

**DISEÑO Y CONTRUCCION DEL SERVICIO DE IMAGENOLOGIA DEL HOSPITAL
SIMON BOLIVAR. BOGOTA.**



SUBRED INTEGRADA DE SERVICIOS DE SALUD Norte E.S.E.



FASE:
FASE 2 – PRELIMINAR

PROYECTO:
HSB – IMAGENOLOGÍA

DISCIPLINA:
MECÁNICO

TIPO DE DOCUMENTO:
MEMORIAS DE CÁLCULO

TÍTULO:
CÁLCULO DE CARGAS TÉRMICAS

CONTRATO

Fase	Edificio	Disciplina	Tipo	Número	Rev.
2	HSB	M	CAL	0001	A

CUADRO DE CONTROL		
Elaboró:		Ing. DIEGO ANDRÉS CADENA ALFONSO
Revisó:		SUBRED NORTE
Aprobó:		
Fecha Elaboración:		27/08/2019
Versión del documento		A
CONTROL DE CAMBIOS		
VERSIÓN	FECHA	MODIFICACIÓN
A	27/08/2019	Versión Inicial

Project Summary

Location and Weather	
Project	Project Name
Address	
Calculation Time	Monday, August 26, 2019 5:48 PM
Report Type	Detailed
Latitude	4.61°
Longitude	-74.07°
Summer Dry Bulb	69 °F
Summer Wet Bulb	59 °F
Winter Dry Bulb	36 °F
Mean Daily Range	19 °F

Building Summary

Inputs	
Building Type	Hospital or Healthcare
Area (m ²)	120.34
Volume (m ³)	361.03
Calculated Results	
Peak Cooling Total Load (Btu/h)	172,775.3
Peak Cooling Month and Hour	November 4:00 PM
Peak Cooling Sensible Load (Btu/h)	170,751.8
Peak Cooling Latent Load (Btu/h)	2,023.5
Maximum Cooling Capacity (Btu/h)	172,852.6
Peak Cooling Airflow (CFM)	7,061
Peak Heating Load (Btu/h)	-167,804.5
Peak Heating Airflow (CFM)	414
Checksums	
Cooling Load Density (Btu/(h·ft ²))	133.38
Cooling Flow Density (CFM/SF)	5.45
Cooling Flow / Load (CFM/ton)	490.40
Cooling Area / Load (SF/ton)	89.97
Heating Load Density (Btu/(h·ft ²))	-129.54
Heating Flow Density (CFM/SF)	0.32

Level Summary - Level 1

Inputs	
Area (m ²)	120.34
Volume (m ³)	361.03
Calculated Results	
Peak Cooling Total Load (Btu/h)	169,207.8
Peak Cooling Month and Hour	November 4:00 PM
Peak Cooling Sensible Load (Btu/h)	167,184.3
Peak Cooling Latent Load (Btu/h)	2,023.5
Peak Cooling Airflow (CFM)	7,060
Peak Heating Load (Btu/h)	-167,804.5
Peak Heating Airflow (CFM)	414
Checksums	
Cooling Load Density (Btu/(h·ft ²))	130.62
Cooling Flow Density (CFM/SF)	5.45
Cooling Flow / Load (CFM/ton)	500.67
Cooling Area / Load (SF/ton)	91.87
Heating Load Density (Btu/(h·ft ²))	-129.54
Heating Flow Density (CFM/SF)	0.32

Zone Summary - CUARTO DE MAQUINAS ZONA

Inputs	
Area (m²)	11.68
Volume (m³)	35.03
Cooling Setpoint	72 °F
Heating Setpoint	70 °F
Supply Air Temperature	54 °F
Number of People	1
Infiltration (CFM)	7
Air Volume Calculation Type	Variable Refrigerant Flow
Relative Humidity	44.00% (Calculated)
Psychrometrics	
Psychrometric Message	None
Cooling Coil Entering Dry-Bulb Temperature	82 °F
Cooling Coil Entering Wet-Bulb Temperature	65 °F
Cooling Coil Leaving Dry-Bulb Temperature	54 °F
Cooling Coil Leaving Wet-Bulb Temperature	57 °F
Mixed Air Dry-Bulb Temperature	82 °F
Calculated Results	
Peak Cooling Total Load (Btu/h)	20,298.5
Peak Cooling Month and Hour	April 4:00 PM
Peak Cooling Sensible Load (Btu/h)	20,369.8
Peak Cooling Latent Load (Btu/h)	-71.3
Peak Cooling Airflow (CFM)	852
Peak Heating Load (Btu/h)	-18,437.6
Peak Heating Airflow (CFM)	414
Peak Ventilation Airflow (CFM)	0
Checksums	
Cooling Load Density (Btu/(h·ft²))	161.48
Cooling Flow Density (CFM/SF)	6.78
Cooling Flow / Load (CFM/ton)	503.79
Cooling Area / Load (SF/ton)	74.31
Heating Load Density (Btu/(h·ft²))	-146.68
Heating Flow Density (CFM/SF)	3.29
Ventilation Density (CFM/SF)	0.00
Ventilation / Person (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	-423.8	-2.09%	-177.7	-243.7	-2.4	0.0	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	1,251.4	6.16%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	-1,333.9	-6.57%	-	-	-	-	-	-	-	-
Infiltration	-159.4	-0.79%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	641.4	3.16%	-	-	-	-	-	-	-	-
Power	19,850.7	97.79%	-	-	-	-	-	-	-	-
People	41.2	0.20%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Fan Heat	430.8	2.12%	-	-	-	-	-	-	-	-
Reheat	0.0	0.00%	-	-	-	-	-	-	-	-
Total	20,298.5	100%	-177.7	-243.7	-2.4	0.0	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	851.8	3.76%	419.8	419.8	12.2	0.0	0.0	0.0	0.0	0.0

Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	1,054.8	4.66%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	189.1	0.84%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-641.4	-2.83%	-	-	-	-	-	-	-	-
Power	-	-	-	-	-	-	-	-	-	-
People	-41.2	-0.18%	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-
	18,437.6	100%	419.8	419.8	12.2	0.0	0.0	0.0	0.0	0.0

CUARTO DE MAQUINAS ZONA Spaces

Space Name	Area (m²)	Volume (m³)	Peak Cooling Load (Btu/h)	Cooling Airflow (CFM)	Peak Heating Load (Btu/h)	Heating Airflow (CFM)
10 CUARTO MAQUINAS	11.68	35.03	19,867.6	852	-18,437.6	414

Zone Summary - RAYOS X 01 ZONA

Inputs	
Area (m ²)	20.42
Volume (m ³)	61.25
Cooling Setpoint	66 °F
Heating Setpoint	70 °F
Supply Air Temperature	54 °F
Number of People	5
Infiltration (CFM)	24
Air Volume Calculation Type	Variable Refrigerant Flow
Relative Humidity	42.00% (Calculated)
Psychrometrics	
Psychrometric Message	None
Cooling Coil Entering Dry-Bulb Temperature	82 °F
Cooling Coil Entering Wet-Bulb Temperature	65 °F
Cooling Coil Leaving Dry-Bulb Temperature	53 °F
Cooling Coil Leaving Wet-Bulb Temperature	56 °F
Mixed Air Dry-Bulb Temperature	82 °F
Calculated Results	
Peak Cooling Total Load (Btu/h)	36,532.2
Peak Cooling Month and Hour	November 4:00 PM
Peak Cooling Sensible Load (Btu/h)	36,207.1
Peak Cooling Latent Load (Btu/h)	325.1
Peak Cooling Airflow (CFM)	1,494
Peak Heating Load (Btu/h)	-35,584.7
Peak Heating Airflow (CFM)	0
Peak Ventilation Airflow (CFM)	0
Checksums	
Cooling Load Density (Btu/(h·ft ²))	166.24
Cooling Flow Density (CFM/SF)	6.80
Cooling Flow / Load (CFM/ton)	490.69
Cooling Area / Load (SF/ton)	72.18
Heating Load Density (Btu/(h·ft ²))	-161.93
Heating Flow Density (CFM/SF)	0.00
Ventilation Density (CFM/SF)	0.00
Ventilation / Person (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	772.5	2.11%	-82.6	432.7	-15.5	437.9	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	2.1	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	-582.3	-1.59%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	1,500.0	4.11%	-	-	-	-	-	-	-	-
Power	32,632.8	89.33%	-	-	-	-	-	-	-	-
People	1,451.9	3.97%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Fan Heat	755.2	2.07%	-	-	-	-	-	-	-	-
Reheat	0.0	0.00%	-	-	-	-	-	-	-	-
Total	36,532.2	100%	-82.6	432.7	-15.5	437.9	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-1,500.0	-4.22%	-	-	-	-	-	-	-	-
Power	-	-	-	-	-	-	-	-	-	-
	32,632.8	-91.70%	-	-	-	-	-	-	-	-
People	-1,451.9	-4.08%	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-
	35,584.7	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

RAYOS X 01 ZONA Spaces

Space Name	Area (m²)	Volume (m³)	Peak Cooling Load (Btu/h)	Cooling Airflow (CFM)	Peak Heating Load (Btu/h)	Heating Airflow (CFM)
7 RAYOS X 01	20.42	61.25	35,777.0	1,494	-35,584.7	0

Zone Summary - RAYOS X 2 ZONA

Inputs	
Area (m²)	26.24
Volume (m³)	78.71
Cooling Setpoint	66 °F
Heating Setpoint	70 °F
Supply Air Temperature	54 °F
Number of People	6
Infiltration (CFM)	25
Air Volume Calculation Type	Variable Refrigerant Flow
Relative Humidity	42.00% (Calculated)
Psychrometrics	
Psychrometric Message	None
Cooling Coil Entering Dry-Bulb Temperature	82 °F
Cooling Coil Entering Wet-Bulb Temperature	65 °F
Cooling Coil Leaving Dry-Bulb Temperature	53 °F
Cooling Coil Leaving Wet-Bulb Temperature	56 °F
Mixed Air Dry-Bulb Temperature	82 °F
Calculated Results	
Peak Cooling Total Load (Btu/h)	46,897.4
Peak Cooling Month and Hour	November 4:00 PM
Peak Cooling Sensible Load (Btu/h)	46,401.1
Peak Cooling Latent Load (Btu/h)	496.4
Peak Cooling Airflow (CFM)	1,914
Peak Heating Load (Btu/h)	-45,800.6
Peak Heating Airflow (CFM)	0
Peak Ventilation Airflow (CFM)	0
Checksums	
Cooling Load Density (Btu/(h·ft²))	166.06
Cooling Flow Density (CFM/SF)	6.78
Cooling Flow / Load (CFM/ton)	489.86
Cooling Area / Load (SF/ton)	72.27
Heating Load Density (Btu/(h·ft²))	-162.17
Heating Flow Density (CFM/SF)	0.00
Ventilation Density (CFM/SF)	0.00
Ventilation / Person (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	1,169.1	2.49%	-61.4	320.9	-13.2	922.9	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	2.6	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	-433.8	-0.92%	-	-	-	-	-	-	-	-
Infiltration	-609.0	-1.30%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	1,927.8	4.11%	-	-	-	-	-	-	-	-
Power	42,006.8	89.57%	-	-	-	-	-	-	-	-
People	1,866.0	3.98%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Fan Heat	967.9	2.06%	-	-	-	-	-	-	-	-
Reheat	0.0	0.00%	-	-	-	-	-	-	-	-
Total	46,897.4	100%	-61.4	320.9	-13.2	922.9	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-1,927.8	-4.21%	-	-	-	-	-	-	-	-
Power	- 42,006.8	-91.72%	-	-	-	-	-	-	-	-
People	-1,866.0	-4.07%	-	-	-	-	-	-	-	-
Total	- 45,800.6	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

RAYOS X 2 ZONA Spaces

Space Name	Area (m ²)	Volume (m ³)	Peak Cooling Load (Btu/h)	Cooling Airflow (CFM)	Peak Heating Load (Btu/h)	Heating Airflow (CFM)
6 RAYOS X 02	26.24	78.71	45,929.6	1,914	-45,800.6	0

Zone Summary - RESONADOR ZONA

Inputs	
Area (m²)	38.30
Volume (m³)	114.90
Cooling Setpoint	66 °F
Heating Setpoint	70 °F
Supply Air Temperature	54 °F
Number of People	8
Infiltration (CFM)	26
Air Volume Calculation Type	Variable Refrigerant Flow
Relative Humidity	44.00% (Calculated)
Psychrometrics	
Psychrometric Message	None
Cooling Coil Entering Dry-Bulb Temperature	82 °F
Cooling Coil Entering Wet-Bulb Temperature	65 °F
Cooling Coil Leaving Dry-Bulb Temperature	53 °F
Cooling Coil Leaving Wet-Bulb Temperature	56 °F
Mixed Air Dry-Bulb Temperature	82 °F
Calculated Results	
Peak Cooling Total Load (Btu/h)	33,882.0
Peak Cooling Month and Hour	November 4:00 PM
Peak Cooling Sensible Load (Btu/h)	33,013.1
Peak Cooling Latent Load (Btu/h)	868.9
Peak Cooling Airflow (CFM)	1,362
Peak Heating Load (Btu/h)	-33,677.5
Peak Heating Airflow (CFM)	0
Peak Ventilation Airflow (CFM)	0
Checksums	
Cooling Load Density (Btu/(h·ft²))	82.19
Cooling Flow Density (CFM/SF)	3.30
Cooling Flow / Load (CFM/ton)	482.40
Cooling Area / Load (SF/ton)	146.00
Heating Load Density (Btu/(h·ft²))	-81.69
Heating Flow Density (CFM/SF)	0.00
Ventilation Density (CFM/SF)	0.00
Ventilation / Person (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	571.8	1.69%	-86.0	450.4	-27.3	234.8	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	3.9	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	-427.0	-1.26%	-	-	-	-	-	-	-	-
Infiltration	-632.8	-1.87%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	2,814.0	8.31%	-	-	-	-	-	-	-	-
Power	28,139.8	83.05%	-	-	-	-	-	-	-	-
People	2,723.7	8.04%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Fan Heat	688.6	2.03%	-	-	-	-	-	-	-	-
Reheat	0.0	0.00%	-	-	-	-	-	-	-	-
Total	33,882.0	100%	-86.0	450.4	-27.3	234.8	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-2,814.0	-8.36%	-	-	-	-	-	-	-	-
Power	- 28,139.8	-83.56%	-	-	-	-	-	-	-	-
People	-2,723.7	-8.09%	-	-	-	-	-	-	-	-
Total	- 33,677.5	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

RESONADOR ZONA Spaces

Space Name	Area (m²)	Volume (m³)	Peak Cooling Load (Btu/h)	Cooling Airflow (CFM)	Peak Heating Load (Btu/h)	Heating Airflow (CFM)
8 RESONADOR	38.30	114.90	33,193.4	1,362	-33,677.5	0

Zone Summary - TOMOGRAFO ZONA

Inputs	
Area (m²)	23.71
Volume (m³)	71.14
Cooling Setpoint	66 °F
Heating Setpoint	70 °F
Supply Air Temperature	54 °F
Number of People	5
Infiltration (CFM)	25
Air Volume Calculation Type	Variable Refrigerant Flow
Relative Humidity	42.00% (Calculated)
Psychrometrics	
Psychrometric Message	None
Cooling Coil Entering Dry-Bulb Temperature	82 °F
Cooling Coil Entering Wet-Bulb Temperature	65 °F
Cooling Coil Leaving Dry-Bulb Temperature	53 °F
Cooling Coil Leaving Wet-Bulb Temperature	56 °F
Mixed Air Dry-Bulb Temperature	82 °F
Calculated Results	
Peak Cooling Total Load (Btu/h)	35,242.5
Peak Cooling Month and Hour	November 4:00 PM
Peak Cooling Sensible Load (Btu/h)	34,835.0
Peak Cooling Latent Load (Btu/h)	407.5
Peak Cooling Airflow (CFM)	1,437
Peak Heating Load (Btu/h)	-34,304.2
Peak Heating Airflow (CFM)	0
Peak Ventilation Airflow (CFM)	0
Checksums	
Cooling Load Density (Btu/(h·ft²))	138.07
Cooling Flow Density (CFM/SF)	5.63
Cooling Flow / Load (CFM/ton)	489.38
Cooling Area / Load (SF/ton)	86.92
Heating Load Density (Btu/(h·ft²))	-134.39
Heating Flow Density (CFM/SF)	0.00
Ventilation Density (CFM/SF)	0.00
Ventilation / Person (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	832.7	2.36%	-86.6	453.6	-17.0	482.8	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	2.4	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	-623.4	-1.77%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	1,742.4	4.94%	-	-	-	-	-	-	-	-
Power	30,875.3	87.61%	-	-	-	-	-	-	-	-
People	1,686.5	4.79%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Fan Heat	726.6	2.06%	-	-	-	-	-	-	-	-
Reheat	0.0	0.00%	-	-	-	-	-	-	-	-
Total	35,242.5	100%	-86.6	453.6	-17.0	482.8	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Ventilation	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-1,742.4	-5.08%	-	-	-	-	-	-	-	-
Power	-30,875.3	-90.00%	-	-	-	-	-	-	-	-
People	-1,686.5	-4.92%	-	-	-	-	-	-	-	-
Total	-34,304.2	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOMOGRAFO ZONA Spaces

Space Name	Area (m ²)	Volume (m ³)	Peak Cooling Load (Btu/h)	Cooling Airflow (CFM)	Peak Heating Load (Btu/h)	Heating Airflow (CFM)
9 TOMOGRAFO	23.71	71.14	34,515.9	1,437	-34,304.2	0

Space Summary - 10 CUARTO MAQUINAS

Input Data	
Area (m²)	11.68
Volume (m³)	35.03
Wall Area (m²)	16.25
Roof Area (m²)	12.80
Door Area (m²)	0.00
Partition Area (m²)	29.63
Window Area (m²)	0.00
Skylight Area (m²)	0.00
Lighting Load (W)	251
Power Load (W)	7,781
Number of People	1
Sensible Heat Gain / Person (Btu/h)	250.0
Latent Heat Gain / Person (Btu/h)	200.0
Infiltration Airflow (CFM)	7
Space Type	Electrical/Mechanical
Calculated Results	
Peak Cooling Total Load (Btu/h)	19,867.6
Peak Cooling Sensible Load (Btu/h)	19,939.0
Peak Cooling Latent Load (Btu/h)	-71.3
Peak Cooling Airflow (CFM)	852
Peak Heating Load (Btu/h)	-18,437.6
Peak Heating Airflow (CFM)	414

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	-423.8	-2.13%	-177.7	-243.7	-2.4	0.0	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	1,251.4	6.30%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	-1,333.9	-6.71%	-	-	-	-	-	-	-	-
Infiltration	-159.4	-0.80%	-	-	-	-	-	-	-	-
Lighting	641.4	3.23%	-	-	-	-	-	-	-	-
Power	19,850.7	99.91%	-	-	-	-	-	-	-	-
People	41.2	0.21%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Total	19,867.6	100%	-177.7	-243.7	-2.4	0.0	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	851.8	3.76%	419.8	419.8	12.2	0.0	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	1,054.8	4.66%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	189.1	0.84%	-	-	-	-	-	-	-	-
Lighting	-641.4	-2.83%	-	-	-	-	-	-	-	-
Power	-19,850.7	-87.72%	-	-	-	-	-	-	-	-
People	-41.2	-0.18%	-	-	-	-	-	-	-	-
Total	-18,437.6	100%	419.8	419.8	12.2	0.0	0.0	0.0	0.0	0.0

Space Summary - 7 RAYOS X 01

Input Data	
Area (m²)	20.42
Volume (m³)	61.25
Wall Area (m²)	58.09
Roof Area (m²)	21.84
Door Area (m²)	0.00
Partition Area (m²)	0.00
Window Area (m²)	0.00
Skylight Area (m²)	0.00
Lighting Load (W)	439
Power Load (W)	9,561
Number of People	5
Sensible Heat Gain / Person (Btu/h)	250.0
Latent Heat Gain / Person (Btu/h)	200.0
Infiltration Airflow (CFM)	24
Space Type	Hospital/Radiology - Hospital/Healthcare
Calculated Results	
Peak Cooling Total Load (Btu/h)	35,777.0
Peak Cooling Sensible Load (Btu/h)	35,451.9
Peak Cooling Latent Load (Btu/h)	325.1
Peak Cooling Airflow (CFM)	1,494
Peak Heating Load (Btu/h)	-35,584.7
Peak Heating Airflow (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	772.5	2.16%	-82.6	432.7	-15.5	437.9	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	2.1	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	-582.3	-1.63%	-	-	-	-	-	-	-	-
Lighting	1,500.0	4.19%	-	-	-	-	-	-	-	-
Power	32,632.8	91.21%	-	-	-	-	-	-	-	-
People	1,451.9	4.06%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Total	35,777.0	100%	-82.6	432.7	-15.5	437.9	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-1,500.0	-4.22%	-	-	-	-	-	-	-	-
Power	-32,632.8	-91.70%	-	-	-	-	-	-	-	-
People	-1,451.9	-4.08%	-	-	-	-	-	-	-	-
Total	-35,584.7	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Space Summary - 6 RAYOS X 02

Input Data	
Area (m ²)	26.24
Volume (m ³)	78.71
Wall Area (m ²)	60.75
Roof Area (m ²)	27.55
Door Area (m ²)	0.00
Partition Area (m ²)	14.93
Window Area (m ²)	0.00
Skylight Area (m ²)	0.00
Lighting Load (W)	565
Power Load (W)	12,308
Number of People	6
Sensible Heat Gain / Person (Btu/h)	250.0
Latent Heat Gain / Person (Btu/h)	200.0
Infiltration Airflow (CFM)	25
Space Type	Hospital/Radiology - Hospital/Healthcare
Calculated Results	
Peak Cooling Total Load (Btu/h)	45,929.6
Peak Cooling Sensible Load (Btu/h)	45,433.2
Peak Cooling Latent Load (Btu/h)	496.4
Peak Cooling Airflow (CFM)	1,914
Peak Heating Load (Btu/h)	-45,800.6
Peak Heating Airflow (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	1,169.1	2.55%	-61.4	320.9	-13.2	922.9	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	2.6	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	-433.8	-0.94%	-	-	-	-	-	-	-	-
Infiltration	-609.0	-1.33%	-	-	-	-	-	-	-	-
Lighting	1,927.8	4.20%	-	-	-	-	-	-	-	-
Power	42,006.8	91.46%	-	-	-	-	-	-	-	-
People	1,866.0	4.06%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Total	45,929.6	100%	-61.4	320.9	-13.2	922.9	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-1,927.8	-4.21%	-	-	-	-	-	-	-	-
Power	-42,006.8	-91.72%	-	-	-	-	-	-	-	-
People	-1,866.0	-4.07%	-	-	-	-	-	-	-	-
Total	-45,800.6	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Space Summary - 8 RESONADOR

Input Data	
Area (m²)	38.30
Volume (m³)	114.90
Wall Area (m²)	63.12
Roof Area (m²)	40.22
Door Area (m²)	0.00
Partition Area (m²)	14.70
Window Area (m²)	0.00
Skylight Area (m²)	0.00
Lighting Load (W)	824
Power Load (W)	8,245
Number of People	8
Sensible Heat Gain / Person (Btu/h)	250.0
Latent Heat Gain / Person (Btu/h)	200.0
Infiltration Airflow (CFM)	26
Space Type	Hospital/Radiology - Hospital/Healthcare
Calculated Results	
Peak Cooling Total Load (Btu/h)	33,193.4
Peak Cooling Sensible Load (Btu/h)	32,324.5
Peak Cooling Latent Load (Btu/h)	868.9
Peak Cooling Airflow (CFM)	1,362
Peak Heating Load (Btu/h)	-33,677.5
Peak Heating Airflow (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	571.8	1.72%	-86.0	450.4	-27.3	234.8	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	3.9	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	-427.0	-1.29%	-	-	-	-	-	-	-	-
Infiltration	-632.8	-1.91%	-	-	-	-	-	-	-	-
Lighting	2,814.0	8.48%	-	-	-	-	-	-	-	-
Power	28,139.8	84.78%	-	-	-	-	-	-	-	-
People	2,723.7	8.21%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Total	33,193.4	100%	-86.0	450.4	-27.3	234.8	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-2,814.0	-8.36%	-	-	-	-	-	-	-	-
Power	-28,139.8	-83.56%	-	-	-	-	-	-	-	-
People	-2,723.7	-8.09%	-	-	-	-	-	-	-	-
Total	-33,677.5	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Space Summary - 9 TOMOGRAFO

Input Data	
Area (m²)	23.71
Volume (m³)	71.14
Wall Area (m²)	62.18
Roof Area (m²)	25.24
Door Area (m²)	0.00
Partition Area (m²)	0.00
Window Area (m²)	0.00
Skylight Area (m²)	0.00
Lighting Load (W)	511
Power Load (W)	9,046
Number of People	5
Sensible Heat Gain / Person (Btu/h)	250.0
Latent Heat Gain / Person (Btu/h)	200.0
Infiltration Airflow (CFM)	25
Space Type	Hospital/Radiology - Hospital/Healthcare
Calculated Results	
Peak Cooling Total Load (Btu/h)	34,515.9
Peak Cooling Sensible Load (Btu/h)	34,108.4
Peak Cooling Latent Load (Btu/h)	407.5
Peak Cooling Airflow (CFM)	1,437
Peak Heating Load (Btu/h)	-34,304.2
Peak Heating Airflow (CFM)	0

Cooling Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	832.7	2.41%	-86.6	453.6	-17.0	482.8	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	2.4	0.01%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	-623.4	-1.81%	-	-	-	-	-	-	-	-
Lighting	1,742.4	5.05%	-	-	-	-	-	-	-	-
Power	30,875.3	89.45%	-	-	-	-	-	-	-	-
People	1,686.5	4.89%	-	-	-	-	-	-	-	-
Plenum	0.0	0.00%	-	-	-	-	-	-	-	-
Total	34,515.9	100%	-86.6	453.6	-17.0	482.8	0.0	0.0	0.0	0.0
Heating Components	Total (Btu/h)	Percentage	North (Btu/h)	South (Btu/h)	East (Btu/h)	West (Btu/h)	Northeast (Btu/h)	Southeast (Btu/h)	Northwest (Btu/h)	Southwest (Btu/h)
Wall	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Window	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Door	0.0	0.00%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roof	0.0	0.00%	-	-	-	-	-	-	-	-
Partition	0.0	0.00%	-	-	-	-	-	-	-	-
Skylight	0.0	0.00%	-	-	-	-	-	-	-	-
Infiltration	0.0	0.00%	-	-	-	-	-	-	-	-
Lighting	-1,742.4	-5.08%	-	-	-	-	-	-	-	-
Power	-30,875.3	-90.00%	-	-	-	-	-	-	-	-
People	-1,686.5	-4.92%	-	-	-	-	-	-	-	-
Total	-34,304.2	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**DISEÑO Y CONTRUCCION DEL SERVICIO DE IMAGENOLOGIA DEL HOSPITAL
SIMON BOLIVAR. BOGOTA.**



SUBRED INTEGRADA DE SERVICIOS DE SALUD Norte E.S.E.



FASE:
FASE 2 – PRELIMINAR

PROYECTO:
HSB – IMAGENOLOGÍA

DISCIPLINA:
MECÁNICO

TIPO DE DOCUMENTO:
MEMORIAS DE CÁLCULO

TÍTULO:
CÁLCULO DE VENTILACIÓN MECANICA

CONTRATO

Fase	Edificio	Disciplina	Tipo	Número	Rev.
2	HSB	M	CAL	0002	A

 Secretaría de Salud Subred Integrada de Servicios de Salud Norte E.S.E.	SUBRED INTEGRADA DE SERVICIOS DE SALUD – NORTE E.S.E.			
2-HSB-M-RPT-0002	DISCIPLINA	M	MECANICO	
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CUADRO DE CONTROL		
Elaboró:		Ing. DIEGO ANDRÉS CADENA ALFONSO
Revisó:		SUBRED NORTE
Aprobó:		
Fecha Elaboración:		27/08/2019
Versión del documento		A
CONTROL DE CAMBIOS		
VERSIÓN	FECHA	MODIFICACIÓN
A	27/08/2019	Versión Inicial

 Secretaría de Salud Subred Integrada de Servicios de Salud Norte E.S.E.	SUBRED INTEGRADA DE SERVICIOS DE SALUD – NORTE E.S.E.			
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1 DESCRIPCION DEL DOCUMENTO

El propósito de este documento es proporcionar al cliente una breve explicación de los cálculos de diseño bajo los cuales se realizará el diseño del proyecto y del sistema de ventilación mecánica los cuales se consideran son los más apropiados para el proyecto y cada una de las zonas que lo comprenden.

2 COMPARATIVO PARA DETERMINACION DE CAUDALES

Los caudales que se han tenido en cuenta en el diseño han sido recopilados de las normas ASHRAE 62.1 y ASHRAE 170. Aunque esta ultima normativa mencionada es una norma de la que se ha tomado el tipo de presión de cada una de las zonas deberían tener. Para el caso de la ASHRAE 62.1 se ha tomado como referencia para contemplar el caudal que se debería contemplar en cada uno de los espacios. Finalmente se ha tenido en cuenta la Resolución 4445, en donde se determinan algunos parámetros, que para las zonas específicas del proyecto no son concluyentes.

Es importante notar que en algunos casos se ha contemplado valores de caudales de aire referenciados a algunos casos específicos que no son parte de los espacios, como lo es la sala de recuperación, la cual se ha contemplado como si fuera una habitación de un paciente.

Adicionalmente, es importante notar que el caudal del pasillo, se hace una evacuación del caudal asumiendo lo requerido para un pasillo según ASHRAE 62.1 y la evacuación del aire que se inyecta a los cuartos circundantes al pasillo. Con lo anterior se garantiza una circulación dentro de la nueva zona de imagenología del Hospital Simón Bolívar.

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3 DETERMINACION DE CAUDALES REQUERIDOS POR ZONA

ESPACIO	PRESION	TIPO	AREA		ALTURA		VOLUMEN		PERSONAS	ASHRAE 170	ASHRAE 62.1		CAUDAL CFM	CONSIDERACION Y OBSERVACIONES
			m2	ft2	m	ft	m3	ft3						
PASILLO	NEGATIVA	EXTRACCION	71.8	772.85	3.00	9.84	215.40	7606.78	20	N/R	PASARELAS	0.06*ft2	857.68	Contempla todo el caudal inyectado en los diferentes espacios perimetrales, pero en extracción.
AREA DE ESPERA DE CAMILLAS	NEGATIVA	EXTRACCION	13.3	143.16	3.00	9.84	39.90	1409.06	2	N/R			117.4	Se contempla inyección EQUIVALENTE A 5REN/HR
CONTROL RESONADOR	POSITIVA	INYECCION	6.31	67.92	3.00	9.84	18.93	668.51	1		OFICINA	0.06*ft2 + 17*personas	21.1	Se contempla inyección EQUIVALENTE A 10REN/HR
RESONADOR	POSITIVA	INYECCION	37.83	407.20	3.00	9.84	113.49	4007.86	5	N/R	OFICINA	0.06*ft2 + 17*personas	109.4	La resolución no habla de ventilación para estos espacios, la ASHRAE 170 no especifica tipo de presión, se considera oficina para oxigenación del espacio por habitabilidad, como si fuera oficina.
CUARTO MAQUINAS	N/R	N/R	11.05	118.94	3.50	11.48	38.68	1365.79	0	N/R	N/R	-	0.0	No se contempla ventilación, se considera ocupación

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														temporal y circunstancial
ESTACION LECTURA RADIOLOGICO	POSITI VA	INYECCIO N	7.76	83.5 3	3.0 0	9.84	23.2 8	822.1 3	1	N/R	OFICINA	0.06*ft2 + 17*personas	22.0	Se contempla oficina de trabajo para persona que se encuentra en el ordenador con un margen de trabajo moderado.
CONTROL TAC	POSITI VA	INYECCIO N	6.87	73.9 5	3.0 0	9.84	20.6 1	727.8 4	1	N/R	OFICINA	0.06*ft2 + 17*personas	21.4	La resolución no habla de ventilación para estos espacios, la ASHRAE 170 no especifica tipo de presión, se considera oficina para oxigenación del espacio por habitabilidad, como si fuera oficina.
TOMOGRAFO TAC	POSITI VA	INYECCIO N	23.5	252. 95	3.0 0	9.84	70.5 0	2489. 68	5	N/R	OFICINA	0.06*ft2 + 17*personas	100.2	
RAYOS X 01	POSITI VA	INYECCIO N	20.0 4	215. 71	3.0 0	9.84	60.1 2	2123. 12	5	N/R	OFICINA	0.06*ft2 + 17*personas	97.9	
LECTURA Y DISPARO RAYOS-X 01	POSITI VA	INYECCIO N	3.04	32.7 2	3.0 0	9.84	9.12	322.0 7	1	N/R	OFICINA	0.06*ft2 + 17*personas	19.0	
RAYOS X 02	POSITI VA	INYECCIO N	19.9 8	215. 06	3.0 0	9.84	59.9 4	2116. 76	5	N/R	OFICINA	0.06*ft2 + 17*personas	97.9	

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LECTURA Y DISPARO RAYOS-X 02	POSITI VA	INYECCIO N	2.72	29.2 8	3.0 0	9.84	8.16	288.1 7	1	N/R	OFICINA	0.06*ft2 + 17*personas	18.8	
RECUPERACIO N	NEUTR A	INYECCIO N / EXTRACCI ON	13.7 4	147. 90	3.0 0	9.84	41.2 2	1455. 67	4	N/R			291.1	Se contempla inyección EQUIVALENT E A 12REN/HR en extracción e inyección
RADIOLOGIA INTERVENCIO N	POSITI VA	INYECCIO N	18.8 3	202. 68	3.0 0	9.84	56.4 9	1994. 93	4	N/R	OFICINA	0.06*ft2 + 17*personas	80.2	
BAÑO RADIOLOGIA INTERVENCIO N	NEGATI VA	EXTRACCI ON	2.13	22.9 3	3.0 0	9.84	6.39	225.6 6	1	N/R	BAÑO	100	100.0	
ULTRA SONIDO	POSITI VA	INYECCIO N	15.1 8	163. 40	3.0 0	9.84	45.5 4	1608. 23	4	N/R	OFICINA	0.06*ft2 + 17*personas	77.8	
BAÑO ULTRASONIDO	NEGATI VA	EXTRACCI ON	2.19	23.5 7	3.0 0	9.84	6.57	232.0 2	1			100CFM/UN sanitaria	100	
ALMACENAMIE NTO MATERIAL ESTERIL INSUMOS	POSITI VA	EXTRACCI ON	2.55	27.4 5	3.0 0	9.84	7.65	270.1 6	1	POSITIVA		0.06*ft2 + 35*personas	36.6	
VESTIER	NEGATI VA	EXTRACCI ON	5.41	58.2 3	3.0 0	9.84	16.2 3	573.1 6	5	N/R	LOCKER S ROOM	0.25*ft2	14.6	
VESTIER PERSONAL ASISTENCIAL	NEGATI VA	EXTRACCI ON	3.64	39.1 8	3.0 0	9.84	10.9 2	385.6 4	4	N/R	LOCKER S ROOM	0.25*ft2	9.8	
BAÑO VESTIER ASISTENCIAL	NEGATI VA	EXTRACCI ON	2.93	31.5 4	3.0 0	9.84	8.79	310.4 2	1				100	
CITAS CONTROL	POSITI VA	INYECCIO N	5.51	59.3 1	3.0 0	9.84	16.5 3	583.7 5	3		OFICINA	0.06*ft2 + 17*personas	54.6	
OFICINA COORDINADOR	POSITI VA	INYECCIO N	5.32	57.2 6	3.0 0	9.84	15.9 6	563.6 2	3		OFICINA	0.06*ft2 + 17*personas	54.4	
ASEO	NEGATI VA	EXTRACCI ON	2.14	23.0 3	3.0 0	9.84	6.42	226.7 2	1				100	
BAÑOS SALA DE ESPERA	NEGATI VA	EXTRACCI ON	7.69	82.7 7	3.0 0	9.84	23.0 7	814.7 1	2				200	

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SALA DE ESPERA	NEGATI VA	EXTRACCI ON	20.9 4	225. 40	3.0 0	9.84	62.8 2	2218. 47	20	NEGATIV A	RECEPTI ON AREA	0.06*ft2+7*pers onas	153.5	
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4 CAIDA DE PRESIÓN Y CANTIDAD DE LAMINA EN ACERO

Luego de determinar el dimensionamiento de caída de presión en los ductos de aire ya sea de suministro o de extracción, los cálculos obtenidos son los siguientes, que determinaran la selección de los ventiladores a utilizar:

DUCTOS DE SUMINISTRO							
ANCHO	ALTO	LARGO		AREA SUPER	CANTIDAD DE cent. LONG 100ft	CAIDA DE PRESION	CAIDA DE PRESION TOTAL
in	in	m	ft	m2		in w.g/100ft	in w.g
55	8	50.9	166.99	162.90	1.67	0.017	0.0284
40	7	2.43	7.97	5.80	0.08	0.015	0.0012
95	5	4.08	13.39	20.73	0.13	0.039	0.0052
32	7	4.54	14.90	8.99	0.15	0.015	0.0022
11	5	8	26.25	6.50	0.26	0.015	0.0039
25	4	2.9	9.51	4.27	0.10	0.024	0.0023
15	4	6.54	21.46	6.31	0.21	0.015	0.0032
35	6	9.72	31.89	20.24	0.32	0.01	0.0032
15	6	10.5	34.45	11.20	0.34	0.012	0.0041
15	6	4.67	15.32	4.98	0.15	0.015	0.0023
7	6	5.3	17.39	3.50	0.17	0.015	0.0026
5	5	1	3.28	0.51	0.03	0.01	0.0003
5	5	1	3.28	0.51	0.03	0.01	0.0003
5	5	1.5	4.92	0.76	0.05	0.01	0.0005
15	6	4.7	15.42	5.01	0.15	0.015	0.0023
7	6	5.3	17.39	3.50	0.17	0.015	0.0026
15	6	11.54	37.86	12.31	0.38	0.015	0.0057
7	6	3.63	11.91	2.40	0.12	0.015	0.0018
DIAMETRO	6	1.2	3.94	N/A	0.04	0.02	0.0008
TOTAL				280		TOTAL RUTA CRITICA	0.0420
DESPERDICIO (10%)				28		DERIVACIONES (40%)	0.0168
RESERVA (20%)				62		RESERVA (40%)	0.0235
TOTAL				370		PREFILTRO	0.7
						FILTRO HEPA	2
						TOTAL (IN W.G.)	2.7822

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DUCTOS DE EXTRACCION							
ANCHO	ALTO	LARGO		AREA SUPER	CANTIDAD DE cent. LONG 100ft	CAIDA DE PRESION	CAIDA DE PRESION TOTAL
in	in	m	ft	m2		in w.g./100ft	in w.g
55	11	58.41	191.63	195.84	1.916	0.024	0.0460
95	5	5.42	17.78	27.53	0.178	0.039	0.0069
40	9	9	29.53	22.40	0.295	0.039	0.0115
30	6	3.1	10.17	5.67	0.102	0.02	0.0020
9	6	2.9	9.51	2.21	0.095	0.02	0.0019
30	9	8.1	26.57	16.05	0.266	0.03	0.0080
24	9	3.12	10.24	5.23	0.102	0.032	0.0033
16	9	6.9	22.64	8.76	0.226	0.026	0.0059
16	5	1.5	4.92	1.60	0.049	0.02	0.0010
16	5	2.8	9.19	2.99	0.092	0.01	0.0009
30	6	2.7	8.86	4.94	0.089	0.021	0.0019
15	5	2.3	7.55	2.34	0.075	0.01	0.0008
16	5	5	16.40	5.33	0.164	0.021	0.0034
15	5	1.4	4.59	1.42	0.046	0.01	0.0005
11	3	1.5	4.92	1.07	0.049	0.01	0.0005
15	5	2.1	6.89	2.13	0.069	0.014	0.0010
11	3	1	3.28	0.71	0.033	0.01	0.0003
15	5	3.5	11.48	3.56	0.115	0.01	0.0011
11	3	0.7	2.30	0.50	0.023	0.01	0.0002
15	5	1.8	5.91	1.83	0.059	0.01	0.0006
15	6	3.8	12.47	4.05	0.125	0.02	0.0025
40	7	14.22	46.65	33.95	0.467	0.02	0.0093
30	6	14.56	47.77	26.63	0.478	0.02	0.0096
30	5	3.33	10.93	5.92	0.109	0.01	0.0011
15	5	3.1	10.17	3.15	0.102	0.01	0.0010
15	5	8.5	27.89	8.64	0.279	0.01	0.0028
TOTAL				310		TOTAL RUTA CRITICA	0.0855
DESPERDICIO (10%)				31		DERIVACIONES (40%)	0.1197
RESERVA (20%)				68		RESERVA (40%)	0.0479
TOTAL (m2)				409		TOTAL (in w.g.)	0.1676

En verde se han resaltado las rutas de mayor caída de presión presentadas en el diseño. Es importante notar que los recorridos se encuentran representados en planos.

5 RESUMEN

- En resumen, se requerirá la fabricación de ductos en 779m² lamina de acero galvanizado calibre 24, para inyección de aire exterior y para extracción de aire interior.
- Se requerirá un ventilador de inyección de aire de 1055CFM con una caída de presión de 2.78in. w.a.
- Se requerirá un ventilador de extracción de aire con un caudal de 2150CFM con una caída de presión de 0.17in. w.a.