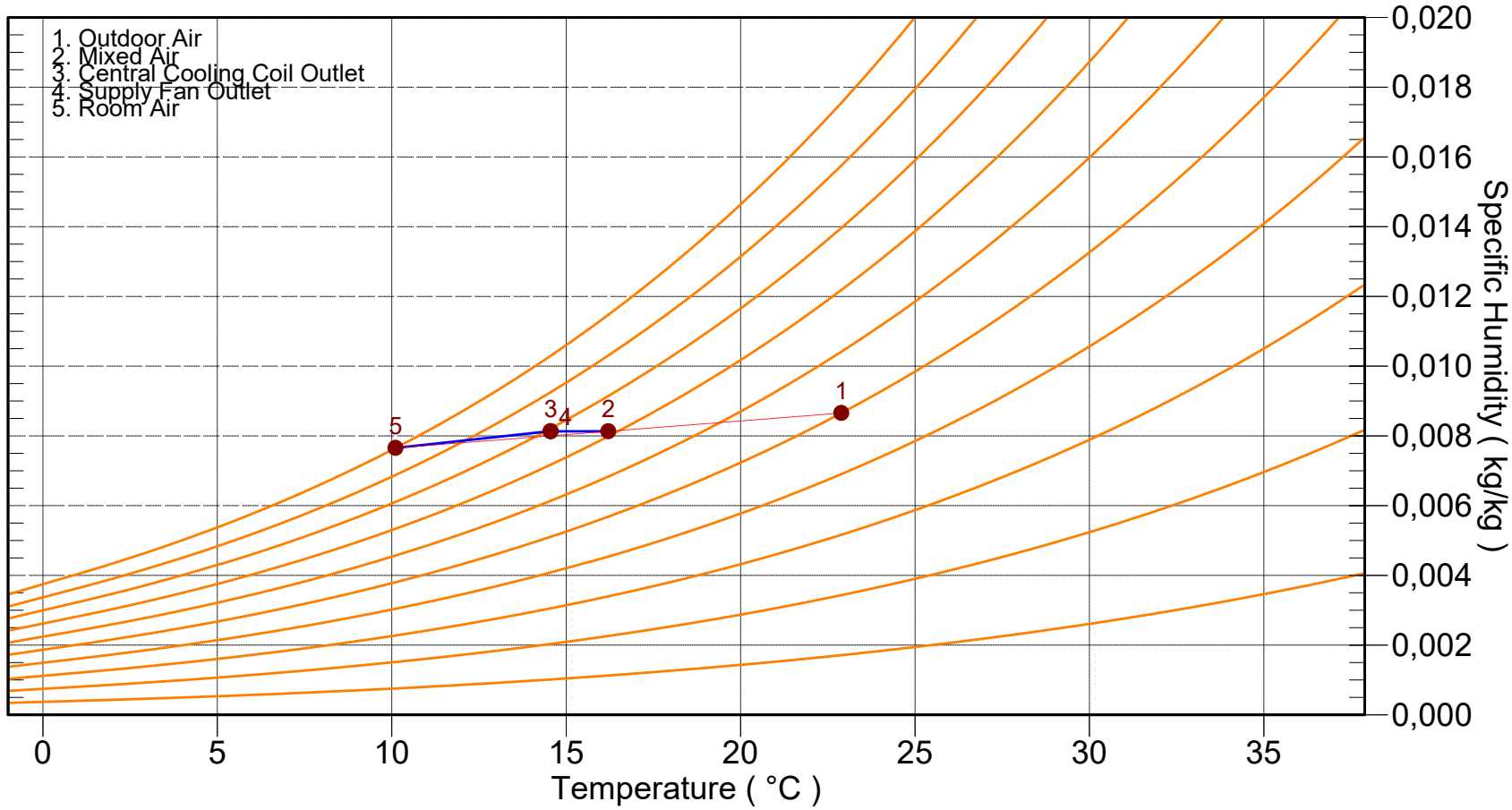
Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	513	416	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón G-09

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-10

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

Air System Information

Air System Name	**AA Salón G-10**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**15,9**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,2**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**511**	L/s	Entering DB / WB	**28,9 / 23,3**	°C
Max block L/s	**511**	L/s	Leaving DB / WB	**15,6 / 15,2**	°C
Sum of peak zone L/s	**511**	L/s	Coil ADP	**14,2**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**60**	%
m²/kW	**4,2**		Design supply temp.	**14,4**	°C
W/m²	**237,5**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**511**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**509**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,65**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-10

Air System Information

Air System Name ..... **AA Salón G-10**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	511	511	7,65	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-10	1	5,8	Dec 1500	511	0,0	66,8	7,65

Ventilation Sizing Summary for AA Salón G-10

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:05a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-10	1	66,8	41,0	510,9	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**510,9**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	12 m²	515	-	12 m²	-	-
Wall Transmission	58 m²	134	-	58 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	12 m²	330	-	12 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5589**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5487	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	511 L/s	0	-	511 L/s	0	-
Ventilation Load	245 L/s	2669	6266	245 L/s	-3767	-722
Supply Fan Load	511 L/s	0	-	511 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8156**	**7709**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8156	7709	-	-1036	0
>> Total Conditioning	**-**	**8156**	**7709**	**-**	**-1036**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-10" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	12 m²	1003	-	12 m²	-	-
Wall Transmission	58 m²	50	-	58 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	12 m²	156	-	12 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5805**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-10" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	16	0,331	-	8	-	0
WINDOW 2	4	3,339	0,550	48	91	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
E EXPOSURE						
WALL	29	0,331	-	25	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2669	6266
Vent - Return Mixing	Outlet	28,9	0,01581	511	792	-	-
Central Cooling Coil	Outlet	15,6	0,01067	511	792	8156	7709
Supply Fan	Outlet	15,6	0,01067	511	792	0	-
Cold Supply Duct	Outlet	15,6	0,01067	511	792	-	-
Zone Air	-	24,6	0,01164	511	1153	5487	1443
Return Plenum	Outlet	24,6	0,01164	511	1153	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5589	Cooling	5487	24,6	511	1153	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

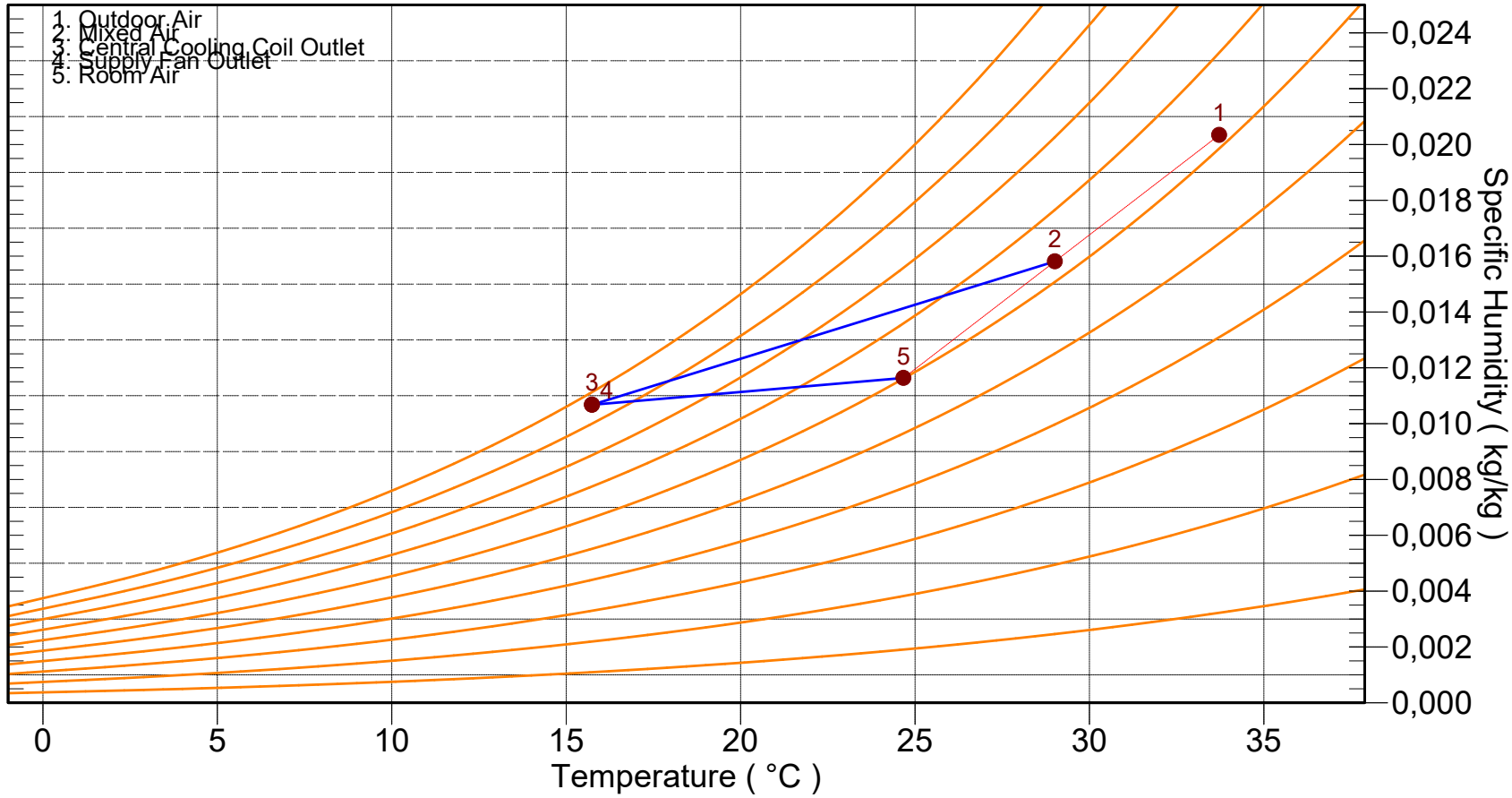
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	511	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	511	408	1036	0
Supply Fan	Outlet	14,4	0,00813	511	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	511	408	-	-
Zone Air	-	10,0	0,00765	511	415	0	0
Return Plenum	Outlet	10,0	0,00765	511	415	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

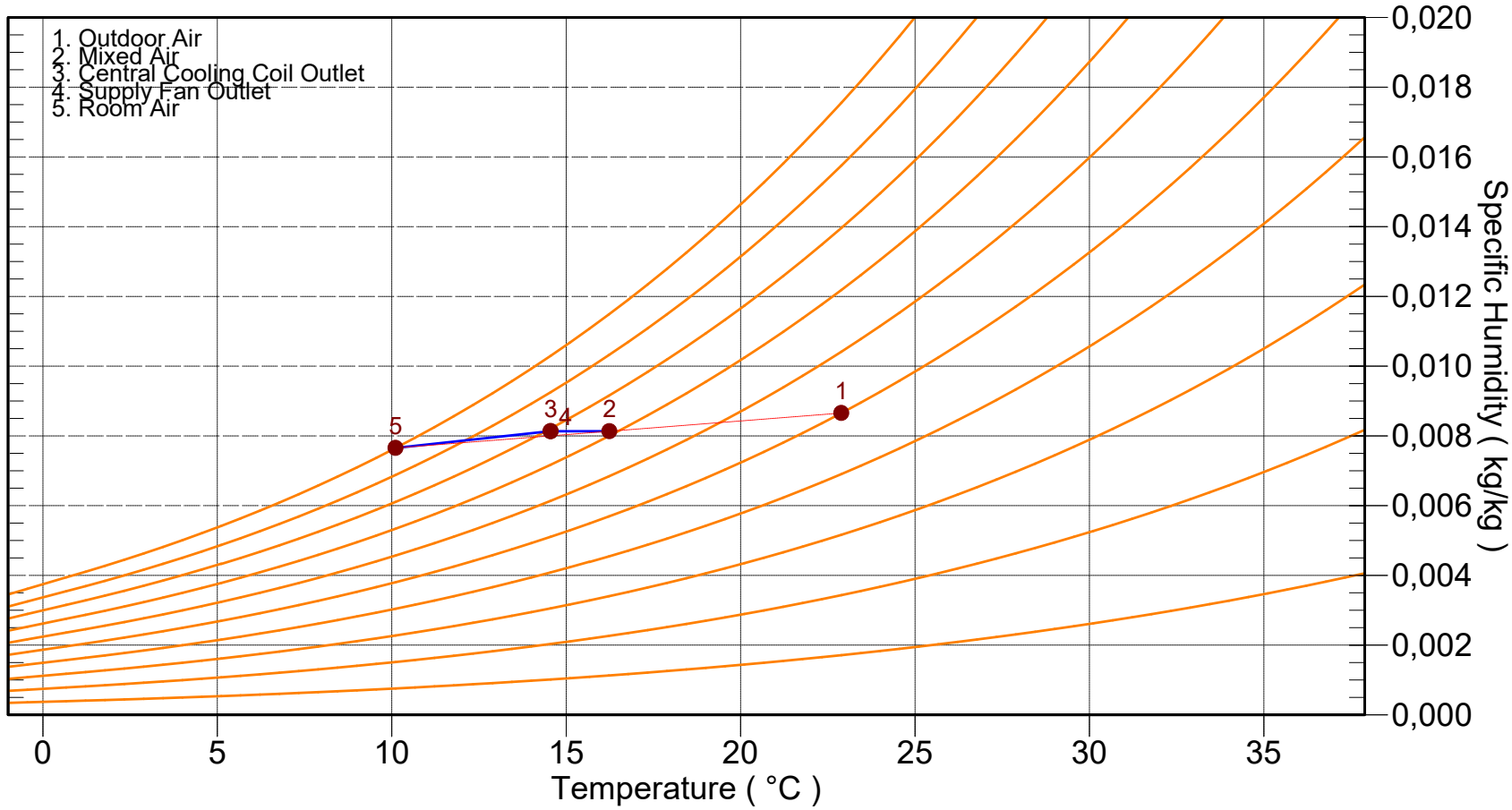
Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	511	415	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón G-10

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-11

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name	**AA Salón G-11**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**514**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**514**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**514**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,523**		Bypass Factor	**0,100**	
L/(s kW)	**31,8**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,1**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**514**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,70**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-11

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name ..... **AA Salón G-11**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	514	514	7,70	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-11	1	5,8	Dec 1500	514	0,0	66,8	7,70

Ventilation Sizing Summary for AA Salón G-11

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-11	1	66,8	41,0	514,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**514,2**					**245,1**

Air System Design Load Summary for AA Salón G-11

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	521	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5693**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5655	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	514 L/s	0	-	514 L/s	0	-
Ventilation Load	245 L/s	2798	6272	245 L/s	-3767	-722
Supply Fan Load	514 L/s	0	-	514 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8453**	**7716**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8453	7716	-	-1018	0
>> Total Conditioning	**-**	**8453**	**7716**	**-**	**-1018**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-11" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5842**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-11" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2798	6272
Vent - Return Mixing	Outlet	29,0	0,01554	514	793	-	-
Central Cooling Coil	Outlet	15,3	0,01044	514	793	8453	7716
Supply Fan	Outlet	15,3	0,01044	514	793	0	-
Cold Supply Duct	Outlet	15,3	0,01044	514	793	-	-
Zone Air	-	24,5	0,01139	514	1151	5655	1443
Return Plenum	Outlet	24,5	0,01139	514	1151	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5693	Cooling	5655	24,5	514	1151	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	514	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	514	408	1018	0
Supply Fan	Outlet	14,4	0,00813	514	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	514	408	-	-
Zone Air	-	10,0	0,00765	514	416	0	0
Return Plenum	Outlet	10,0	0,00765	514	416	0	-

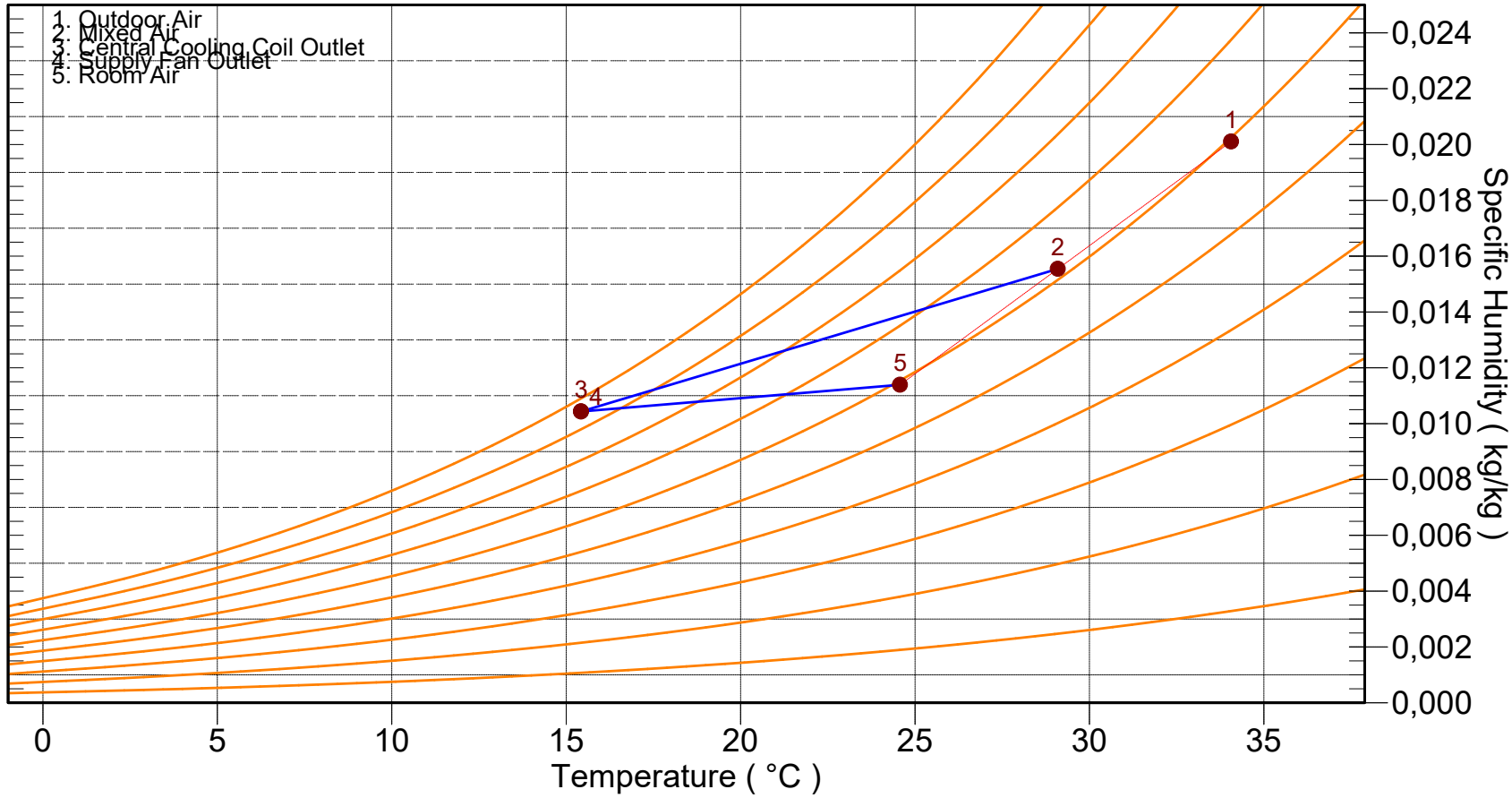
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	514	416	0	0

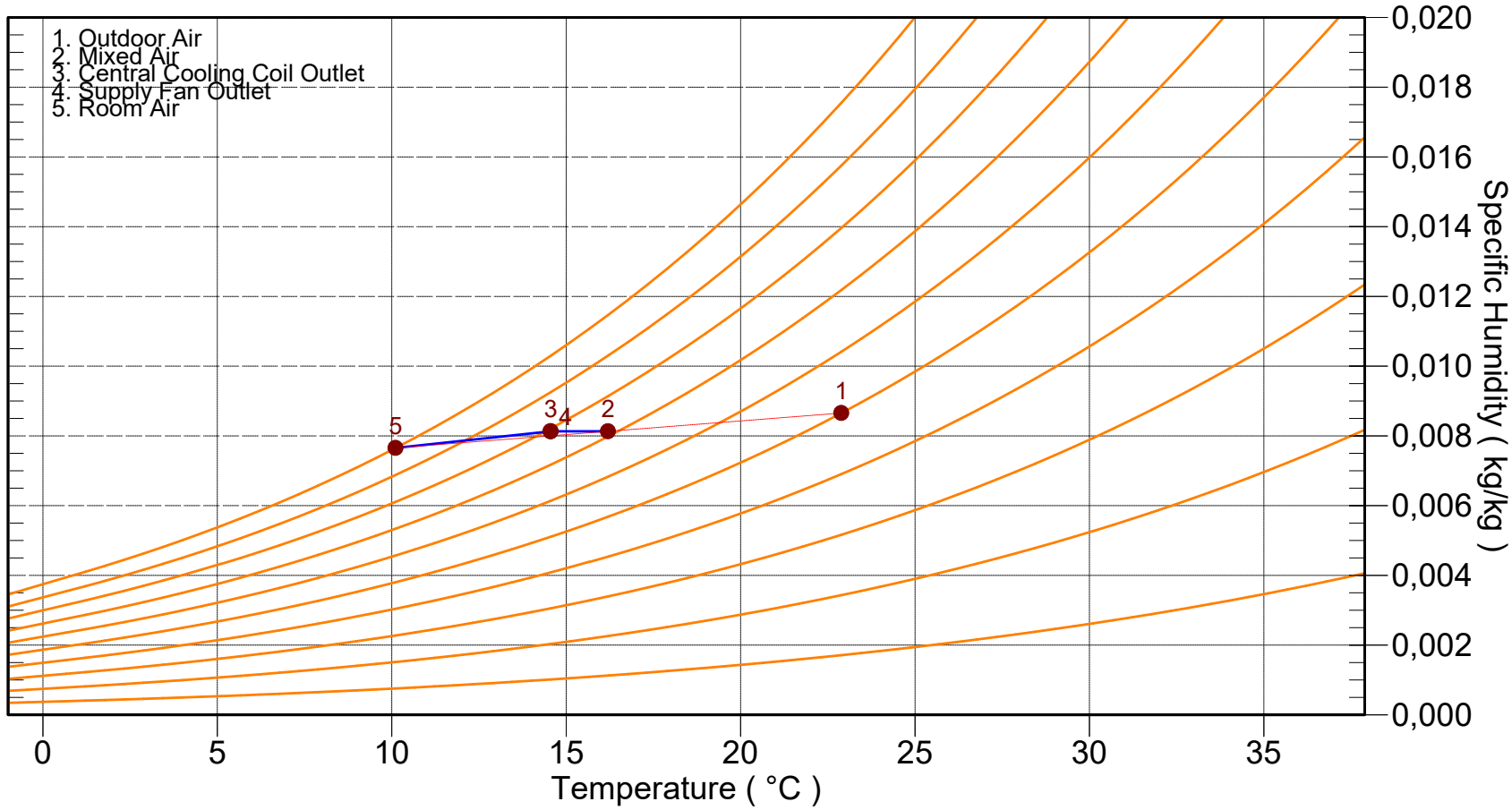
System Psychrometrics for AA Salón G-11

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-11

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-12

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name	**AA Salón G-12**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**514**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**514**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**514**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,523**		Bypass Factor	**0,100**	
L/(s kW)	**31,8**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,1**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**514**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,70**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-12

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name ..... **AA Salón G-12**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	514	514	7,70	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-12	1	5,8	Dec 1500	514	0,0	66,8	7,70

Ventilation Sizing Summary for AA Salón G-12

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-12	1	66,8	41,0	514,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**514,2**					**245,1**

Air System Design Load Summary for AA Salón G-12

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	521	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5693**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5655	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	514 L/s	0	-	514 L/s	0	-
Ventilation Load	245 L/s	2798	6272	245 L/s	-3767	-722
Supply Fan Load	514 L/s	0	-	514 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8453**	**7716**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8453	7716	-	-1018	0
>> Total Conditioning	**-**	**8453**	**7716**	**-**	**-1018**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-12" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5842**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-12" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2798	6272
Vent - Return Mixing	Outlet	29,0	0,01554	514	793	-	-
Central Cooling Coil	Outlet	15,3	0,01044	514	793	8453	7716
Supply Fan	Outlet	15,3	0,01044	514	793	0	-
Cold Supply Duct	Outlet	15,3	0,01044	514	793	-	-
Zone Air	-	24,5	0,01139	514	1151	5655	1443
Return Plenum	Outlet	24,5	0,01139	514	1151	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5693	Cooling	5655	24,5	514	1151	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	514	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	514	408	1018	0
Supply Fan	Outlet	14,4	0,00813	514	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	514	408	-	-
Zone Air	-	10,0	0,00765	514	416	0	0
Return Plenum	Outlet	10,0	0,00765	514	416	0	-

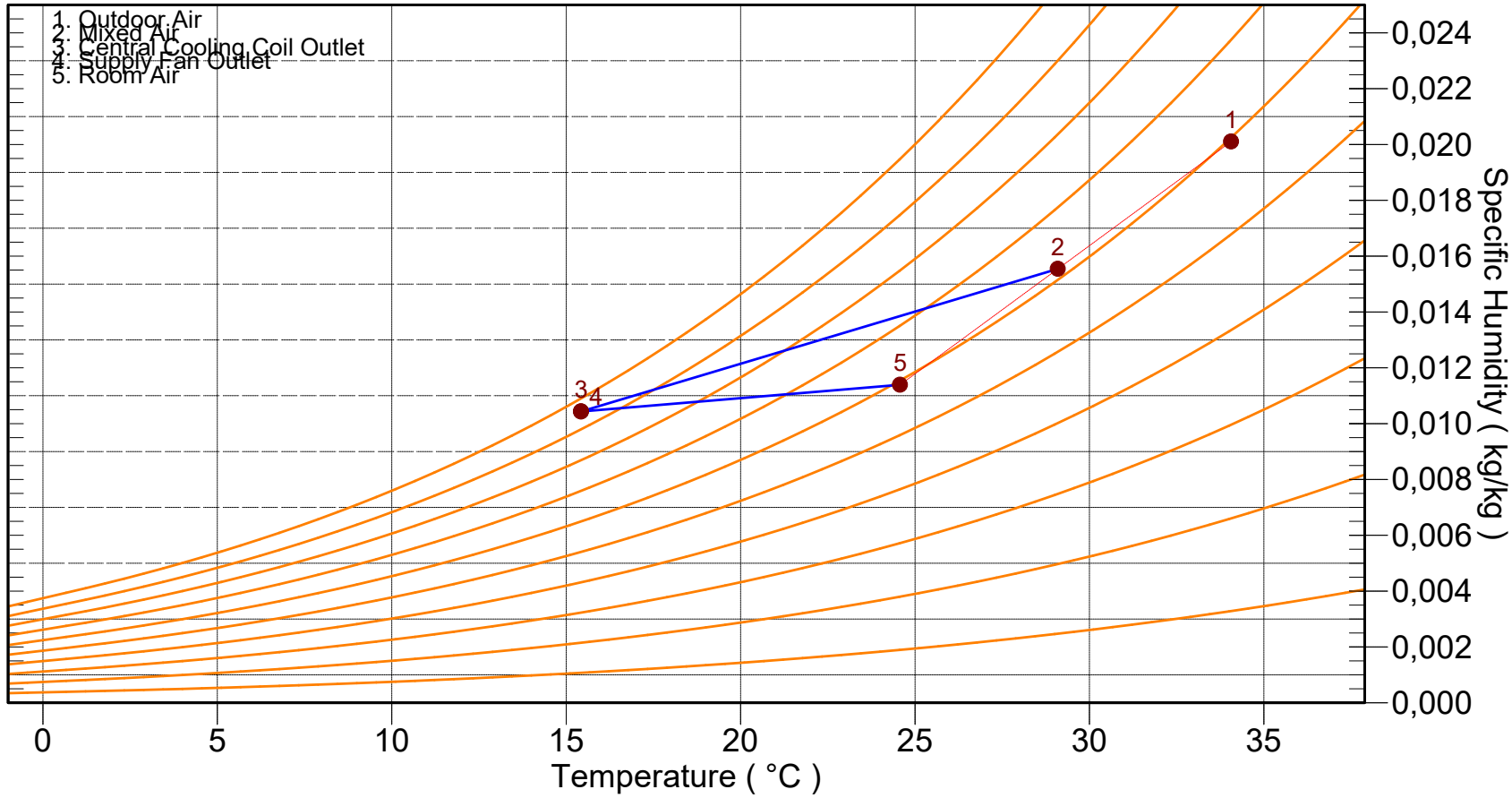
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	514	416	0	0

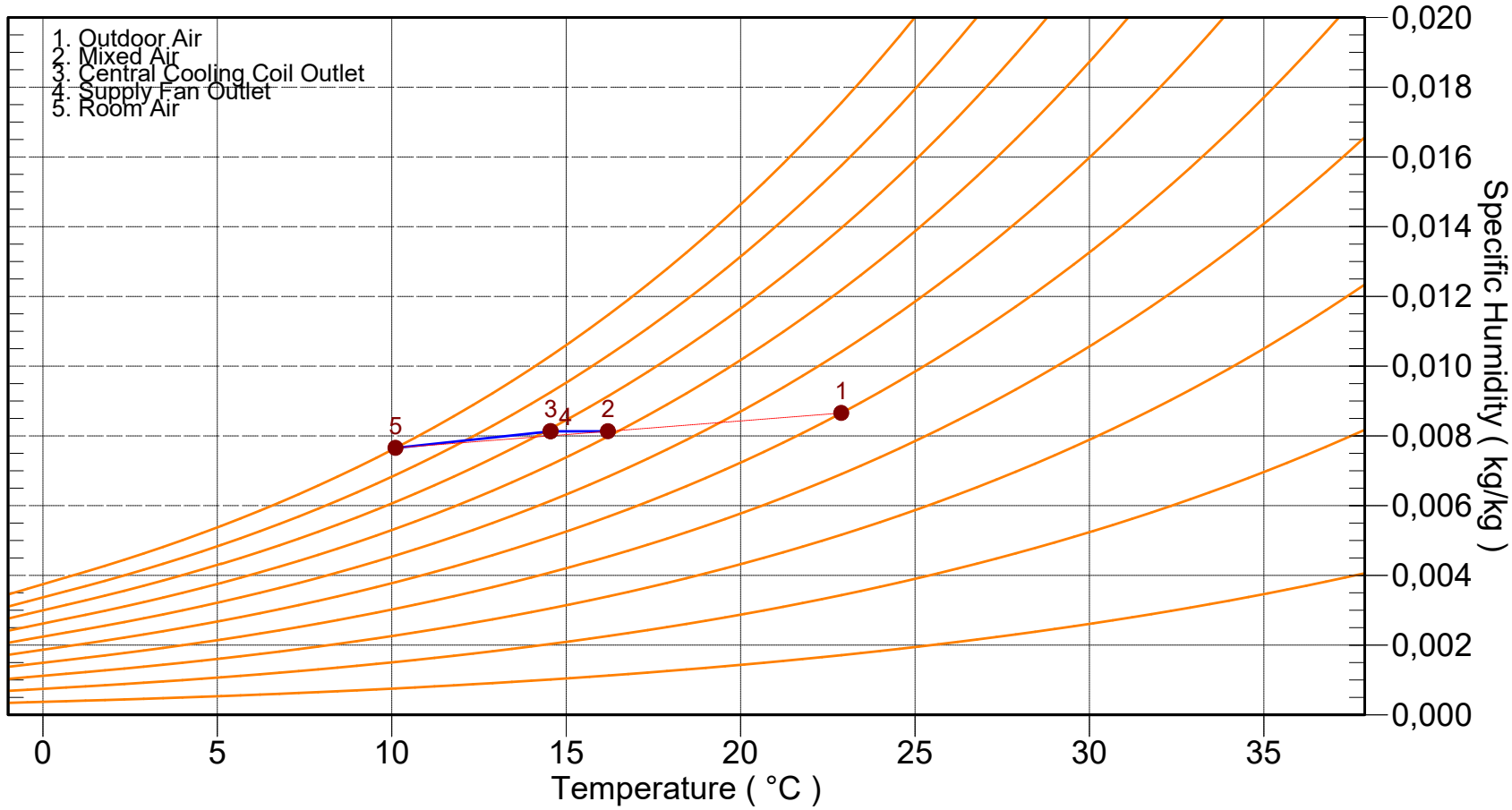
System Psychrometrics for AA Salón G-12

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-12

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-13

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name	**AA Salón G-13**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**514**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**514**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**514**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,523**		Bypass Factor	**0,100**	
L/(s kW)	**31,8**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,1**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**514**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,70**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-13

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name ..... **AA Salón G-13**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	514	514	7,70	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-13	1	5,8	Dec 1500	514	0,0	66,8	7,70

Ventilation Sizing Summary for AA Salón G-13

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-13	1	66,8	41,0	514,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**514,2**					**245,1**

Air System Design Load Summary for AA Salón G-13

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	521	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5693**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5655	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	514 L/s	0	-	514 L/s	0	-
Ventilation Load	245 L/s	2798	6272	245 L/s	-3767	-722
Supply Fan Load	514 L/s	0	-	514 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8453**	**7716**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8453	7716	-	-1018	0
>> Total Conditioning	**-**	**8453**	**7716**	**-**	**-1018**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-13" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5842**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-13" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2798	6272
Vent - Return Mixing	Outlet	29,0	0,01554	514	793	-	-
Central Cooling Coil	Outlet	15,3	0,01044	514	793	8453	7716
Supply Fan	Outlet	15,3	0,01044	514	793	0	-
Cold Supply Duct	Outlet	15,3	0,01044	514	793	-	-
Zone Air	-	24,5	0,01139	514	1151	5655	1443
Return Plenum	Outlet	24,5	0,01139	514	1151	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5693	Cooling	5655	24,5	514	1151	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	514	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	514	408	1018	0
Supply Fan	Outlet	14,4	0,00813	514	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	514	408	-	-
Zone Air	-	10,0	0,00765	514	416	0	0
Return Plenum	Outlet	10,0	0,00765	514	416	0	-

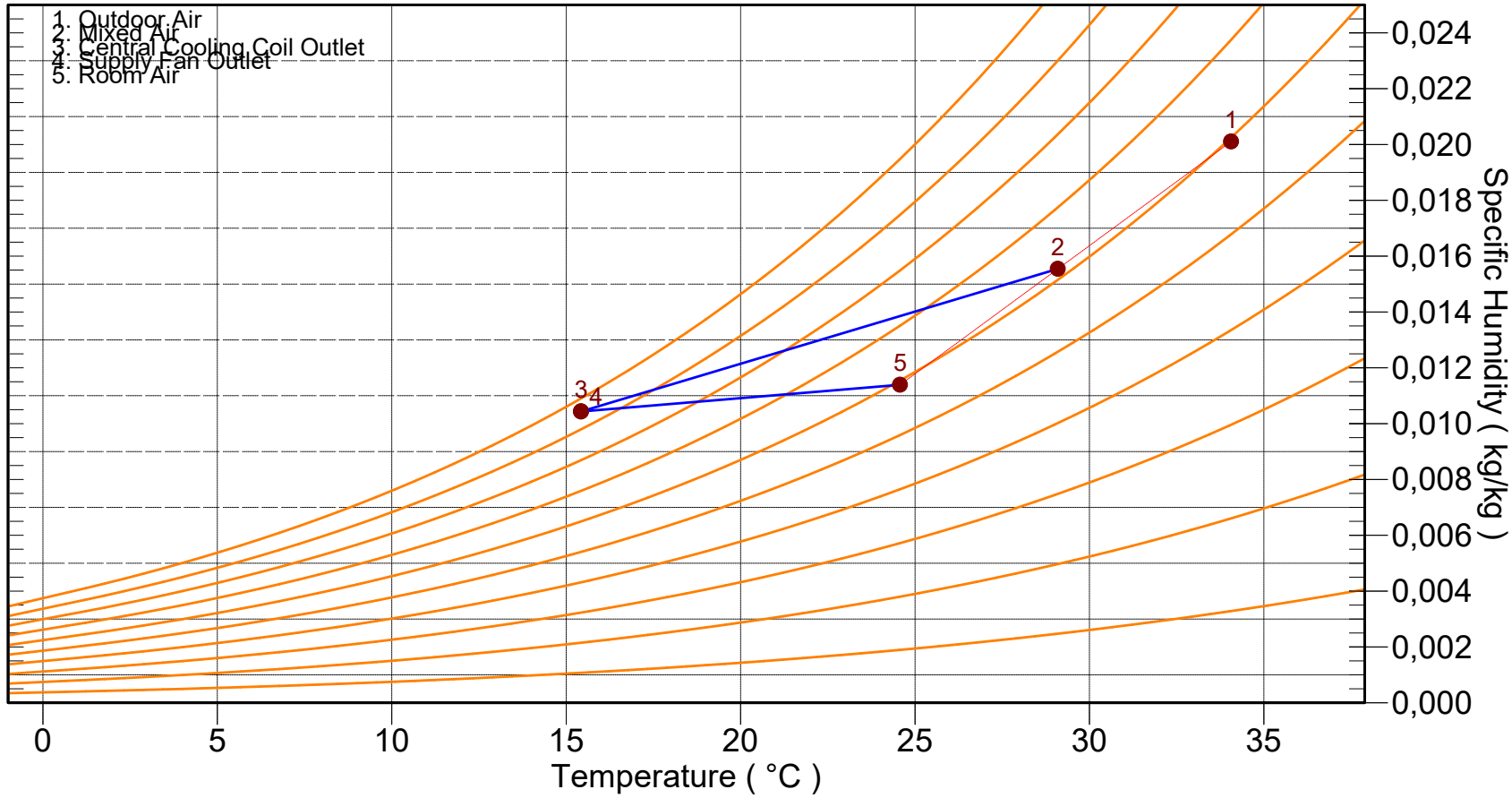
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	514	416	0	0

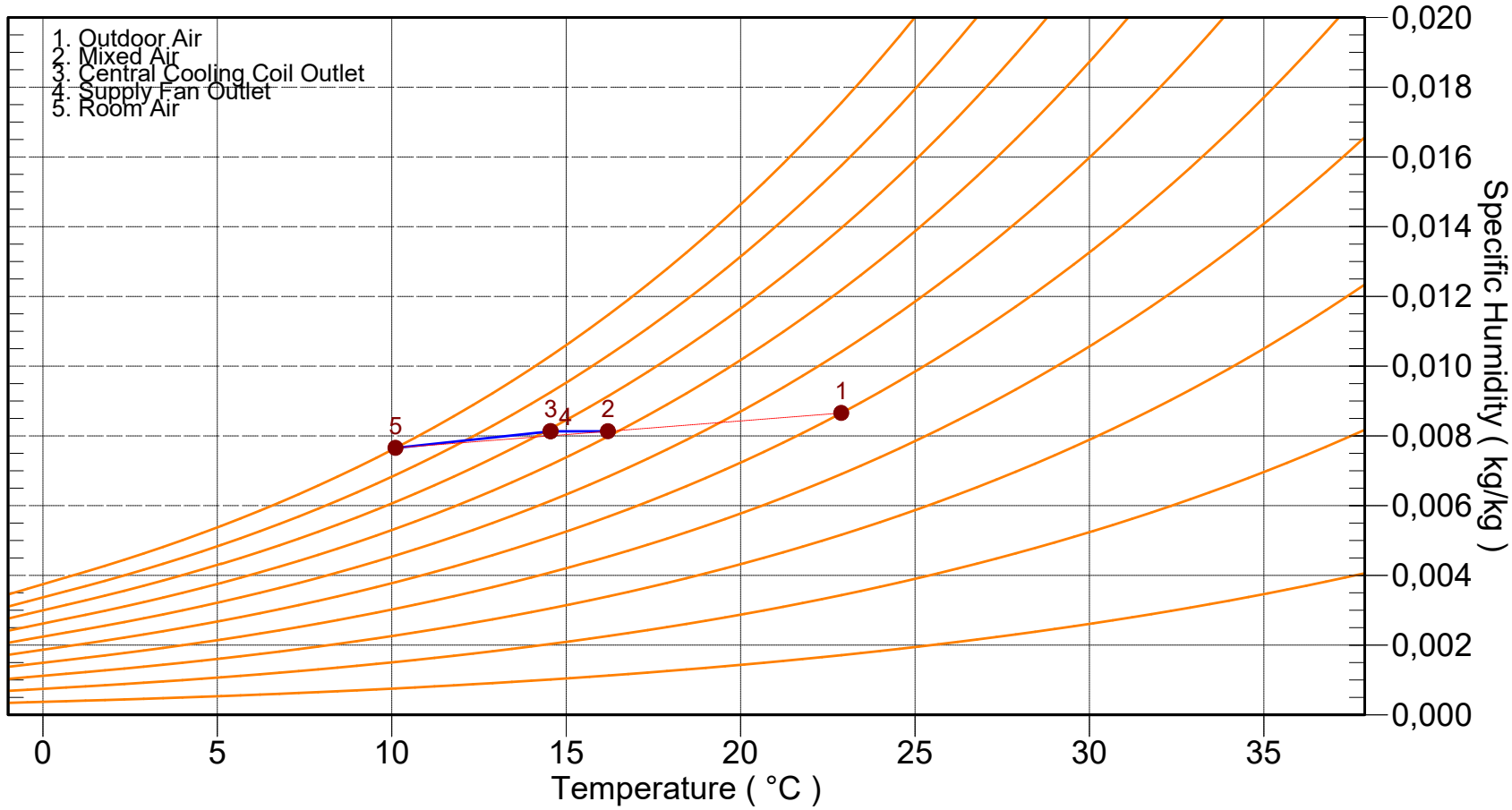
System Psychrometrics for AA Salón G-13

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-13

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-14

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name	**AA Salón G-14**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**514**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**514**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**514**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,523**		Bypass Factor	**0,100**	
L/(s kW)	**31,8**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,1**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**514**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,70**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-14

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:12a. m.

Air System Information

Air System Name ..... **AA Salón G-14**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	514	514	7,70	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-14	1	5,8	Dec 1500	514	0,0	66,8	7,70

Ventilation Sizing Summary for AA Salón G-14

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-14	1	66,8	41,0	514,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**514,2**					**245,1**

Air System Design Load Summary for AA Salón G-14

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	521	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5693**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5655	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	514 L/s	0	-	514 L/s	0	-
Ventilation Load	245 L/s	2798	6272	245 L/s	-3767	-722
Supply Fan Load	514 L/s	0	-	514 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8453**	**7716**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8453	7716	-	-1018	0
>> Total Conditioning	**-**	**8453**	**7716**	**-**	**-1018**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-14" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5842**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-14" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2798	6272
Vent - Return Mixing	Outlet	29,0	0,01554	514	793	-	-
Central Cooling Coil	Outlet	15,3	0,01044	514	793	8453	7716
Supply Fan	Outlet	15,3	0,01044	514	793	0	-
Cold Supply Duct	Outlet	15,3	0,01044	514	793	-	-
Zone Air	-	24,5	0,01139	514	1151	5655	1443
Return Plenum	Outlet	24,5	0,01139	514	1151	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5693	Cooling	5655	24,5	514	1151	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

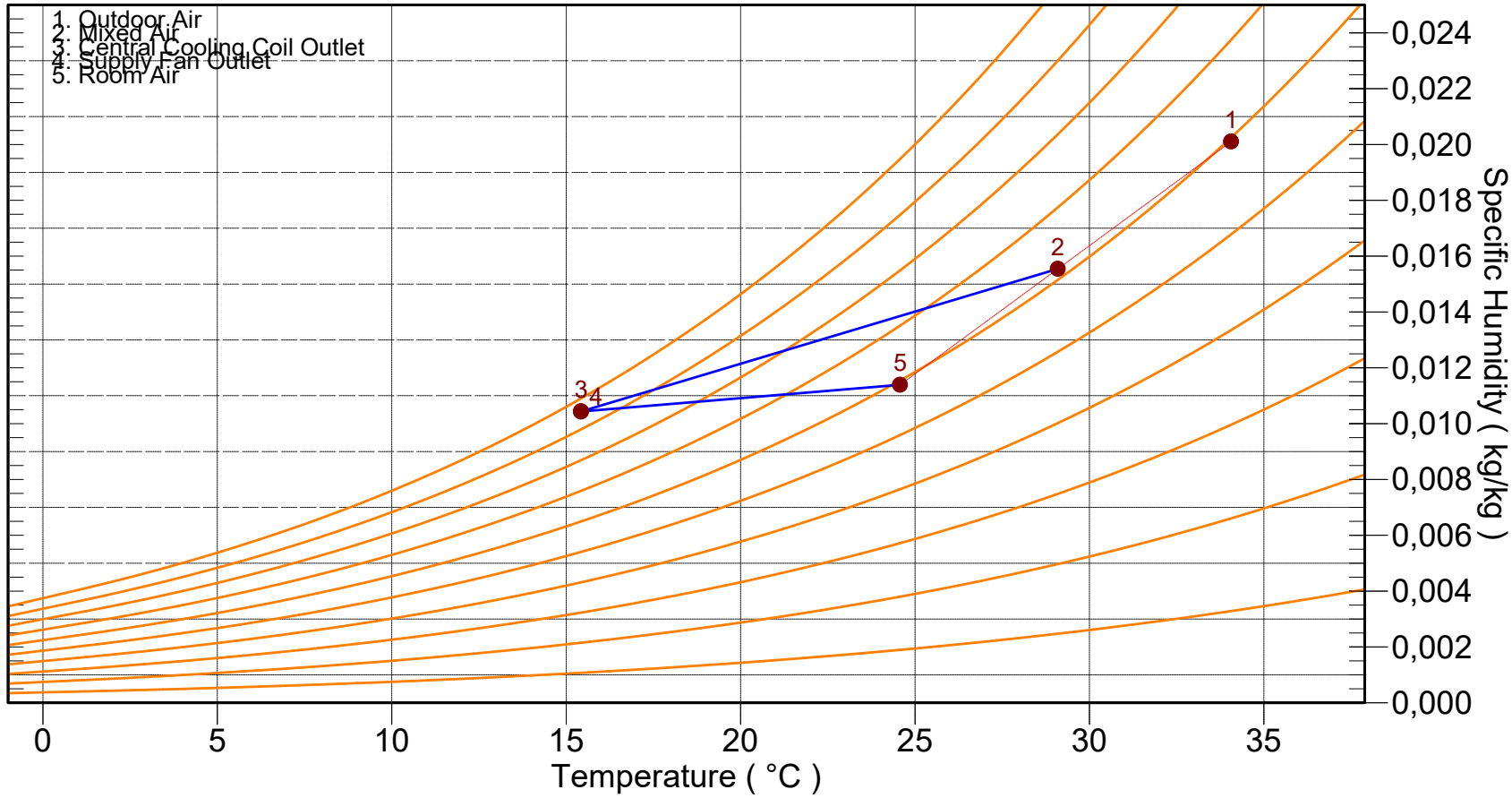
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	514	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	514	408	1018	0
Supply Fan	Outlet	14,4	0,00813	514	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	514	408	-	-
Zone Air	-	10,0	0,00765	514	416	0	0
Return Plenum	Outlet	10,0	0,00765	514	416	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

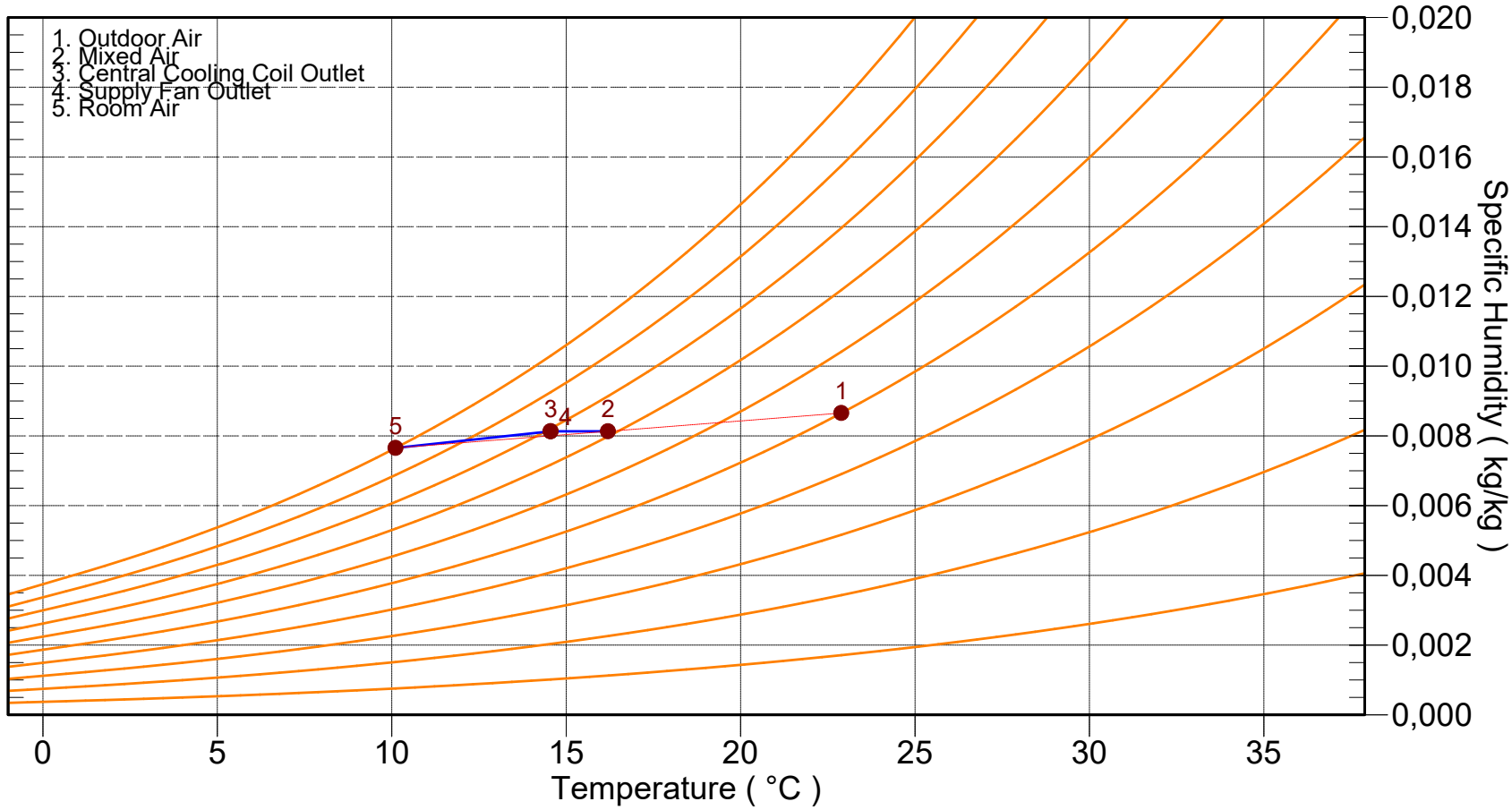
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	514	416	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-15

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name	**AA Salón G-15**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**514**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**514**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**514**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,523**		Bypass Factor	**0,100**	
L/(s kW)	**31,8**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,1**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**514**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,70**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-15

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name ..... **AA Salón G-15**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	514	514	7,70	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-15	1	5,8	Dec 1500	514	0,0	66,8	7,70

Ventilation Sizing Summary for AA Salón G-15

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-15	1	66,8	41,0	514,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**514,2**					**245,1**

Air System Design Load Summary for AA Salón G-15

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	521	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5693**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5655	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	514 L/s	0	-	514 L/s	0	-
Ventilation Load	245 L/s	2798	6272	245 L/s	-3767	-722
Supply Fan Load	514 L/s	0	-	514 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8453**	**7716**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8453	7716	-	-1018	0
>> Total Conditioning	**-**	**8453**	**7716**	**-**	**-1018**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-15" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5842**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-15" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2798	6272
Vent - Return Mixing	Outlet	29,0	0,01554	514	793	-	-
Central Cooling Coil	Outlet	15,3	0,01044	514	793	8453	7716
Supply Fan	Outlet	15,3	0,01044	514	793	0	-
Cold Supply Duct	Outlet	15,3	0,01044	514	793	-	-
Zone Air	-	24,5	0,01139	514	1151	5655	1443
Return Plenum	Outlet	24,5	0,01139	514	1151	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5693	Cooling	5655	24,5	514	1151	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

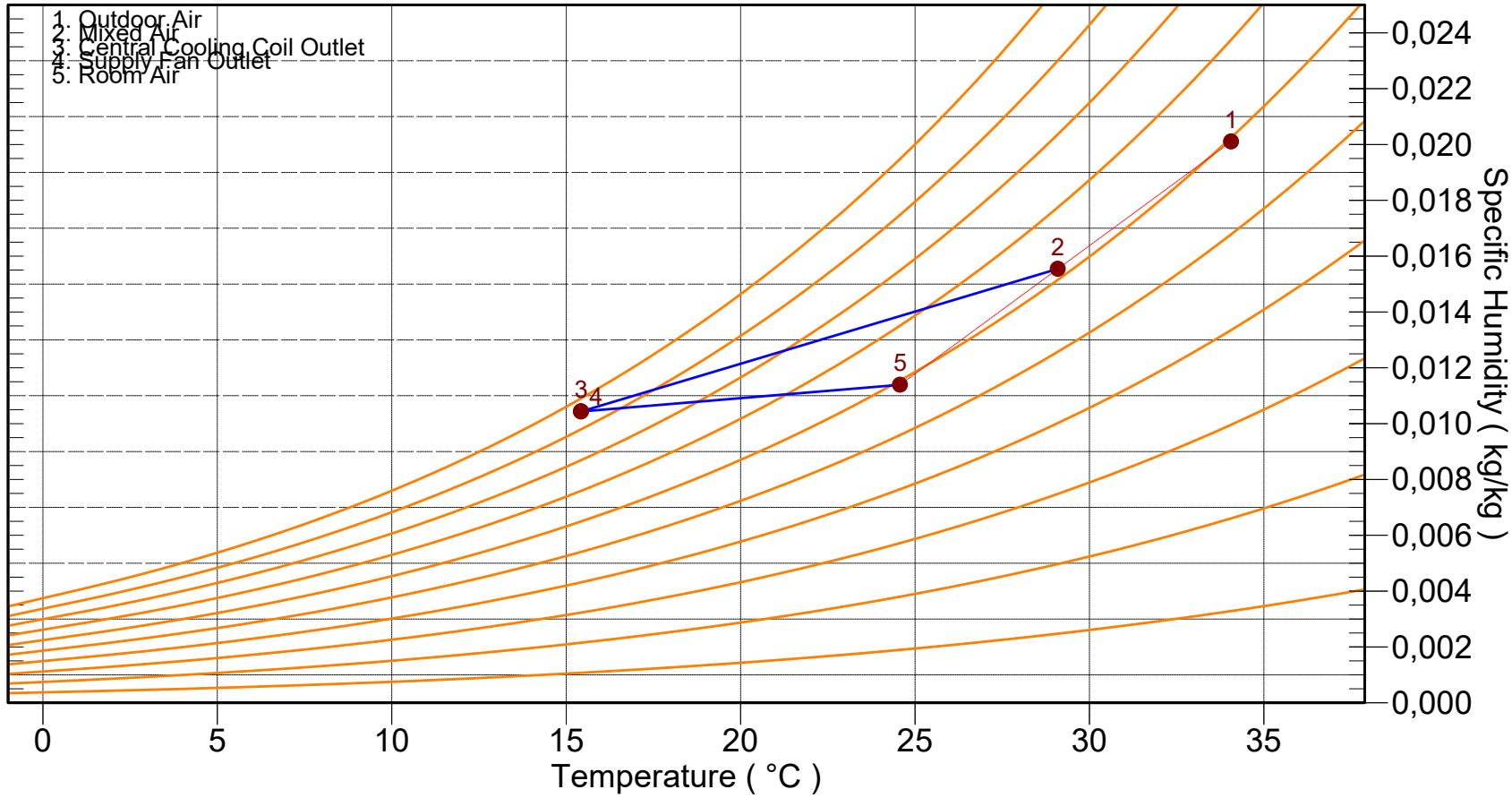
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	514	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	514	408	1018	0
Supply Fan	Outlet	14,4	0,00813	514	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	514	408	-	-
Zone Air	-	10,0	0,00765	514	416	0	0
Return Plenum	Outlet	10,0	0,00765	514	416	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

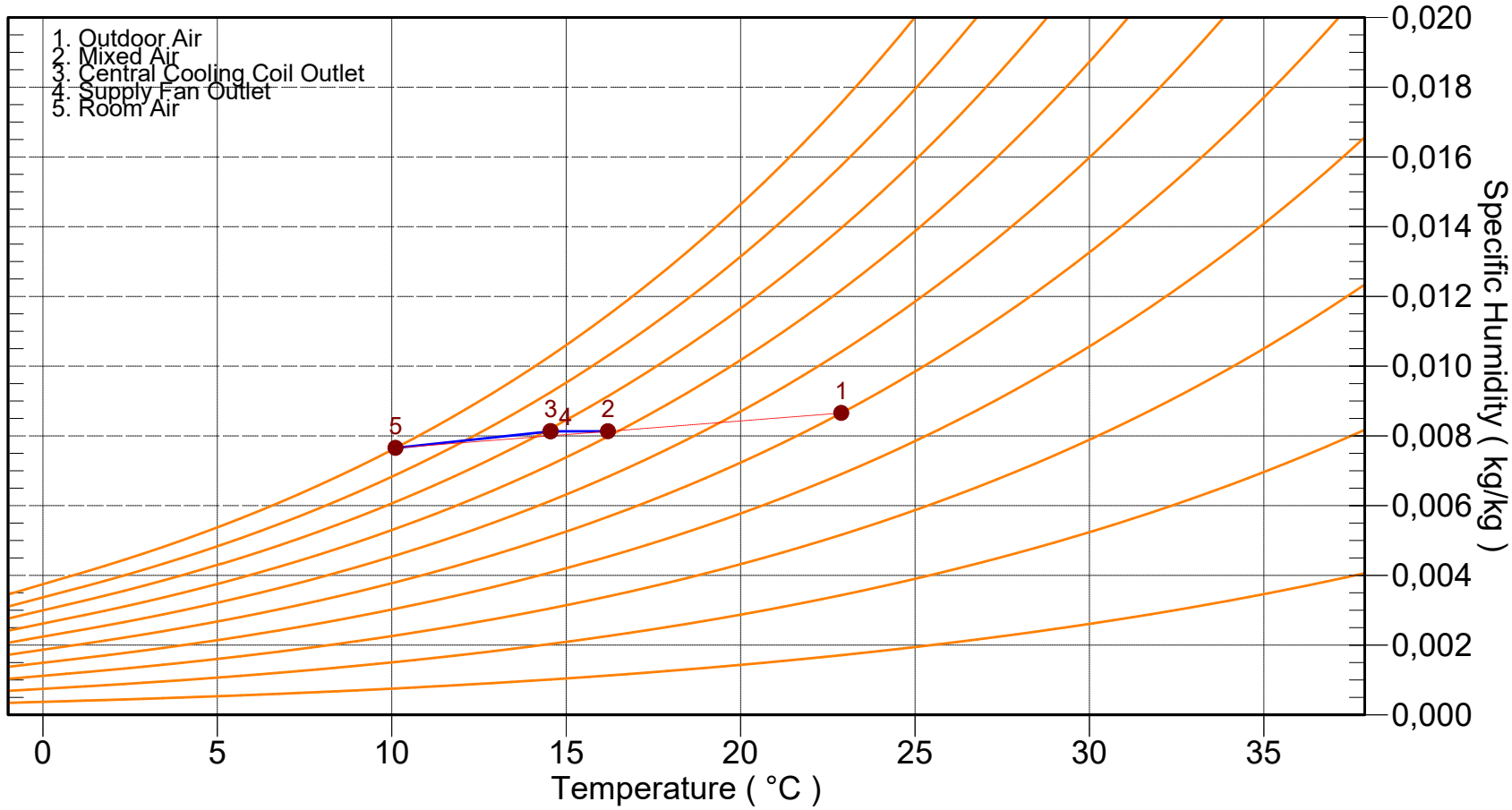
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	514	416	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-16

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name	**AA Salón G-16**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**514**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**514**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**514**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,523**		Bypass Factor	**0,100**	
L/(s kW)	**31,8**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,1**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**514**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,70**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-16

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name ..... **AA Salón G-16**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	514	514	7,70	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-16	1	5,8	Dec 1500	514	0,0	66,8	7,70

Ventilation Sizing Summary for AA Salón G-16

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-16	1	66,8	41,0	514,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**514,2**					**245,1**

Air System Design Load Summary for AA Salón G-16

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	521	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5693**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5655	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	514 L/s	0	-	514 L/s	0	-
Ventilation Load	245 L/s	2798	6272	245 L/s	-3767	-722
Supply Fan Load	514 L/s	0	-	514 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8453**	**7716**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8453	7716	-	-1018	0
>> Total Conditioning	**-**	**8453**	**7716**	**-**	**-1018**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-16" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5842**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-16" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0

System Psychrometrics for AA Salón G-16

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2798	6272
Vent - Return Mixing	Outlet	29,0	0,01554	514	793	-	-
Central Cooling Coil	Outlet	15,3	0,01044	514	793	8453	7716
Supply Fan	Outlet	15,3	0,01044	514	793	0	-
Cold Supply Duct	Outlet	15,3	0,01044	514	793	-	-
Zone Air	-	24,5	0,01139	514	1151	5655	1443
Return Plenum	Outlet	24,5	0,01139	514	1151	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5693	Cooling	5655	24,5	514	1151	0	0

System Psychrometrics for AA Salón G-16

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

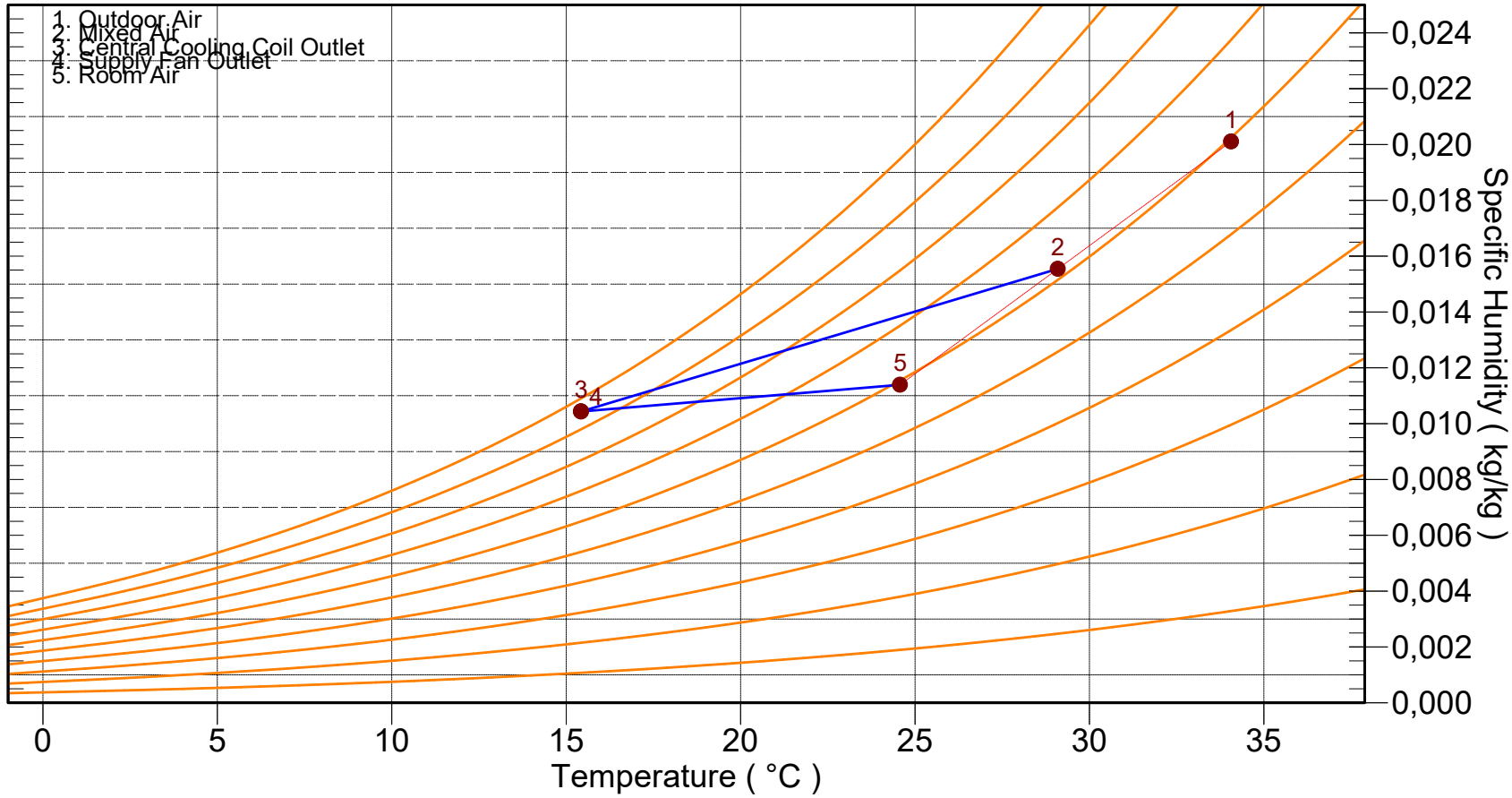
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	514	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	514	408	1018	0
Supply Fan	Outlet	14,4	0,00813	514	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	514	408	-	-
Zone Air	-	10,0	0,00765	514	416	0	0
Return Plenum	Outlet	10,0	0,00765	514	416	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

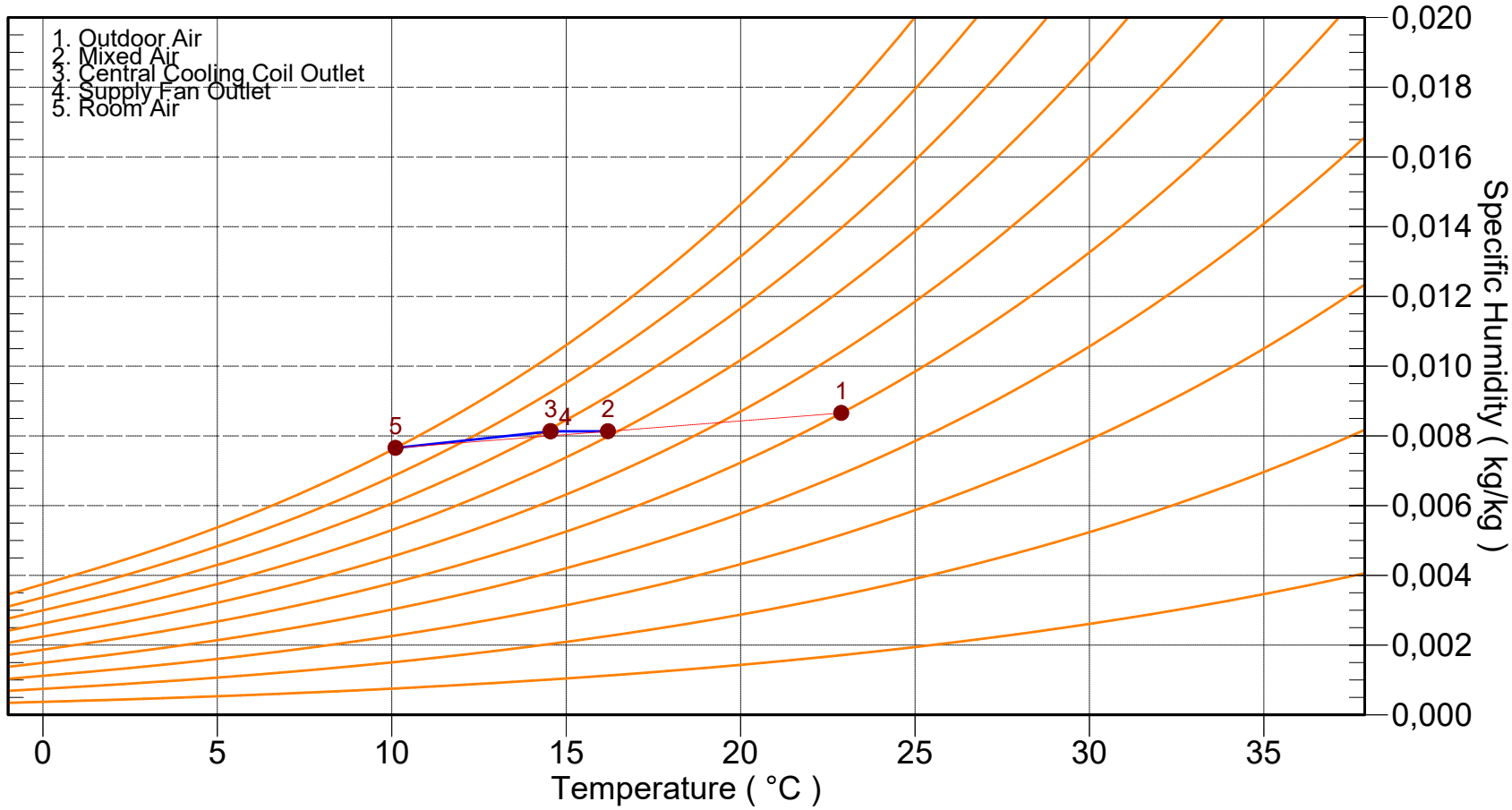
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	514	416	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-17

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name	**AA Salón G-17**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**514**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**514**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**514**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,523**		Bypass Factor	**0,100**	
L/(s kW)	**31,8**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,1**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**514**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**512**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,70**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-17

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name ..... **AA Salón G-17**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	514	514	7,70	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,8	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-17	1	5,8	Dec 1500	514	0,0	66,8	7,70

Ventilation Sizing Summary for AA Salón G-17

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-17	1	66,8	41,0	514,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**514,2**					**245,1**

Air System Design Load Summary for AA Salón G-17

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	521	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5693**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5655	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	514 L/s	0	-	514 L/s	0	-
Ventilation Load	245 L/s	2798	6272	245 L/s	-3767	-722
Supply Fan Load	514 L/s	0	-	514 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8453**	**7716**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8453	7716	-	-1018	0
>> Total Conditioning	**-**	**8453**	**7716**	**-**	**-1018**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-17" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5842**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-17" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2798	6272
Vent - Return Mixing	Outlet	29,0	0,01554	514	793	-	-
Central Cooling Coil	Outlet	15,3	0,01044	514	793	8453	7716
Supply Fan	Outlet	15,3	0,01044	514	793	0	-
Cold Supply Duct	Outlet	15,3	0,01044	514	793	-	-
Zone Air	-	24,5	0,01139	514	1151	5655	1443
Return Plenum	Outlet	24,5	0,01139	514	1151	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5693	Cooling	5655	24,5	514	1151	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

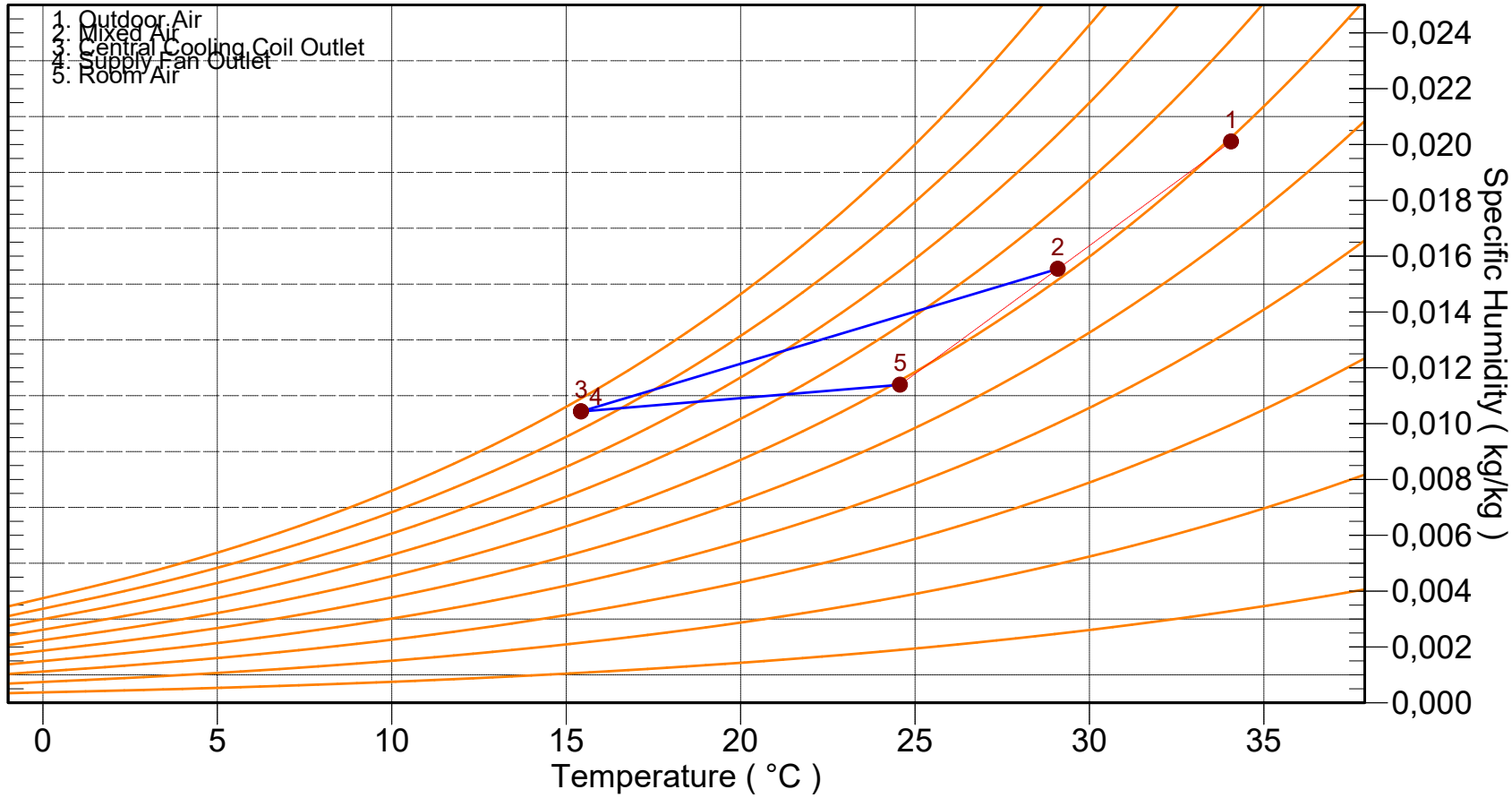
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	514	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	514	408	1018	0
Supply Fan	Outlet	14,4	0,00813	514	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	514	408	-	-
Zone Air	-	10,0	0,00765	514	416	0	0
Return Plenum	Outlet	10,0	0,00765	514	416	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

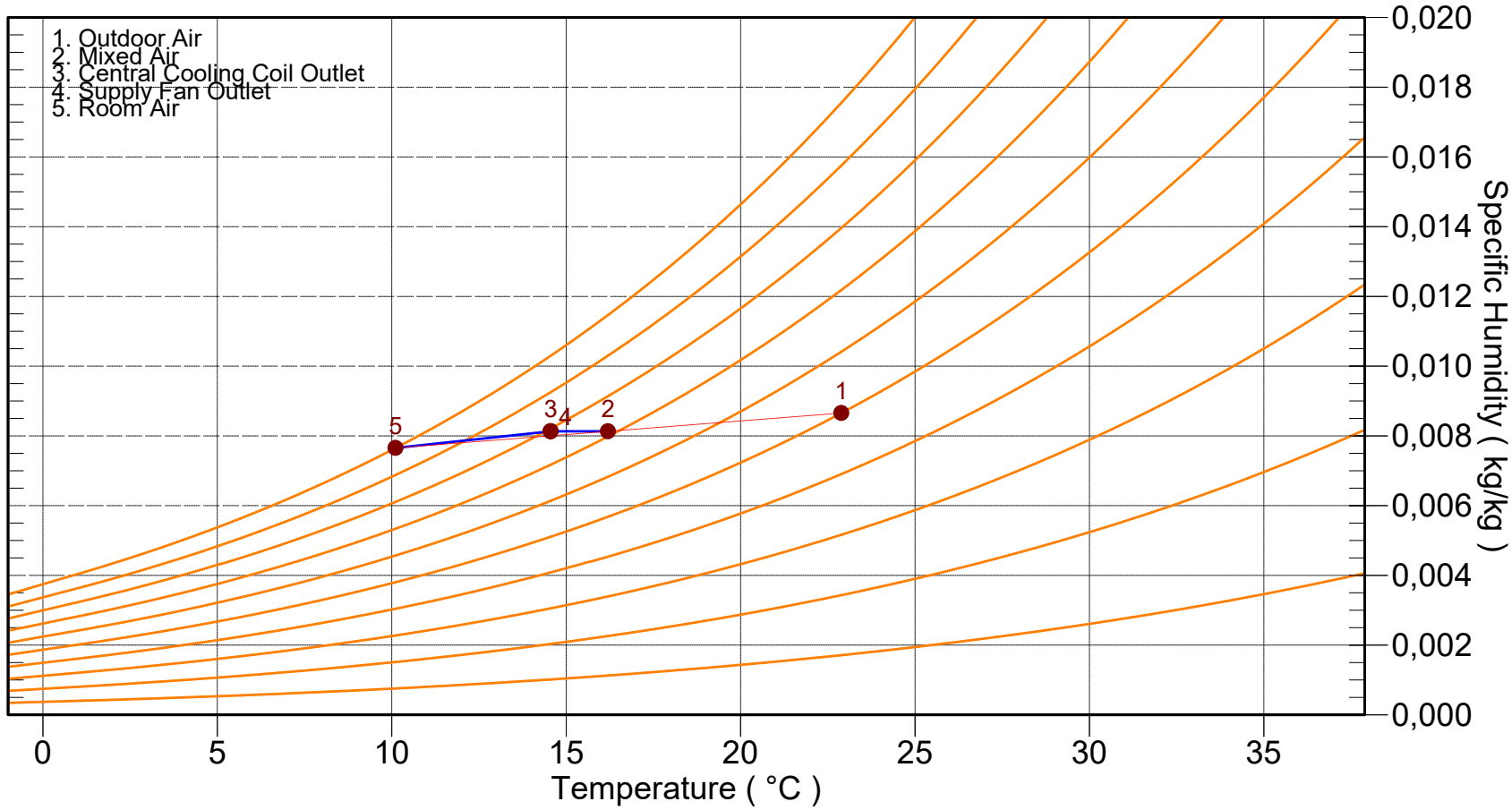
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	514	416	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-18

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name	**AA Salón G-18**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,1**	kW	Load occurs at	**Jun 1600**	
Sensible coil load	**8,3**	kW	OA DB / WB	**33,4 / 27,2**	°C
Coil L/s at Jun 1600	**516**	L/s	Entering DB / WB	**28,8 / 23,2**	°C
Max block L/s	**516**	L/s	Leaving DB / WB	**15,4 / 15,0**	°C
Sum of peak zone L/s	**516**	L/s	Coil ADP	**13,9**	°C
Sensible heat ratio	**0,514**		Bypass Factor	**0,100**	
L/(s kW)	**32,0**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**241,2**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**516**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**514**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,72**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-18

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name ..... **AA Salón G-18**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	516	516	7,72	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	5,9	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-18	1	5,9	Dec 1500	516	0,0	66,8	7,72

Ventilation Sizing Summary for AA Salón G-18

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-18	1	66,8	41,0	516,0	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**516,0**					**245,1**

Air System Design Load Summary for AA Salón G-18

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	581	-	15 m²	-	-
Wall Transmission	55 m²	131	-	55 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5789**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5678	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	516 L/s	0	-	516 L/s	0	-
Ventilation Load	245 L/s	2607	6383	245 L/s	-3767	-722
Supply Fan Load	516 L/s	0	-	516 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8285**	**7826**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8285	7826	-	-1008	0
>> Total Conditioning	**-**	**8285**	**7826**	**-**	**-1008**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-18" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	55 m²	44	-	55 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	67 m²	0	-	67 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5862**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-18" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
W EXPOSURE						
WALL	29	0,331	-	20	-	0

June DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,4	0,02034	245	400	2607	6383
Vent - Return Mixing	Outlet	28,8	0,01569	516	794	-	-
Central Cooling Coil	Outlet	15,4	0,01052	516	794	8285	7826
Supply Fan	Outlet	15,4	0,01052	516	794	0	-
Cold Supply Duct	Outlet	15,4	0,01052	516	794	-	-
Zone Air	-	24,6	0,01147	516	1150	5678	1443
Return Plenum	Outlet	24,6	0,01147	516	1150	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5789	Cooling	5678	24,6	516	1150	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,1	0,00813	516	408	-	-
Central Cooling Coil	Outlet	14,4	0,00813	516	408	1008	0
Supply Fan	Outlet	14,4	0,00813	516	408	0	-
Cold Supply Duct	Outlet	10,0	0,00813	516	408	-	-
Zone Air	-	10,0	0,00765	516	416	0	0
Return Plenum	Outlet	10,0	0,00765	516	416	0	-

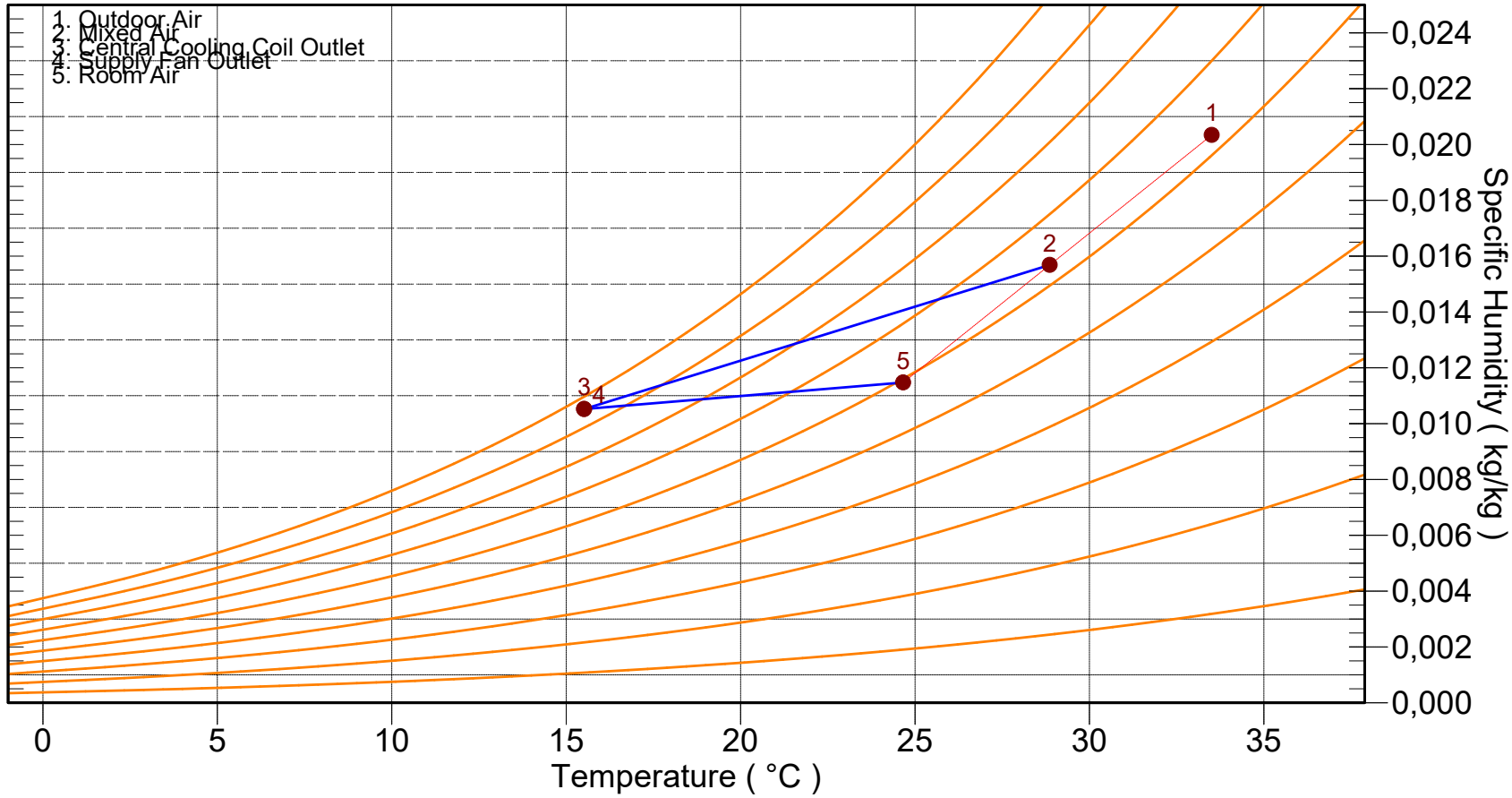
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	516	416	0	0

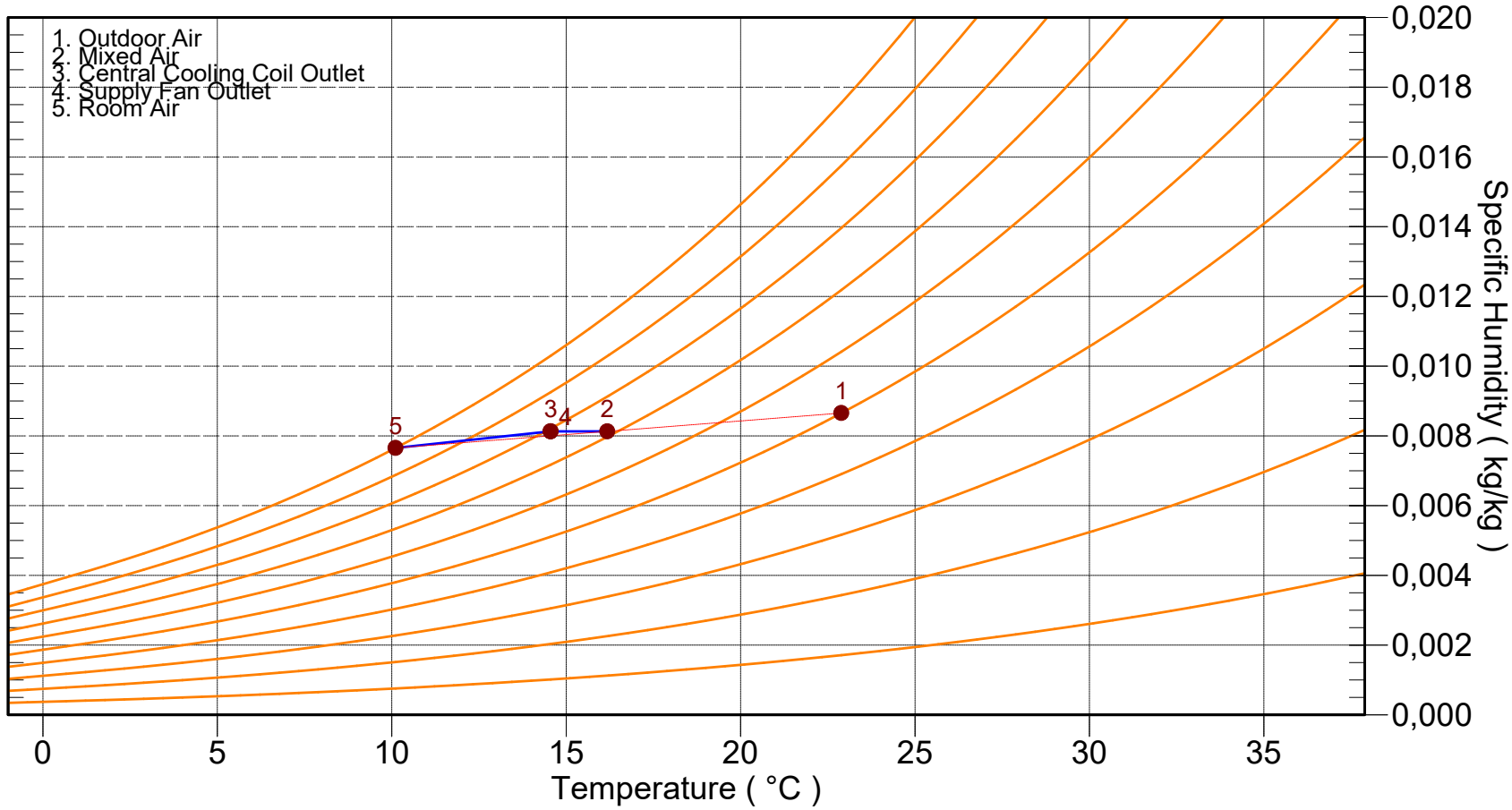
System Psychrometrics for AA Salón G-18

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-18

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-19

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name	**AA Salón G-19**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,7**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**532**	L/s	Entering DB / WB	**28,9 / 23,0**	°C
Max block L/s	**532**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**532**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,529**		Bypass Factor	**0,100**	
L/(s kW)	**32,3**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,6**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**532**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**530**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,96**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-19

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name ..... **AA Salón G-19**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	532	532	7,96	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-19	1	6,0	Jun 1600	532	0,0	66,8	7,96

Ventilation Sizing Summary for AA Salón G-19

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-19	1	66,8	41,0	531,8	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**531,8**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	55 m²	142	-	55 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6018**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5936	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	532 L/s	0	-	532 L/s	0	-
Ventilation Load	245 L/s	2770	6322	245 L/s	-3767	-722
Supply Fan Load	532 L/s	0	-	532 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8706**	**7765**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8706	7766	-	-924	0
>> Total Conditioning	**-**	**8706**	**7766**	**-**	**-924**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-19" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	55 m²	132	-	55 m²	0	-
Roof Transmission	67 m²	206	-	67 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6041**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-19" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0
E EXPOSURE						
WALL	29	0,331	-	71	-	0
H EXPOSURE						
ROOF	67	0,131	-	206	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6322
Vent - Return Mixing	Outlet	28,9	0,01537	532	799	-	-
Central Cooling Coil	Outlet	15,3	0,01040	532	799	8706	7766
Supply Fan	Outlet	15,3	0,01040	532	799	0	-
Cold Supply Duct	Outlet	15,3	0,01040	532	799	-	-
Zone Air	-	24,6	0,01132	532	1140	5936	1443
Return Plenum	Outlet	24,6	0,01132	532	1140	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	6018	Cooling	5936	24,6	532	1140	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00811	532	410	-	-
Central Cooling Coil	Outlet	14,4	0,00811	532	410	924	0
Supply Fan	Outlet	14,4	0,00811	532	410	0	-
Cold Supply Duct	Outlet	10,0	0,00811	532	410	-	-
Zone Air	-	10,0	0,00765	532	418	0	0
Return Plenum	Outlet	10,0	0,00765	532	418	0	-

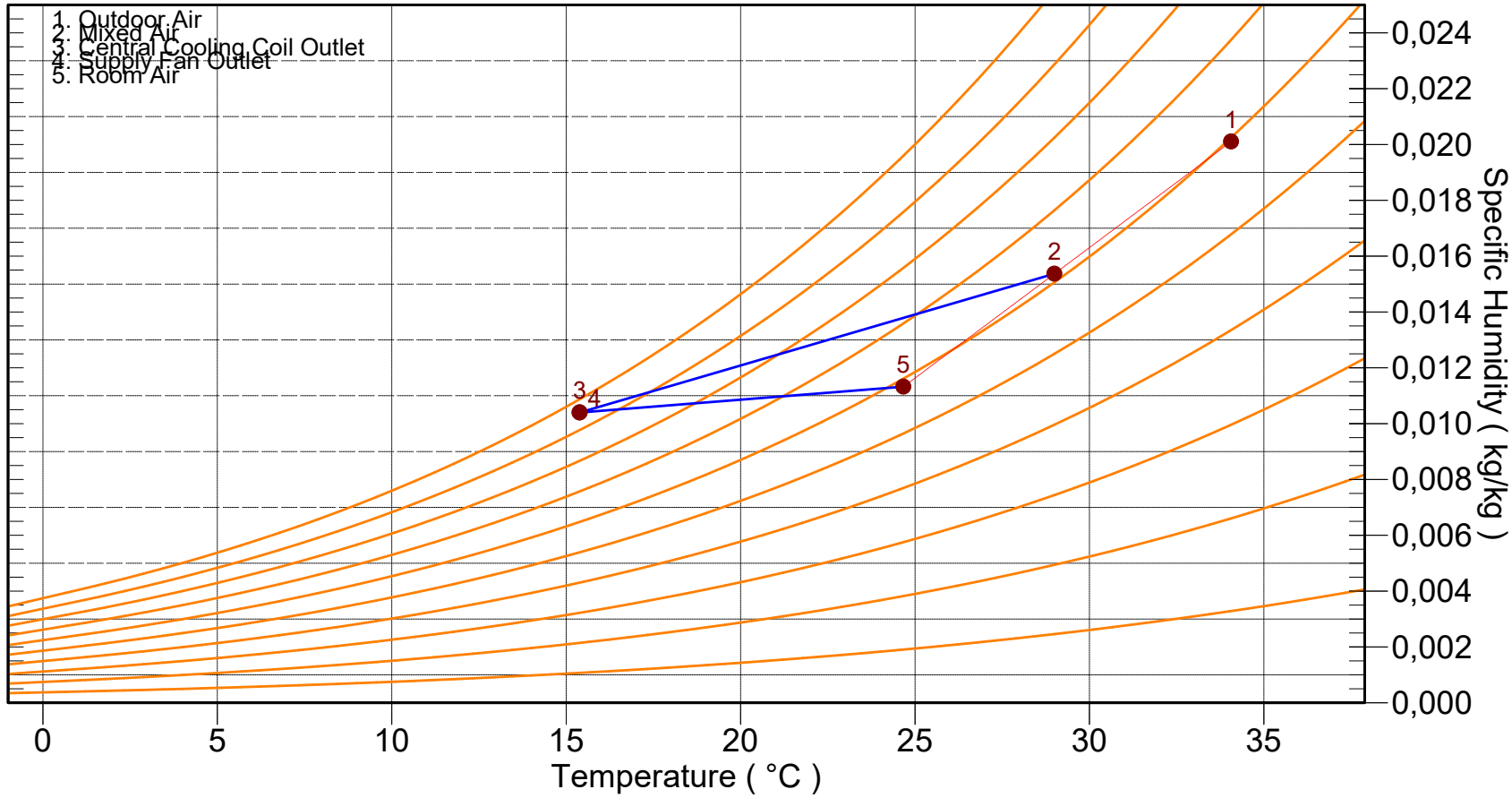
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	532	418	0	0

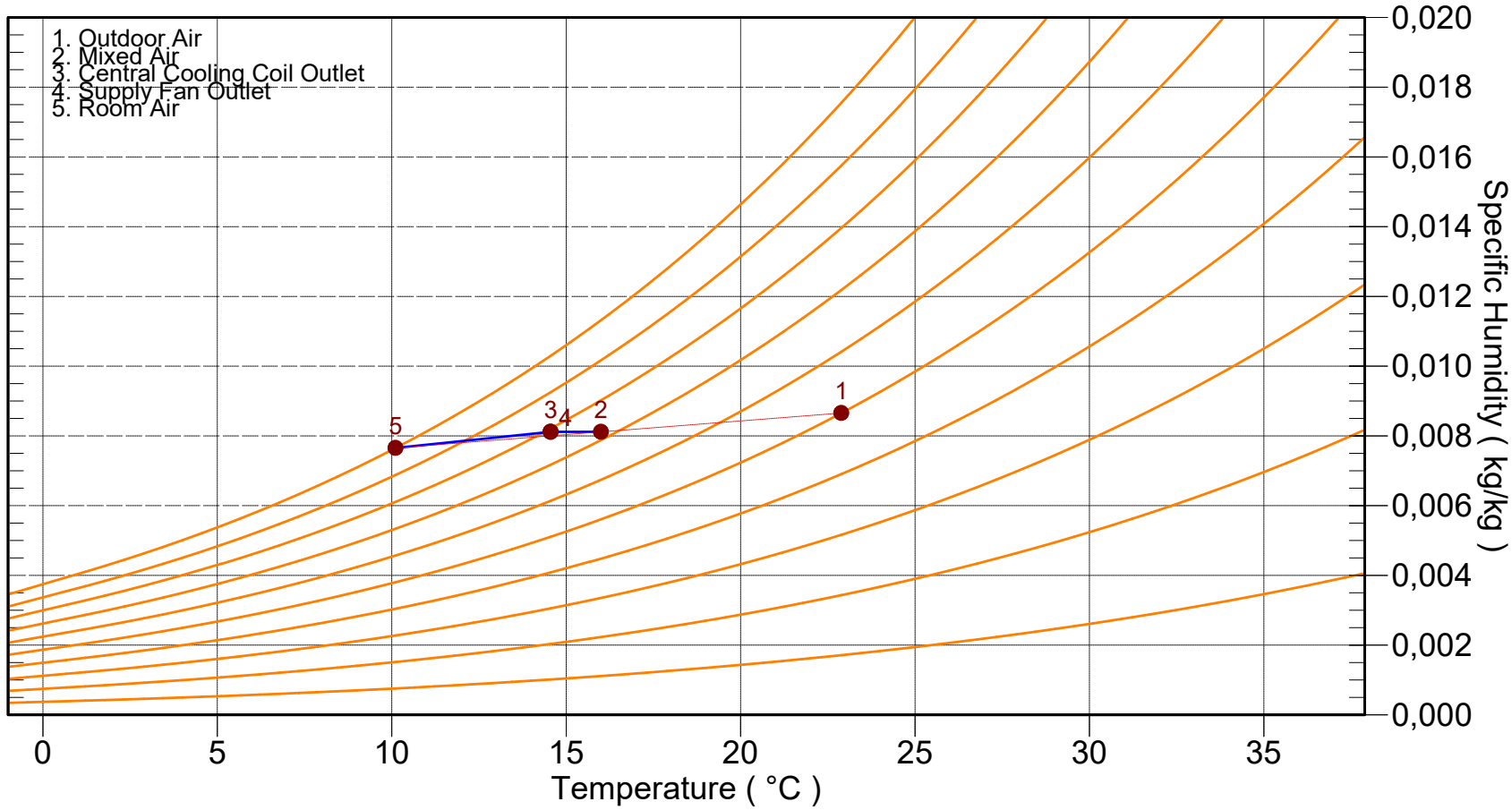
System Psychrometrics for AA Salón G-19

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-19

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-20

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name	**AA Salón G-20**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-20

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

Air System Information

Air System Name ..... **AA Salón G-20**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-20	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón G-20

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:13a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-20	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-20" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-20" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

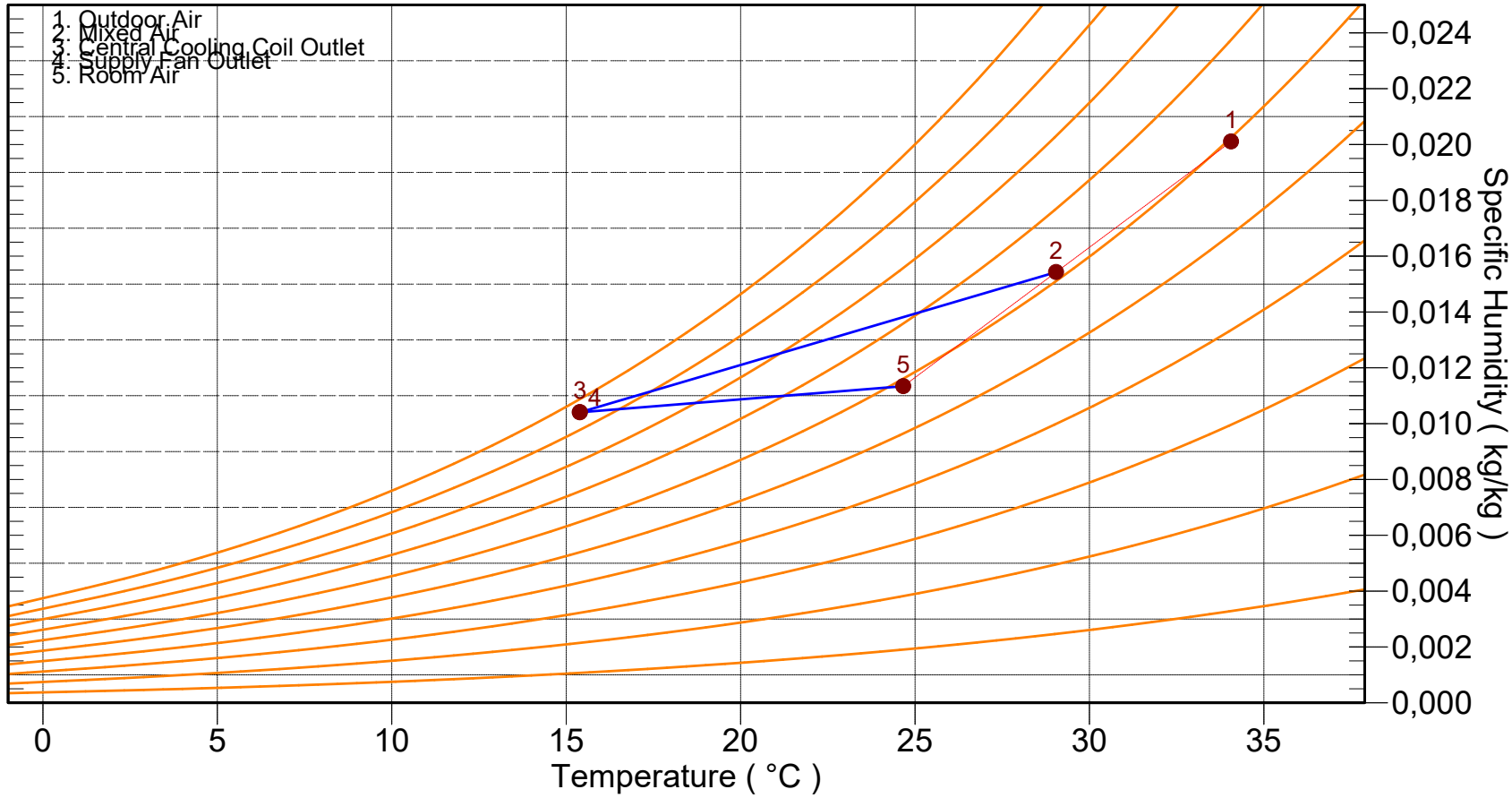
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

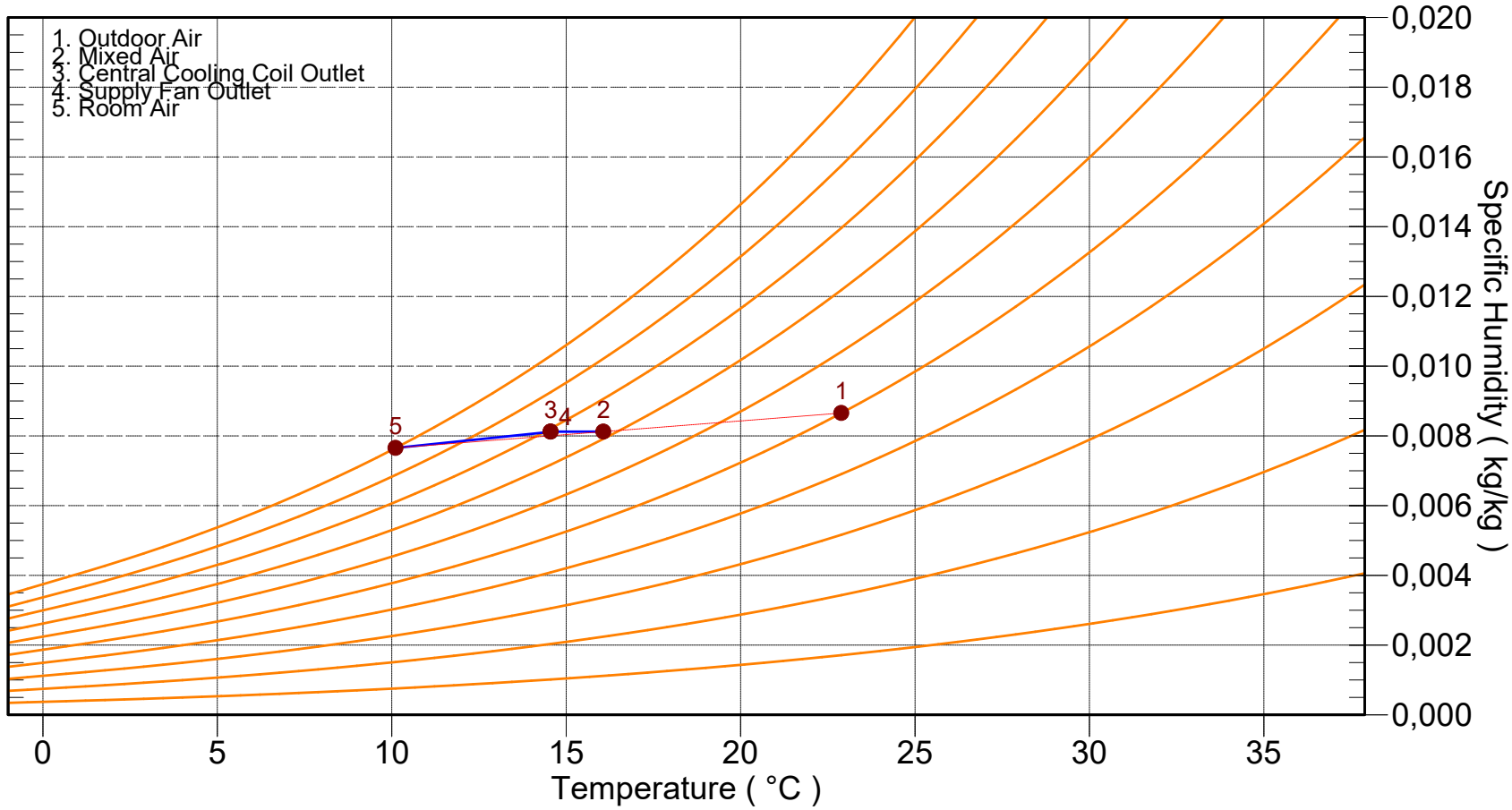
System Psychrometrics for AA Salón G-20

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-20

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-21

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

Air System Information

Air System Name	**AA Salón G-21**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-21

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

Air System Information

Air System Name ..... **AA Salón G-21**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-21	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón G-21

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-21	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

Air System Design Load Summary for AA Salón G-21

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-21" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-21" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

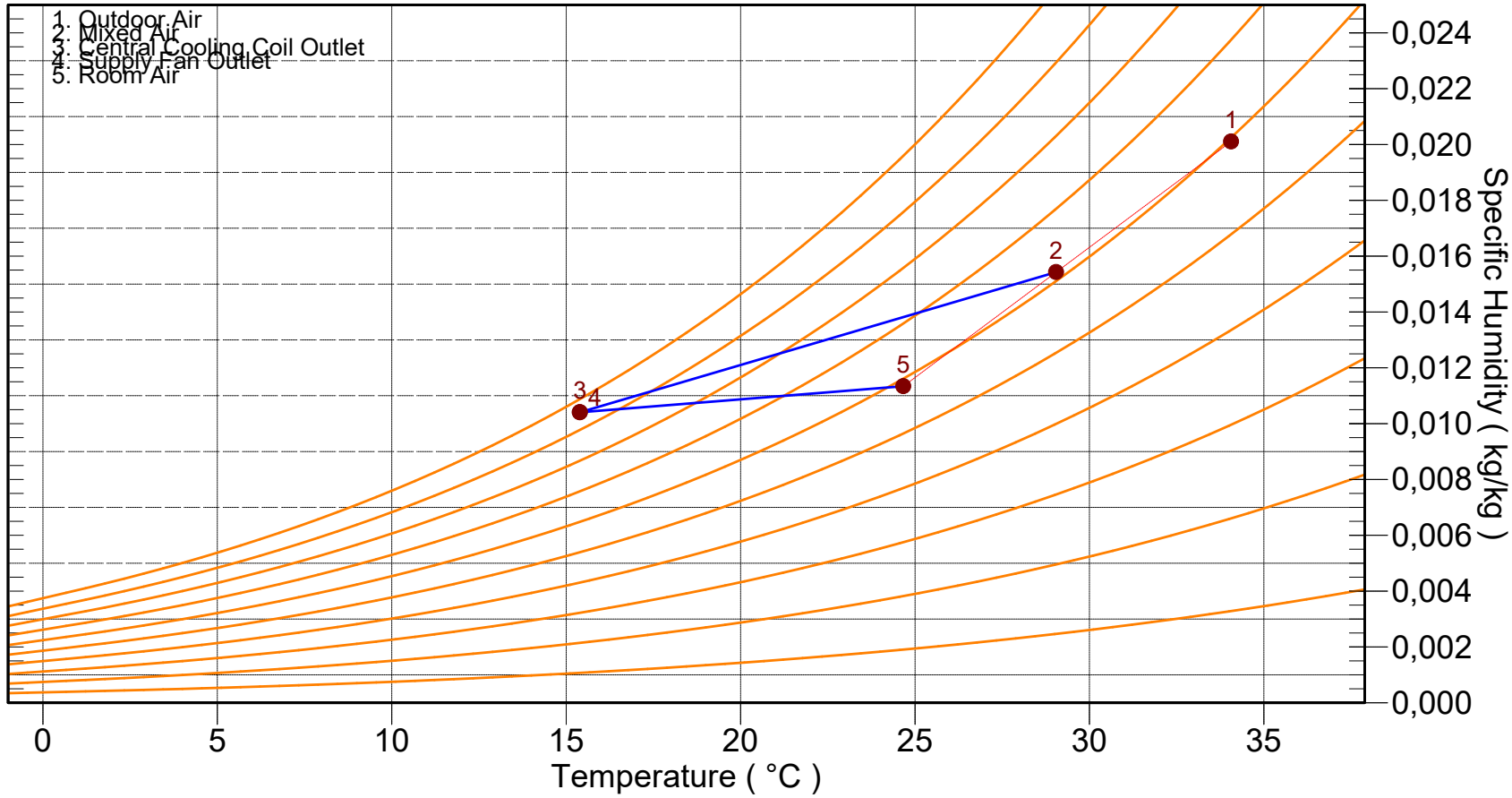
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

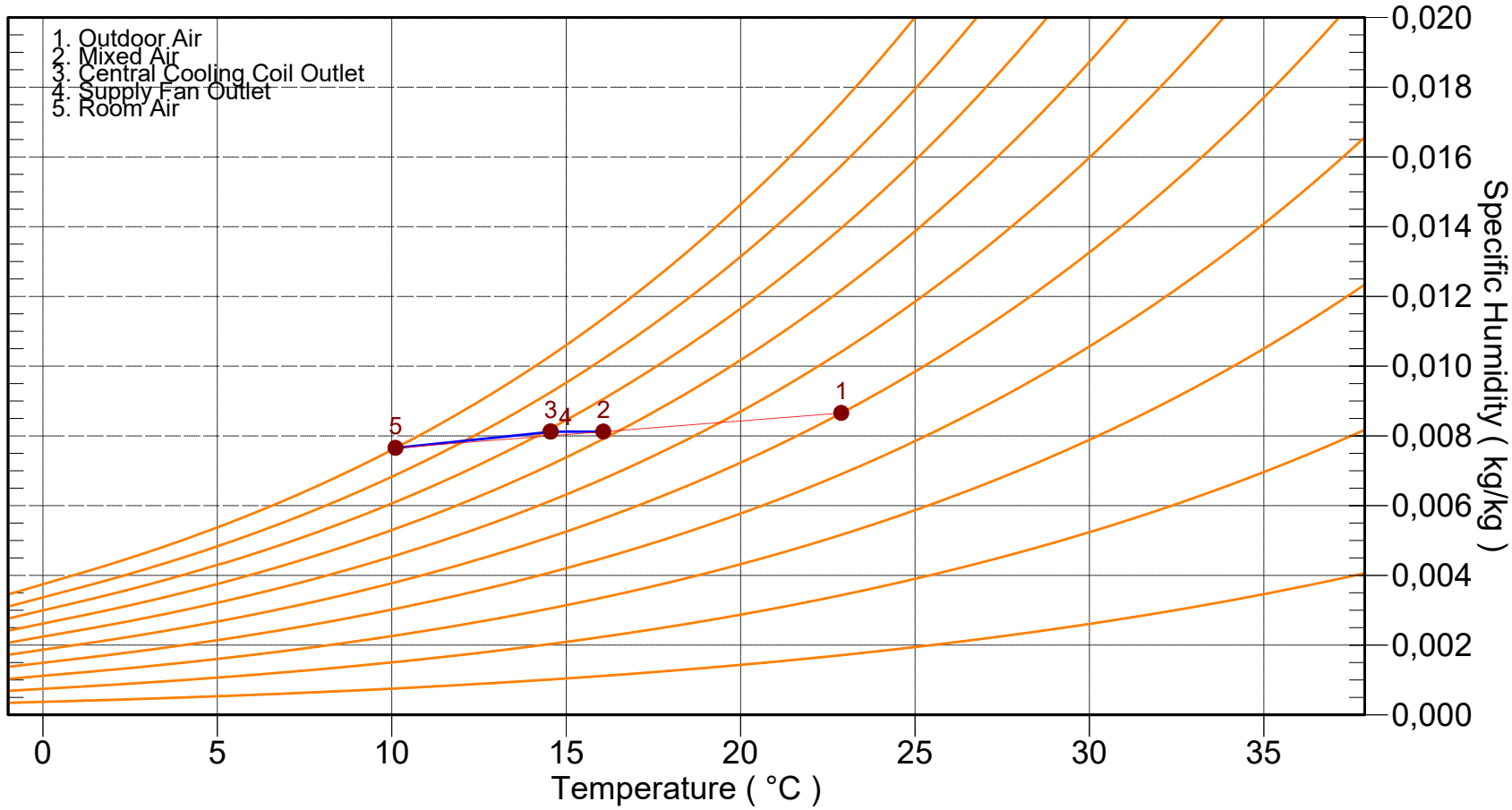
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-22

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

Air System Information

Air System Name	**AA Salón G-22**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-22

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

Air System Information

Air System Name ..... **AA Salón G-22**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-22	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón G-22

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-22	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-22" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-22" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

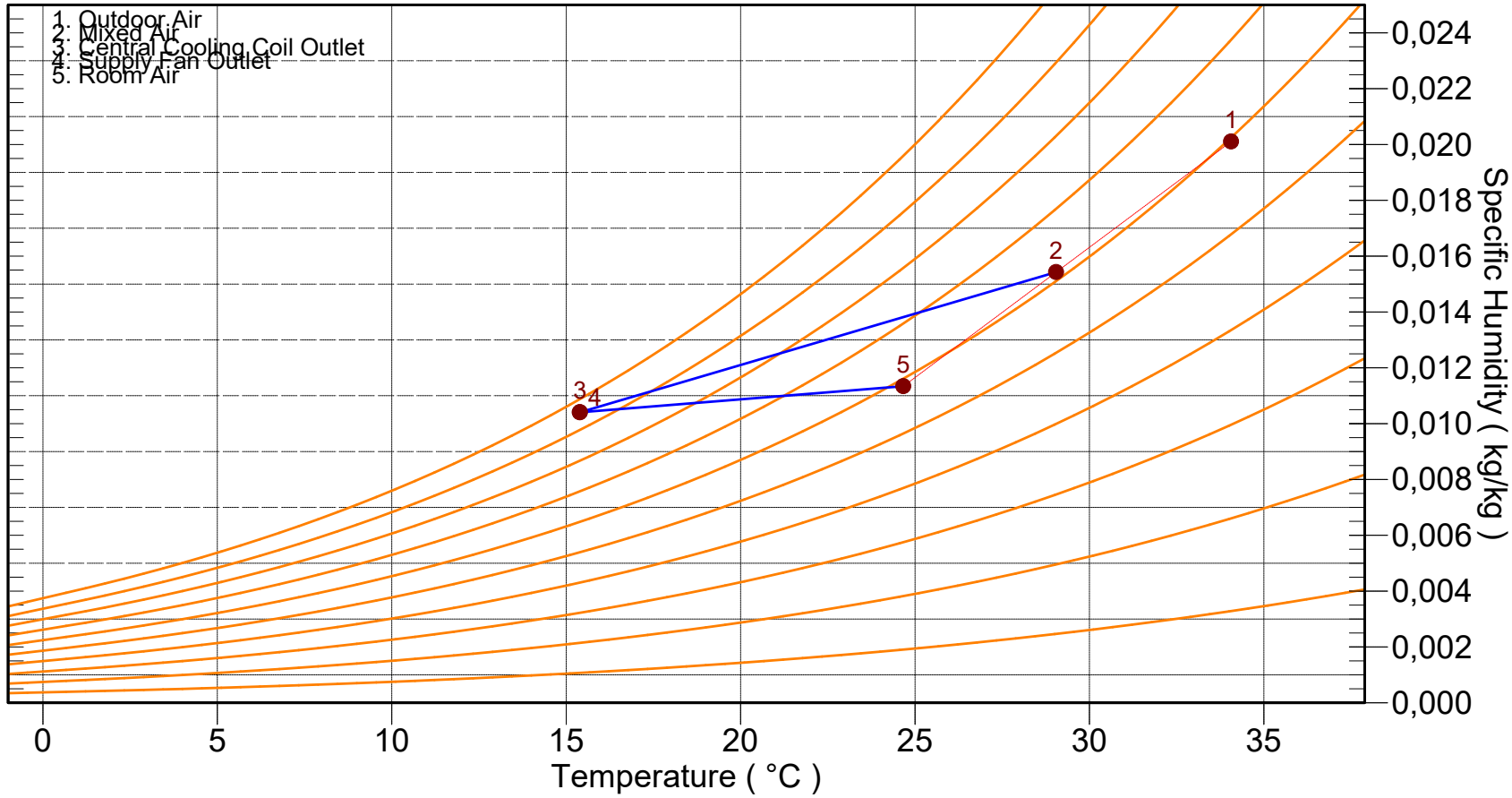
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

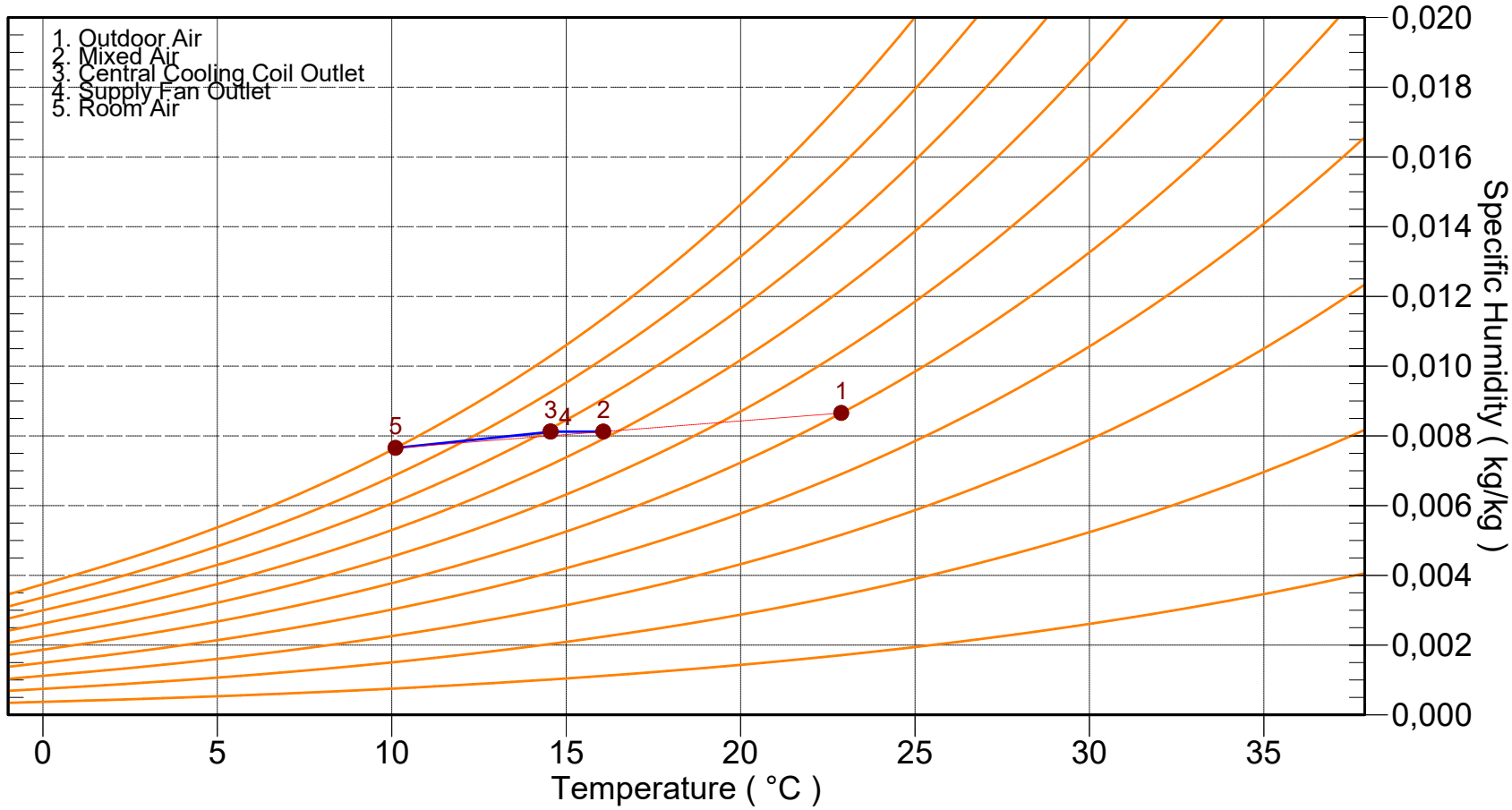
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-23

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

Air System Information

Air System Name	**AA Salón G-23**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-23

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

Air System Information

Air System Name ..... **AA Salón G-23**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-23	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón G-23

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-23	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

Air System Design Load Summary for AA Salón G-23

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/19/2025
12:14a. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-23" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-23" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

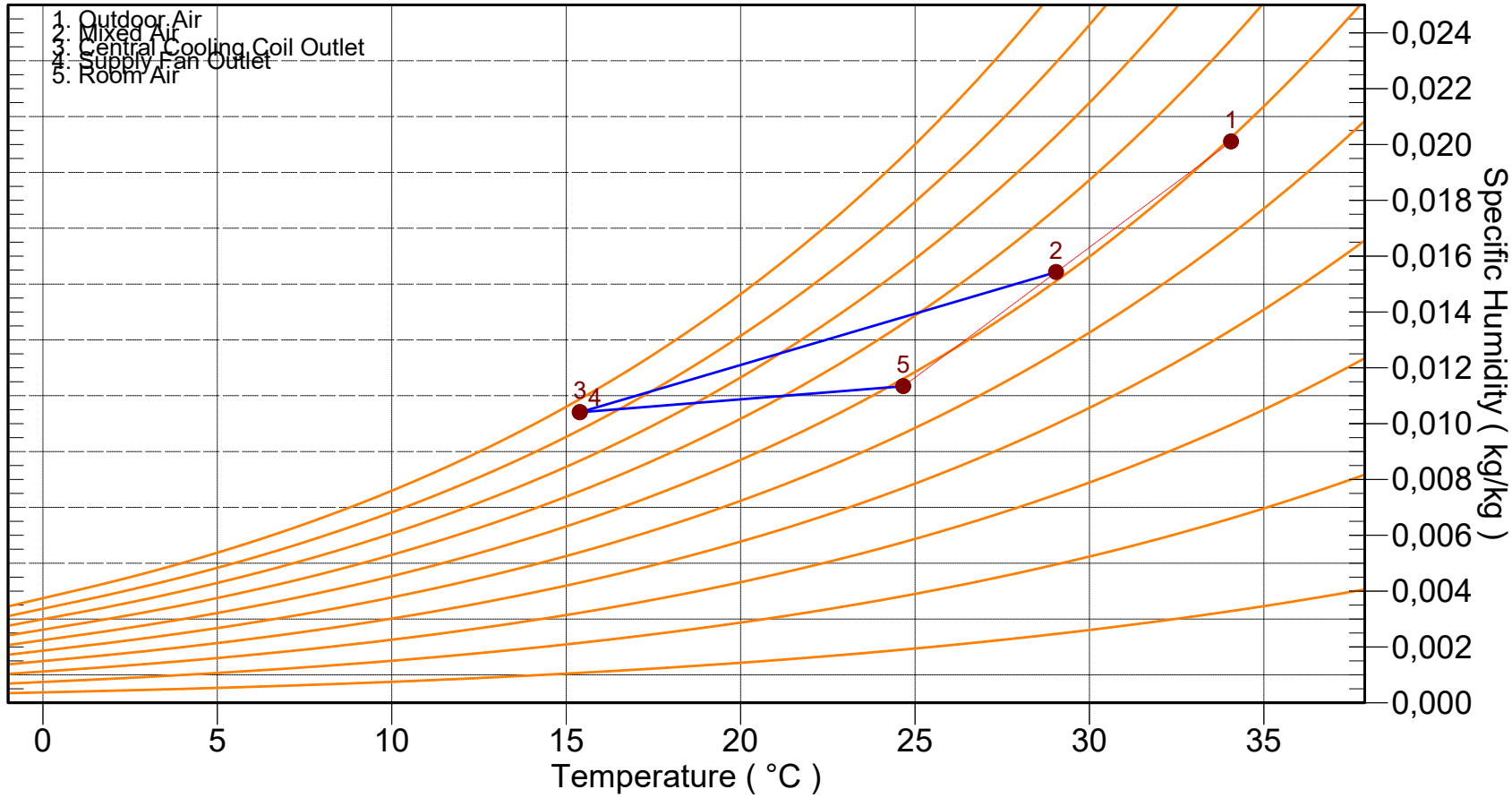
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

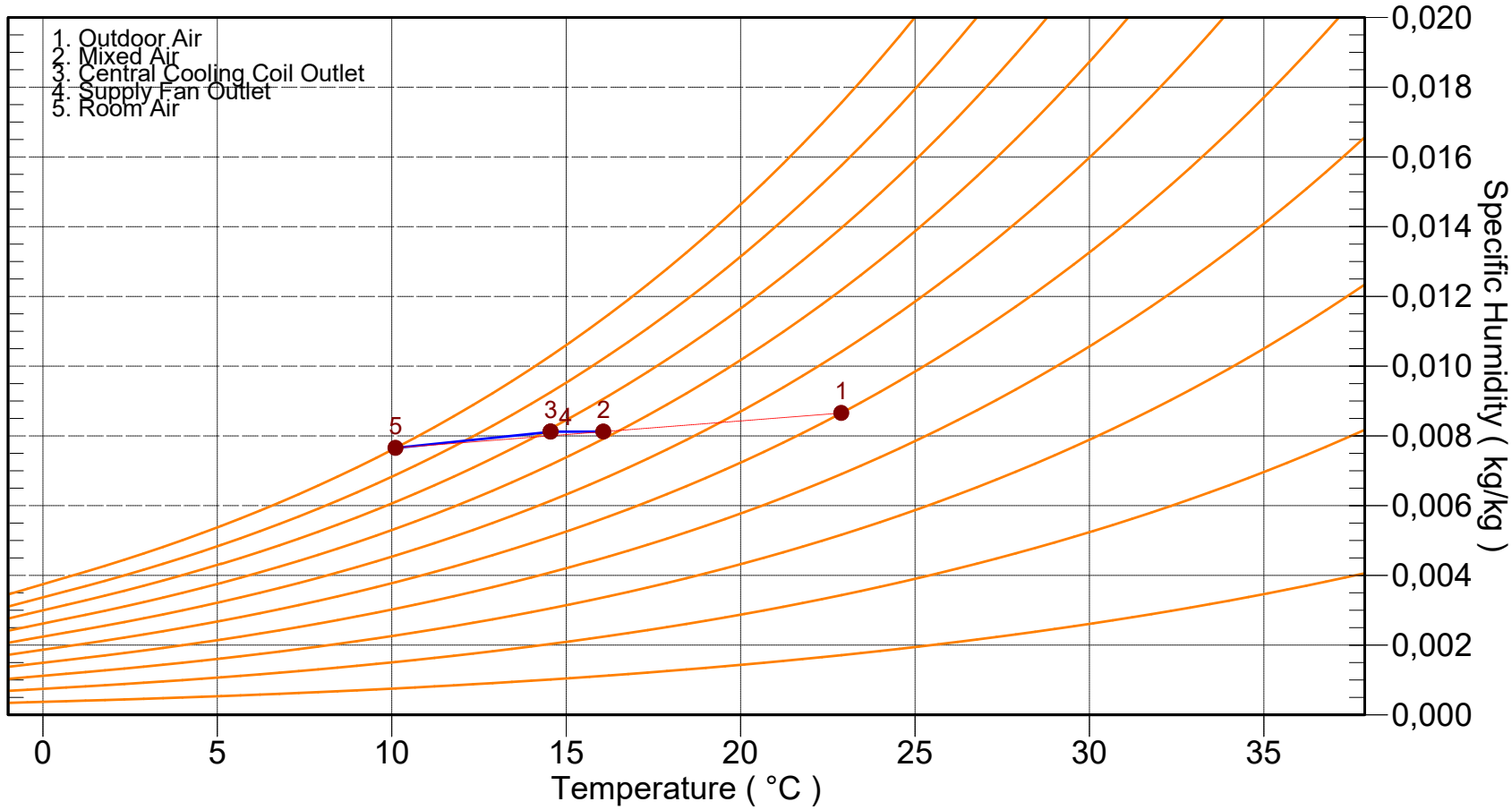
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-24

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-24**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-24

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-24**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-24	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón G-24

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-24	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

Air System Design Load Summary for AA Salón G-24

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-24" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-24" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

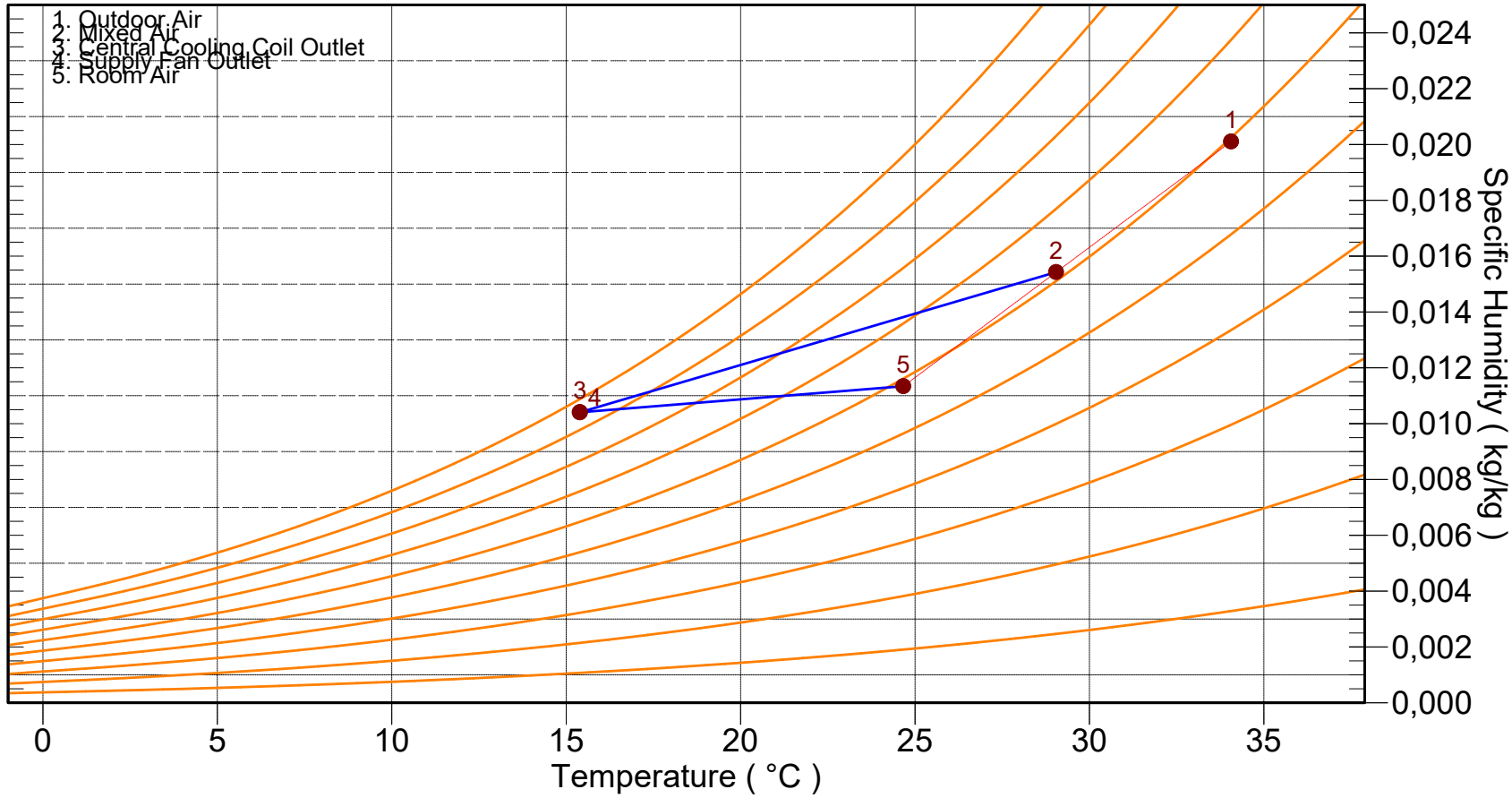
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

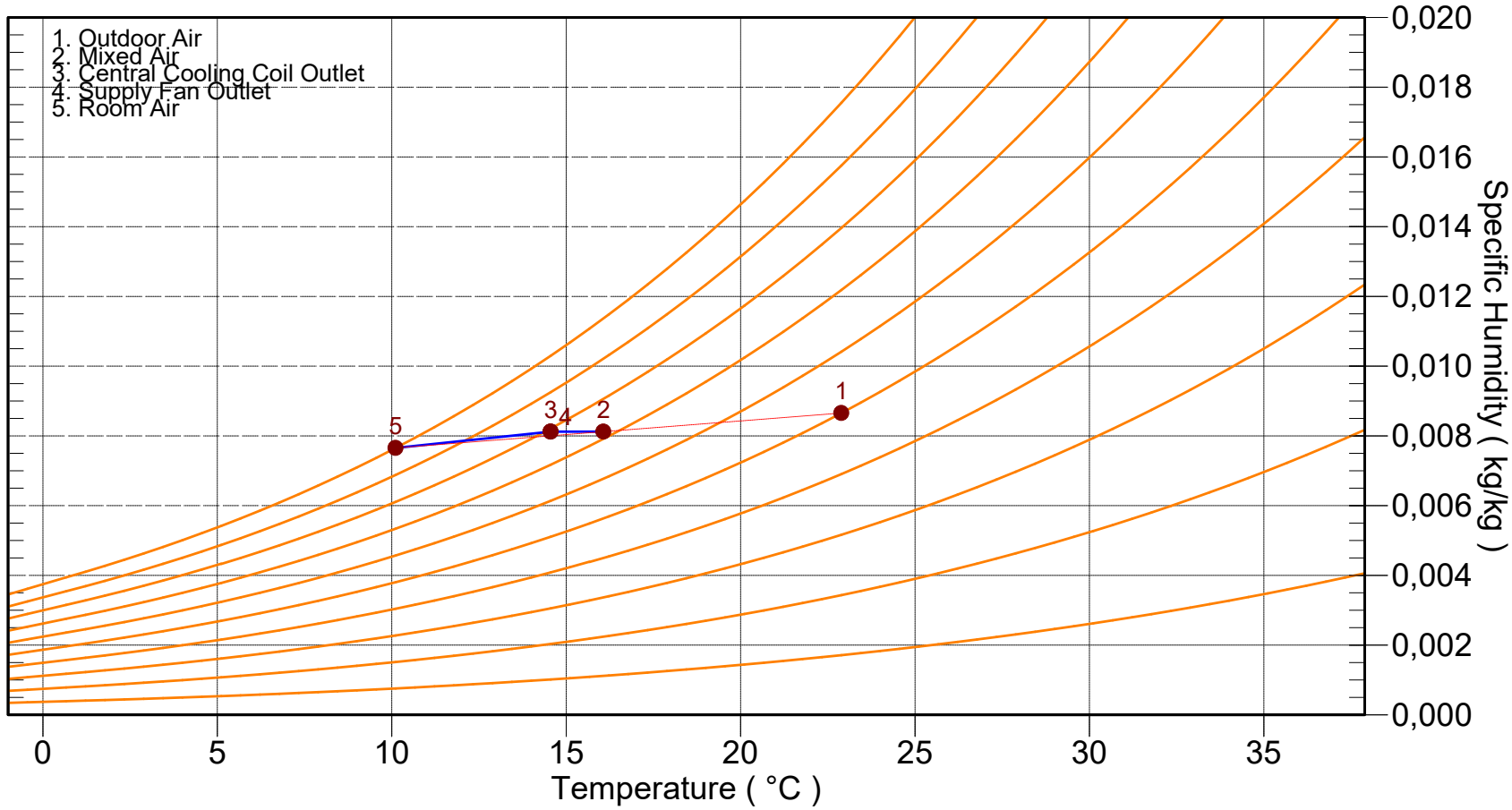
System Psychrometrics for AA Salón G-24

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-24

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-25

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-25**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-25

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-25**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-25	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón G-25

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-25	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

Air System Design Load Summary for AA Salón G-25

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-25" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-25" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

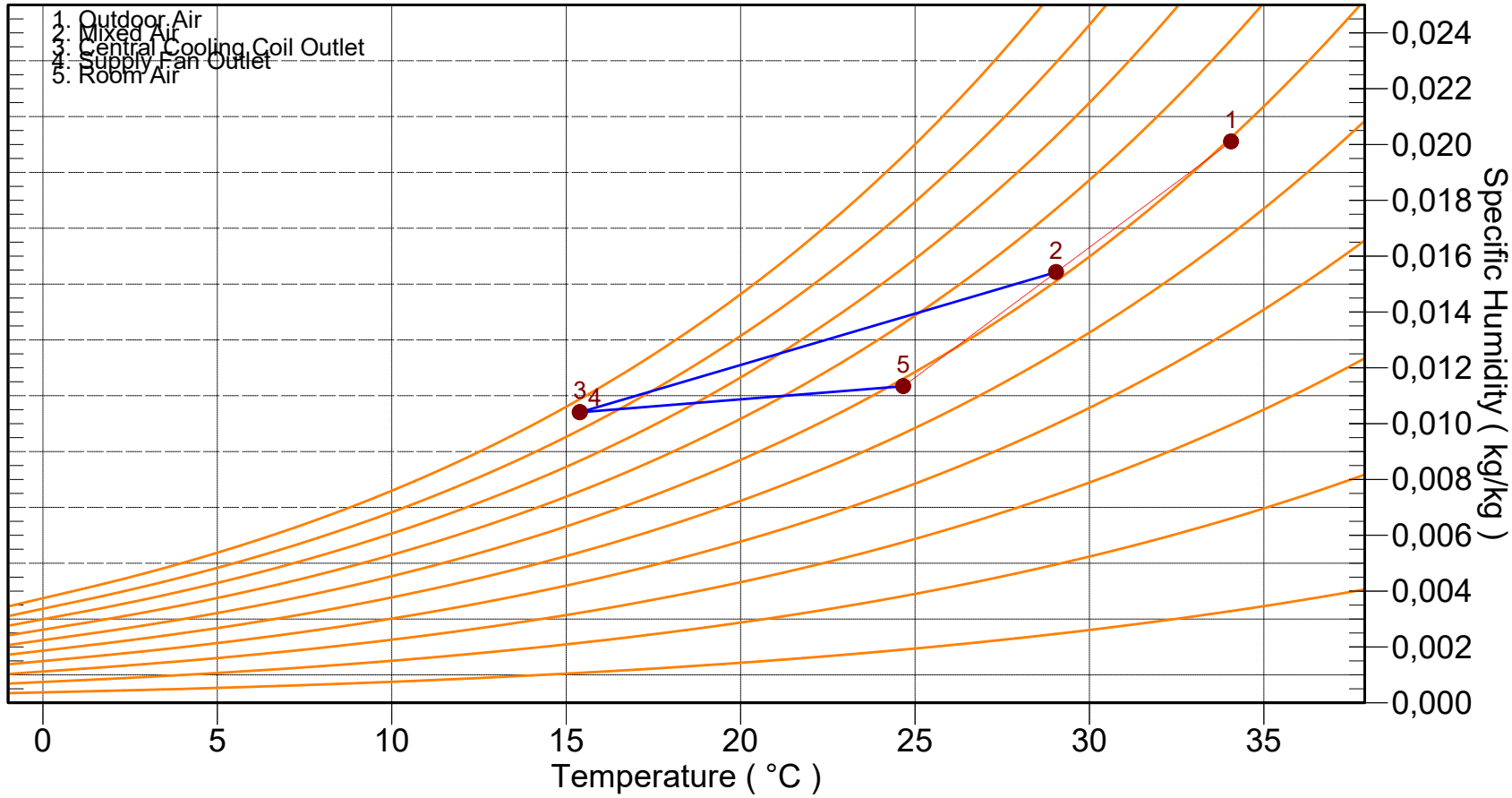
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

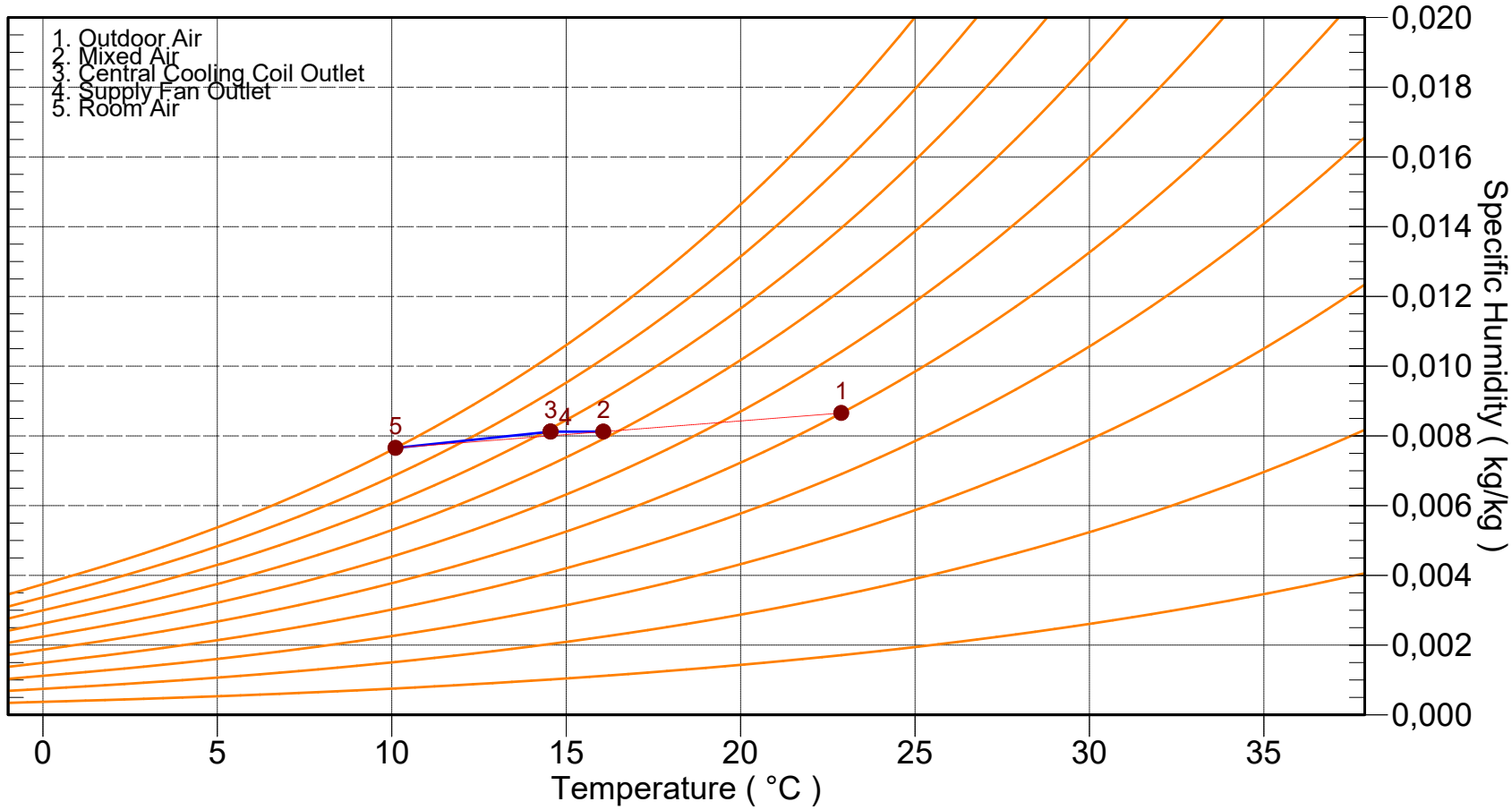
System Psychrometrics for AA Salón G-25

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-25

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-26

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-26**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jul 1600**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,0 / 27,2**	°C
Coil L/s at Jul 1600	**526**	L/s	Entering DB / WB	**28,9 / 23,1**	°C
Max block L/s	**526**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**526**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,527**		Bypass Factor	**0,100**	
L/(s kW)	**32,1**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**526**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**524**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,87**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-26

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-26**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	526	526	7,87	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-26	1	6,0	Jun 1500	526	0,0	66,8	7,87

Ventilation Sizing Summary for AA Salón G-26

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-26	1	66,8	41,0	525,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**525,6**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 34,0 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	554	-	15 m²	-	-
Wall Transmission	26 m²	65	-	26 m²	0	-
Roof Transmission	67 m²	215	-	67 m²	0	-
Window Transmission	15 m²	447	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	30	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5941**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5862	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	526 L/s	0	-	526 L/s	0	-
Ventilation Load	245 L/s	2770	6309	245 L/s	-3767	-722
Supply Fan Load	526 L/s	0	-	526 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8633**	**7752**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8633	7753	-	-957	0
>> Total Conditioning	**-**	**8633**	**7753**	**-**	**-957**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-26" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	26 m²	58	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5972**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-26" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	26	-	0
WINDOW 2	7	3,339	0,350	194	158	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	32	-	0
WINDOW 1	8	3,339	0,350	228	471	0
H EXPOSURE						
ROOF	67	0,131	-	251	-	0

July DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,0	0,02011	245	400	2770	6309
Vent - Return Mixing	Outlet	28,9	0,01543	526	797	-	-
Central Cooling Coil	Outlet	15,3	0,01041	526	797	8633	7753
Supply Fan	Outlet	15,3	0,01041	526	797	0	-
Cold Supply Duct	Outlet	15,3	0,01041	526	797	-	-
Zone Air	-	24,6	0,01134	526	1144	5862	1443
Return Plenum	Outlet	24,6	0,01134	526	1144	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5941	Cooling	5862	24,6	526	1144	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	16,0	0,00812	526	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	526	409	957	0
Supply Fan	Outlet	14,4	0,00812	526	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	526	409	-	-
Zone Air	-	10,0	0,00765	526	417	0	0
Return Plenum	Outlet	10,0	0,00765	526	417	0	-

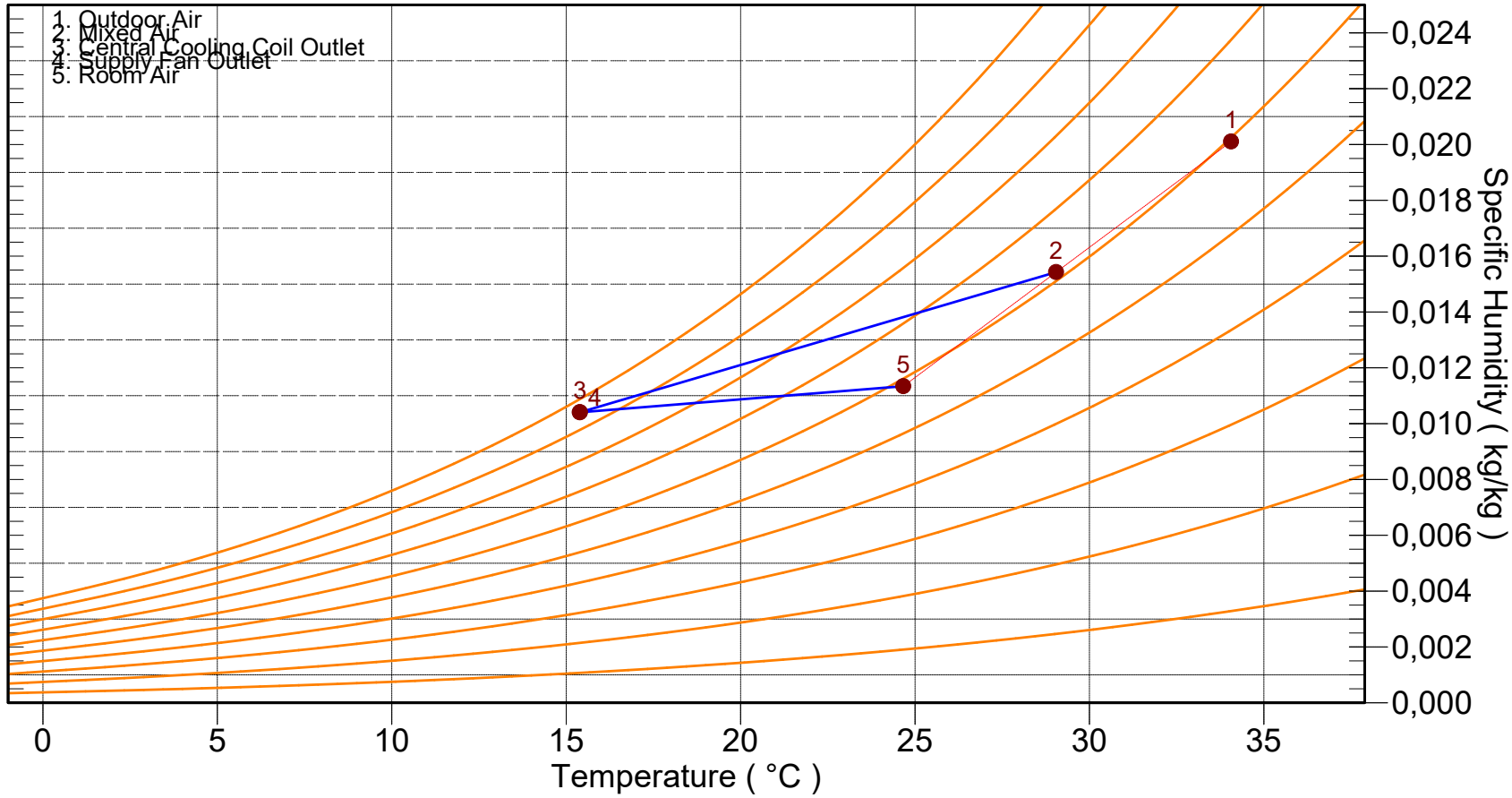
Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	526	417	0	0

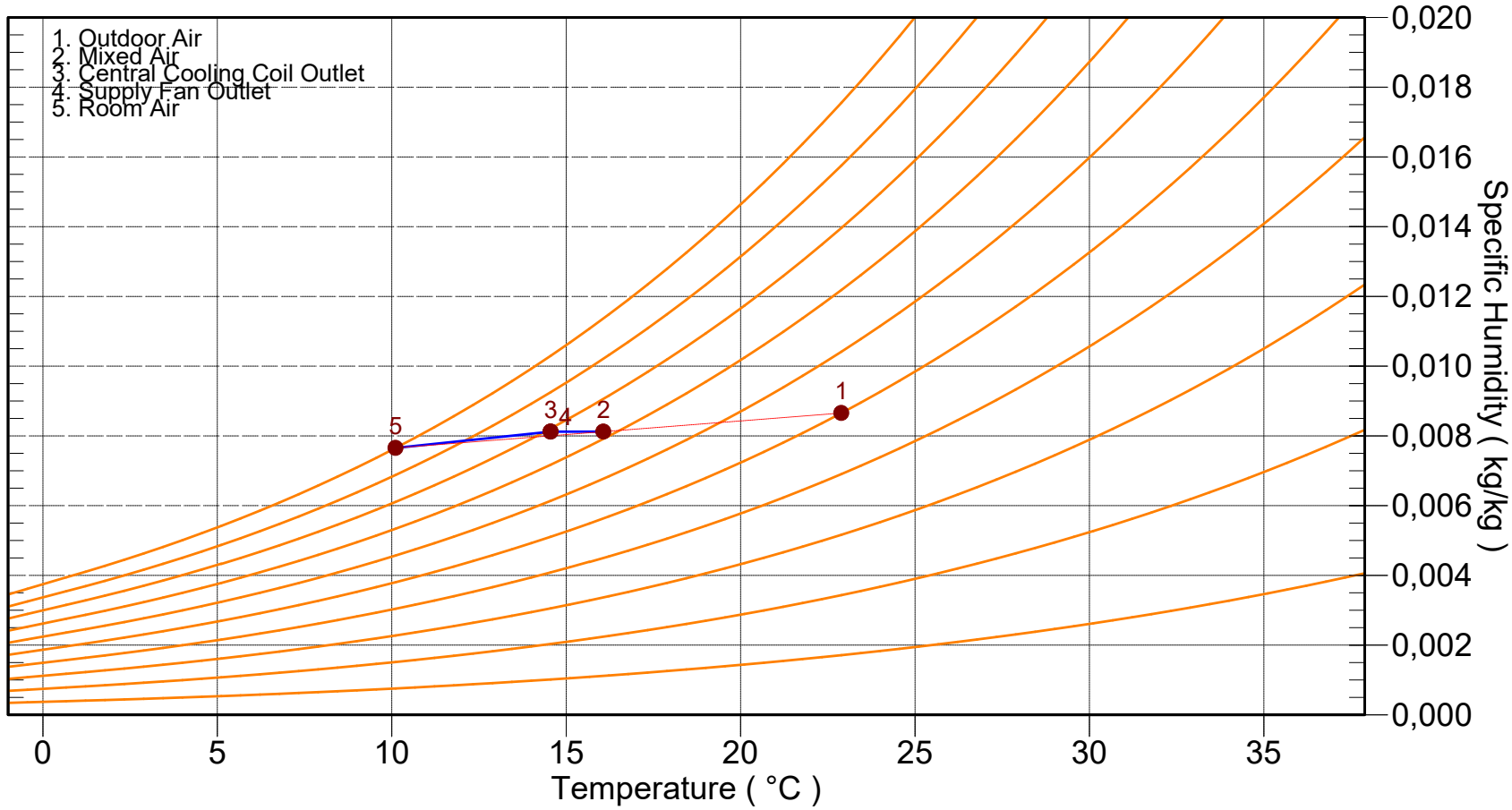
System Psychrometrics for AA Salón G-26

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1600



System Psychrometrics for AA Salón G-26

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-27

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-27**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**532**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**532**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**532**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,521**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,0**		Design supply temp.	**14,4**	°C
W/m²	**247,3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**532**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**530**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,96**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-27

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-27**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	532	532	7,96	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Jun 1600	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-27	1	6,0	Jun 1600	532	0,0	66,8	7,96

Ventilation Sizing Summary for AA Salón G-27

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-27	1	66,8	41,0	531,6	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**531,6**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	630	-	15 m²	-	-
Wall Transmission	55 m²	121	-	55 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6035**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5933	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	532 L/s	0	-	532 L/s	0	-
Ventilation Load	245 L/s	2669	6473	245 L/s	-3767	-722
Supply Fan Load	532 L/s	0	-	532 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8601**	**7916**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8601	7916	-	-925	0
>> Total Conditioning	**-**	**8601**	**7916**	**-**	**-925**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-27" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	625	-	15 m²	-	-
Wall Transmission	55 m²	131	-	55 m²	0	-
Roof Transmission	67 m²	206	-	67 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6040**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-27" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	0,331	-	27	-	0
WINDOW 2	7	3,339	0,350	193	150	0
DOOR	2	1,703	-	29	-	0
N EXPOSURE						
WALL	14	0,331	-	34	-	0
WINDOW 1	8	3,339	0,350	227	475	0
W EXPOSURE						
WALL	29	0,331	-	70	-	0
H EXPOSURE						
ROOF	67	0,131	-	206	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2669	6473
Vent - Return Mixing	Outlet	28,7	0,01549	532	799	-	-
Central Cooling Coil	Outlet	15,3	0,01042	532	799	8601	7916
Supply Fan	Outlet	15,3	0,01042	532	799	0	-
Cold Supply Duct	Outlet	15,3	0,01042	532	799	-	-
Zone Air	-	24,6	0,01135	532	1140	5933	1443
Return Plenum	Outlet	24,6	0,01135	532	1140	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	6035	Cooling	5933	24,6	532	1140	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

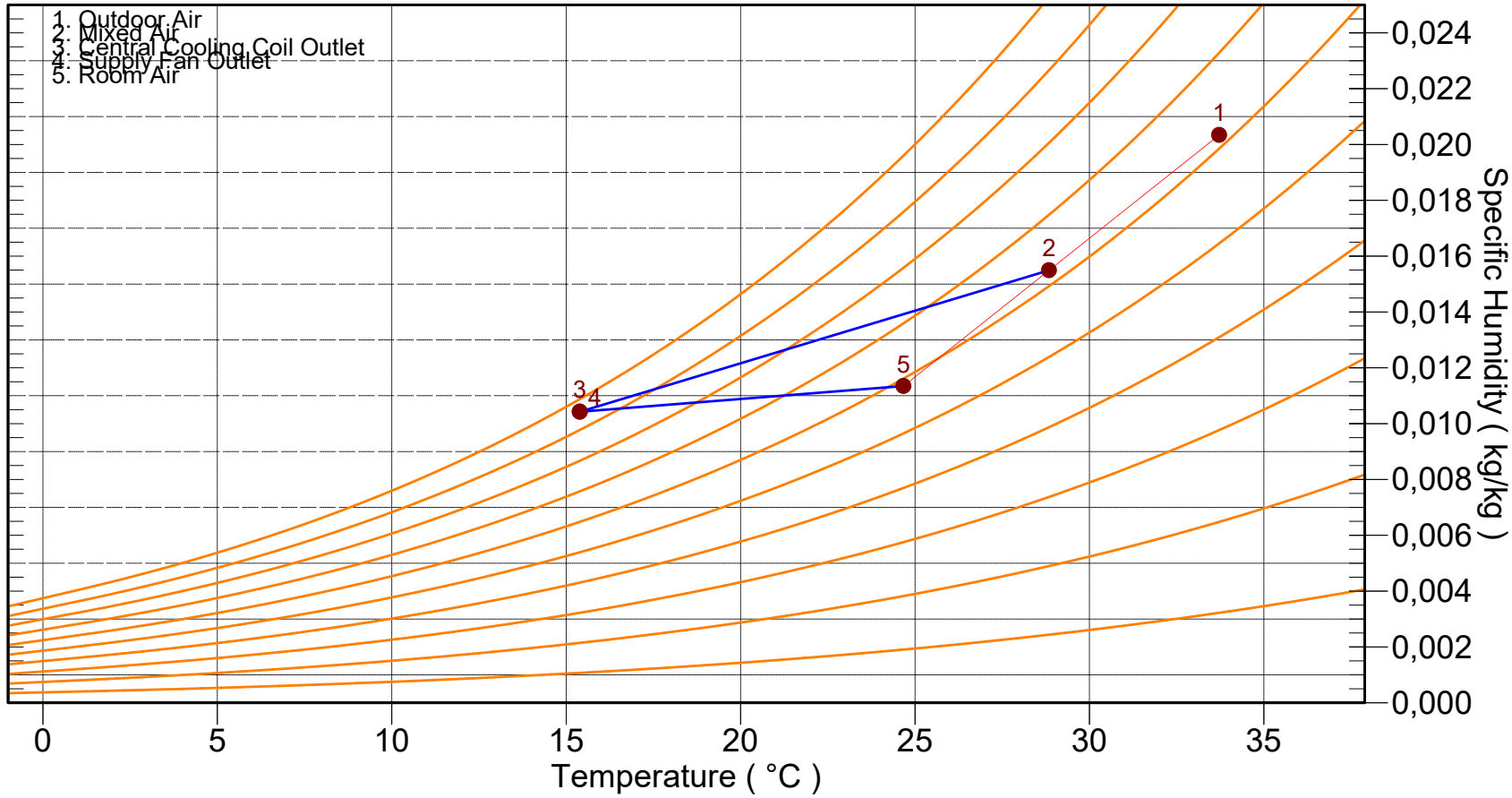
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	532	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	532	410	925	0
Supply Fan	Outlet	14,4	0,00812	532	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	532	410	-	-
Zone Air	-	10,0	0,00765	532	418	0	0
Return Plenum	Outlet	10,0	0,00765	532	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

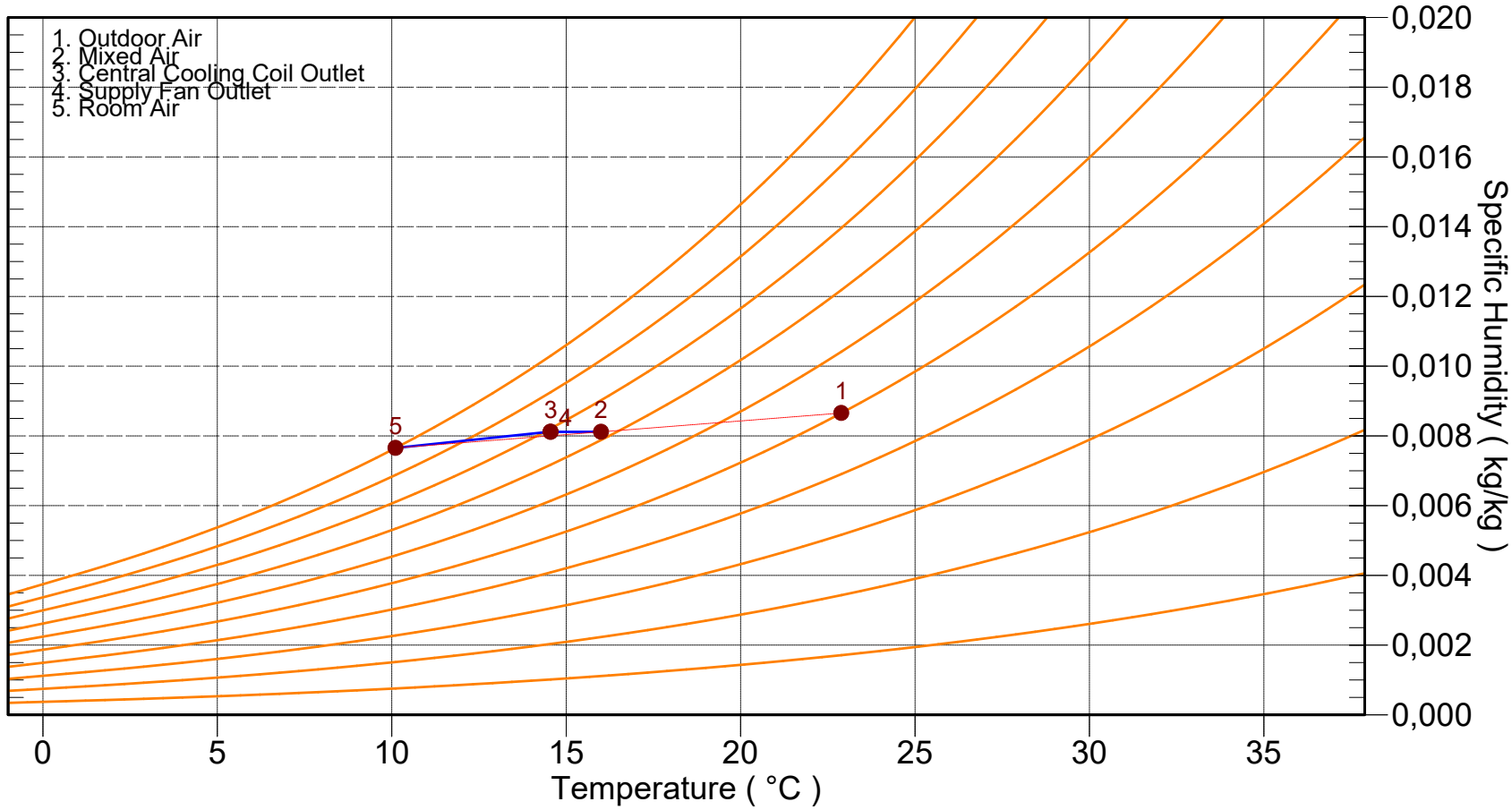
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	532	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-28

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-28**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,2**	kW	Load occurs at	**Jul 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**34,2 / 27,2**	°C
Coil L/s at Jul 1500	**527**	L/s	Entering DB / WB	**29,0 / 23,2**	°C
Max block L/s	**527**	L/s	Leaving DB / WB	**15,5 / 15,1**	°C
Sum of peak zone L/s	**527**	L/s	Coil ADP	**14,0**	°C
Sensible heat ratio	**0,528**		Bypass Factor	**0,100**	
L/(s kW)	**32,5**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**242,6**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**527**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**525**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,89**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-28

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-28**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	527	527	7,89	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-28	1	6,0	Dec 1500	527	0,0	66,8	7,89

Ventilation Sizing Summary for AA Salón G-28

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-28	1	66,8	41,0	526,9	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**526,9**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500 COOLING OA DB / WB 34,2 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	12 m²	466	-	12 m²	-	-
Wall Transmission	58 m²	143	-	58 m²	0	-
Roof Transmission	67 m²	260	-	67 m²	0	-
Window Transmission	12 m²	351	-	12 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	31	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5833**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5729	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	527 L/s	0	-	527 L/s	0	-
Ventilation Load	245 L/s	2834	6202	245 L/s	-3767	-722
Supply Fan Load	527 L/s	0	-	527 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8563**	**7645**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8563	7645	-	-950	0
>> Total Conditioning	**-**	**8563**	**7645**	**-**	**-950**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-28" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	12 m²	1003	-	12 m²	-	-
Wall Transmission	58 m²	50	-	58 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	12 m²	156	-	12 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5986**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-28" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	16	0,331	-	8	-	0
WINDOW 2	4	3,339	0,550	48	91	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
E EXPOSURE						
WALL	29	0,331	-	25	-	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

July DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	34,2	0,02010	245	400	2834	6202
Vent - Return Mixing	Outlet	29,0	0,01550	527	797	-	-
Central Cooling Coil	Outlet	15,5	0,01056	527	797	8563	7645
Supply Fan	Outlet	15,5	0,01056	527	797	0	-
Cold Supply Duct	Outlet	15,5	0,01056	527	797	-	-
Zone Air	-	24,6	0,01149	527	1143	5729	1443
Return Plenum	Outlet	24,6	0,01149	527	1143	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5833	Cooling	5729	24,6	527	1143	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

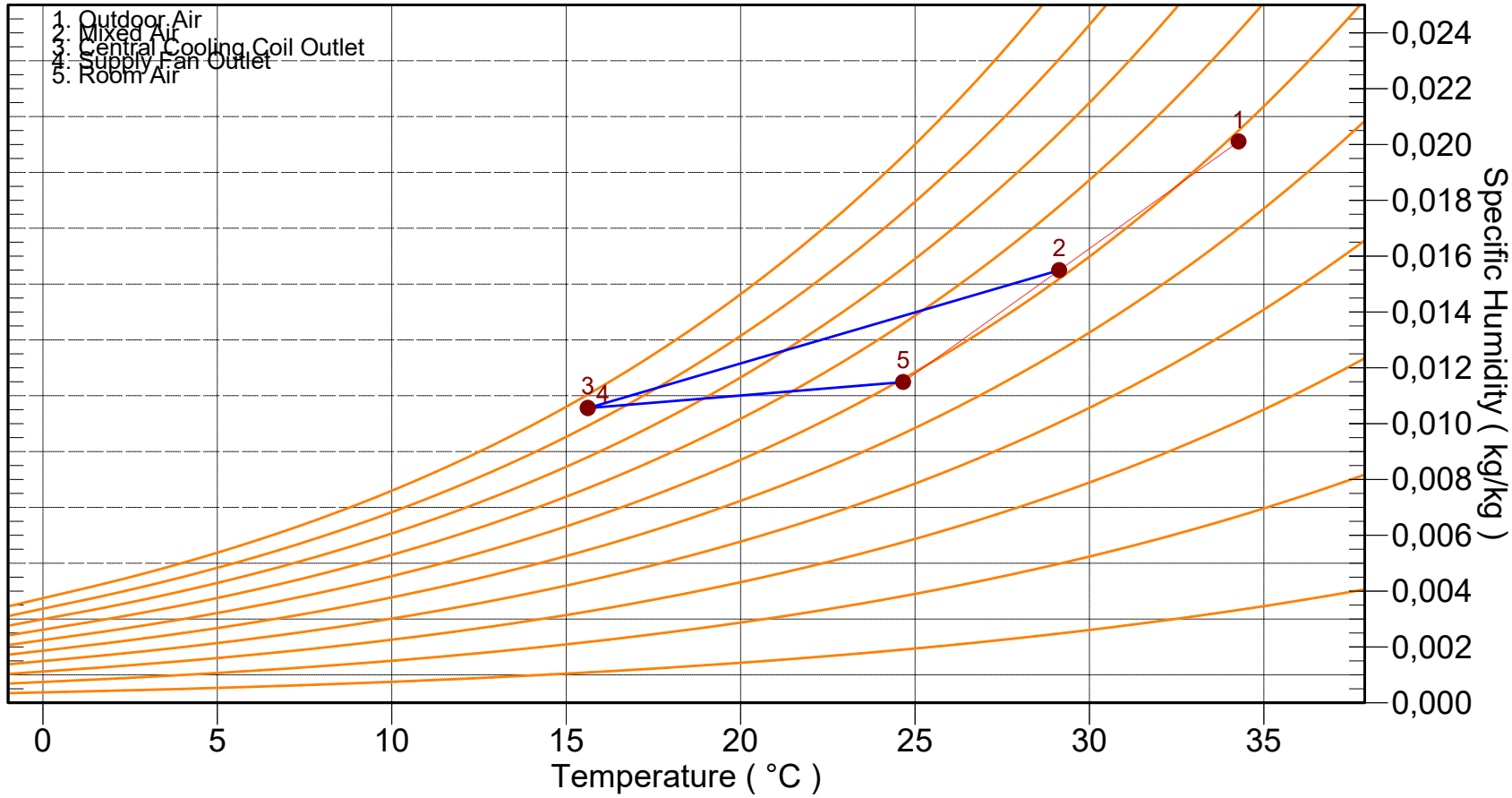
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	527	409	-	-
Central Cooling Coil	Outlet	14,4	0,00812	527	409	950	0
Supply Fan	Outlet	14,4	0,00812	527	409	0	-
Cold Supply Duct	Outlet	10,0	0,00812	527	409	-	-
Zone Air	-	10,0	0,00765	527	418	0	0
Return Plenum	Outlet	10,0	0,00765	527	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

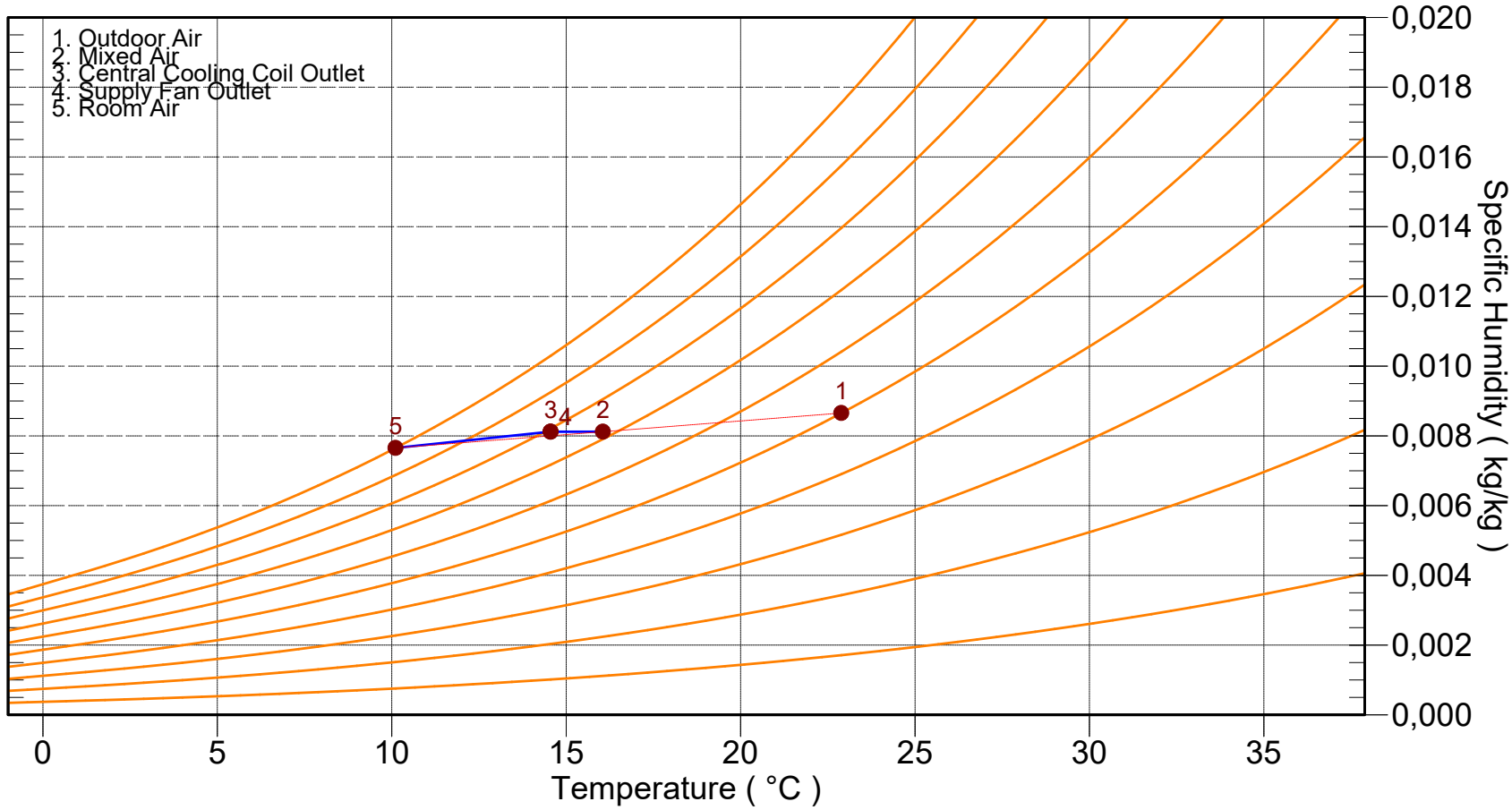
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	527	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: July DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-29

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-29**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-29

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-29**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-29	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón G-29

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-29	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

Air System Design Load Summary for AA Salón G-29

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-29" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-29" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

System Psychrometrics for AA Salón G-29

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

System Psychrometrics for AA Salón G-29

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

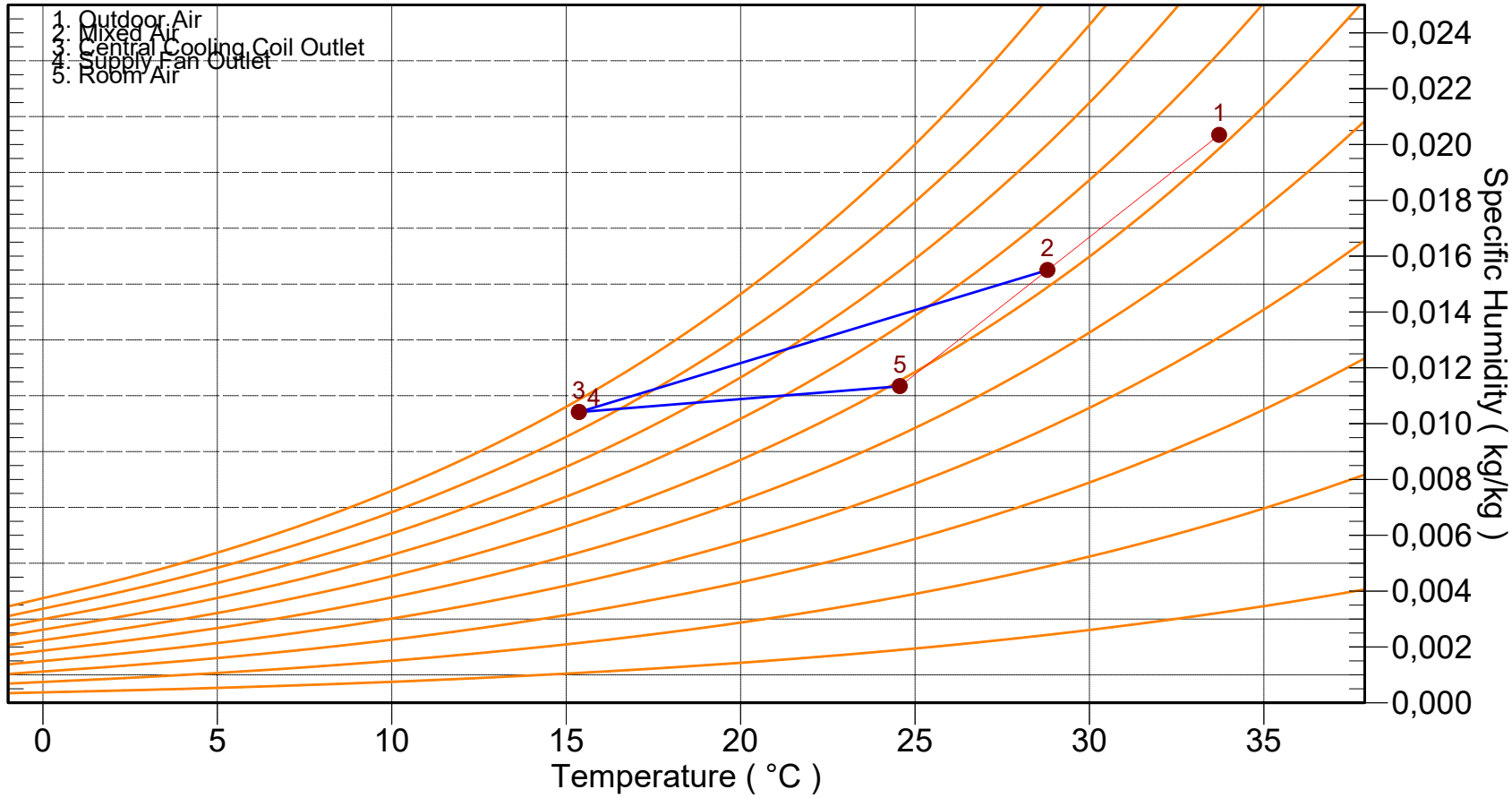
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

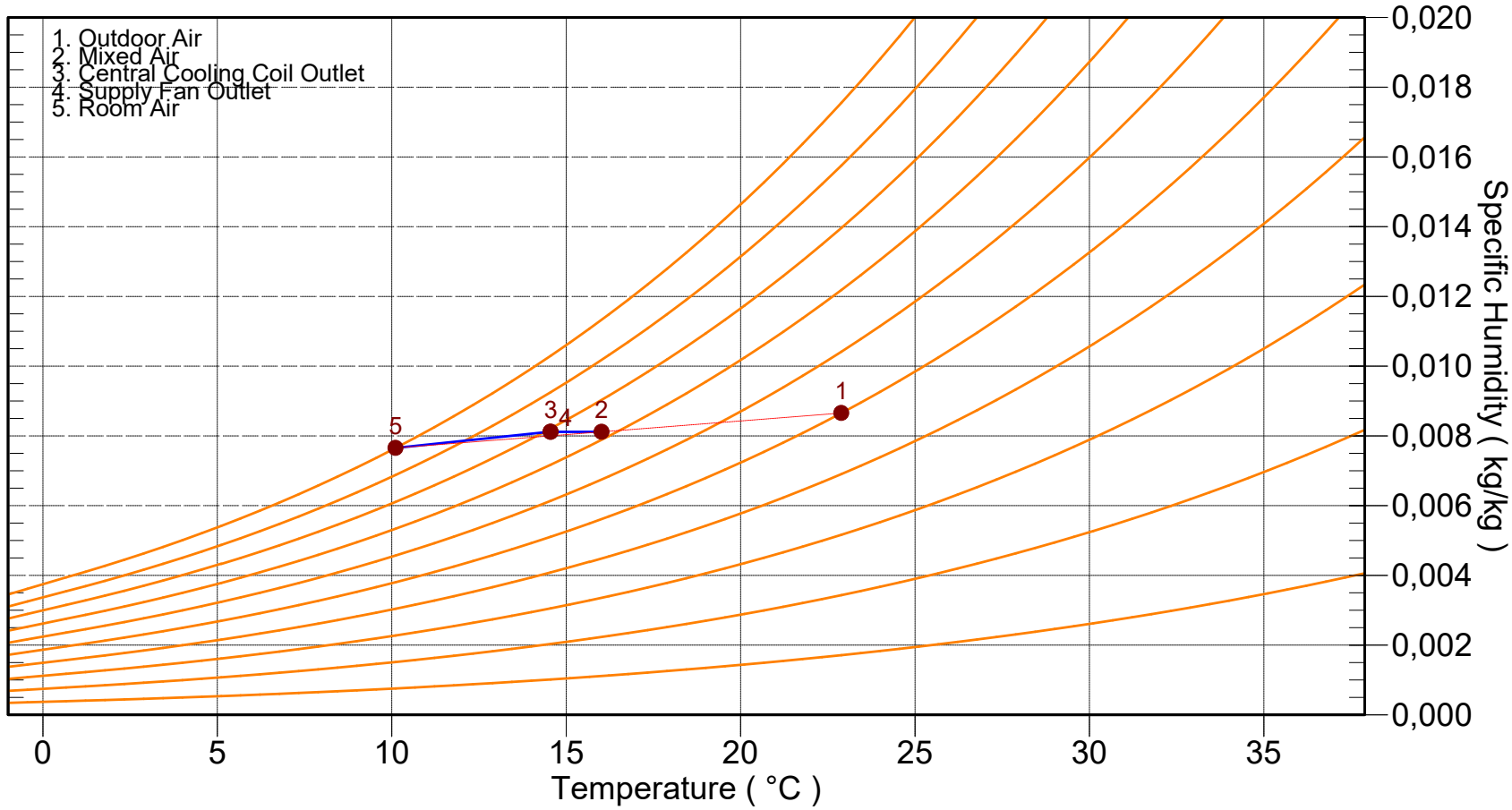
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-30

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-30**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-30

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-30**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-30	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón G-30

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-30	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-30" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-30" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

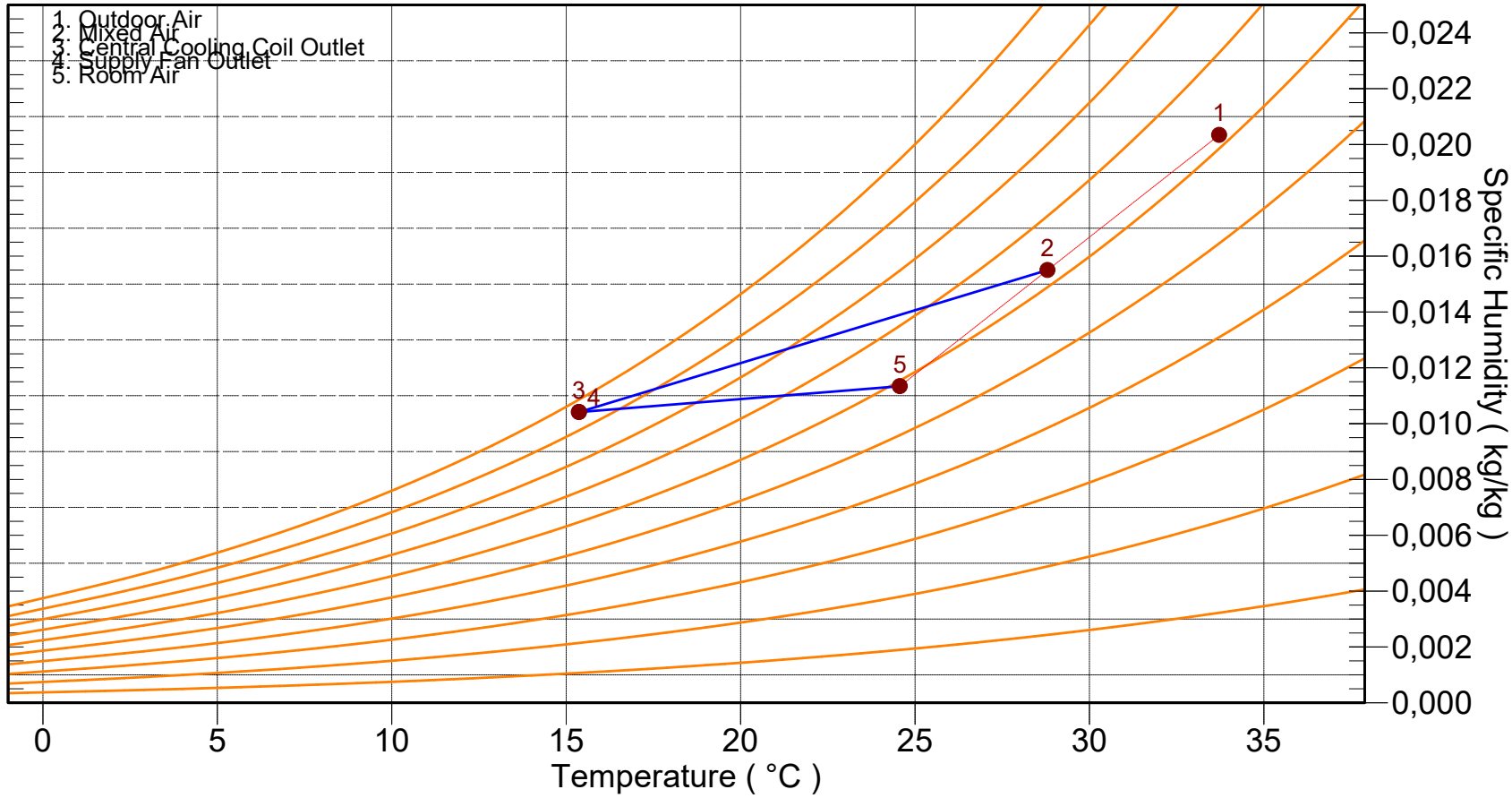
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

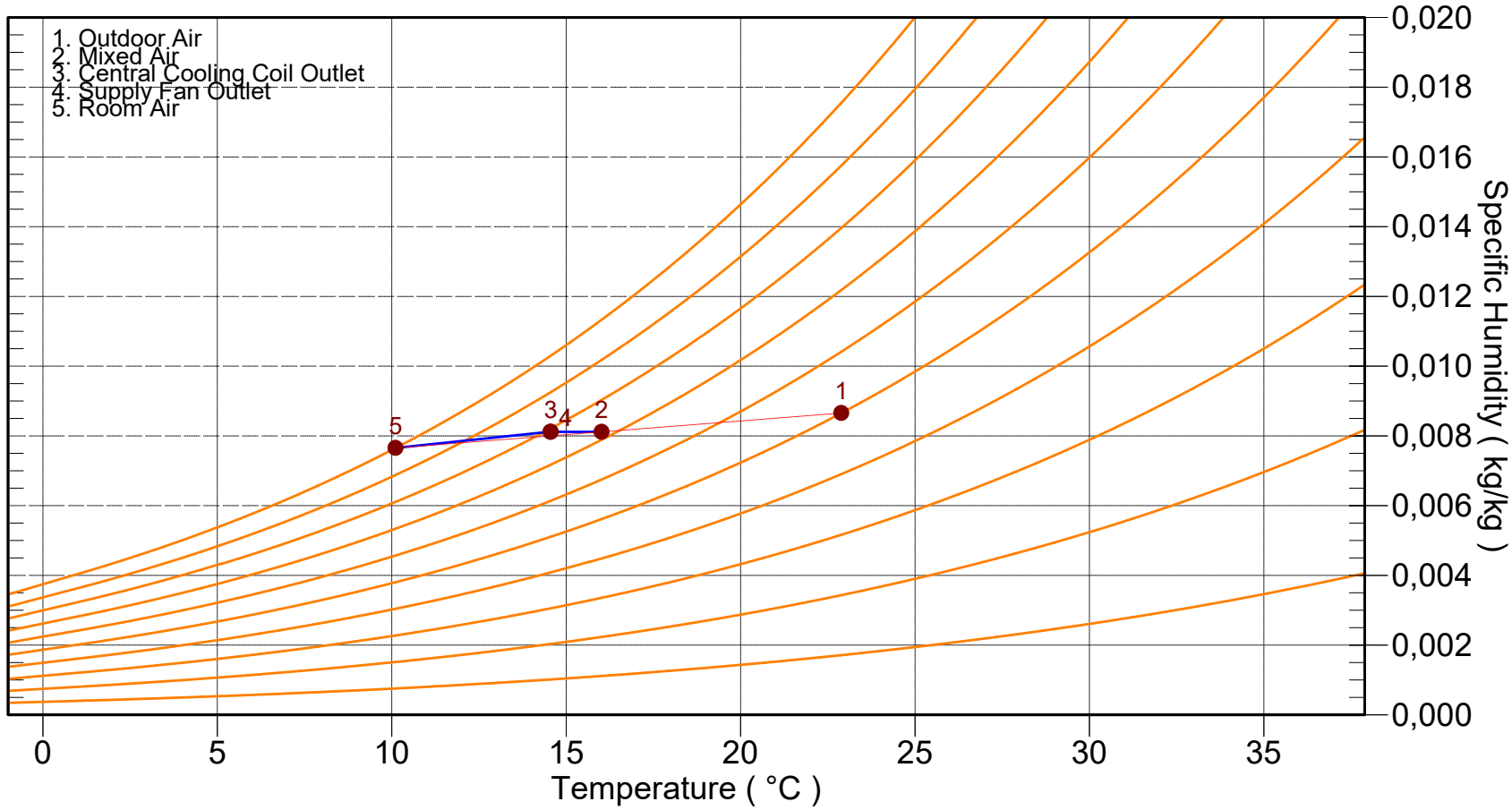
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-31

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-31**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-31

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-31**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-31	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón G-31

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-31	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-31" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-31" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

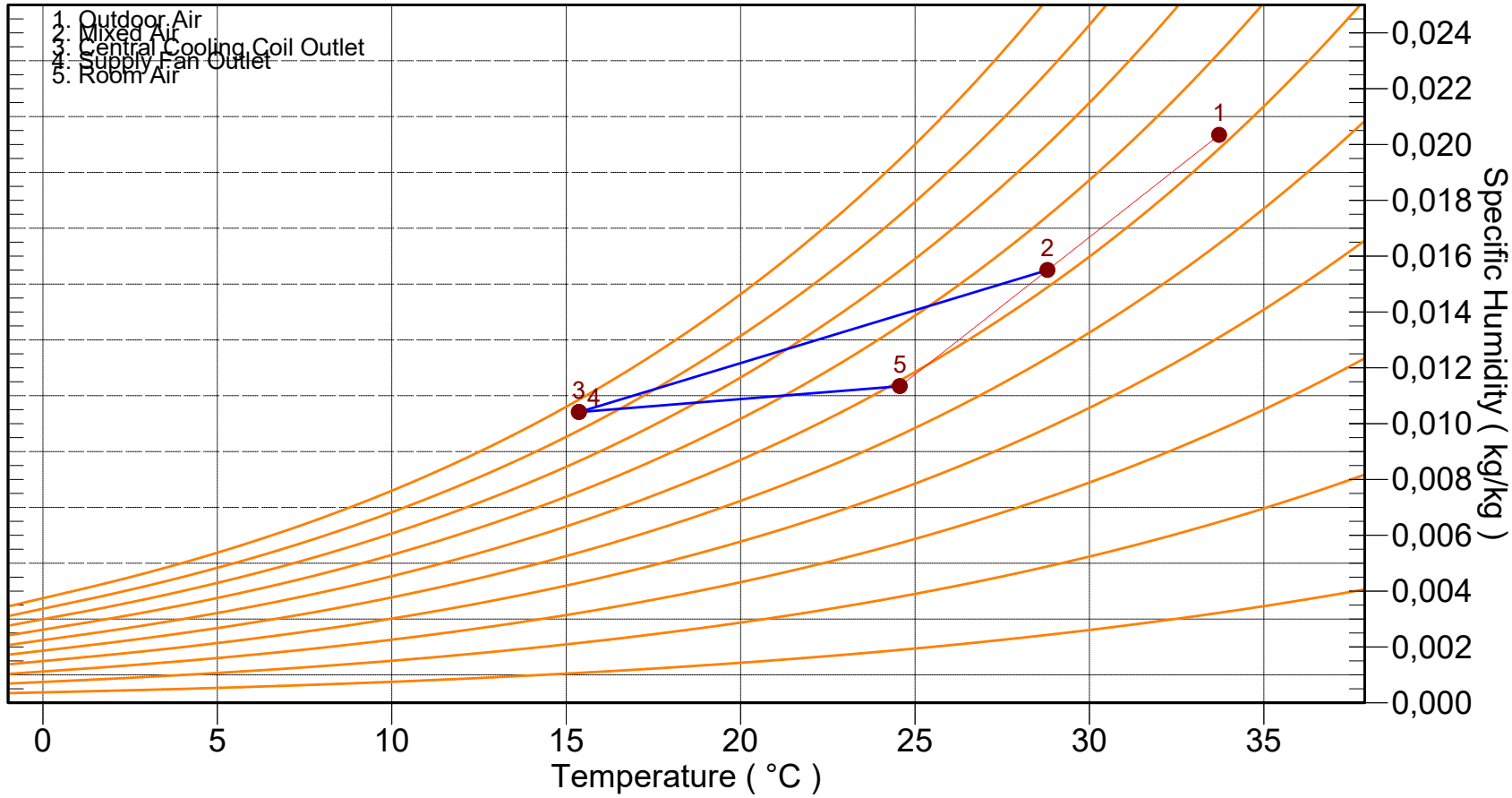
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

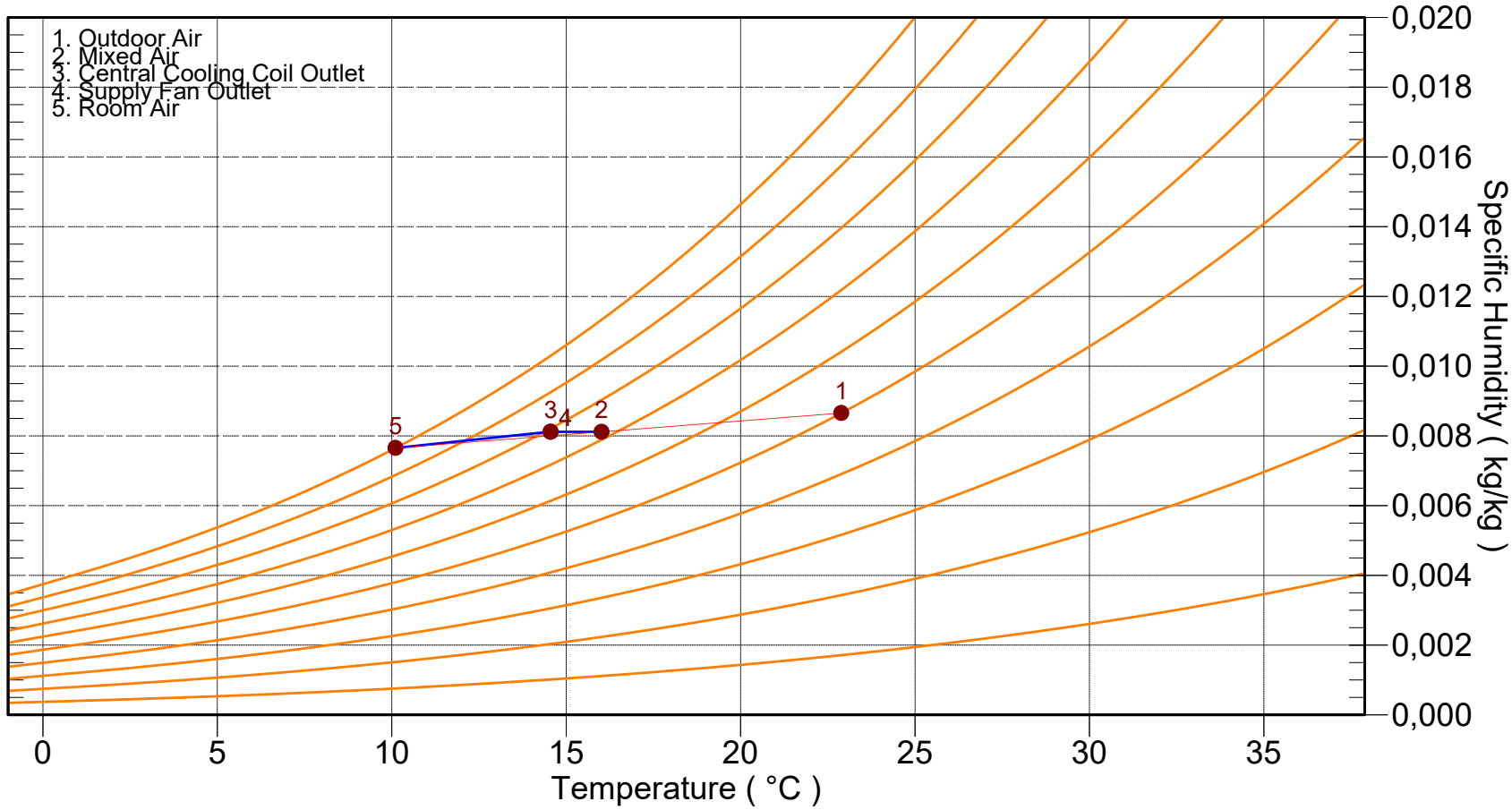
Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón G-31

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-32

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-32**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-32

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-32**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-32	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón G-32

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-32	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-32" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-32" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

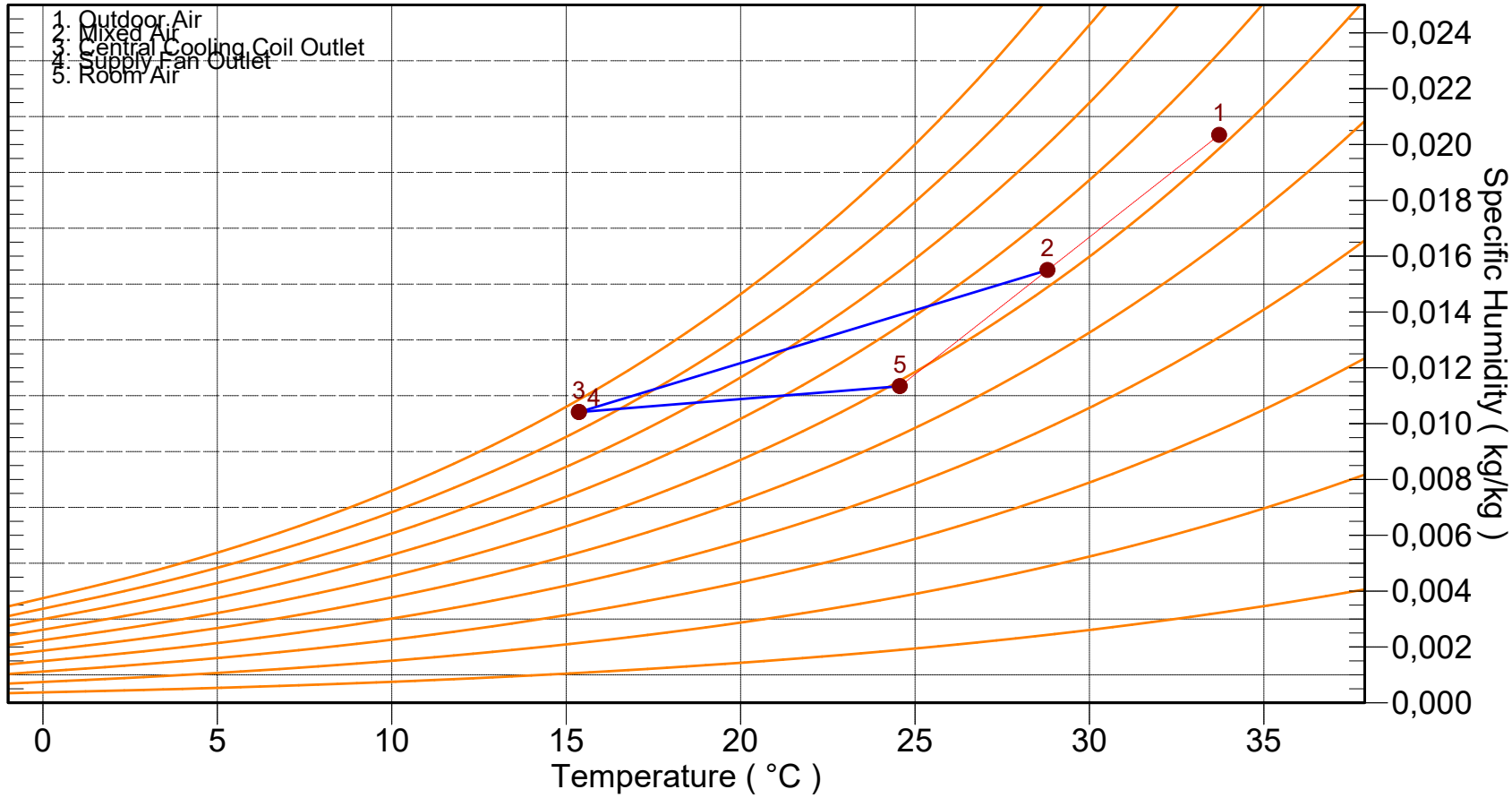
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

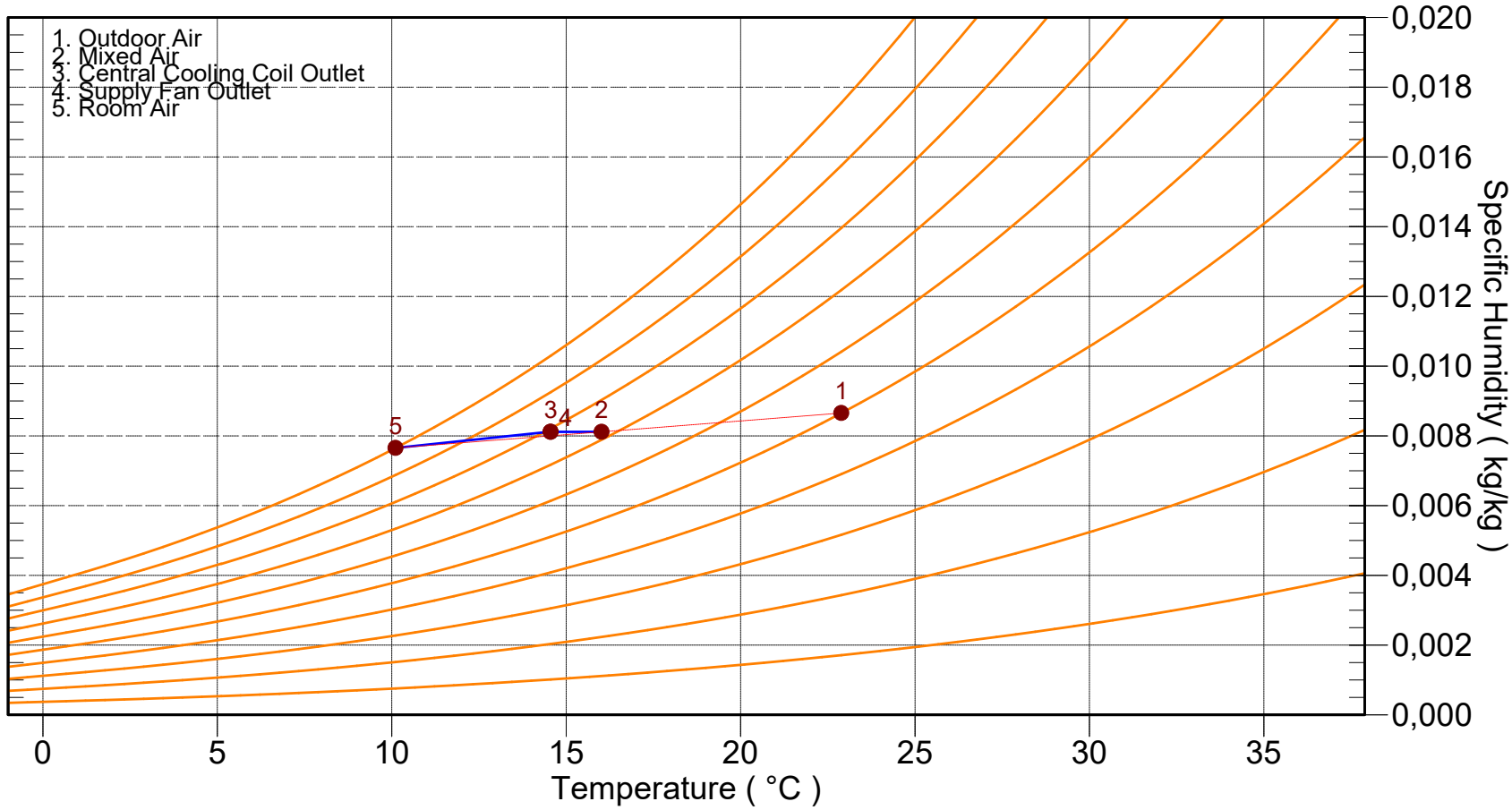
Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



System Psychrometrics for AA Salón G-32

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-33

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

Air System Information

Air System Name	**AA Salón G-33**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-33

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

Air System Information

Air System Name ..... **AA Salón G-33**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-33	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón G-33

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-33	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-33" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-33" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

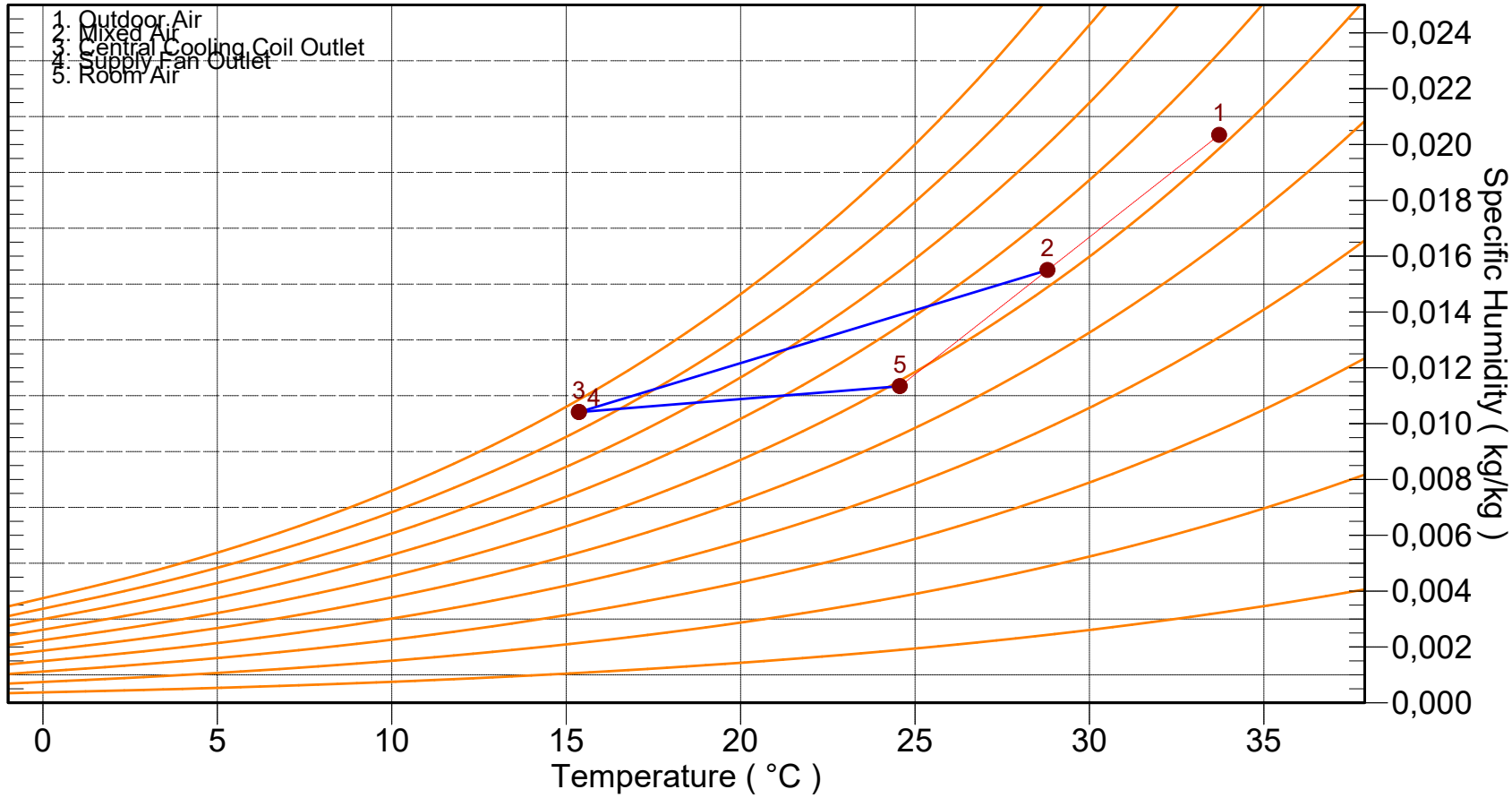
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

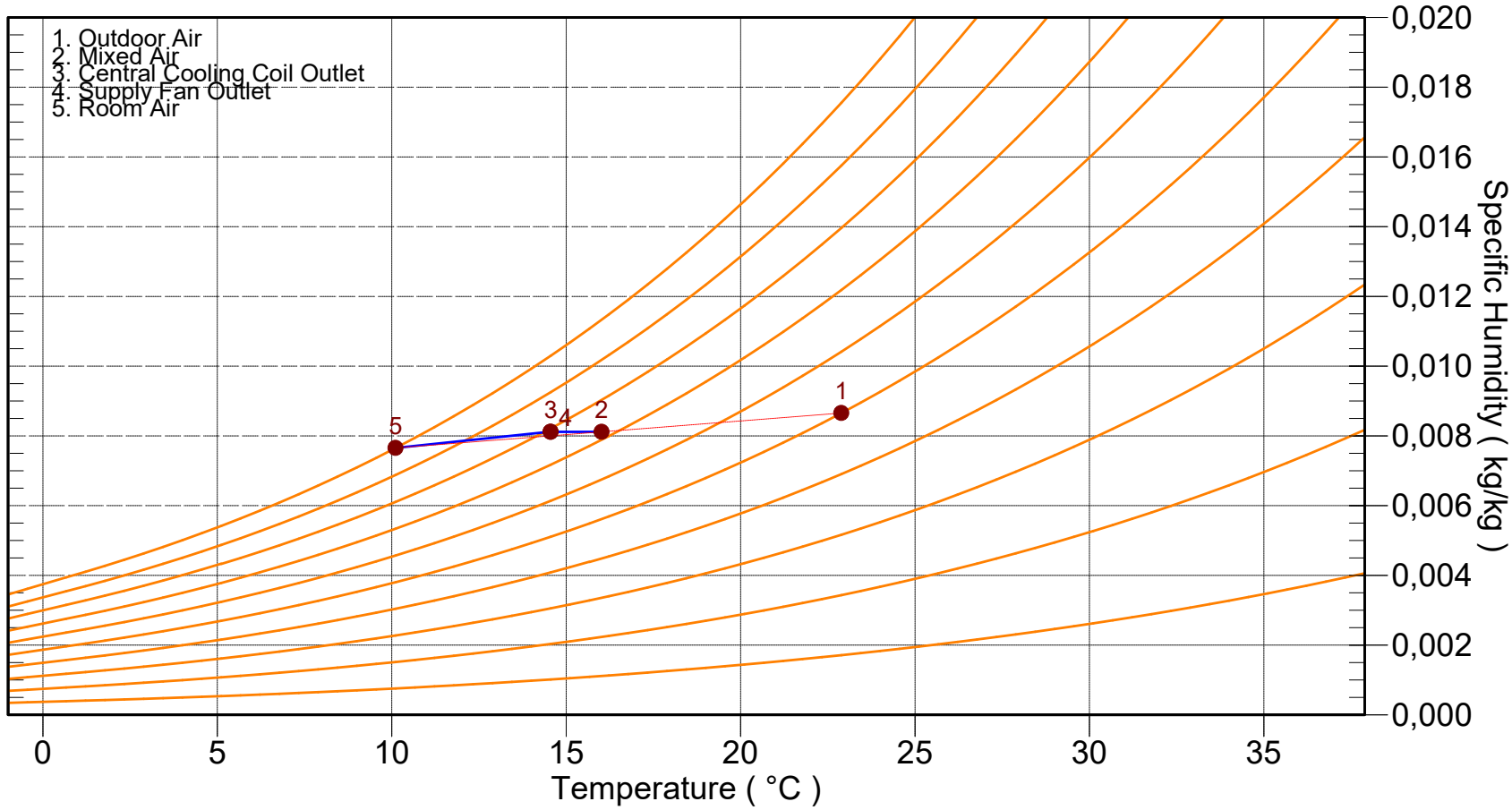
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-34

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-34**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-34

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-34**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-34	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón G-34

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-34	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

Air System Design Load Summary for AA Salón G-34

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-34" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-34" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

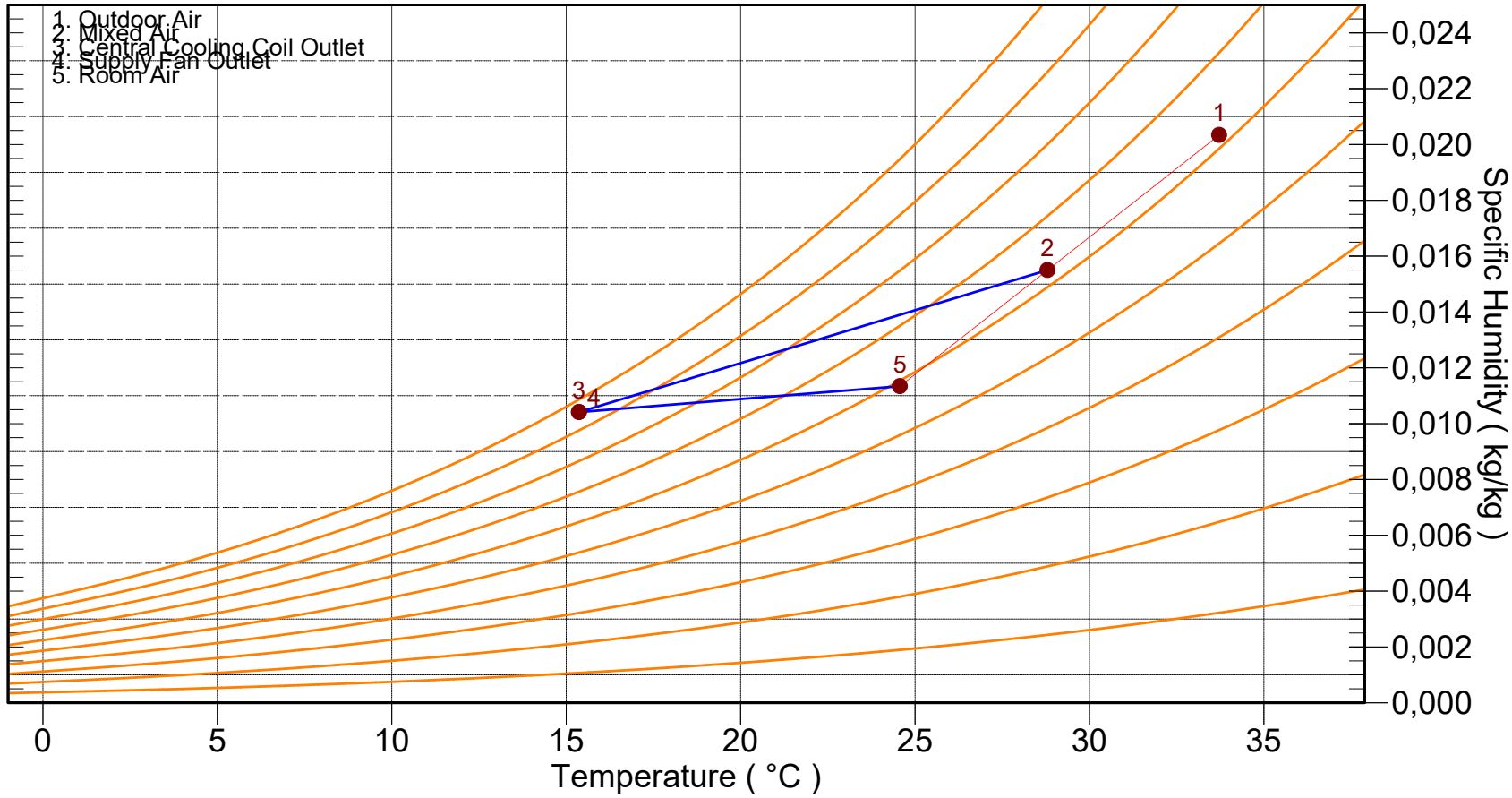
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

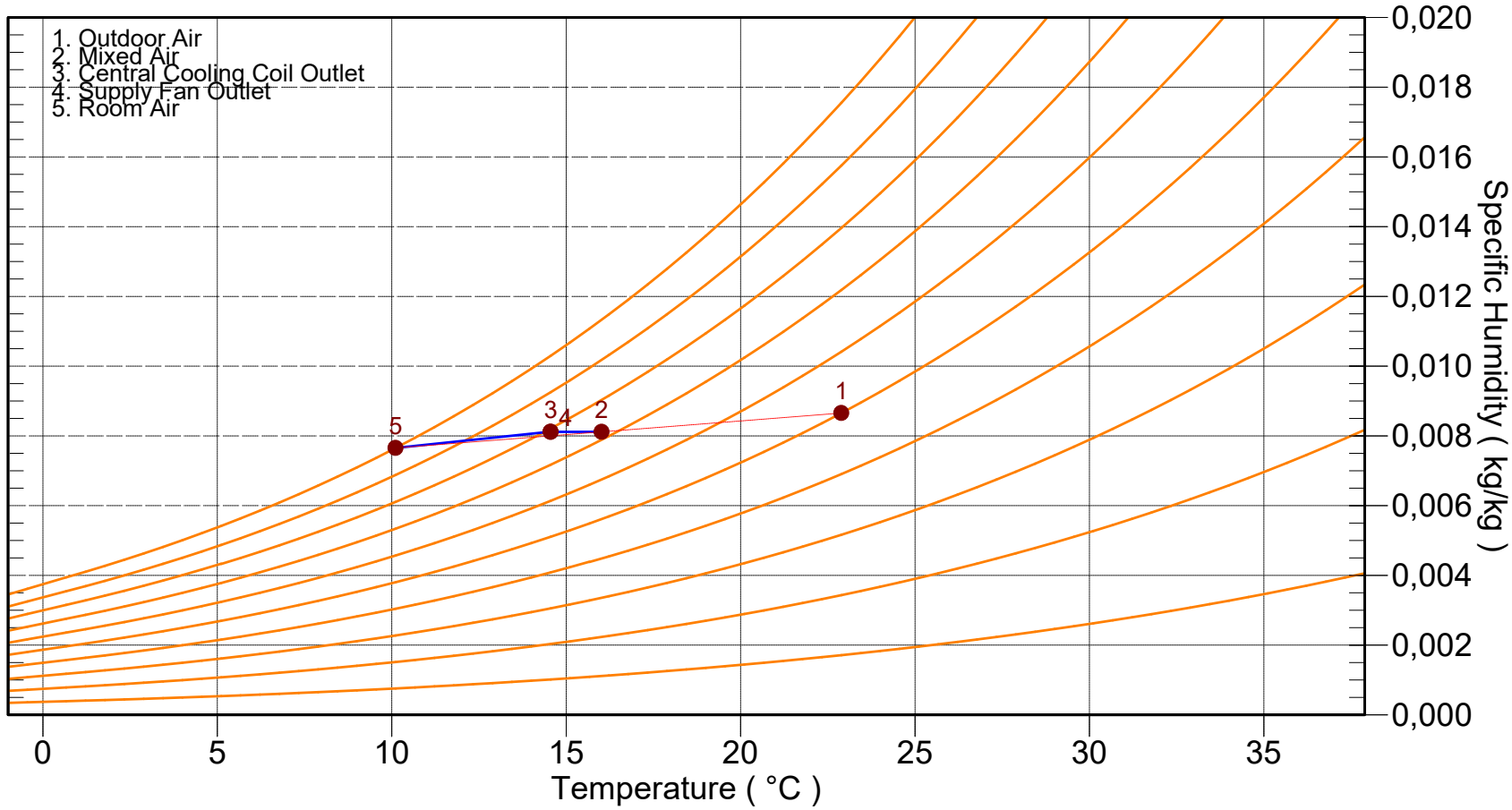
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-35

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name	**AA Salón G-35**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone L/s Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space L/s Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**16,5**	kW	Load occurs at	**Jun 1500**	
Sensible coil load	**8,6**	kW	OA DB / WB	**33,6 / 27,2**	°C
Coil L/s at Jun 1500	**530**	L/s	Entering DB / WB	**28,7 / 23,1**	°C
Max block L/s	**530**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**530**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,2**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**246,8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**530**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**528**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,94**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-35

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

Air System Information

Air System Name ..... **AA Salón G-35**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	530	530	7,94	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-35	1	6,0	Dec 1500	530	0,0	66,8	7,94

Ventilation Sizing Summary for AA Salón G-35

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:55p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-35	1	66,8	41,0	530,2	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**530,2**					**245,1**

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33,6 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	587	-	15 m²	-	-
Wall Transmission	26 m²	57	-	26 m²	0	-
Roof Transmission	67 m²	251	-	67 m²	0	-
Window Transmission	15 m²	423	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5929**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5866	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	530 L/s	0	-	530 L/s	0	-
Ventilation Load	245 L/s	2699	6480	245 L/s	-3767	-722
Supply Fan Load	530 L/s	0	-	530 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8565**	**7923**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8565	7923	-	-933	0
>> Total Conditioning	**-**	**8565**	**7923**	**-**	**-933**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-35" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	26 m²	23	-	26 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6023**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-35" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,6	0,02034	245	400	2699	6480
Vent - Return Mixing	Outlet	28,7	0,01550	530	798	-	-
Central Cooling Coil	Outlet	15,3	0,01041	530	798	8565	7923
Supply Fan	Outlet	15,3	0,01041	530	798	0	-
Cold Supply Duct	Outlet	15,3	0,01041	530	798	-	-
Zone Air	-	24,5	0,01134	530	1141	5866	1443
Return Plenum	Outlet	24,5	0,01134	530	1141	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5929	Cooling	5866	24,5	530	1141	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

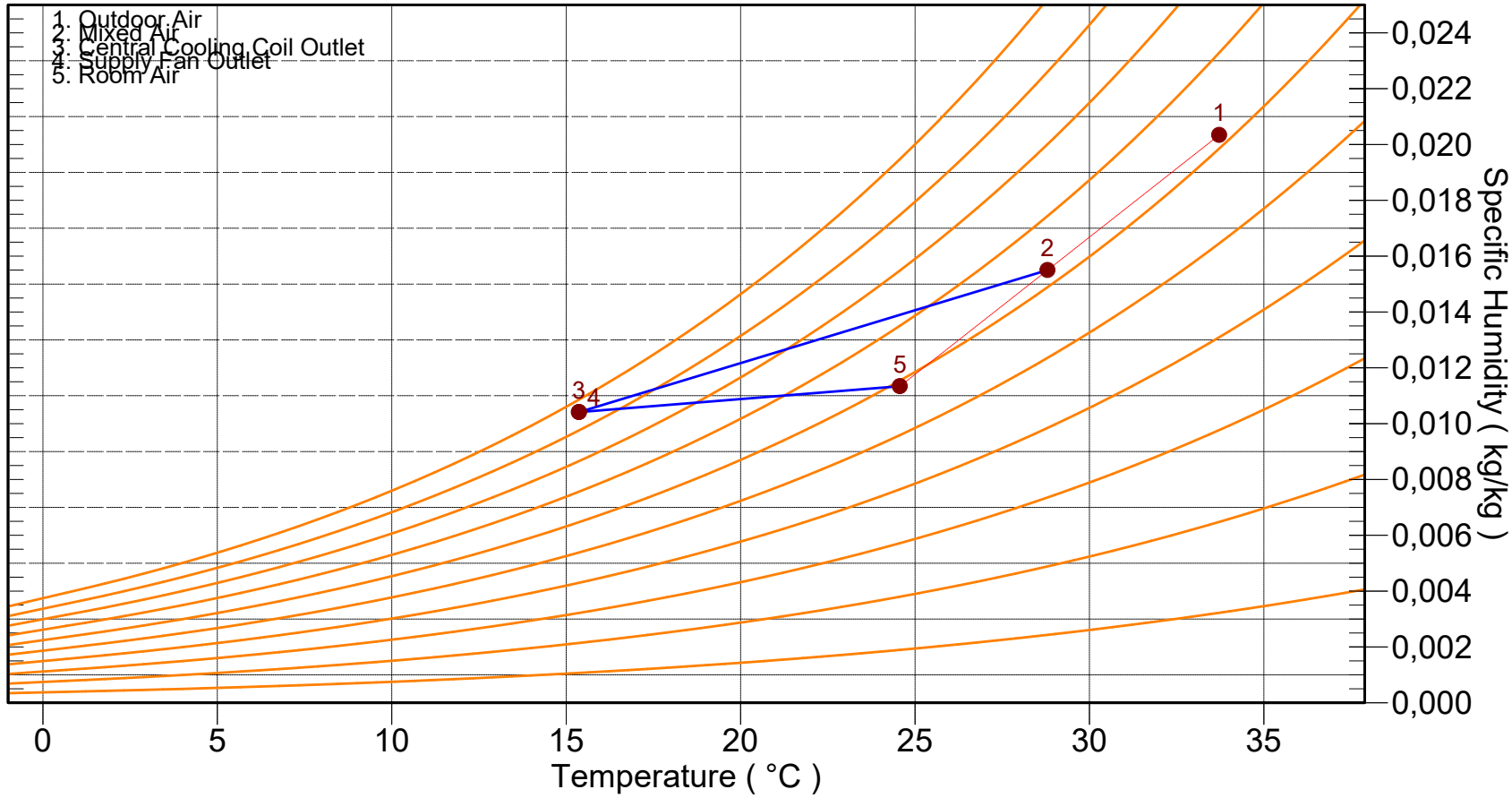
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00812	530	410	-	-
Central Cooling Coil	Outlet	14,4	0,00812	530	410	933	0
Supply Fan	Outlet	14,4	0,00812	530	410	0	-
Cold Supply Duct	Outlet	10,0	0,00812	530	410	-	-
Zone Air	-	10,0	0,00765	530	418	0	0
Return Plenum	Outlet	10,0	0,00765	530	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

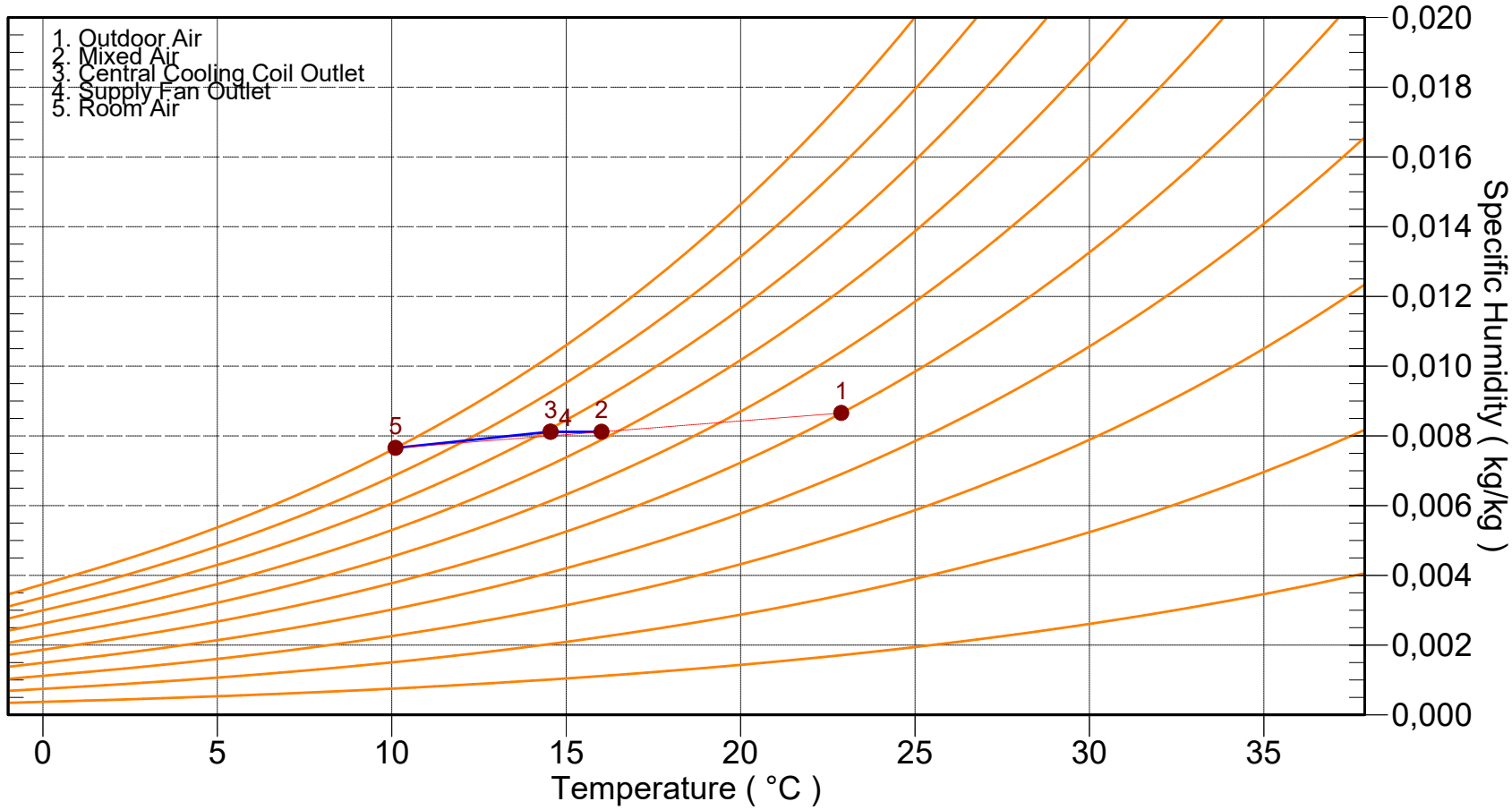
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	530	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1500



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AA Salón G-36

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:56p. m.

Air System Information

Air System Name	**AA Salón G-36**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**66,8**	m²
Air System Type	**SZCAV**		Location	**Barranquilla, Colombia**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone L/s Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space L/s Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**16,4**	kW	Load occurs at	**Jun 1600**	
Sensible coil load	**8,5**	kW	OA DB / WB	**33,4 / 27,2**	°C
Coil L/s at Jun 1600	**532**	L/s	Entering DB / WB	**28,6 / 23,0**	°C
Max block L/s	**532**	L/s	Leaving DB / WB	**15,3 / 14,9**	°C
Sum of peak zone L/s	**532**	L/s	Coil ADP	**13,8**	°C
Sensible heat ratio	**0,519**		Bypass Factor	**0,100**	
L/(s kW)	**32,4**		Resulting RH	**59**	%
m²/kW	**4,1**		Design supply temp.	**14,4**	°C
W/m²	**245,9**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 5,6 K rise	**N/A**		Max zone temperature deviation	**0,0**	K

Supply Fan Sizing Data

Actual max L/s	**532**	L/s	Fan motor BHP	**0,00**	BHP
Standard L/s	**530**	L/s	Fan motor kW	**0,00**	kW
Actual max L/(s·m²)	**7,96**	L/(s·m²)	Fan static	**0**	Pa

Outdoor Ventilation Air Data

Design airflow L/s	**245**	L/s	L/s/person	**5,98**	L/s/person
L/(s·m²)	**3,67**	L/(s·m²)			

Zone Sizing Summary for AA Salón G-36

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:56p. m.

Air System Information

Air System Name ..... **AA Salón G-36**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **66,8** m²
Location ..... **Barranquilla, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone L/s Sizing ..... **Sum of space airflow rates**
Space L/s Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (L/s)	Minimum Supply Airflow (L/s)	Zone L/(s·m²)	Reheat Coil Load (kW)	Reheat Coil Water L/s @ 11,1 K	Zone Htg Unit Coil Load (kW)	Zone Htg Unit Water L/s @ 11,1 K	Mixing Box Fan Airflow (L/s)
Zone 1	532	532	7,96	0,0	-	0,0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
Zone 1	6,0	Dec 1500	0,0	66,8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Salón G-36	1	6,0	Dec 1500	532	0,0	66,8	7,96

Ventilation Sizing Summary for AA Salón G-36

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:56p. m.

1. Summary

Ventilation Sizing Method ..... **Sum of Space OA Airflows**
Design Ventilation Airflow Rate ..... **245** L/s

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (m^2)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m^2))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Salón G-36	1	66,8	41,0	532,0	5,00	0,60	0,0	0,0	245,1
Totals (incl. Space Multipliers)				**532,0**					**245,1**

Air System Design Load Summary for AA Salón G-36

Project Name: USM - Metric
Prepared by: Pineda Arquitectes

09/18/2025
11:56p. m.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33,4 °C / 27,2 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C		
ZONE LOADS	**Details**	**Sensible (W)**	**Latent (W)**	**Details**	**Sensible (W)**	**Latent (W)**
Window & Skylight Solar Loads	15 m²	581	-	15 m²	-	-
Wall Transmission	55 m²	131	-	55 m²	0	-
Roof Transmission	67 m²	206	-	67 m²	0	-
Window Transmission	15 m²	420	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	29	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1881	-	0	0	-
People	41	2288	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**5995**	**1443**	**-**	**0**	**0**
Zone Conditioning	-	5903	1443	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	532 L/s	0	-	532 L/s	0	-
Ventilation Load	245 L/s	2617	6462	245 L/s	-3767	-722
Supply Fan Load	532 L/s	0	-	532 L/s	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**8520**	**7905**	**-**	**-3767**	**-722**
Central Cooling Coil	-	8520	7906	-	-923	0
>> Total Conditioning	**-**	**8520**	**7906**	**-**	**-923**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "Salón G-36" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29,2 °C / 24,4 °C OCCUPIED T-STAT 23,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 22,8 °C / 16,1 °C OCCUPIED T-STAT 10,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(W)**	**(W)**	**Details**	**(W)**	**(W)**
Window & Skylight Solar Loads	15 m²	1023	-	15 m²	-	-
Wall Transmission	55 m²	44	-	55 m²	0	-
Roof Transmission	67 m²	181	-	67 m²	0	-
Window Transmission	15 m²	200	-	15 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	14	-	2 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	534 W	456	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2004 W	1872	-	0	0	-
People	41	2254	1443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**6043**	**1443**	**-**	**0**	**0**

TABLE 1.1.B. Envelope Loads For Space "Salón G-36" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	0,331	-	6	-	0
WINDOW 2	7	3,339	0,350	92	111	0
DOOR	2	1,703	-	14	-	0
S EXPOSURE						
WALL	14	0,331	-	17	-	0
WINDOW 1	8	3,339	0,350	108	912	0
W EXPOSURE						
WALL	29	0,331	-	20	-	0
H EXPOSURE						
ROOF	67	0,131	-	181	-	0

June DESIGN COOLING DAY, 1600

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	33,4	0,02034	245	400	2617	6462
Vent - Return Mixing	Outlet	28,6	0,01550	532	799	-	-
Central Cooling Coil	Outlet	15,3	0,01044	532	799	8520	7906
Supply Fan	Outlet	15,3	0,01044	532	799	0	-
Cold Supply Duct	Outlet	15,3	0,01044	532	799	-	-
Zone Air	-	24,5	0,01136	532	1140	5903	1443
Return Plenum	Outlet	24,5	0,01136	532	1140	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	5995	Cooling	5903	24,5	532	1140	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

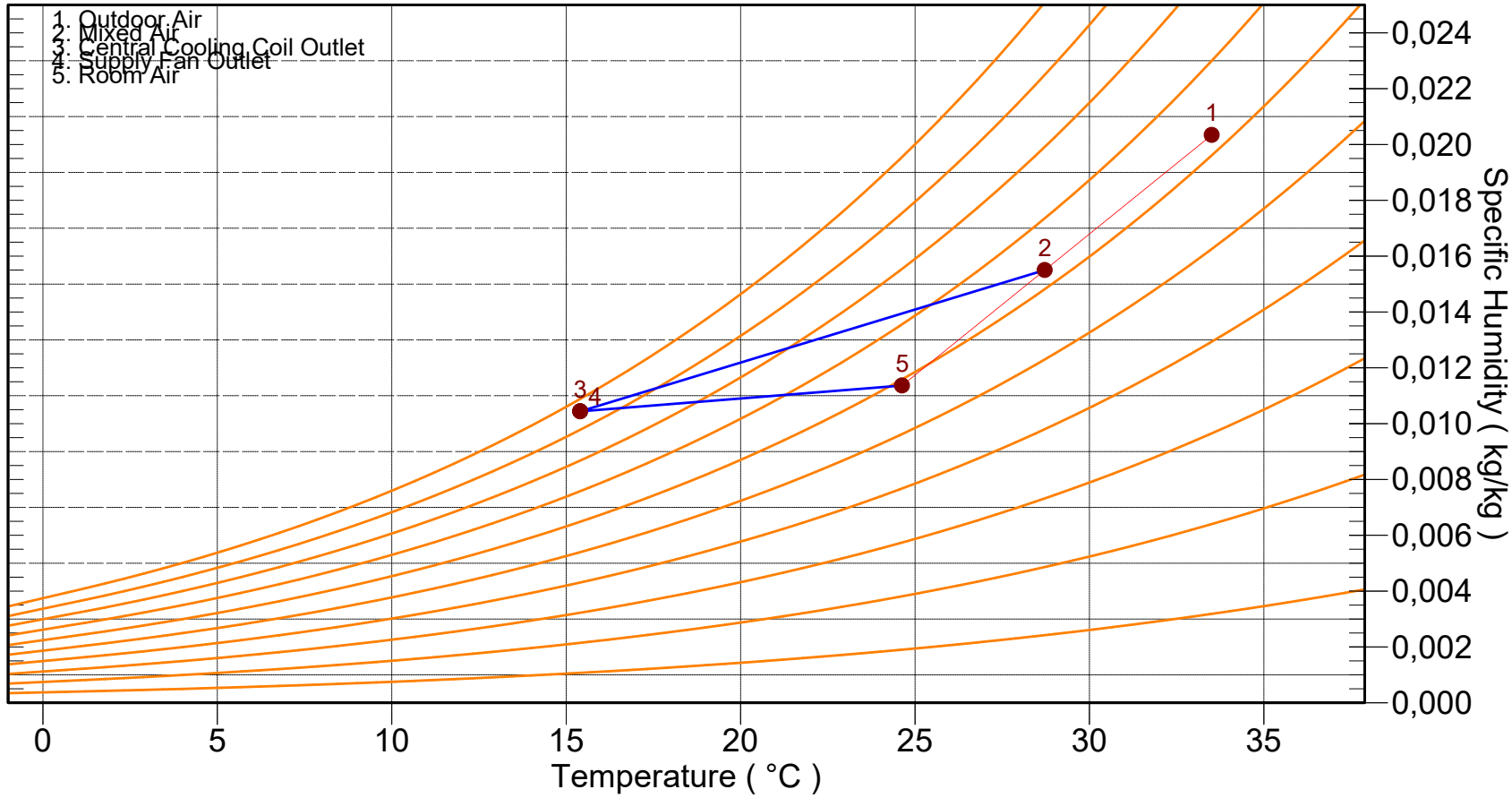
Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	22,8	0,00866	245	400	3767	722
Vent - Return Mixing	Outlet	15,9	0,00811	532	410	-	-
Central Cooling Coil	Outlet	14,4	0,00811	532	410	923	0
Supply Fan	Outlet	14,4	0,00811	532	410	0	-
Cold Supply Duct	Outlet	10,0	0,00811	532	410	-	-
Zone Air	-	10,0	0,00765	532	418	0	0
Return Plenum	Outlet	10,0	0,00765	532	418	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1,207; At site altitude = 1,203 W/(L/s-K)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947,6; At site altitude = 2937,1 W/(L/s)
Site Altitude = 29,9 m

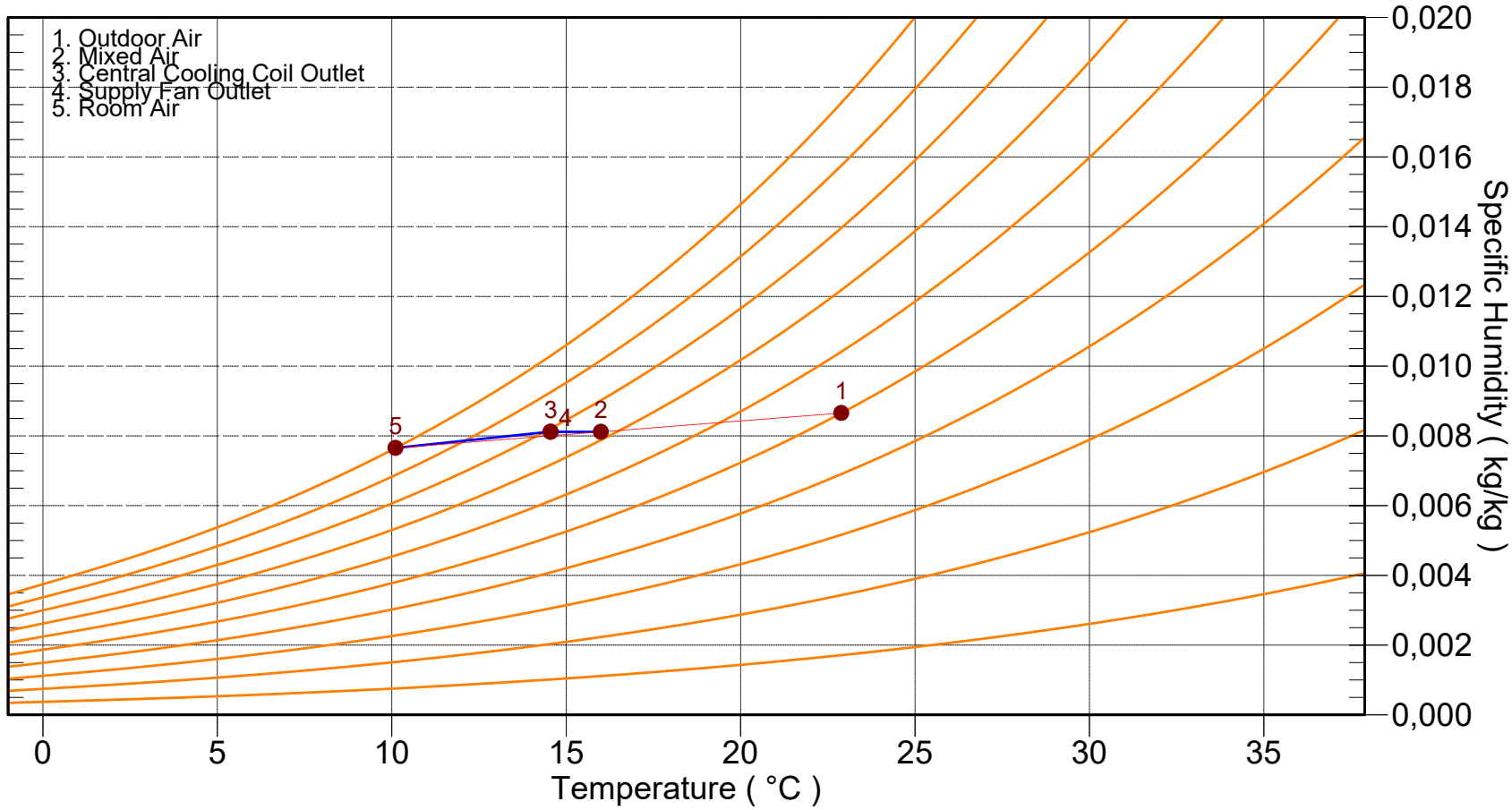
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	0	Deadband	0	10,0	532	418	0	0

Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: June DESIGN COOLING DAY, 1600



Location: Barranquilla, Colombia
Altitude: 29,9 m.
Data for: WINTER DESIGN HEATING



13. SELECCIÓN DE EQUIPOS

Urbanización Sierradentro
Teléfono 3007112802
Santa Marta
E-Mail:
Osalas96@gmail.com

AUTOR: ING. OSVALDO SALAS MARTINEZ

Modelo :	**AVNQ60GM2A5_AUUQ60GH5**
Tipo :	**SPLIT UNITARIO TECHO**
Modo de Operación :	**SÓLO FRIO**
Tipo de Compresor :	**INVERTER**
N° de Parte del Evaporador :	**AVNQ60GM2A5**
N° de Parte :	**AUUQ60GH5**
Unidad de Despacho :	**POR UNIDAD**
Garantía de Fábrica :	**12 MESES, ON-SITE**
Empaque de Fabricación :	**EN CAJA**
Modelo del Condensador :	**AUUQ60GH5**
Modelo del Evaporador :	**AVNQ60GM2A5**
SEER :	**SEER: (C) (4,60<=SEER<5,10); 4,98**
Capacidad de Enfriamiento Máx :	**61,000 Btu/h**

Unidad Interior



Unidad Exterior



RENDIMIENTO:

Capacidad Comercial (BTU/h)	60,000
Capacidad de Enfriamiento (Min ~ Max) (BTU/h)	13,800 ~ 61,000
Potencia de Entrada de Enfriamiento (kW)	5.85
Corriente de Funcionamiento (A)	25.7

Las prestaciones se basan en las siguientes condiciones:

Refrigeración : Temp. Ambiente Interior. 26,7°CDB / 19,4°CWB, temperatura ambiente exterior. 35°CDB / 24°CWB

Calefacción : Temp. Ambiente Interior. 21,1 ° CDB / 15,6 ° CWB, temperatura ambiente exterior. 8,3°CDB / 6,1°CWB

TECNOLOGÍA PRINCIPAL:

Tecnología de Compresor	INVERTER
EER (W/W)	2.91
SEER (W /W) / (BTU / hW) :	4.98 / 16.99

ELECTRICIDAD:

Tensión de Funcionamiento (Voltios)	220
Frecuencia (Hz)	60
Número de Fases (Ø) x No. Cables	Monofásico x 4C
MCA (A)	34.5
MFA (A)	40
Cable de Conexión Eléctrica (incluido Tierra) mm^2 x N° - unidad interior	0.75 × 4C
Cable de alimentación (H07RN-F) mm^2 x N°.- unidad exterior	6 × 3C

COMPRESOR:

Tipo	Hermetic Motor Compressor
Tipo de motor	BLDC
Salida del Motor (W x N°.)	4,000 x 1
Tipo de aceite	FW68D
Cantidad de carga de aceite (cc x N°.)	1,300 x 1

REFRIGERANTE:

Tipo de refrigerante	R410A
Cantidad de precarga (Kg)	3.4
Carga de refrigerante adicional (g /m)	40
Longitud de tubería sin carga (m)	7.5
Control	EEV

TUBERIA:

Liquido mm(pulg.)	Ø 9.52 (3/8)
Gas mm(pulg.)	Ø 19.05 (3/4)
Drenaje (con bomba de drenaje) (O.D. / I.D.) mm	-
Drenaje (drenaje natural) (O.D. / I.D.) mm	Ø 21.5 / 16

ENTRE INTERIOR Y EXTERIOR:

Longitud de tubería IDU - ODU (Nominal) (m)	7.5
Longitud de tubería IDU - ODU (Máx / Mín) (m)	50 / 7.5
Diferencia de altura máxima IDU - ODU (m)	30

CARACTERISTICAS ADICIONALES:

* Incluye control remoto inalámbrico.
* Incluye manual de usuario y manual de instalación.
* Compare el retorno de su inversión con el aplicativo PayBack LG.

RANGO DE TEMPERATURA

Enfriamiento °C DB	Desde -10°C hasta 50°C

UNIDAD INTERIOR

Dimensiones netas (ancho x alto × profundidad) (mm)	1,600 x 235 x 690
Dimensiones de despacho (ancho x alto × profundidad) (mm)	1,715 x 320 x 772
Peso Neto / Bruto (kg)	36.9 / 43.7
Nivel de Presión de Sonido dB(A)	- / 48.0 / 44.0 / 40.0
Color de carcasa	Morning Fog
Dispositivo de protección	Fusible

VENTILADOR (unidad interior)

Tipo	Cross Flow Fan
Rango de flujo de aire (Máx / H / M / L) (m^3/min)	- / 30.0 / 25.0 / 20.0
Tipo de Motor	BLDC
Salida de Motor (W x N°.)	125 x 1

INTERCAMBIADOR DE CALOR (unidad interior)

(Fila x Columna x Aletas x Pulgada) x N°.	(3 x 18 x 18) x 1
Área frontal (m^2)	0.46

UNIDAD EXTERIOR

Dimensiones netas (ancho x alto × profundidad) (mm)	950 x 1,380 x 330
Dimensiones de despacho (ancho x alto × profundidad) (mm)	1,140 x 1,463 x 461
Peso Neto / Bruto (kg)	89 / 98
Nivel de Presión de Sonido dB(A)	59
Color de carcasa	Warm Gray
Material de carcasa	Fierro galvanizado pintado en horno de alta resistencia

VENTILADOR (unidad exterior)

Tipo	Axial
Rango de flujo de aire (m^3/min x N°.)	60 x 2
Tipo de Motor	BLDC
Salida de Motor (W x N°.)	124 x 2

INTERCAMBIADOR DE CALOR (unidad exterior)

(Fila x Columna x Aletas x Pulgada) x N°.	(2 x 32 x 14) x 2

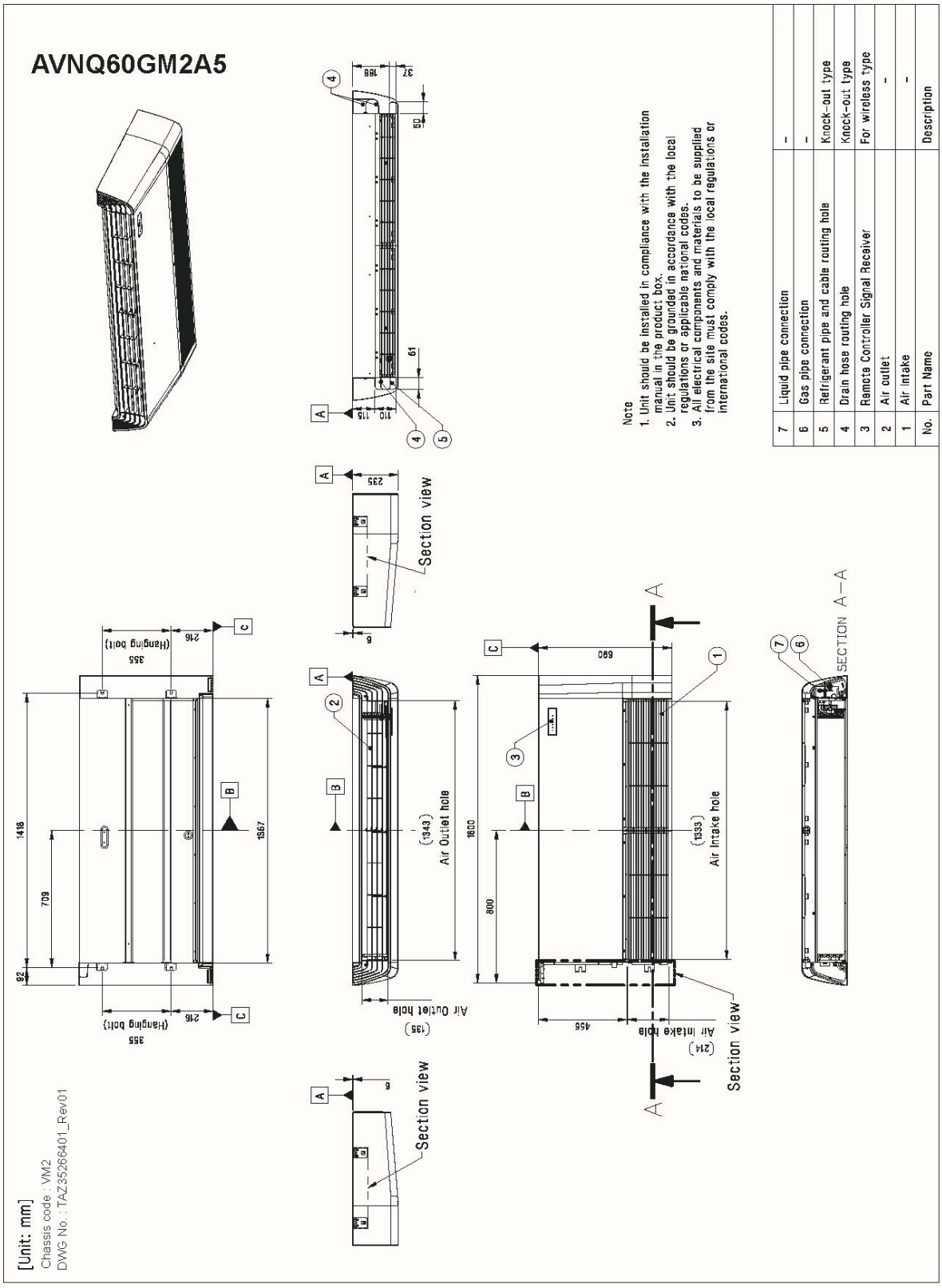
Nota:

MFA : Corriente para seleccionar el tamaño máximo permitido del interruptor termomagnético que desconectará correctamente la alimentación de la unidad condensadora bajo cualquier condición de corto ciruito y de falla a tierra.

MCA : Corriente para seleccionar el tamaño mínimo del conductor necesario para garantizar que el cableado no entre en condición de sobrecalentamiento en todas las condiciones de funcionamiento durante la vida útil de la unidad condensadora.

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AUUQ60GH5 Unidad exterior
AVNQ60GM2A5 Unidad interior
SPLIT UNITARIO TECHO
60,000 BTU/h Capacidad Comercial



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