

 PREFEITURA SAQUAREMA <small>TRABALHO E RESPEITO</small>	<i>MEMÓRIA DE CÁLCULO</i>		<i>Nº: HMPNA-PB-CLI-MC-01-R00</i>						
	CLIENTE: <i>PREFEITURA MUNICIPAL DE SAQUAREMA</i>		FOLHA: <i>01 de 176</i>						
	OBRA: <i>HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO</i>		-						
	TÍTULO: <i>SISTEMAS DE AR CONDICIONADO E VENTILAÇÃO MECÂNICA</i>		<i>MS-WORD 2016</i>						
CASÁLIS ENGENHARIA LTDA ME PROF. RESP.: CLÁUDIA REGINA TAVARES COELHO - Nº CREA. MG: 55 322/D DESENVOLVEDOR: CARLOS ACYR WERMELINGER SOUTELINO – Nº CREA RJ: 1978103224									
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<i>REV.</i>	<i>DESCRIÇÃO E/OU FOLHAS ATINGIDAS</i>								
<i>00</i>	<i>EMIÇÃO INICIAL</i>								
 <i>Carlos Acyr Wermelinger Soutelino</i>									
	REV. 00	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATA	28/04/2023								
PROJETO	CASALIS								
EXECUÇÃO	CAWS								
VERIFICAÇÃO	-								
APROVAÇÃO	CLÁUDIA								

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1. OBJETIVO

Este documento visa apresentar os cálculos dimensionamentos dos sistemas de ar condicionado e ventilação mecânica relativos à reforma do Hospital Municipal Porfírio Nunes de Azeredo, situado na Rua Rodolfo Bravo, 197 - Bacaxá, Saquarema – RJ e complementam as informações do projeto identificado no item 3 “DOCUMENTOS DO PROJETO”, dessa memória. As premissas e as soluções aqui apresentadas foram definidas com base nos documentos de referência citados no item 2 “DOCUMENTOS DE REFERÊNCIA” dessa memória e nas informações recebidas do cliente.

2. DOCUMENTOS DE REFERÊNCIA

- Projeto de Arquitetura HMPNA_ARQ_PBA_DE_R03 – Arquivo Geral
- Informações do cliente

3. DOCUMENTOS DO PROJETO

- HMPNA-PB-CLI-DE-01-R00 – Planta do 1º pavimento
- HMPNA-PB-CLI-DE-02-R00 – Planta do 2º pavimento
- HMPNA-PB-CLI-DE-03-R00 – Planta da cobertura
- HMPNA-PB-CLI-DE-04-R00 – Planta de cortes e detalhes
- HMPNA-PB-CLI-DE-05-R00 – Planta de detalhes construtivos
- HMPNA-PB-CLI-DE-06-R00 – Planta de detalhes construtivos
- HMPNA-PB-CLI-MC-01-R00 – Memória de Cálculos
- HMPNA-PB-CLI-ET-01-R00 – Especificação Técnica
- HMPNA-PB-CLI-LI-01-R00 – Lista de Materiais e equipamentos
- HMPNA-PB-CLI-FD-01-R00 – Folhas de dados dos splits
- HMPNA-PB-CLI-FD-02-R00 – Folhas de dados dos condicionadores de ar central
- HMPNA-PB-CLI-FD-03-R00 – Folhas de dados dos ventiladores
- HMPNA-PB-CLI-FD-04-R00 – Folhas de dados do lavador de gases

4. NORMAS E CÓDIGOS

- Deverão ser observados as Normas e Códigos de Obras pertinentes à instalação;
- As normas da ABNT – Associação Brasileira de Normas Técnicas e da ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers serão consideradas como base para os serviços ou fornecimento de materiais e equipamentos;
- No caso de omissão, devem ser consultadas as normas internacionais pertinentes;
- A execução da instalação do sistema, assim como os equipamentos e materiais a serem empregados, deverão atender às últimas revisões das Normas, Recomendações e Orientações de cada uma das instituições a seguir:

ABNT - Associação Brasileira de Normas Técnicas;

ANVISA - Agência Nacional de Vigilância Sanitária;

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ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers;
SMACNA - Sheet Metal and Air Conditioning Contractors National Association;
INMETRO - Instituto Nacional de Metrologia, Normalização e Qualidade Industrial
PROCEL – Programa Nacional de Conservação de Energia Elétrica.

Para o projeto em questão destacamos as seguintes normas:

- Portaria GM/MS nº 3.523 do Ministério da Saúde;
- Resolução – ANVS/RE Nº 09 de 19/01/2003 da ANVISA
- Norma NBR 16401-1/2/3 da ABNT de 04/08/2008 – Instalações de ar condicionado – Sistemas centrais e unitários.
- Norma NBR 7256 da ABNT de 06/08/2021 – Tratamento de ar em estabelecimentos assistenciais de saúde (EAS) – Requisitos para projetos e execução das instalações
- Norma NBR 14518 – Sistemas de ventilação para cozinhas profissionais

5. DESCRIÇÃO GERAL - PREMISSAS DO PROJETO

Este projeto refere-se a reforma de um prédio antigo, com limitações de espaços para as instalações em geral. Por esse motivo e também por motivo de custos, tivemos que utilizar os sistemas de climatização que nos foi possível, conforme iremos detalhando nesse documento. O prédio é constituído de três pavimentos. Nos 1º e 2º pavimentos estão localizados os recintos destinados ao atendimento médico, que requerem condições específicas de temperatura, umidade, limpeza e pressão do ar interno, bem como todos os recintos de apoio (Salas de utilidades, DML's, sanitários, vestiários, etc). No 2º pavimento também existem áreas técnica onde foi criada uma casa de máquinas de ar condicionado (área coberta) e posicionados diversos condensadores remotos em área descoberta. No 3º pavimento (Cobertura) estão localizadas algumas casas de máquinas de condicionadores de ar, casa de máquinas de exaustão e de insuflação de ar externo, bem como diversos condensadores remotos. No projeto, utilizamos sistemas de expansão direta, sendo o gás refrigerante como fluido de transferência de calor, com utilização de condicionadores de ar do tipo self-contained, com condensação a ar remota, do tipo splitão e splits convencionais.

Conforme dito anteriormente, por limitação de espaço, alguns recintos de atendimento médico não puderam ser atendidos com insuflação de ar com filtragem G4+F8. Para compensar, transferimos essa classe de filtragem para o ar externo insuflado nesses recintos.

Os sanitário e vestiários não dotados de ventilação natural bem como alguns recintos da área médica que necessitam de renovação de ar e pressão negativa interna, serão dotados de sistemas de exaustão mecânica.

Para a área da cozinha foi projetado um sistema de exaustão e insuflação de ar, com utilização de coifas, exaustor, caixa ventiladora, lavador de gases e dampers corta-fogo.

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6. CONDIÇÕES EXTERNAS E INTERNAS CONSIDERADAS NOS CÁLCULOS DE CARGA TÉRMICA

Cidade		Saquarema	
Estado		RJ	
País		Brasil	
Latitude		S 22°55'52"	
Longitude		W 42°29'47"	
Altitude		5,0 m	
Condições externas do local			
Verão	Temperatura de bulbo seco (TBS)	38,0 °C	
	Temperatura de bulbo úmido (TBU)	28,0 °C	
Inverno	Temperatura de bulbo seco (TBS)	14,8 °C	
	Temperatura de Ponto de Orvalho (TPO)	9,9 °C	
Fonte: NBR 16401 -1:2008			
Condições internas de conforto			
Áreas de conforto	Verão	Temperatura de bulbo seco (TBS)	23,0 °C
		Umidade relativa (UR)	50,0%±10% sem controle direto
	Inverno	Temperatura de bulbo seco (TBS)	22,0 °C
		Umidade relativa (UR)	50,0%±10% sem controle direto
Fonte: NBR 16401 -2:2008			

6.1 OUTRAS CONDIÇÕES

- Não foram considerados vãos permanentemente abertos para o exterior;
- Todas as portas e janelas externas foram consideradas fechadas;
- Nos cálculos de carga térmica foi considerado que as janelas externas serão dotadas de cortinas internas, de cor clara e reflexiva, de modo a reduzir os efeitos de insolação.
- As instalações de VAC deverão atender as seguintes características:
 - Atender aos Requisitos Técnicos da Qualidade para o Nível de Eficiência Energética de Edifícios Comerciais, de Serviços e Públicos – RTQ-C;
 - Atender ao Programa Nacional de Conservação de Energia Elétrica – PROCEL;
 - Atender as normas vigentes de Proteção Ambiental e Qualidade do Ar Interior em ambientes condicionados;

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7.0 VAZÕES DE AR EXTERNO

Para o cálculo da vazão de ar externo (Tomada de ar exterior - TAE) dos sistemas de ar condicionado, foram consideradas as metodologias normativas a seguir:

- Mínima renovação de ar conforme referência ABNT NBR 16401-3;
- Mínima renovação conforme RE 09/2003 – ANVISA;
- Mínima renovação e circulação de ar conforme a NBR-7256:2021 da ABNT;

Nos cálculos de carga térmica foram utilizadas as vazões de ar calculadas na tabela abaixo:

AMBIENTES		DADOS DE INPUT						RESULTADOS PARCIAIS										RESULTADO FINAL			
NOMES	ÁREA (m²)	PD (m)	INFORMAÇÕES DOS RECINTOS			ANVISA (m³/h.pes)	NBR 16401-3 / ABNT (l/s.pes)	EXAUSTÃO DIRETA (Capelas/Coifas/etc)		REN/H		ANVISA - RE-09		NBR 16401-3		PRESSURIZAÇÃO DO AMBIENTE		VAZÕES SELECIONADAS		VAZÕES ADOTADAS	
			QUANT. PESSOAS	REN/h	(l/s)			(l/s)	(m³/h)	(l/s)	(m³/h)	(l/s)	(m³/h)	(l/s)	(m³/h)	(l/s)	(m³/h)	(l/s)	(m³/h)	(l/s)	(m³/h)
Espera 01 + Recepção + Espera 02 + Guarda de cadeiras	101,04	2,90	45	2,0	27,0	3,8	0,5	26	95	163	586	338	1215	222	799			338	1215	339	1220
Classificação de Risco	8,07	2,90	3	2,0	27,0	3,8	0,5			13	47	23	81	15	54			23	81	24	85
Capela	5,49	2,90	1	1,0	27,0	3,8	0,5			4	16	8	27	7	25			8	27	8	30
Ante Câmara e Isolamento	12,00	2,90	2	2,0	27,0	3,8	0,5			19	70	15	54	14	50			19	70	19	70
Ante Câmara + Posto serviço/prescrição + Unidade Semi-Intensiva	74,94	2,90	12	2,0	27,0	3,8	0,5	47	170	121	435	90	324	83	299			121	435	121	435
Aplicação medicam/Reidratação+Posto de enfer+Coleta sangue	47,20	2,90	25	2,0	27,0	3,8	0,5			76	274	188	675	119	428			188	675	189	680
Sala de exames	5,62	2,90	3	2,0	27,0	3,8	0,5			9	33	23	81	14	50			23	81	24	85
Sala de suturas	9,26	2,90	3	2,0	27,0	3,8	0,5			15	54	23	81	16	58			23	81	24	85
Consultório 01	7,30	2,90	3	2,0	27,0	3,8	0,5			12	42	23	81	15	54			23	81	24	85
Consultório 02	7,05	2,90	3	2,0	27,0	3,8	0,5			11	41	23	81	15	54			23	81	24	85
Ante Câmara e Isolamento	11,67	2,90	2	2,0	27,0	3,8	0,5	38	135	19	68	15	54	13	47			38	135	39	140
Sala de emergência+Posto de enferm+Prep+Sala Vermelha	103,93	2,90	15	5,0	27,0	3,8	0,5	58	210	419	1507	113	405	109	392			419	1507	419	1510
Recepção/Digitalização (do Raio x)	4,61	2,90	1	2,0	27,0	3,8	0,5			7	27	8	27	6	22			8	27	8	30
Raio X / Vestibrio	21,84	2,90	2	2,0	27,0	3,8	0,5			35	127	15	54	19	68			35	127	36	130
Farmácia Satélite	6,85	2,90	1	2,0	27,0	3,8	0,5			11	40	8	27	7	25			11	40	11	40
Sala Distr. Compatib+Área estocagem hemocomp. + Plantão	19,34	2,90	1	2,0	27,0	3,8	0,5			31	112	8	27	13	47			31	112	32	115
Plantão 1	6,68	2,90	2	2,0	27,0	3,8	0,5			11	39	15	54	11	40			15	54	15	55
Plantão 2	5,18	2,90	2	2,0	27,0	3,8	0,5			8	30	15	54	10	36			15	54	15	55
Administração	6,88	2,90	1	2,0	27,0	3,8	0,5			11	40	8	27	7	25			11	40	11	40
Enfermaria Feminina	42,49	2,90	8	2,0	27,0	3,8	0,5	39	140	68	246	60	216	52	187			68	246	69	250
Posto de enfermagem	18,58	2,90	4	2,0	27,0	3,8	0,5	49	175	30	108	30	108	24	86			49	175	50	180
Enfermaria masculina 1	30,03	2,90	6	2,0	27,0	3,8	0,5	44	160	48	174	45	162	38	137			48	174	49	175
Enfermaria masculina 2	24,28	2,90	5	2,0	27,0	3,8	0,5	40	145	39	141	38	135	31	112			40	145	42	150
Ortopedia	8,88	2,90	3	2,0	27,0	3,8	0,5			14	52	23	81	16	58			23	81	24	85
Sala de gesso	7,92	2,90	2	2,0	27,0	3,8	0,5			13	46	15	54	12	43			15	54	15	55
Aplicação de medicamentos/Reidratação+Posto+Sala de Inalação	28,16	2,90	10	2,0	27,0	3,8	0,5			45	163	75	270	52	187			75	270	76	275
Observação Pediátrica	23,60	2,90	9	2,0	27,0	3,8	0,5	32	115	38	137	68	243	46	166			68	243	68	245
Espera+Recepção+Sala de Triagem + Circulação H	69,40	2,90	25	2,0	27,0	3,8	0,5	49	175	112	403	188	675	130	468			188	675	189	680
Atendimento imediato+Posto preparo	24,94	2,90	4	2,0	27,0	3,8	0,5			40	145	30	108	28	101			40	145	40	145
Ante-câmara+Isolamento	9,74	2,90	2	2,0	27,0	3,8	0,5	31	110	16	56	15	54	12	43			31	110	32	115
Consultório 01A	6,29	2,90	3	2,0	27,0	3,8	0,5			10	36	23	81	15	54			23	81	24	85
Consultório 02A	6,96	2,90	3	2,0	27,0	3,8	0,5			11	40	23	81	15	54			23	81	24	85
Nutricionista	7,53	2,90	4	2,0	27,0	3,8	0,5			12	44	30	108	19	68			30	108	31	110
Alim. Parenteral	1,98	2,90	1	2,0	27,0	3,8	0,5			3	11	8	27	5	18			8	27	8	30
Estar copeira	3,95	2,90	1	2,0	27,0	3,8	0,5			6	23	8	27	6	22			8	27	8	30
Nutri/Adm	6,80	2,90	3	2,0	27,0	3,8	0,5			11	39	23	81	15	54			23	81	24	85
Refeitório	26,01	2,90	28	2,0	27,0	3,8	0,5			42	151	210	756	119	428			210	756	211	760
Distribuição Refeitório	7,53	2,90	2	2,0	27,0	3,8	0,5			12	44	15	54	11	40			15	54	15	55
Preparo de carne	4,75	2,90	1	2,0	27,0	3,8	0,5			8	28	8	27	6	22			8	28	8	30
Armário Seco	4,78	2,90		2,0	27,0	3,8	0,5			8	28			2	7			8	28	8	30
Hortifrut	5,44	2,90		2,0	27,0	3,8	0,5			9	32			3	11			9	32	10	35
Recepção (Lavagem de vegetais)	5,36	2,90	2	2,0	27,0	3,8	0,5			9	31	15	54	10	36			15	54	15	55
Lavagem (lactário)	3,77	2,90	1	2,0	27,0	3,8	0,5			6	22	8	27	6	22			8	27	8	30
Prep./Envase (lactário)	3,89	2,90	1	2,0	27,0	3,8	0,5			6	23	8	27	6	22			8	27	8	30
Paramentação (lactário)	2,01	2,90		2,0	27,0	3,8	0,5			3	12			1	4			3	12	4	15
Necrotório	18,67	2,90		12,0	27,0	3,8	0,5			180	650			9	32			180	650	181	650
TOTAL:																	2596	9311	2624	9445	

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CÁLCULO DAS VAZÕES DE AR EXTERNO
HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - 2º PAVIMENTO - PREFEITURA MUNICIPAL DE SAQUEREMA

DADOS DE INPUT										RESULTADOS PARCIAIS													
AMBIENTES		INFORMAÇÕES DOS RECINTOS						EXAUSTÃO DIRETA		REN/H				ANVISA - RE-09		NBR 16401-3		PRESSURIZAÇÃO DO AMBIENTE		VAZÃO SELECIONADAS		VAZÃO ADOTADAS	
NOMES	ÁREA (m²)	PD (m)	QUANT. PESSOAS	Ren/h	ANVISA (m³/h.pes)	NBR 16401-3 / ABNT (l/s.pess)	(l/s.m²)	(l/s)	m³/h	(l/s)	m³/h	(l/s)	m³/h	(l/s)	m³/h	(l/s)	m³/h	(l/s)	m³/h	(l/s)	m³/h		
Ante-câmara e isolamento	10,04	2,70	2	2,0	27,0	3,8	0,5			15	54	15	54	13	47	15	54	15	54	15	55		
Quarto 01	10,72	2,70	1	2,0	27,0	3,8	0,5			16	58	8	27	9	32	16	58	17	60				
Quarto 02	15,06	2,70	2	2,0	27,0	3,8	0,5			23	81	15	54	15	54	23	81	24	85				
Quarto 03	14,92	2,70	2	2,0	27,0	3,8	0,5			22	81	15	54	15	54	22	81	24	85				
Quarto 04	14,69	2,70	2	2,0	27,0	3,8	0,5			22	79	15	54	15	54	22	79	22	80				
Quarto 05	17,89	2,70	2	2,0	27,0	3,8	0,5			27	97	15	54	17	61	27	97	28	100				
Quarto 06	17,67	2,70	2	2,0	27,0	3,8	0,5			27	95	15	54	16	58	27	95	28	100				
Posto de enfermagem	12,28	2,70	2	2,0	27,0	3,8	0,5			18	66	15	54	14	50	18	66	19	70				
Quarto 07	12,84	2,70	1	2,0	27,0	3,8	0,5			19	69	8	27	10	36	19	69	19	70				
Quarto 08	16,71	2,70	2	2,0	27,0	3,8	0,5			25	90	15	54	16	58	25	90	26	95				
Rack	4,37	2,70		1,0	27,0	3,8	0,5			3	12			2	7	3	12	4	15				
Laboratório	15,35	2,70	3	2,0	27,0	3,8	0,5			23	83	23	81	19	68	23	83	24	85				
Quarto psiquiatria 01	11,90	2,70	1	2,0	27,0	3,8	0,5			18	64	8	27	10	36	18	64	18	65				
Quarto psiquiatria 02	9,55	2,70	1	2,0	27,0	3,8	0,5			14	52	8	27	9	32	14	52	15	55				
Quarto psiquiatria 03 (Pediátrico)	14,20	2,70	1	2,0	27,0	3,8	0,5			21	77	8	27	11	40	21	77	22	80				
Direção geral	22,80	2,70	2	2,0	27,0	3,8	0,5			34	123	15	54	19	68	34	123	35	125				
Sala de equipamentos	4,63	2,70	1	1,0	27,0	3,8	0,5			3	13	8	27	6	22	8	27	8	30				
Farmácia	5,52	2,70	1	2,0	27,0	3,8	0,5			8	30	8	27	7	25	8	30	8	30				
Purificação	10,30	2,70	1	2,0	27,0	3,8	0,5			15	56	8	27	9	32	15	56	17	60				
Preparo+Desinfecção química	20,49	2,70	3	2,0	27,0	3,8	0,5			31	111	23	81	22	79	31	111	32	115				
Guarda e Esterilização + Param.	15,75	2,70	3	2,0	27,0	3,8	0,5			24	85	23	81	19	68	24	85	25	90				
Direção Adm.	12,92	2,70	3	2,0	27,0	3,8	0,5			19	70	23	81	18	65	19	70	24	85				
Gerência enfermagem	22,76	2,70	4	2,0	27,0	3,8	0,5			34	123	30	108	27	97	34	123	35	125				
Sala de reunião	17,04	2,70	7	2,0	27,0	3,8	0,5			26	92	53	189	35	126	26	92	53	190				
CCH/CVE/CRO/CRP	20,96	2,70	4	2,0	27,0	3,8	0,5			31	113	30	108	26	94	31	113	32	115				
NIR	10,28	2,70	3	2,0	27,0	3,8	0,5			15	56	23	81	17	61	15	56	24	85				
Sala de TI	11,41	2,70	3	2,0	27,0	3,8	0,5			17	62	23	81	17	61	17	62	24	85				
Quarto de descanso 1	16,42	2,70	4	2,0	27,0	3,8	0,5			25	89	30	108	23	83	25	89	31	110				
Quarto de descanso 2	16,46	2,70	4	2,0	27,0	3,8	0,5			25	89	30	108	23	83	25	89	31	110				
Quarto de descanso 3	14,46	2,70	4	2,0	27,0	3,8	0,5			22	78	30	108	22	79	22	78	30	110				
Quarto de descanso 4	14,46	2,70	3	2,0	27,0	3,8	0,5			22	78	23	81	19	68	22	78	24	85				
Quarto de descanso 5	13,82	2,70	3	2,0	27,0	3,8	0,5			21	75	23	81	18	65	21	75	24	85				
Quarto de descanso 6	10,74	2,70	3	2,0	27,0	3,8	0,5			16	58	23	81	17	61	16	58	24	85				
Área coletiva tratamento1+Posto enfermagem+A.Câmara	76,46	2,70	5	2,0	27,0	3,8	0,5	157	565	115	413	38	135	57	205	115	413	158	570				
Serviço	6,22	2,70	2	2,0	27,0	3,8	0,5			9	34	15	54	11	40	9	34	15	55				
Ante-câmara e quarto de isolamento	18,57	2,70	1	2,0	27,0	3,8	0,5			28	100	8	27	13	47	28	100	29	105				
Área coletiva de tratamento2	40,09	2,70	7	2,0	27,0	3,8	0,5			60	216	53	189	47	169	60	216	61	220				
Plantão	11,41	2,70	2	2,0	27,0	3,8	0,5			17	62	15	54	13	47	17	62	18	65				
Paramentação	4,94	2,70	1	2,0	27,0	3,8	0,5			7	27	8	27	6	22	8	27	8	30				
Descanso médico	11,46	2,70	4	2,0	27,0	3,8	0,5			17	62	30	108	21	76	17	62	30	110				
TOTAL:																		1046	3749	1074	3865		

8. ENVOLTÓRIA

A carga térmica decorrente da condução e radiação através das paredes, assim como do calor sensível (temperatura) e latente (umidade relativa) do ar exterior introduzido nos recintos, foi considerada para 365 dias do ano/24 horas.

Para os cálculos, foram considerados os seguintes fatores de condução de calor:

Paredes externas..... 2,78 w/m².°K
Paredes internas..... 2,44 w/m².°K
Vidros externos..... 6,40 w/m².°K
Tetos..... 3,29 w/m².°K
Telhado..... 1,95 w/m².°K

9. PESSOAS, ILUMINAÇÃO E EQUIPAMENTOS

Nos cálculos de carga térmica foram considerados os quantitativos de pessoas, carga de iluminação e carga de equipamentos da tabela abaixo:

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DADOS DOS RECINTOS E QUE FORAM CONSIDERADOS NO PROJETO										
HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - 1º PAVIMENTO - PREFEITURA MUNICIPAL DE SAQUAREMA										
NOMES	ÁREA	PD	PESSOAS	ILUMINAÇÃO		EQUIPAMENTOS		OUTRAS CARGAS		
	(m²)	(m)		Watts	Watts/m²	Watts	Watts/m²	Watts	Kcal/h	Btu/h
Espera 01 + Recepção + Espera 02 + Guarda de cadeiras	101,04	2,90	45	1617	16	200	2,0			
Classificação de Risco	8,07	2,90	3	129	16	200	24,8			
Capela	5,49	2,90	1	88	16	200	36,4			
Ante Câmara e Isolamento	12,00	2,90	2	192	16	200	16,7			
Ante Câmara + Posto serviço/prescrição + Unidade Semi-Intensiva	74,94	2,90	12	1199	16	600	8,0			
Aplicação medicam/Reidratação+Posto de enfer+Coleta sangue	47,20	2,90	25	755	16	200	4,2			
Sala de exames	5,62	2,90	3	90	16	150	26,7			
Sala de suturas	9,26	2,90	3	148	16	150	16,2			
Consultório 01	7,30	2,90	3	117	16	150	20,5			
Consultório 02	7,05	2,90	3	113	16	150	21,3			
Ante Câmara e Isolamento	11,67	2,90	2	187	16	200	17,1			
Sala de emergência+Posto de enferm+Prep+Sala Vermelha	103,93	2,90	15	1663	16	1500	14,4			
Recepção/Digitalização (do Raio x)	4,61	2,90	1	74	16	300	65,1			
Raio X / Vestiário	21,84	2,90	2	349	16	2000	91,6			
Farmácia Satélite	6,85	2,90	1	110	16	150	21,9			
Sala Distr.Compatab+Área estocagem hemocomp. + Plantão	19,34	2,90	1	309	16	200	10,3			
Plantão 1	6,68	2,90	2	107	16	100	15,0			
Plantão 2	5,18	2,90	2	83	16	100	19,3			
Administração	6,88	2,90	1	110	16	150	21,8			
Enfermaria Feminina	42,49	2,90	8	680	16	300	7,1			
Posto de enfermagem	18,58	2,90	4	297	16	400	21,5			
Enfermaria masculina 1	30,03	2,90	6	480	16	600	20,0			
Enfermaria masculina 2	24,28	2,90	5	388	16	600	24,7			
Ortopedia	8,88	2,90	3	142	16	150	16,9			
Sala de gesso	7,92	2,90	2	127	16	150	18,9			
Aplicação de medicamentos/Reidratação+Posto+Sala de Inalação	28,16	2,90	10	451	16	350	12,4			
Observação Pediátrica	23,60	2,90	9	378	16	400	16,9			
Espera+Recepção+Sala de Triage + Circulação H	69,40	2,90	25	1110	16	450	6,5			
Atendimento imediato+Posto preparo	24,94	2,90	4	399	16	350	14,0			
Ante-câmara+Isolamento	9,74	2,90	2	156	16	200	20,5			
Consultório 01A	6,29	2,90	3	101	16	150	23,8			
Consultório 02A	6,96	2,90	3	111	16	150	21,6			
Nutricionista	7,53	2,90	4	120	16	200	26,6			
Alim. Parenteral	1,98	2,90	1	32	16	100	50,5			
Estar copeira	3,95	2,90	1	63	16	100	25,3			
Nutri/Adm	6,80	2,90	3	109	16	400	58,8			
Refeitório	26,01	2,90	28	416	16	200	7,7			
Distribuição Refeitório	7,53	2,90	2	120	16	100	13,3			
Preparo de carne	4,75	2,90	1	76	16	300	63,2			
Armário Seco	4,78	2,90		76	16	100	20,9			
Hortifruti	5,44	2,90		87	16	100	18,4			
Recepção (Lavagem de vegetais)	5,36	2,90	2	86	16	150	28,0			
Lavagem (lactário)	3,77	2,90	1	60	16	100	26,5			
Prep./Envase (lactário)	3,89	2,90	1	62	16	200	51,4			
Paramentação. (lactário)	2,01	2,90		32	16	100	49,8			
Necrotério	18,67	2,90		299	16	100	5,4			

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DADOS DOS RECINTOS E QUE FORAM CONSIDERADOS NO PROJETO										
HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - 2º PAVIMENTO - PREFEITURA MUNICIPAL DE SAQUAREMA										
NOMES	ÁREA	PD	PESSOAS	ILUMINAÇÃO		EQUIPAMENTOS		OUTRAS CARGAS		
	(m²)	(m)		Watts	Watts/m²	Watts	Watts/m²	Watts	Kcal/h	Btu/h
Ante-câmara e isolamento	10,04	2,70	2	161	16	200	20			
Quarto 01	10,72	2,70	1	172	16	200	19			
Quarto 02	15,06	2,70	2	241	16	200	13			
Quarto 03	14,92	2,70	2	239	16	200	13			
Quarto 04	14,69	2,70	2	235	16	200	14			
Quarto 05	17,89	2,70	2	286	16	200	11			
Quarto 06	17,67	2,70	2	283	16	200	11			
Posto de enfermagem	12,28	2,70	2	196	16	150	12			
Quarto 07	12,84	2,70	1	205	16	200	16			
Quarto 08	16,71	2,70	2	267	16	200	12			
Rack	4,37	2,70		70	16	1000	229			
Laboratório	15,35	2,70	3	246	16	300	20			
Quarto psiquiatria 01	11,90	2,70	1	190	16	100	8			
Quarto psiquiatria 02	9,55	2,70	1	153	16	100	10			
Quarto psiquiatria 03 (Pediátrico)	14,20	2,70	1	227	16	100	7			
Direção geral	22,80	2,70	2	365	16	300	13			
Sala de equipamentos	4,63	2,70	1	74	16	102	22			
Farmácia	5,52	2,70	1	88	16	100	18			
Purificação	10,30	2,70	1	165	16	100	10			
Preparo+Desinfecção química	20,49	2,70	3	328	16	300	15			
Guarda e Esterilização + Param.	15,75	2,70	3	252	16	300	19			
Direção Adm.	12,92	2,70	3	207	16	450	35			
Gerência enfermagem	22,76	2,70	4	364	16	600	26			
Sala de reunião	17,04	2,70	7	273	16	150	9			
CCIH/CVE/CRO/CRP	20,96	2,70	4	335	16	600	29			
NIR	10,28	2,70	3	164	16	450	44			
Sala de TI	11,41	2,70	3	183	16	450	39			
Quarto de descanso 1	16,42	2,70	4	263	16	100	6			
Quarto de descanso 2	16,46	2,70	4	263	16	100	6			
Quarto de descanso 3	14,46	2,70	4	231	16	100	7			
Quarto de descanso 4	14,46	2,70	3	231	16	100	7			
Quarto de descanso 5	13,82	2,70	3	221	16	100	7			
Quarto de descanso 6	10,74	2,70	3	172	16	100	9			
Área coletiva tratamento1+Posto enfermagem+A. Câmara	76,46	2,70	5	1223	16	500	7			
Serviço	6,22	2,70	2	100	16	100	16			
Ante-câmara e quarto de isolamento	18,57	2,70	1	297	16	200	11			
Área coletiva de tratamento2	40,09	2,70	7	641	16	500	12			
Plantão	11,41	2,70	2	183	16	100	9			
Paramentação	4,94	2,70	1	79	16					
Descanso médico	11,46	2,70	4	183	16	100	9			

10. RESULTADOS DOS CÁLCULOS DE CARGA TÉRMICA

O cálculo de carga térmica foi realizado tendo como referência as condições definidas no item 6 – CONDIÇÕES BÁSICAS CONSIDERADAS NO PROJETO, bem como o quantitativo de pessoas presentes nos recintos, carga de iluminação e de equipamentos, taxas de ar externo e as cargas de insolação e transmissão de calor do prédio.

Os cálculos foram realizados através do programa HAP-49 da Carrier.

As tabelas abaixo demonstram o resumo dos cálculos da carga térmica dos recintos:

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HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - P. M. DE SAQUAREMA - 1º PAVIMENTO

ITEM	CARGA TÉRMICA DAS ZONAS					
	RECINTOS	ÁREA [m²]	CARGA TÉRMICA			CT [TR]
			CS [KW]	CL [KW]	CT [KW]	
1	Espera1+Recep+Capela+Classificação de Risco	114,60	21,06	11,59	32,65	9,3
2	Isolamento e antecâmara	12,00	2,97	0,50	3,47	1,0
3	Unidade SI + AC	74,90	8,82	3,75	12,57	3,6
4	Aplicação de medicamentos	47,20	7,48	5,15	12,63	3,6
5	Sala de exames	5,60	1,25	0,70	1,95	0,6
6	Sala de suturas	9,30	1,79	0,74	2,52	0,7
7	Consultório 01	7,30	1,21	0,70	1,91	0,5
8	Consultório 02	7,10	1,21	0,70	1,91	0,5
9	Isolamento e antecâmara	11,70	1,74	0,90	2,64	0,8
10	Sala Vermelha/Sala de emergência	103,90	16,88	10,22	27,10	7,7
11	Raio X/Recepção Digit/Vestiário	26,40	6,22	1,25	7,47	2,1
12	Farmácia Satélite	6,90	0,98	0,32	1,30	0,4
13	Sala distribuição/Estocagem	19,30	2,74	0,89	3,63	1,0
14	Plantão 01	6,70	1,53	0,48	2,01	0,6
15	Plantão 02	5,20	1,42	0,48	1,90	0,5
16	Administração	6,90	1,26	0,32	1,58	0,4
17	Enfermaria Masc/Fem/Posto de enfermagem	115,40	15,09	5,92	21,01	6,0
18	Ortopedia	8,90	1,54	0,73	2,27	0,6
19	Sala de gesso	7,90	1,45	0,48	1,93	0,5
20	Obs.Pediátrica/Aplic.Med/Reidratação/Aten.Imed.	159,40	25,01	11,63	36,64	10,4
21	Isolamento e antecâmara	9,70	2,27	0,84	3,10	0,9
22	Consultório 01A	6,30	1,53	0,60	2,13	0,6
23	Consultório 02A	7,00	1,33	0,77	2,10	0,6
24	Nutricionista	7,50	2,91	0,95	3,86	1,1
25	Estar copeira	4,00	0,92	0,25	1,17	0,3
26	Nutri/Adm	6,80	1,72	0,75	2,47	0,7
27	Refeitório	26,00	7,92	5,18	13,10	3,7
28	Distribuição Refeitório	7,50	0,92	0,46	1,38	0,4
29	Preparo de carne	4,80	1,39	0,26	1,65	0,5
30	Armário Seco	4,80	1,28	0,25	1,53	0,4
31	Hortifruti	5,40	1,28	0,30	1,58	0,4
32	Recepção (Lavagem de vegetais)	5,40	2,30	0,48	2,78	0,8
33	Lavagem/Envase/Param./Alim.Parenteral(lactário)	11,65	2,49	0,92	3,41	1,0
34	Necrotério	18,70	7,39	5,38	12,77	3,6

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HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - P. M. DE SAQUAREMA - 1º PAVIMENTO

ITEM	CARGA TÉRMICA TOTAL					
	RECINTOS	AE [m²/h]	CT [KW]	CT [TR]	Vazão [L/s]	Vazão [m³/h]
1	Espera1+Recep+Capela+Classificação de Risco	1335	32,65	9,3	1051	3790
2	Isolamento e antecâmara	70	3,47	1,0	195	710
3	Unidade SI + AC	435	12,57	3,6	472	1700
4	Aplicação de medicamentos	680	12,43	3,6	299	1080
5	Sala de exames	90	1,95	0,6	63	230
6	Sala de suturas	90	2,52	0,7	106	390
7	Consultório 01	90	1,91	0,5	215	780
8	Consultório 02	90	1,91	0,5	215	780
9	Isolamento e antecâmara	140	2,64	0,8	85	310
10	Sala Vermelha/Sala de emergência	1510	27,10	7,7	684	2470
11	Raio X/Recepção_Digit/Vestiário	160	7,47	2,1	387	1400
12	Farmácia Satélite	40	1,30	0,4	60	220
13	Sala distribuição/Estocagem	115	3,63	1,0	159	580
14	Plantão 01	55	2,01	0,6	99	360
15	Plantão 02	55	1,90	0,5	93	340
16	Administração	40	1,58	0,4	83	300
17	Enfermaria Masc/Fem/Posto de enfermagem	755	21,01	6,0	960	3460
18	Ortopedia	90	2,27	0,6	86	310
19	Sala de gesso	55	1,93	0,5	92	340
20	Obs.Pediátrica/Aplic.Med/Reidratação/Aten.Imed.	1460	36,64	10,4	1503	5420
21	Isolamento e antecâmara	115	3,10	0,9	139	510
22	Consultório 01A	90	2,13	0,6	111	400
23	Consultório 02A	90	2,10	0,6	86	310
24	Nutricionista	115	3,86	1,1	190	690
25	Estar copeira	30	1,17	0,3	61	220
26	Nutri/Adm	90	2,47	0,7	101	370
27	Refeitório	760	13,10	3,7	331	1200
28	Distribuição Refeitório	55	1,38	0,4	50	190
29	Preparo de carne	30	1,65	0,5	99	360
30	Armário Seco	30	1,53	0,4	92	340
31	Hortifruti	40	1,58	0,4	87	320
32	Recepção (Lavagem de vegetais)	55	2,78	0,8	164	600
33	Lavagem/Envase/Param./Alim.Parenteral(lactário)	100	3,41	1,0	151	550
34	Necrotério	960	12,77	3,6	264	960

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HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - P. M. DE SAQUAREMA - 2º PAVIMENTO

ITEM	CARGA TÉRMICA DAS ZONAS					
	RECINTOS	ÁREA [m²]	CARGA TÉRMICA			CT [TR]
			CS [KW]	CL [KW]	CT [KW]	
1	CCIH/CVE/CRO/CRP	21,00	6,98	1,24	8,22	2,3
2	Descanso médico	11,50	3,97	1,19	5,16	1,5
3	Direção Adm	12,90	4,13	0,93	5,06	1,4
4	Direção Geral	22,76	6,07	1,05	7,12	2,0
5	Farmácia	5,52	1,77	0,23	2,00	0,6
6	Gerência enfermagem	22,76	6,83	1,34	8,16	2,3
7	Laboratório	15,40	5,29	0,84	6,13	1,7
8	NIR	10,30	4,29	0,92	5,21	1,5
9	Plantão	11,41	4,00	0,69	4,68	1,3
10	Posto de enfermagem	12,28	4,15	0,61	4,76	1,4
11	Quarto 01	10,70	4,29	0,77	5,06	1,4
12	Quarto 02	15,10	4,77	0,88	5,65	1,6
13	Quarto 03	14,90	4,63	0,63	5,26	1,5
14	Quarto 04	14,70	4,84	1,00	5,84	1,7
15	Quarto 05	17,90	5,62	1,04	6,66	1,9
16	Quarto 06	17,70	6,00	0,96	6,96	2,0
17	Quarto 07	12,90	4,87	0,74	5,61	1,6
18	Quarto 08	16,70	5,22	1,04	6,26	1,8
19	Quarto de descanso 01	16,42	4,77	1,20	5,97	1,7
20	Quarto de descanso 02	16,46	4,77	1,20	5,97	1,7
21	Quarto de descanso 03	14,46	4,77	1,20	5,96	1,7
22	Quarto Psiquiatria 01	11,90	3,89	0,69	4,58	1,3
23	Quarto Psiquiatria 02	9,55	3,92	0,71	4,63	1,3
24	Quarto Psiquiatria 03 - Pediátrico	14,20	5,10	1,11	6,21	1,8
25	Rack	4,40	2,85	0,23	3,08	0,9
26	Sala de Reunião	17,00	5,78	2,04	7,82	2,2
27	Sala de TI	11,40	4,28	0,85	5,13	1,5
28	Isolamento + Antecâmara	10,00	4,12	0,50	4,62	1,3
29	Purif/Prep/Desinf./Guarda/Esteri/Param	51,50	17,34	2,18	19,52	5,5
30	Sala Equip/Área Colet Trat/Serviço	127,40	35,55	7,53	43,09	12,2
31	Isolamento + Antecâmara	18,60	5,19	0,82	6,01	1,7
32	Quarto de descanso 04	14,46	4,84	0,54	5,38	1,5
33	Quarto de descanso 05	13,82	4,95	0,55	5,50	1,6
34	Quarto de descanso 06	10,74	3,79	0,84	4,62	1,3

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HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - P. M. DE SAQUAREMA - 2º PAVIMENTO

ITEM	CARGA TÉRMICA TOTAL					
	RECINTOS	AE [m³/h]	CT [KW]	CT [TR]	Vazão [L/s]	Vazão [m³/h]
1	CCIH/CVE/CRO/CRP	115	8,22	2,3	504	1820
2	Descanso médico	90	5,16	1,5	267	970
3	Direção Adm	90	5,06	1,4	286	1030
4	Direção Geral	125	7,12	2,0	424	1530
5	Farmácia	30	2,00	0,6	156	570
6	Gerência enfermagem	126	8,16	2,3	486	1750
7	Laboratório	90	6,13	1,7	466	1680
8	NIR	90	5,21	1,5	305	1100
9	Plantão	105	4,68	1,3	338	1220
10	Posto de enfermagem	70	4,76	1,4	368	1330
11	Quarto 01	120	5,06	1,4	298	1080
12	Quarto 02	130	5,65	1,6	328	1190
13	Quarto 03	90	5,26	1,5	333	1200
14	Quarto 04	145	5,84	1,7	330	1190
15	Quarto 05	155	6,66	1,9	386	1390
16	Quarto 06	145	6,96	2,0	428	1550
17	Quarto 07	115	5,61	1,6	344	1240
18	Quarto 08	155	6,26	1,8	354	1280
19	Quarto de descanso 01	115	5,97	1,7	335	1210
20	Quarto de descanso 02	115	5,97	1,7	335	1210
21	Quarto de descanso 03	115	5,96	1,7	335	1210
22	Quarto Psiquiatria 01	115	4,58	1,3	234	850
23	Quarto Psiquiatria 02	115	4,63	1,3	268	970
24	Quarto Psiquiatria 03 - Pediátrico	160	6,21	1,8	346	1250
25	Rack	15	3,08	0,9	218	790
26	Sala de Reunião	190	7,82	2,2	376	1360
27	Sala de TI	90	5,13	1,5	373	1350
28	Isolamento + Antecâmara	55	4,62	1,3	290	1050
29	Purif/Prep/Desinf./Guarda/Esteri/Param	295	19,52	5,5	1400	5050
30	Sala Equip/Área Colet Trat/Serviço	871	43,09	12,2	2312	8330
31	Isolamento + Antecâmara	105	6,01	1,7	351	1270
32	Quarto de descanso 04	90	5,38	1,5	427	1540
33	Quarto de descanso 05	90	5,50	1,6	433	1560
34	Quarto de descanso 06	90	4,62	1,3	320	1160

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11. DIMENSIONAMENTO DAS TUBULAÇÕES DE GÁS REFRIGERANTE

Os diâmetros das tubulações de gás refrigerante dos splits da Midea/Carrier, Tosi e Traydus, foram definidos em função da capacidade dos condicionadores de ar e o comprimento equivalente das tubulações entre as unidades evaporadoras e condensadoras, conforme especificado nos catálogos dos fabricantes. Segue abaixo planilha de dimensionamento das tubulações:

9000 BTU/H			
0 - 25 metros			
UE/UC	COMP	Sucção	Líquido
		Pol	Pol
03	23,0	3/8	1/4
04	25,0	3/8	1/4
07	6,5	3/8	1/4
08	13,5	3/8	1/4
09	16,0	3/8	1/4
15	14,0	3/8	1/4
18	14,0	3/8	1/4
21	15,0	3/8	1/4
23	18,0	3/8	1/4
28	15,0	3/8	1/4
31	15,0	3/8	1/4
47	20,0	3/8	1/4
48	21,0	3/8	1/4
50	15,0	3/8	1/4
53	9,0	3/8	1/4
55	8,0	3/8	1/4
57	11,0	3/8	1/4
58	12,0	3/8	1/4
59	14,5	3/8	1/4
61	9,5	3/8	1/4

12000 BTU/H			
0 - 25 metros			
UE/UC	COMP	Sucção	Líquido
		Pol	Pol
02	23	1/2	1/4
16	12	1/2	1/4
20	15	1/2	1/4
33	12	1/2	1/4
34	7,5	1/2	1/4
45	10	1/2	1/4
49	21	1/2	1/4

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18000 BTU/H			
<i>0 - 30 metros</i>			
UE/UC	COMP	Sucção	Líquido
		Pol	Pol
05	1	1/2	1/4
06	1	1/2	1/4
17	4,5	1/2	1/4
20	1	1/2	1/4
24	7,5	1/2	1/4
29	5,5	1/2	1/4
43	4	1/2	1/4
45	16	1/2	1/4
65	7,5	1/2	1/4
66	12	1/2	1/4
75	10	1/2	1/4

24000 BTU/H			
<i>0 - 30 metros</i>			
UE/UC	COMP	Sucção	Líquido
		Pol	Pol
03	24	5/8	3/8
10	5,5	5/8	3/8
12	1	5/8	3/8
19	4,5	5/8	3/8
22	4	5/8	3/8
30	11,5	5/8	3/8
32	14	5/8	3/8
35	4,5	5/8	3/8
39	3	5/8	3/8
40	3	5/8	3/8
42	3	5/8	3/8
44	8,5	5/8	3/8
51	7	5/8	3/8
52	7,5	5/8	3/8
54	9,5	5/8	3/8
56	10	5/8	3/8
60	7	5/8	3/8
62	11	5/8	3/8
63	24	5/8	3/8
64	7	5/8	3/8
71	5	5/8	3/8
74	8	5/8	3/8

30000 BTU/H			
<i>0 - 30 metros</i>			
UE/UC	COMP	Sucção	Líquido
		Pol	Pol
13	3	7/8	3/8
41	3,5	7/8	3/8

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DIMENSIONAMENTO DE TUBULAÇÕES DE GÁS REFRIGERANTE DE SPLITS
SPLITS TIPO BUILT-IN VERSATILE DE 48000 BTU/H - MARCAR CARRIER

CLIENTE: CASALIS
 OBRA: HMPNA
 IDENTIF: SAQUAREMA
 DATA: 16/03/23

48000 BTU/H - Série 42BQA (Rotativo)							
UE/UC	COMP	0 a 10 m			>10 - <=30		
		COMP	Sucção	Líquido	COMP	Sucção	Líquido
			Pol	Pol		Pol	Pol
11	4	4,00	1	3/8			

DIÂMETROS E COMPRIMENTOS DAS TUBULAÇÕES DE GÁS					
ITEM	TAG	CAPACIDADE (Btu/h ou TR)	TUBULAÇÕES		
			Comp (m)	Sucção (pol)	Líquido (pol)
1	UE/UC-72	15TR	4,0	2x 1 3/8"	2x 5/8"
2	UE/UC-38	10TR	5,0	2x 1 1/8"	2x 1/2"
3	UE/UC-26	10TR	14,0	2x 1 1/8"	2x 1/2"
4	UE/UC-37	7,5TR	6,0	1 3/8"	5/8"
5	UE/UC-36	5,0TR	7,0	1 1/8"	1/2"
5	UE/UC-67	5,0TR	11,0	1 1/8"	1/2"
5	UE/UC-69	5,0TR	11,0	1 1/8"	1/2"
6	UE/UC-25	1,0TR	4,0	5/8"	3/8"
6	UE/UC-68	2,0TR	9,5	7/8"	3/8"
6	UE/UC-70	2,0TR	11,0	7/8"	3/8"
6	UE/UC-73	2,0TR	5,5	5/8"	3/8"
12	UE/UC-01	1,0TR	13,0	5/8"	3/8"
12	UE/UC-14	1,0TR	12,0	5/8"	3/8"

12. DIMENSIONAMENTO DAS REDES DE DUTOS DE AR CONDICIONADO

Os dutos de insuflação de ar condicionado foram calculados pelo método "Equal Friction" considerando as seguintes condições:

Velocidade máxima: 8,0 m/s
 Perda mínima: 0,07 mmca/m
 Perda máxima: 0,13 mmca/m

Segue abaixo a planilha de cálculos dos dutos:

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DIMENSIONAMENTO DE DUTOS - MÉTODO EQUAL FRICTION

CLIENTE: Casális
OBRA: HMPNA - Saquarema
SISTEMA: Unidade SI + Antecâmara

DADOS DO SISTEMA

DATA: 27/01/23

Vazão Inicial: 2500 m³/h
Velocidade inicial do ar: 6,00 m/s
Altura inicial do duto: 25 cm
Largura inicial do duto: 50 cm
Diâmetro Equivalente: 40 cm
Perda de carga por metro: 0,10 mmca/m de duto

RELAÇÃO DOS RAMAIS DE DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VELOC.	PERDA	DIÂMETRO	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(mmca/m)	(cm)	(m)	(mmca)
1	2500	50	25	5,6	0,091	40		
2	1720	40	25	4,8	0,081	35		
3	940	25	25	4,2	0,077	30		
4	680	20	25	3,8	0,080	25		
5	420	15	20	3,9	0,110	20		
6	160	15	10	3,0	0,096	15		
7	780	20	25	4,3	0,102	25		
8	520	20	20	3,6	0,073	25		
9	260	15	20	2,4	0,046	20		

DIMENSIONAMENTO DE DUTOS - MÉTODO EQUAL FRICTION

CLIENTE: Casális
OBRA: HMPNA - Saquarema
SISTEMA: Aplicação de Medicamentos

DADOS DO SISTEMA

DATA: 25/01/23

Vazão Inicial: 1080 m³/h
Velocidade inicial do ar: 5,00 m/s
Altura inicial do duto: 25 cm
Largura inicial do duto: 25 cm
Diâmetro Equivalente: 30 cm
Perda de carga por metro: 0,11 mmca/m de duto

RELAÇÃO DOS RAMAIS DE DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VELOC.	PERDA	DIÂMETRO	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(mmca/m)	(cm)	(m)	(mmca)
1	1080	25	25	4,8	0,099	30		
2	810	25	25	3,6	0,058	30		
3	540	15	25	4,0	0,088	25		
4	270	15	15	3,3	0,083	20		

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DIMENSIONAMENTO DE DUTOS - MÉTODO EQUAL FRICTION

CLIENTE: Casális

OBRA: HMPNA - Saquarema

SISTEMA: Sala Vermelha + Sala de emergência

DADOS DO SISTEMA

DATA: 27/01/23

Vazão Inicial: 2500 m³/h
Velocidade inicial do ar: 6,00 m/s
Altura inicial do duto: 15 cm
Largura inicial do duto: 80 cm
Diâmetro Equivalente: 35 cm
Perda de carga por metro: 0,12 mmca/m de duto

RELAÇÃO DOS RAMAIS DE DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VELOC.	PERDA	DIÂMETRO	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(mmca/m)	(cm)	(m)	(mmca)
1	2500	80	15	5,8	0,115	35		
2	1095	45	15	4,5	0,088	30		
3	730	30	15	4,5	0,110	25		
4	365	20	15	3,4	0,085	20		
5	1040	40	15	4,8	0,099	30		
6	310	15	15	3,8	0,107	20		
7	675	30	15	4,2	0,095	25		

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DIMENSIONAMENTO DE DUTOS - EQUAL FRICTION

CLIENTE: Casális

OBRA: HMPNA - Saquarema

SISTEMA: Aplicação Med/Obs. Pediátrica/Espera_Recep/Atendimentos Imediatos/Consultórios

DADOS DO SISTEMA

DATA: 30/01/23

Vazão Inicial: 5500 m³/h
Velocidade inicial do ar: 6,50 m/s
Altura inicial do duto: 40 cm
Largura inicial do duto: 60 cm
Diâmetro Equivalente: 55 cm
Perda de carga por metro: 0,08 mmca/m de duto

Novo

Calcular

RAMAIS DOS DUTOS								
Nº DO RAMAL	VAZÃO (m ³ /h)	LARGURA (cm)	ALTURA (cm)	VELOC. (m/s)	PERDA (mmca/m)	DIÂMETRO (cm)	COMP. (m)	PERDA (mmca)
1	5500	60	40	6,4	0,079	55		
2	5080	60	40	5,9	0,068	55		
3	2620	35	40	5,2	0,070	45		
4	2410	35	40	4,8	0,060	45		
5	2190	30	40	5,1	0,077	40		
6	1970	30	40	4,6	0,063	40		
7	1750	30	35	4,6	0,065	40		
8	1595	30	30	4,9	0,086	35		
9	1375	30	30	4,2	0,065	35		
10	1155	30	25	4,3	0,080	30		
11	620	20	25	3,4	0,067	25		
12	535	15	25	4,0	0,087	25		
13	315	10	25	3,5	0,091	20		
14	220	10	30	2,0	0,034	20		
15	155	10	30	1,4	0,018	20		
16	2040	30	40	4,7	0,067	40		
17	1780	35	30	4,7	0,067	40		
18	940	40	15	4,4	0,083	30		
19	630	15	30	3,9	0,084	25		
20	420	15	25	3,1	0,056	25		
21	210	10	25	2,3	0,044	20		
22	3040	40	40	5,3	0,071	45		
23	1570	30	30	4,8	0,083	35		
24	400	20	15	3,7	0,101	20		
25	540	25	15	4,0	0,088	25		
26	420	15	25	3,1	0,056	25		
27	210	10	25	2,3	0,044	20		

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DIMENSIONAMENTO DE DUTOS - EQUAL FRICTION

CLIENTE: Casális

OBRA: HMPNA - Saquarema

SISTEMA: Enfermarias Masculina e Feminina + Posto de Enfermagem

DADOS DO SISTEMA

DATA: 30/01/23

Vazão Inicial: 3500 m³/h
Velocidade inicial do ar: 6,50 m/s
Altura inicial do duto: 20 cm
Largura inicial do duto: 75 cm
Diâmetro Equivalente: 45 cm
Perda de carga por metro: 0,10 mmca/m de duto

Novo

Calcular

RAMAIS DOS DUTOS								
Nº DO RAMAL	VAZÃO (m ³ /h)	LARGURA (cm)	ALTURA (cm)	VELOC. (m/s)	PERDA (mmca/m)	DIÂMETRO (cm)	COMP. (m)	PERDA (mmca)
1	3500	75	20	6,5	0,104	45		
2	2722	65	20	5,8	0,099	40		
3	2558	60	20	5,9	0,102	40		
4	2230	55	20	5,6	0,093	40		
5	1630	45	20	5,0	0,089	35		
6	1040	30	20	4,8	0,099	30		
7	590	20	20	4,1	0,092	25		
8	295	10	20	4,1	0,121	20		
9	450	15	20	4,2	0,125	20		
10	225	10	20	3,1	0,074	20		
11	360	15	20	3,3	0,083	20		
12	240	10	20	3,3	0,083	20		
13	120	10	20	1,7	0,024	20		
14	328	15	20	3,0	0,070	20		
15	164	10	20	2,3	0,042	20		
16	120	10	15	2,2	0,057	15		
17	3172	70	20	6,3	0,114	40		
18	2745	65	20	5,9	0,100	40		
19	2080	50	20	5,8	0,115	35		
20	2680	65	20	5,7	0,096	40		

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DIMENSIONAMENTO DE DUTOS - MÉTODO EQUAL FRICTION

CLIENTE: Casális

OBRA: HMPNA - Saquarema

SISTEMA: Purificação/Preparo/Desinf/Guarda/Esteril/Paramentação

DADOS DO SISTEMA

DATA: 25/01/23

Vazão Inicial: 5000 m³/h
Velocidade inicial do ar: 7,00 m/s
Altura inicial do duto: 25 cm
Largura inicial do duto: 80 cm
Diâmetro Equivalente: 50 cm
Perda de carga por metro: 0,11 mmca/m de duto

RELAÇÃO DOS RAMAIS DE DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VELOC.	PERDA	DIÂMETRO	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(mmca/m)	(cm)	(m)	(mmca)
1	5000	80	25	6,9	0,104	50		
2	3350	60	25	6,2	0,096	45		
3	1750	45	20	5,4	0,101	35		
4	1600	45	20	4,9	0,086	35		
5	1500	35	25	4,8	0,081	35		
6	500	20	20	3,5	0,068	25		
7	150	10	25	1,7	0,024	20		
8	4700	80	25	6,5	0,093	50		
9	500	35	10	4,0	0,114	20		
10	1500	15	65	4,3	0,066	35		
11	3250	25	65	5,6	0,078	45		
12	1750	15	65	5,0	0,088	35		
13	3500	25	65	6,0	0,090	45		
14	2375	20	65	5,1	0,077	40		

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DIMENSIONAMENTO DE DUTOS - MÉTODO EQUAL FRICTION

CLIENTE: Casális

OBRA: HMPNA - Saquarema

SISTEMA: Sala de Equip/Áreas coletivas de tratamento/Serviço

DADOS DO SISTEMA

DATA:

Vazão Inicial: 8410 m³/h
Velocidade inicial do ar: 7,00 m/s
Altura inicial do duto: 40 cm
Largura inicial do duto: 85 cm
Diâmetro Equivalente: 65 cm
Perda de carga por metro: 0,08 mmca/m de duto

RELAÇÃO DOS RAMAIS DE DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VELOC.	PERDA	DIÂMETRO	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(mmca/m)	(cm)	(m)	(mmca)
1	8410	85	40	6,9	0,074	65		
2	5740	85	30	6,3	0,076	55		
3	1335	50	15	4,9	0,104	30		
4	5220	80	30	6,0	0,072	55		
5	520	15	30	3,2	0,059	25		
6	3440	55	30	5,8	0,085	45		
7	2250	40	30	5,2	0,081	40		
8	1360	30	30	4,2	0,064	35		
9	470	15	30	2,9	0,049	25		

DIMENSIONAMENTO DE DUTOS - VELOCIDADE CONSTANTE

Cliente: Casális

Obra: HMPNA - Saquarema

Sistema: Dutos de exaustão das coifas

DADOS DO SISTEMA

DATA: 24/01/23

Vazão Inicial: 13650 m³/h
Velocidade inicial do ar: 13,00 m/s
Altura inicial do duto: 40 cm
Largura inicial do duto: 75 cm
Diâmetro Equivalente: 60 cm
Perda de carga por metro: 0,26 mmca/m de duto

RELAÇÃO DOS RAMAIS DE DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VEL.REAL	DIÂMETRO	PERDA	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(cm)	mmca/m	(m)	(mmca)
1	13650	72	40	13,2	60	0,27		
2	9750	52	40	13,0	50	0,33		
3	5170	27	40	13,3	40	0,44		
4	1275	13	20	13,6	20	1,08		
5	3900	20	40	13,5	35	0,54		
6	685	14	10	13,6	15	1,53		

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DIMENSIONAMENTO DE DUTOS - MÉTODO EQUAL FRICTION

CLIENTE: Casális
OBRA: HMPNA - Saquarema
SISTEMA: Insuflação da cozinha - 1º Pavimento

DADOS DO SISTEMA

DATA: 24/01/23

Vazão Inicial: 13100 m³/h
Velocidade inicial do ar: 7,50 m/s
Altura inicial do duto: 40 cm
Largura inicial do duto: 125 cm
Diâmetro Equivalente: 75 cm
Perda de carga por metro: 0,07 mmca/m de duto

RELAÇÃO DOS RAMAIS DE DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VELOC.	PERDA	DIÂMETRO	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(mmca/m)	(cm)	(m)	(mmca)
1	13100	125	40	7,3	0,069	75		
2	12285	70	70	7,0	0,059	80		
3	6150	40	70	6,1	0,066	60		
4	4100	30	70	5,4	0,066	50		
5	2050	20	70	4,1	0,051	40		
6	6135	40	70	6,1	0,065	60		
7	4100	30	70	5,4	0,066	50		
8	2050	20	70	4,1	0,051	40		
9	815	15	40	3,8	0,064	30		
10	760	15	40	3,5	0,056	30		
11	760	50	10	4,2	0,098	25		

DIMENSIONAMENTO DE DUTOS - EQUAL FRICTION

CLIENTE: Casális
OBRA: HMPNA - Saquarema
SISTEMA: Exaustão Recintos da cozinha

DADOS DO SISTEMA

DATA: 29/01/23

Vazão Inicial: 735 m³/h
Velocidade inicial do ar: 4,50 m/s
Altura inicial do duto: 20 cm
Largura inicial do duto: 25 cm
Diâmetro Equivalente: 25 cm
Perda de carga por metro: 0,11 mmca/m de duto

Novo

Calcular

RAMAIS DOS DUTOS								
Nº DO	VAZÃO	LARGURA	ALTURA	VELOC.	PERDA	DIÂMETRO	COMP.	PERDA
RAMAL	(m ³ /h)	(cm)	(cm)	(m/s)	(mmca/m)	(cm)	(m)	(mmca)
1	735	25	20	4,1	0,092	25		
2	680	25	20	3,8	0,080	25		
3	540	20	20	3,8	0,079	25		
4	445	20	20	3,1	0,055	25		

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13. PERDAS DE CARGAS NOS DUTOS, EQUIPAMENTOS E ACESSÓRIOS

As perdas de cargas nos sistemas de ar condicionado e exaustão mecânica foram calculadas conforme tabelas a seguir e, serviram de base para a seleção dos condicionadores de ar tipo splitão.

CÁLCULOS DA PRESSÃO ESTÁTICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-25 - 1º Pavimento - Isolamento + Antecâmara

DADOS DO SISTEMA

VAZÃO DE AR: 310 m³/h
 PERDA/METRO: 0,07 mmca/m
 VELOCIDADE DO AR: 1,5 m/s
 P. DINÂMICA: 0,14 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	30	20	30	310	1,44	1,5	0,01	0,0164391
2	20	20	25	240	1,67	0,6	0,02	0,0107828
3	30	30	35	170	0,52	0,7	0,00	0,0010183
4	30	15	25	170	1,05	1,8	0,01	0,0139376
SUB-TOTAL:								0,0421778

ACIDENTES E ACESSÓRIOS

CURVAS, JOELHOS, REDUÇÕES, ETC

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
30	20	310	1,44	0,21	0,13	1	0,03
30	30	170	0,52	0,21	0,02	2	0,01
30	15	170	1,05	0,21	0,07	2	0,03
SUB-TOTAL:							0,06

OUTROS ACESSÓRIOS

COSTOS ACCESÓRIOS	
TIPO	PERDA
	mmca
Damper corta fogo de 30x30 cm	2,50
Damper corta fogo de 30x20 cm	3,00
Difusor quadrado de 4 saídas de 9"x9"	2,30
Veneziana de retorno 300x300mm	1,02
SUB-TOTAL:	
	8,82

RESUMO DA PERDA DE CARGA NO SISTEMA

RECURSO DEVERIA DE CARGA DO SISTEMA	
TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	0,04
PERDAS NAS CURVAS	0,06
PERDAS NOS DEMAIS ACESSÓRIOS	8,82
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	0,07
SUB-TOTAL:	8,99
FOLGA DE 15%	1,35
PERDA DE CARGA DO SISTEMA (mmca):	10,34
PERDA ADOTADA NO PROJETO (mmca):	15,00

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CÁLCULOS DA PRESSÃO ESTATICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-26 - 1º Pavimento - Sala Observação e Emergência

DADOS DO SISTEMA

VAZÃO DE AR: 2500 m³/h

PERDA/METRO: 0,12 mmca/m

VELOCIDADE DO AR: 5,8 m/s

P. DINÂMICA: 2,06 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	80	15	35	2500	5,79	4,75	0,11	0,5456366
2	105	15	40	2500	4,41	1	0,06	0,0595003
3	45	15	30	1095	4,51	2,9	0,09	0,2550016
4	30	15	25	730	4,51	3,15	0,11	0,3459844
5	20	15	20	365	3,38	3,3	0,09	0,2819043
6	45	15	30	990	4,07	8,3	0,07	0,6074986
7	25	25	30	990	4,40	2,8	0,08	0,2357526
8	45	10	25	495	3,06	5,85	0,05	0,3168369
SUB-TOTAL:								2,6481152

ACIDENTES E ACESSÓRIOS**CURVAS, JOELHOS, REDUÇÕES, ETC**

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
80	15	2500	5,79	0,21	2,05	2	0,86
45	15	1095	4,51	0,21	1,24	1	0,26
45	15	990	4,07	0,21	1,02	2	0,43
SUB-TOTAL:							1,55

OUTROS ACESSÓRIOS

TIPO	PERDA
	mmca
Damper corta fogo de 80x20 cm	3,00
Damper corta fogo de 50x20 cm	2,00
Damper controlador de vazão de 45x15cm	3,00
Difusor quadrado de 4 saídas de 9"x9"	2,30
SUB-TOTAL:	
	10,30

RESUMO DA PERDA DE CARGA NO SISTEMA

TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	2,65
PERDAS NAS CURVAS	1,55
PERDAS NOS DEMAIS ACESSÓRIOS	10,30
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	1,03
SUB-TOTAL:	15,53
FOLGA DE 15%	2,33
PERDA DE CARGA DO SISTEMA (mmca):	17,86
PERDA ADOTADA NO PROJETO (mmca):	25,00

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CÁLCULOS DA PRESSÃO ESTÁTICA DOS EQUIPAMENTOS

CLIENTE: *Casális Engenharia Ltda ME*

OBRA: HMPNA - Saguarema - RJ

SISTEMA: Sistema de ar condicionado da UE-36 - 2º Pavimento - CME - Centro de Materiais Esterilizados

DADOS DO SISTEMA

VAZÃO DE AR: 5000 m³/h

PERDA/METRO: 0,11 mmca/m

VELOCIDADE DO AR: 6.9 m/s

P. DINÂMICA: 2.92 mmca

TRECHOS RETOS DE DUTOS

TRENCHES REVISÃO DE BOMBA								
TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	80	25	50	5000	6,94	1,5	0,10	0,1553927
2	60	25	45	3350	6,20	0,55	0,10	0,052768
3	50	25	40	3350	7,44	1,3	0,15	0,2006631
4	45	20	35	1750	5,40	2,4	0,10	0,2431577
5	45	20	35	1550	4,78	1,6	0,08	0,1299784
6	65	15	35	940	2,68	2,7	0,03	0,0763022
7	65	25	45	2820	4,82	3,2	0,06	0,1939827
8	65	20	40	1880	4,02	2,8	0,05	0,1406265
9	80	25	50	4700	6,53	7,35	0,09	0,6803296
SUB-TOTAL:							1,8732009	

ACIDENTES E ACESSÓRIOS

CURVAS, JOELHOS, REDUÇÕES, ETC

[illegible]

OUTROS ACESSÓRIOS

TIPO	PERDA
	mmca
Damper corta fogo de 80x30 cm	3,00
Damper corta fogo de 80x30 cm	2,00
Damper controlador de vazão de 50x25cm	8,31
Difusor quadrado de 4 saídas de 18"x18"	2,30
Veneziana de retorno 500x400mm	1,05
SUB-TOTAL:	16,66

RESUMO DA PERDA DE CARGA NO SISTEMA

TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	1,87
PERDAS NAS CURVAS	3,38
PERDAS NOS DEMAIS ACESSÓRIOS	16,66
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	1,46
SUB-TOTAL:	23,37
FOLGA DE 15%	3,51
PERDA DE CARGA DO SISTEMA (mmca):	26,88
PERDA ADOTADA NO PROJETO (mmca):	30,00

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CÁLCULOS DA PRESSÃO ESTÁTICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-37 - Enfermarias e Posto de Enfermagem

DADOS DO SISTEMAVAZÃO DE AR: 3500 m³/h

PERDA/METRO: 0,1 mmca/m

VELOCIDADE DO AR: 6,5 m/s

P. DINÂMICA: 2,59 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P. TOTAL
-	LARG	ALTURA	mm	m ³ /h	m/s	m	mmca/m	mmca
1	75	20	45	3500	6,48	8	0,10	0,8312285
2	65	20	40	2722	5,82	2,35	0,10	0,2314761
3	55	20	40	2230	5,63	2,3	0,09	0,2136125
4	45	20	35	1630	5,03	1,9	0,09	0,1691541
5	30	20	30	1040	4,81	4,2	0,10	0,4166378
6	15	20	20	450	4,17	1,6	0,13	0,2000697
7	10	20	20	225	3,13	2,25	0,07	0,1666692
8	50	20	35	2080	5,78	4,2	0,11	0,4810536
9	55	20	40	2620	6,62	4,55	0,12	0,5666356
10	40	35	45	2745	5,45	3,6	0,08	0,2725268
11	65	20	40	2745	5,87	12,15	0,10	1,2152488
SUB-TOTAL:								4,7643129

ACIDENTES E ACESSÓRIOS**CURVAS, JOELHOS, REDUÇÕES, ETC**

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m ³ /h	m/s	-	mmca	-	mmca
75	20	3500	6,48	0,21	2,57	2	1,08
55	20	2722	6,87	0,21	2,89	1	0,61
55	20	2230	5,63	0,21	1,94	1	0,41
45	20	1630	5,03	0,11	1,55	2	0,34
15	20	450	4,17	0,21	1,06	1	0,22
50	20	2080	5,78	0,21	2,05	2	0,86
55	20	2620	6,62	0,21	2,68	1	0,56
65	20	2620	5,60	0,21	1,92	4	1,61
SUB-TOTAL:							5,70

OUTROS ACESSÓRIOS

TIPO	PERDA	
	mmca	
Damper corta fogo de 70x30 cm	2,00	
Damper corta fogo de 80x20 cm	2,00	
Difusor quadrado de 4 saídas de 9"x9"	2,30	
Veneziana de retorno 1200x400mm	1,02	
Damper controlador de vazão 65x20cm	5,07	
Damper controlador de vazão 55x20cm	4,76	
Damper controlador de vazão 45x20cm	3,80	
Damper controlador de vazão 30x20cm	3,48	
SUB-TOTAL:		24,43

RESUMO DA PERDA DE CARGA NO SISTEMA

TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	4,76
PERDAS NAS CURVAS	5,70
PERDAS NOS DEMAIS ACESSÓRIOS	24,43
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	1,29
SUB-TOTAL:	36,19
FOLGA DE 15%	5,43
PERDA DE CARGA DO SISTEMA (mmca):	41,61
PERDA ADOTADA NO PROJETO (mmca):	45,00

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CÁLCULOS DA PRESSÃO ESTATICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-38 - 1º Pavimento - Área Pediátrica

DADOS DO SISTEMA

VAZÃO DE AR: 5500 m³/h

PERDA/METRO: 0,08 mmca/m

VELOCIDADE DO AR: 6,4 m/s

P. DINÂMICA: 2,51 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	60	40	55	5500	6,37	16,6	0,08	1,3066919
2	60	25	45	4040	7,48	10,85	0,13	1,4637618
3	40	40	45	2620	4,55	0,8	0,05	0,0436328
4	40	35	45	2620	5,20	6,3	0,07	0,4381356
5	40	30	40	2190	5,07	1,9	0,08	0,1457373
6	40	30	40	1970	4,56	1,2	0,06	0,0759134
7	50	20	35	1750	4,86	2,6	0,08	0,2174561
8	45	20	35	1595	4,92	1,8	0,09	0,1540439
9	20	20	25	535	3,72	1,7	0,08	0,1314162
10	15	20	20	315	2,92	4,9	0,07	0,3201371
SUB-TOTAL:								4,296926

ACIDENTES E ACESSÓRIOS**CURVAS, JOELHOS, REDUÇÕES, ETC**

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
60	40	5500	6,37	0,21	2,48	6	3,13
60	40	4040	4,68	0,21	1,34	3	0,84
60	25	4040	7,48	0,11	3,43	2	0,75
40	35	2620	5,20	0,11	1,66	2	0,36
40	30	2410	5,58	0,11	1,91	2	0,42
40	30	1970	4,56	0,21	1,27	1	0,27
45	20	1595	4,92	0,11	1,48	2	0,33
15	20	535	4,95	0,21	1,50	1	0,32

SUB-TOTAL:

6,42**OUTROS ACESSÓRIOS**

TIPO	PERDA
	mmca
Damper corta fogo de 60x40 cm	2,00
Damper controlador de vazão de 40x35cm	4,00
Damper controlador de vazão de 40x30cm	3,00
Damper controlador de vazão de 45x20cm	4,00
Difusor quadrado de 4 saídas de 9"x9"	2,30

SUB-TOTAL:

15,30**RESUMO DA PERDA DE CARGA NO SISTEMA**

TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	4,30
PERDAS NAS CURVAS	6,42
PERDAS NOS DEMAIS ACESSÓRIOS	15,30
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	1,25
SUB-TOTAL:	27,27
FOLGA DE 15%	4,09
PERDA DE CARGA DO SISTEMA (mmca):	31,36
PERDA ADOPTADA NO PROJETO (mmca):	35,00

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CÁLCULOS DA PRESSÃO ESTÁTICA DOS EQUIPAMENTOS

CLIENTE: Casdís Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-67 - 1º Pavimento - Posto de Enfermagem/Aplicação Medicam.

DADOS DO SISTEMA

VAZÃO DE AR: 1080 m³/h

PERDA/METRO: 0,11 mmca/m

VELOCIDADE DO AR: 4,8 m/s

P. DINÂMICA: 1,41 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	35	25	35	1080	3,43	0,5	0,04	0,0221521
2	25	25	30	810	3,60	2,5	0,06	0,1460916
3	25	15	25	540	4,00	3	0,09	0,2652688
4	15	15	20	270	3,33	2,9	0,08	0,2415924
5	30	25	30	400	1,48	7	0,01	0,0812793
6	25	25	30	400	1,78	4,8	0,02	0,0776663
SUB-TOTAL:								0,8340504

ACIDENTES E ACESSÓRIOS**CURVAS, JOELHOS, REDUÇÕES, ETC**

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
35	25	1080	3,43	0,21	0,72	1	0,15
25	25	810	3,60	0,21	0,79	2	0,33
25	25	400	1,78	0,21	0,19	4	0,16
SUB-TOTAL:							0,65

OUTROS ACESSÓRIOS

TIPO	PERDA
	mmca
Damper corta fogo de 30x30 cm	2,50
Damper corta fogo de 40x30 cm	3,00
Difusor quadrado de 4 saídas de 9"x9"	2,30
Veneziana de retorno 400x200mm	1,02
SUB-TOTAL:	8,82

RESUMO DA PERDA DE CARGA NO SISTEMA

TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	0,83
PERDAS NAS CURVAS	0,65
PERDAS NOS DEMAIS ACESSÓRIOS	8,82
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	0,71
SUB-TOTAL:	11,01
FOLGA DE 15%	1,65
PERDA DE CARGA DO SISTEMA (mmca):	12,66
PERDA ADOTADA NO PROJETO (mmca):	15,00

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CÁLCULOS DA PRESSÃO ESTÁTICA DOS EQUIPAMENTOS

CLIENTE: *Casális Engenharia Ltda ME*

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-68 - 1º Pavimento - Isolamento + Antecâmara

DADOS DO SISTEMA

VAZÃO DE AR: $700 \text{ m}^3/\text{h}$

PERDA/METRO: 0,11 mmca/m

VELOCIDADE DO AR: 3,9 m/s

P. DINÂMICA: 0,93 mmca

TRECHOS RETOS DE DUTOS

[illegible]

ACIDENTES E ACESSÓRIOS

CURVAS, JOELHOS, REDUÇÕES, ETC

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
25	20	700	3,89	0,21	0,93	3	0,58
20	20	630	4,38	0,21	1,17	2	0,49

SUB-TOTAL:	1,08
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OUTROS ACESSÓRIOS

TIPO	PERDA
	mmca
Damper corta fogo de 30x20 cm	2,50
Damper corta fogo de 20x20 cm	2,50
Difusor quadrado de 4 saídas de 12"x12"	2,30
Veneziana de retorno 400x300mm	1,05

<i>SUB-TOTAL:</i>	8,35
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RESUMO DA PERDA DE CARGA NO SISTEMA

TIPO	PERDA
	mmca

PERDA NOS TRECHOS DE DUTOS RETOS	1,01
PERDAS NAS CURVAS	1,08
PERDAS NOS DEMAIS ACESSÓRIOS	8,35
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	0,47

SUB-TOTAL:	10,90
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FOLGA DE 15%	1,64
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PERDA DE CARGA DO SISTEMA (mmca):	12,54
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PERDA ADOTADA NO PROJETO (mmca):	15,00
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CÁLCULOS DA PRESSÃO ESTATICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-69 - 1º Pavimento - Unidade Semi-Intensiva

DADOS DO SISTEMA

VAZÃO DE AR: 2500 m³/h

PERDA/METRO: 0,1 mmca/m

VELOCIDADE DO AR: 5,6 m/s

P. DINÂMICA: 1,92 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	60	25	45	2500	4,63	1,25	0,06	0,0704024
2	40	25	35	1720	4,78	2,55	0,08	0,2066669
3	25	25	30	1040	4,62	1,75	0,09	0,1611689
4	25	20	25	780	4,33	1,75	0,10	0,179007
5	20	20	25	520	3,61	3,3	0,07	0,2422345
6	15	20	20	260	2,41	2,5	0,05	0,1151877
7	50	25	40	2065	4,59	1	0,06	0,0639878
8	25	50	40	2065	4,59	3,2	0,06	0,2047609
9	80	25	50	2065	2,87	2,75	0,02	0,0569772
SUB-TOTAL:								1,3003932

ACIDENTES E ACESSÓRIOS**CURVAS, JOELHOS, REDUÇÕES, ETC**

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
60	25	2500	4,63	0,21	1,31	2	0,55
50	25	2065	4,59	0,21	1,29	3	0,81
50	25	2065	4,59	0,11	1,29	2	0,28
40	25	1720	4,78	0,21	1,40	1	0,29
20	20	520	3,61	0,21	0,80	1	0,17
15	20	260	2,41	0,11	0,36	2	0,08
SUB-TOTAL:							2,19

OUTROS ACESSÓRIOS

TIPO	PERDA
	mmca
Damper corta fogo de 60x30 cm	3,00
Damper corta fogo de 50x30 cm	3,00
Damper controlador de vazão de 40x25cm	3,50
Damper controlador de vazão de 25x25cm	3,50
Difusor quadrado de 4 saídas de 9"x9"	2,30
Veneziana de retorno 1000x500mm	1,02
SUB-TOTAL:	16,32

RESUMO DA PERDA DE CARGA NO SISTEMA

TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	1,30
PERDAS NAS CURVAS	2,19
PERDAS NOS DEMAIS ACESSÓRIOS	16,32
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	0,96
SUB-TOTAL:	20,77
FOLGA DE 15%	3,12
PERDA DE CARGA DO SISTEMA (mmca):	23,88
PERDA ADOTADA NO PROJETO (mmca):	25,00

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CÁLCULOS DA PRESSÃO ESTÁTICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-70 - 2º Pavimento - Isolamento + Antecâmara

DADOS DO SISTEMA

VAZÃO DE AR: 1100 m³/h

PERDA/METRO: 0,11 mmca/m

VELOCIDADE DO AR: 4,9 m/s

P. DINÂMICA: 1,47 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	25	25	30	1100	4,89	4,75	0,10	0,4844742
2	25	10	20	200	2,22	2,55	0,04	0,1015639
3	25	25	30	1045	4,64	3,3	0,09	0,3065829
4	30	20	30	1045	4,84	0,5	0,10	0,0500346
SUB-TOTAL:								0,9426556

ACIDENTES E ACESSÓRIOS**CURVAS, JOELHOS, REDUÇÕES, ETC**

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
25	25	1100	4,89	0,21	1,46	4	1,23
25	25	1100	4,89	0,11	1,46	2	0,32
25	25	1045	4,64	0,21	1,32	4	1,11
SUB-TOTAL:							2,66

OUTROS ACESSÓRIOS

TIPO	PERDA
	mmca
Damper corta fogo de 30x30 cm	2,50
Damper corta fogo de 30x30 cm	2,50
Difusor quadrado de 4 saídas de 6"x6"	2,30
Veneziana de retorno 500x500mm	1,05
SUB-TOTAL:	
	8,35

RESUMO DA PERDA DE CARGA NO SISTEMA

TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	0,94
PEDAS NAS CURVAS	2,66
PERDAS NOS DEMAIS ACESSÓRIOS	8,35
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	0,74
SUB-TOTAL:	12,69
FOLGA DE 15%	1,90
PERDA DE CARGA DO SISTEMA (mmca):	14,59
PERDA ADOTADA NO PROJETO (mmca):	19,00

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CÁLCULOS DA PRESSÃO ESTATICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME

OBRA: HMPNA - Saquarema - RJ

SISTEMA: Sistema de ar condicionado da UE-72 - 2º Pavimento - Área coletiva de tratamento - CTI

DADOS DO SISTEMA

VAZÃO DE AR: 8410 m³/h

PERDA/METRO: 0,08 mmca/m

VELOCIDADE DO AR: 6,9 m/s

P. DINÂMICA: 2,92 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	85	40	65	8410	6,87	4,65	0,07	0,3430581
2	90	30	55	5740	5,91	1,5	0,07	0,1029955
3	80	30	55	5220	6,04	2,6	0,07	0,1860967
4	55	30	45	3440	5,79	3,5	0,08	0,2962759
5	40	30	40	2250	5,21	3	0,08	0,2417143
6	30	30	35	1360	4,20	3	0,06	0,1920922
7	30	15	25	470	2,90	2,5	0,05	0,123213
8	75	50	70	7845	5,81	4,3	0,05	0,2136501
9	80	50	70	7845	5,45	1	0,04	0,0441797
SUB-TOTAL:								1,7432754

ACIDENTES E ACESSÓRIOS**CURVAS, JOELHOS, REDUÇÕES, ETC**

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
85	40	8410	6,87	0,11	2,89	2	0,64
85	40	8410	6,87	0,21	2,89	1	0,61
49	40	5740	8,13	0,21	4,05	2	1,70
90	30	5740	5,91	0,21	2,14	2	0,90
55	30	3440	5,79	0,11	2,05	2	0,45
30	15	470	2,90	0,21	0,52	2	0,22
SUB-TOTAL:							4,51

OUTROS ACESSÓRIOS

TIPO	PERDA
	mmca
Damper corta fogo de 80x50 cm	3,00
Damper corta fogo de 90x40 cm	3,00
Damper controlador de vazão de 90x30cm	5,23
Damper controlador de vazão de 80x30cm	5,48
Difusor quadrado de 4 saídas de 9"x9"	2,30
Veneziana de retorno 1200x500mm	1,02
SUB-TOTAL:	20,03

RESUMO DA PERDA DE CARGA NO SISTEMA

RESUMO DA PERDA DE CARGA NO SISTEMA	
TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	1,74
PERDAS NAS CURVAS	4,51
PERDAS NOS DEMAIS ACESSÓRIOS	20,03
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	1,46
SUB-TOTAL:	27,74
FOLGA DE 15%	4,16
PERDA DE CARGA DO SISTEMA (mmca):	31,91
PERDA ADOPTADA NO PROJETO (mmca):	35,00

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14. EXAUSTÃO MECÂNICA

Os recintos abaixo relacionados, por não serem dotados de ventilação natural, foram beneficiados com sistemas de exaustão mecânica, conforme abaixo especificado:

1º PAVIMENTO

EXAUSTÃO MECÂNICA - PLANILHA DE CÁLCULOS

CLIENTE: CASALIS

OBRA: HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - 1º PAVIMENTO - P.M. DE SAQUAREMA

LOCAL: 1º PAVIMENTO

DATA: 18/01/2023

ITENS	RECINTOS	P.D. (m)	TAXA (Ren/h)	ÁREA (m²)	VOLUME (m³)	VAZÃO (m³/h)	
						Calculada	Adotada
1	PcD Masc. da recepção/espera principal	2,40	15	2,55	6,12	92	95
2	Banheiro do isolamento da emergência	2,40	15	3,71	8,90	134	135
3	Utilidades da emergência	2,40	15	5,83	13,99	210	210
4	DML (da Circulação A)	2,40	15	6,28	15,07	226	230
5	Utilidades da semi-intensiva	2,40	15	4,13	9,91	149	150
6	Utilidades posto de enfermagem	2,40	15	4,86	11,66	175	175
7	Banheiro 1 da enfermaria masc.	2,40	15	3,72	8,93	134	135
8	I.S. (da Circulação C)	2,40	15	1,72	4,13	62	65
9	Banh. Func. (da Circulação F)	2,40	15	2,70	6,48	97	100
10	Banheiro 2 da enfermaria masc.	2,40	15	4,01	9,62	144	145
11	Banheiro 3 da enfermaria feminina	2,40	15	3,83	9,19	138	140
12	I.S. Func. 1 (da Circulação F)	2,40	15	2,51	6,02	90	95
13	I.S. Func. 2 (da Circulação F)	2,40	15	2,50	6,00	90	95
14	PcD observação pediátrica	2,40	15	3,10	7,44	112	115
15	DML circulação H	2,40	15	1,47	3,53	53	55
16	Utilidades circulação H	2,40	15	3,32	7,97	120	120
17	DML da circulação G	2,40	15	2,40	5,76	86	90
18	Dep. de roupas da circulação G	2,40	15	2,02	4,85	73	75
19	Vest. + I.S. + I.S. (Cozinha)	2,40	15	7,55	18,12	272	275
20	PcD do isolamento pediátrico	2,40	15	3,00	7,20	108	110
21	Utilidades estocagem hemocomp.	2,40	15	3,42	8,21	123	125
22	DML - Unidade Semi-intensiva	2,40	15	3,15	7,56	113	115

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2º PAVIMENTO

EXAUSTÃO MECÂNICA - PLANILHA DE CÁLCULOS

CLIENTE: CASALIS

OBRA: HOSPITAL MUNICIPAL PORPHÍRIO NUNES DE AZEREDO - 2º PAVIMENTO - P.M. DE SAQUAREMA

LOCAL: 2º PAVIMENTO

DATA: 18/01/2023

ITENS	RECINTOS	P.D. (m)	TAXA (Ren/h)	ÁREA (m²)	VOLUME (m³)	VAZÃO (m³/h)	
						Calculada	Adotada
1	Banheiro 01 (Quartos)	2,40	15	3,23	7,75	116	120
2	Banheiro 02 (Quartos)	2,40	15	3,48	8,35	125	130
3	Banheiro 04 (Quartos)	2,40	15	3,93	9,43	141	145
4	Banheiro 05 (Quartos)	2,40	15	4,18	10,03	150	155
5	Banheiro 06 (Quartos)	2,40	15	3,94	9,46	142	145
6	Banheiro 07 (Quartos)	2,40	15	3,04	7,30	109	110
7	Banheiro 08 (Quartos)	2,40	15	4,18	10,03	150	155
8	Banheiro 01 (Quartos Psiquiatria)	2,40	15	2,93	7,03	105	110
9	Banheiro 02 (Quartos Psiquiatria)	2,40	15	3,17	7,61	114	115
10	Banheiro 03 (Quartos Psiquiatria)	2,40	15	4,36	10,46	157	160
11	Banheiro 04 (Quartos Psiquiatria)	2,40	15	3,68	8,83	132	135
12	Rouparia da circulação M	2,40	15	3,56	8,54	128	130
13	Lavabo da circulação Q	2,40	15	2,07	4,97	75	75
14	Banheiro (Circulação J)	2,40	15	3,99	9,58	144	145
15	DML da área coletiva de tratamento	2,40	15	2,39	5,74	86	90
16	Banh. (Circulação J)	2,40	15	1,69	4,06	61	65
17	DML (Circulação M)	2,40	15	2,40	5,76	86	90
18	Banheiro Plantão área coletiva de tratamento	2,40	15	2,79	6,70	100	105
19	Rouparia da área coletiva de tratamento	2,40	15	2,26	5,42	81	85
20	Utilidades da área coletiva de tratamento	2,40	15	5,96	14,30	215	215
21	Lavabo da circulação P	2,40	15	2,77	6,65	100	100
22	Copa da área coletiva de tratamento	2,40	15	2,82	6,77	102	105
23	I.S. (CCIH/CVE/CRO/CRP)	2,40	15	2,75	6,60	99	100
24	Copa (Circulação O)	2,40	15	2,52	6,05	91	95
25	Banheiro Funcionários Femininos	2,40	15	8,10	19,44	292	295
26	DML (Circulação J)	2,40	15	2,33	5,59	84	85
27	Utilidades circulação M	2,40	15	4,18	10,03	150	155

15. EXAUSTÃO MECÂNICA DA COZINHA

O sistema de exaustão mecânica da cozinha foi calculado conforme recomendação da Norma NBR 14518 – Sistemas de ventilação para cozinhas profissionais. O resultado dos cálculos é aquele indicado na planilha abaixo:

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DADOS DAS COIFAS				RESULTADOS						INSERIR DADOS	
TIPO DA COIFA	COMP. (m)	LARGURA (m)	ALTURA (m)	A1 (m²)	A2 (m²)	Q1 (m³/h)	Q2 (m³/h)	VAZÃO 1 (m³/h)	VAZÃO 2 (m³/h)	CONTAMINAÇÃO	OBS.
<i>Ilha</i>	3,50	1,45	0,90	5,08	8,91	11693	8019	11693		Com Gordura	
<i>2 Lados encostados</i>	0,92	0,65	0,90	0,60	1,41	861	1272	1272		Com Gordura	
<i>Forno</i>	0,95	0,40	0,10			684	684		684	Sem Gordura	
Conforme NBR 14518 da ABNT - Sistemas de ventilação para cozinhas profissionais.											
RESUMO DO SISTEMA											
						<i>Calculada</i>		<i>Adotada</i>			
Vazão de ar com gordura:.....						12965	m³/h	12965	m³/h		
Vazão de ar sem gordura:.....						684	m³/h	685	m³/h		
Vazão total de exaustão:.....						13649	m³/h	13650	m³/h		
Vazão de ar de insuflação:...						12284	m³/h	12285	m³/h		

CÁLCULOS DA PRESSÃO ESTÁTICA - DUTOS DE GORDURA

OBRA: HMPNA - SAQUAREMA - RJ

SISTEMA: DUTOS DE EXAUSTÃO DA COZINHA

DADOS DO SISTEMA

VAZÃO DE AR: 13650 m³/h
 PERDA/METRO: 0,26 mmca/m
 VELOCIDADE DO AR: 13 m/s
 P. DINÂMICA: 10,35 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	75	40	60	13650	12,64	13,10	0,25	3,23
2	55	40	55	9750	12,31	1,20	0,26	0,31
3	40	30	40	5170	11,97	1,20	0,37	0,44
4	20	15	20	1275	11,81	3,20	0,83	2,66
5	120	40	75	13650	7,90	2,50	0,08	0,20
SUB-TOTAL:								6,85

ACIDENTES E ACESSÓRIOS

CURVAS

LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
40	75	13650	12,64	1,1	9,79	2	21,53
75	40	13650	12,64	1,3	9,79	2	25,45
20	15	1275	11,81	0,23	8,54	1	1,96
15	20	1275	11,81	0,19	8,54	1	1,62
120	40	13650	7,90	1,3	3,82	1	4,97
SUB-TOTAL:							55,53

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OUTROS ACESSÓRIOS	
TIPO	PERDA mmca
Damper corta fogo de 75x40cm	2,00
Lavador de gases	17,00
Filtros inerciais das coifas	5,30
SUB-TOTAL:	24,30
RESUMO DA PERDA DE CARGA NO SISTEMA	
TIPO	PERDA mmca
PERDA NOS TRECHOS DE DUTOS RETOS	6,85
PEDAS NAS CURVAS	55,53
PERDAS NOS DEMAIS ACESSÓRIOS	24,30
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	5,18
SUB-TOTAL:	91,86
FOLGA DE 15%	13,78
PERDA DE CARGA DO SISTEMA (mmca):	105,64
PERDA DE CARGA ADOPTADA NO PROJETO (mmca):	110,00

CÁLCULOS DA PRESSÃO ESTÁTICA DOS EQUIPAMENTOS

CLIENTE: Casális Engenharia Ltda ME
 OBRA: HMPNA - Saquarema - RJ
 SISTEMA: Sistema de ventilação da cozinha

DADOS DO SISTEMA

VAZÃO DE AR: 13100 m³/h
 PERDA/METRO: 0,07 mmca/m
 VELOCIDADE DO AR: 7,3 m/s
 P. DINÂMICA: 3,26 mmca

TRECHOS RETOS DE DUTOS

TRECHO	SEÇÃO (cm)		D.EQUIV	VAZÃO	VELOC	COMP.	PERDA	P.TOTAL
-	LARG	ALTURA	mm	m³/h	m/s	m	mmca/m	mmca
1	130	40	80	13100	7,00	3	0,06	0,1776197
2	75	65	80	13100	7,46	0,6	0,07	0,0399515
3	70	40	60	6150	6,10	9,2	0,07	0,6028376
4	50	40	50	4100	5,69	2,25	0,07	0,1624288
5	30	40	40	2050	4,75	1,76	0,07	0,1197054
6	115	40	75	12285	7,42	0,4	0,07	0,0284945
SUB-TOTAL:								1,1310375

ACIDENTES E ACESSÓRIOS							
CURVAS, JOELHOS, REDUÇÕES, ETC							
LARGURA	ALTURA	VAZÃO	VELOC.	Co	P.DINAM	QUANT.	PERDA
cm	cm	m³/h	m/s	-	mmca	-	mmca
130	40	13100	7,00	0,55	3,00	1	1,65
75	65	13100	7,46	1,2	3,41	1	4,10
115	40	12285	7,42	0,26	3,37	1	0,88
58	40	6150	7,36	1,2	3,32	1	3,99
70	40	6150	6,10	1,3	2,28	3	8,89
SUB-TOTAL:							10,61

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OUTROS ACESSÓRIOS	
TIPO	PERDA
	mmca
Damper corta fogo de 130x40 cm	2,00
Grelha de insuflação de 1050x300mm	0,50
SUB-TOTAL:	2,50
RESUMO DA PERDA DE CARGA NO SISTEMA	
TIPO	PERDA
	mmca
PERDA NOS TRECHOS DE DUTOS RETOS	1,13
PERDAS NAS CURVAS	10,61
PERDAS NOS DEMAIS ACESSÓRIOS	2,50
PERDA DEVIDO A PRESSÃO DINÂMICA DO SISTEMA	1,63
SUB-TOTAL:	15,87
FOLGA DE 15%	2,38
PERDA DE CARGA DO SISTEMA (mmca):	18,25
PERDA ADOPTADA NO PROJETO (mmca):	25,00

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16. PLANILHAS DE CARGA TÉRMICA

A seguir seguem as planilhas de carga térmica dos sistemas de VAC do empreendimento:

1º Pavimento

Air System Sizing Summary for Administração - 1º Pav		03/22/2023 01:29
Project Name: HIMPNA - Saquarema Prepared by: CAWS Projetos		
Air System Information		
Air System Name.....	Administração - 1º Pav	Number of zones.....1
Equipment Class.....	SPLT AHU	Floor Area.....6,9 m²
Air System Type.....	SZCAV	Location.....Saquarema, Brazil
Sizing Calculation Information		
Calculation Months.....	Jan to Dec	Zone L/s Sizing.....Sum of space airflow rates
Sizing Date.....	Calculated	Space L/s Sizing.....Individual peak space loads
Central Cooling Coil Sizing Data		
Total coil load.....	1,6 kW	Load occurs at.....Jan 14:00
Sensible coil load.....	1,3 kW	OA DB / WB.....38,6 / 26,0 °C
Coil L/s at Jan 14:00.....	63 L/s	Entering DB / WB.....26,5 / 18,2 °C
Max block L/s.....	63 L/s	Leaving DB / WB.....13,9 / 12,4 °C
Sum of peak zone L/s.....	63 L/s	Coil ADP.....10,7 °C
Sensible heat ratio.....	0,796	Bypass Factor.....0,200
m³/kW.....	4,4	Resulting RH.....44 %
W/m².....	229,2	Design supply temp.....12,0 °C
Water flow @ 5,6 °K rise.....	N/A	Zone T-stat Check.....1 of 1 OK
		Max zone temperature deviation.....0,0 °K
Supply Fan Sizing Data		
Actual max L/s.....	63 L/s	Fan motor BHP.....0,00 BHP
Standard L/s.....	63 L/s	Fan motor kW.....0,00 kW
Actual max L/(s·m²).....	11,99 L/(s·m²)	Fan static.....25 Pa
Return Fan Sizing Data		
Actual max L/s.....	63 L/s	Fan motor BHP.....0,00 BHP
Standard L/s.....	63 L/s	Fan motor kW.....0,00 kW
Actual max L/(s·m²).....	11,99 L/(s·m²)	Fan static.....0 Pa
Outdoor Ventilation Air Data		
Design airflow L/s.....	11 L/s	L/s/person.....11,00 L/s/person
L/(s·m²).....	1,59 L/(s·m²)	

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Air System Design Load Summary for Administração - 1º Pav		
Project Name: HMPNA - Saguarema		03/22/2023
Prepared by: CAWS Projetos		01/29

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1400			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	16 m²	665	-	16 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	138 W	113	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	138	-	0	0	-
People	1	63	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	49	4	5%	0	0
>> Total Zone Loads	-	1027	83	-	0	0
Zone Conditioning	-	1018	83	-	-57	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	83 L/s	0	-	83 L/s	0	-
Ventilation Load	11 L/s	186	240	11 L/s	62	0
Supply Fan Load	83 L/s	4	-	83 L/s	-4	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	51	-	5%	0	-
>> Total System Loads	-	1259	323	-	1	0
Central Cooling Coil	-	1259	323	-	0	0
>> Total Conditioning	-	1259	323	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Armário Seco - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:33

Air System Information

Air System Name Armário Seco - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 4,8 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 1,5 kW
Sensible coil load 1,3 kW
Coil L/s at Jan 1700 92 L/s
Max block L/s 92 L/s
Sum of peak zone L/s 92 L/s
Sensible heat ratio 0,835
m³/kW 3,1
W/m² 319,7
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1700
OA DB / WB 37,8 / 25,8 °C
Entering DB / WB 25,7 / 17,8 °C
Leaving DB / WB 14,1 / 12,7 °C
Coil ADP 11,3 °C
Bypass Factor 0,200
Resulting RH 45 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 92 L/s
Standard L/s 92 L/s
Actual max L/(s·m²) 19,13 L/(s·m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,00 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 92 L/s
Standard L/s 92 L/s
Actual max L/(s·m²) 19,13 L/(s·m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 8 L/s
L/(s·m²) 1,67 L/(s·m²)

L/s/person 8,00 L/s/person

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Air System Design Load Summary for Armário Seco - 1º Pav Project Name: HMPNA - Saguarema Prepared by: CAWS Projetos			03/22/2023 01-33
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ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 37,8 °C / 25,8 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	21 m²	861	-	21 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	96 W	82	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	93	-	0	0	-
People	1	67	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	55	4	5%	0	0
>> Total Zone Loads	-	1158	83	-	0	0
Zone Conditioning	-	1090	83	-	-44	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	92 L/s	0	-	92 L/s	0	-
Ventilation Load	8 L/s	128	170	8 L/s	50	0
Supply Fan Load	92 L/s	4	-	92 L/s	-4	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	58	-	5%	0	-
>> Total System Loads	-	1281	254	-	2	0
Central Cooling Coil	-	1281	254	-	0	0
>> Total Conditioning	-	1281	254	-	0	0
Key:	Positive values are cdp loads Negative values are htg loads			Positive values are htg loads Negative values are cdp loads		

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Air System Sizing Summary for Consultório 01 - 1º Pav		
Project Name: HMPNA - Saquarema		03/22/2023
Prepared by: CAWS Projetos		01:35

Air System Information

Air System Name..... Consultório 01 - 1º Pav
 Equipment Class..... SPLT AHU
 Air System Type..... SZCAV

Number of zones..... 1
 Floor Area..... 7,3 m²
 Location..... Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load..... 1,9 kW
 Sensible coil load..... 1,2 kW
 Coil L/s at Jan 1600..... 59 L/s
 Max block L/s..... 59 L/s
 Sum of peak zone L/s..... 59 L/s
 Sensible heat ratio..... 0,633
 m³/kW..... 3,8
 W/m²..... 261,3
 Water flow @ 5,6 °K rise..... N/A

Load occurs at..... Jan 1600
 OA DB / WB..... 38,6 / 26,0 °C
 Entering DB / WB..... 30,3 / 21,4 °C
 Leaving DB / WB..... 13,5 / 12,2 °C
 Coil ADP..... 9,3 °C
 Bypass Factor..... 0,200
 Resulting RH..... 49 %
 Design supply temp..... 12,0 °C
 Zone T-stat Check..... 1 of 1 OK
 Max zone temperature deviation..... 0,0 °K

Supply Fan Sizing Data

Actual max L/s..... 59 L/s
 Standard L/s..... 59 L/s
 Actual max L/(s·m²)..... 8,15 L/(s·m²)

Fan motor BHP..... 0,00 BHP
 Fan motor kW..... 0,00 kW
 Fan static..... 25 Pa

Return Fan Sizing Data

Actual max L/s..... 59 L/s
 Standard L/s..... 59 L/s
 Actual max L/(s·m²)..... 8,15 L/(s·m²)

Fan motor BHP..... 0,00 BHP
 Fan motor kW..... 0,00 kW
 Fan static..... 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s..... 24 L/s
 L/(s·m²)..... 3,29 L/(s·m²)

L/s/person..... 8,00 L/s/person

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Air System Design Load Summary for Consultório 01 - 1º Pav		
Project Name: HMPNA - Saquarema		03/22/2023
Prepared by: CAWS Projetos		01/35

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	6 m²	250	-	6 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	146 W	123	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	3	197	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	35	12	5%	0	0
>> Total Zone Loads	-	744	249	-	0	0
Zone Conditioning	-	767	249	-	-60	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	59 L/s	0	-	59 L/s	0	-
Ventilation Load	24 L/s	401	451	24 L/s	63	0
Supply Fan Load	59 L/s	3	-	59 L/s	-3	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	37	-	5%	0	-
>> Total System Loads	-	1207	700	-	1	0
Central Cooling Coil	-	1207	700	-	0	0
>> Total Conditioning	-	1207	700	-	0	0
Key:	Positive values are ckg loads Negative values are htg loads			Positive values are htg loads Negative values are ckg loads		

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Air System Sizing Summary for Consultório 01A - 1º Pav(		
Project Name: HMPNA - Saquarema		03/22/2023
Prepared by: CAWS Projetos		01:37

Air System Information

Air System Name..... Consultório 01A - 1º Pav(

Equipment Class..... SPLT AHU

Air System Type..... SZCAV

Number of zones..... 1

Floor Area..... 6,3 m²

Location..... Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load..... 2,1 kW

Sensible coil load..... 1,5 kW

Coil L/s at Mar 1600..... 111 L/s

Max block L/s..... 111 L/s

Sum of peak zone L/s..... 111 L/s

Sensible heat ratio..... 0,718

m²/kW..... 3,0

W/m²..... 337,7

Water flow @ 5,6 °K rise..... N/A

Load occurs at..... Mar 1600

OA DB / WB..... 37,5 / 25,5 °C

Entering DB / WB..... 27,3 / 20,1 °C

Leaving DB / WB..... 16,0 / 14,7 °C

Coil ADP..... 13,1 °C

Bypass Factor..... 0,200

Resulting RH..... 54 %

Design supply temp..... 14,0 °C

Zone T-stat Check..... 1 of 1 OK

Max zone temperature deviation..... 0,0 °K

Supply Fan Sizing Data

Actual max L/s..... 111 L/s

Standard L/s..... 111 L/s

Actual max L/(s-m²)..... 17,69 L/(s-m²)

Fan motor BHP..... 0,01 BHP

Fan motor kW..... 0,01 kW

Fan static..... 25 Pa

Return Fan Sizing Data

Actual max L/s..... 111 L/s

Standard L/s..... 111 L/s

Actual max L/(s-m²)..... 17,69 L/(s-m²)

Fan motor BHP..... 0,00 BHP

Fan motor kW..... 0,00 kW

Fan static..... 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s..... 24 L/s

L/(s-m²)..... 3,81 L/(s-m²)

L/s/person..... 8,00 L/s/person

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Air System Design Load Summary for Consultório 01A - 1º Pav(		
Project Name: HMPNA - Saguarema		03/22/2023
Prepared by: CAWS Projetos		01:37

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Mar 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 37,5 °C / 25,5 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1 m²	80	-	1 m²	-	-
Wall Transmission	7 m²	273	-	7 m²	96	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	1 m²	82	-	1 m²	39	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	4 m²	175	-	4 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	126 W	108	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	3	197	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	53	12	5%	7	0
>> Total Zone Loads	-	1104	249	-	142	0
Zone Conditioning	-	1091	249	-	-28	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	111 L/s	0	-	111 L/s	0	-
Ventilation Load	24 L/s	375	351	24 L/s	27	0
Supply Fan Load	111 L/s	5	-	111 L/s	-5	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	55	-	5%	7	-
>> Total System Loads	-	1527	601	-	2	0
Central Cooling Coil	-	1527	601	-	0	0
>> Total Conditioning	-	1527	601	-	0	0
Key:	Positive values are ckg loads Negative values are htg loads			Positive values are htg loads Negative values are ckg loads		

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Air System Sizing Summary for Consultório 02 - 1º Pav		
Project Name: HMPNA - Saquarema		03/22/2023
Prepared by: CAWS Projetos		01:38

Air System Information

Air System Name..... Consultório 02 - 1º Pav
 Equipment Class..... SPLT AHU
 Air System Type..... SZCAV

Number of zones..... 1
 Floor Area..... 7,1 m²
 Location..... Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load..... 1,9 kW
 Sensible coil load..... 1,2 kW
 Coil L/s at Jan 1600..... 60 L/s
 Max block L/s..... 60 L/s
 Sum of peak zone L/s..... 60 L/s
 Sensible heat ratio..... 0,634
 m³/kW..... 3,7
 W/m²..... 270,2
 Water flow @ 5,6 °K rise..... N/A

Load occurs at..... Jan 1600
 OA DB / WB..... 38,6 / 26,0 °C
 Entering DB / WB..... 30,2 / 21,3 °C
 Leaving DB / WB..... 13,5 / 12,2 °C
 Coil ADP..... 9,3 °C
 Bypass Factor..... 0,260
 Resulting RH..... 49 %
 Design supply temp..... 12,0 °C
 Zone T-stat Check..... 1 of 1 OK
 Max zone temperature deviation..... 0,0 °K

Supply Fan Sizing Data

Actual max L/s..... 60 L/s
 Standard L/s..... 60 L/s
 Actual max L/(s·m²)..... 8,48 L/(s·m²)

Fan motor BHP..... 0,00 BHP
 Fan motor kW..... 0,00 kW
 Fan static..... 25 Pa

Return Fan Sizing Data

Actual max L/s..... 60 L/s
 Standard L/s..... 60 L/s
 Actual max L/(s·m²)..... 8,48 L/(s·m²)

Fan motor BHP..... 0,00 BHP
 Fan motor kW..... 0,00 kW
 Fan static..... 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s..... 24 L/s
 L/(s·m²)..... 3,38 L/(s·m²)

L/s/person..... 8,00 L/s/person

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Air System Design Load Summary for Consultório 02 - 1º Pav Project Name: HMPNA - Saguarema Prepared by: CAWS Projetos			03/22/2023 01:38
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ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	6 m²	282	-	6 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	142 W	119	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	3	197	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	36	12	5%	0	0
>> Total Zone Loads	-	754	249	-	0	0
Zone Conditioning	-	774	249	-	-61	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	60 L/s	0	-	60 L/s	0	-
Ventilation Load	24 L/s	402	452	24 L/s	65	0
Supply Fan Load	60 L/s	3	-	60 L/s	-3	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	36	-	5%	0	-
>> Total System Loads	-	1216	702	-	1	0
Central Cooling Coil	-	1216	702	-	0	0
>> Total Conditioning	-	1216	702	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Consultório 02A - 1º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/22/2023
01-40

Air System Information

Air System Name..... Consultório 02A - 1º Pav
Equipment Class..... SPLT AHU
Air System Type..... SZCAV

Number of zones..... 1
Floor Area..... 7,0 m²
Location..... Saguarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load..... 2,1 kW
Sensible coil load..... 1,3 kW
Coil L/s at Dec 1500..... 86 L/s
Max block L/s..... 86 L/s
Sum of peak zone L/s..... 86 L/s
Sensible heat ratio..... 0,635
m²/kW..... 3,3
W/m²..... 299,3
Water flow @ 5,6 °K rise..... N/A

Load occurs at..... Dec 1500
OA DB / WB..... 38,3 / 26,1 °C
Entering DB / WB..... 28,5 / 21,2 °C
Leaving DB / WB..... 15,7 / 14,5 °C
Coil ADP..... 12,5 °C
Bypass Factor..... 0,200
Resulting RH..... 58 %
Design supply temp..... 14,0 °C
Zone T-stat Check..... 1 of 1 OK
Max zone temperature deviation..... 0,0 °K

Supply Fan Sizing Data

Actual max L/s..... 86 L/s
Standard L/s..... 86 L/s
Actual max L/(s·m²)..... 12,28 L/(s·m²)

Fan motor BHP..... 0,01 BHP
Fan motor kW..... 0,00 kW
Fan static..... 25 Pa

Return Fan Sizing Data

Actual max L/s..... 86 L/s
Standard L/s..... 86 L/s
Actual max L/(s·m²)..... 12,28 L/(s·m²)

Fan motor BHP..... 0,00 BHP
Fan motor kW..... 0,00 kW
Fan static..... 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s..... 24 L/s
L/(s·m²)..... 3,43 L/(s·m²)

L/s/person..... 8,00 L/s/person

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Air System Design Load Summary for Consultório 02A - 1º Pav		
Project Name: HMPNA - Saquarema		03/22/2023
Prepared by: CAWS Projects		01-80

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	9 m²	371	-	9 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	140 W	116	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	3	204	400	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	41	20	5%	0	0
>> Total Zone Loads	-	871	420	-	0	0
Zone Conditioning	-	886	420	-	-73	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	86 L/s	0	-	86 L/s	0	-
Ventilation Load	24 L/s	396	345	24 L/s	60	0
Supply Fan Load	86 L/s	4	-	86 L/s	-4	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	44	-	5%	0	-
>> Total System Loads	-	1330	765	-	3	0
Central Cooling Coil	-	1330	765	-	0	0
>> Total Conditioning	-	1330	765	-	0	0
Key:	Positive values are cdp loads Negative values are htp loads			Positive values are htp loads Negative values are cdp loads		

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Air System Sizing Summary for Distribuição Refeitório - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:42

Air System Information

Air System Name Distribuição Refeitório - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 7,5 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 1,4 kW
Sensible coil load 0,9 kW
Coil L/s at Jan 1400 50 L/s
Max block L/s 50 L/s
Sum of peak zone L/s 50 L/s
Sensible heat ratio 0,667
m²/kW 5,4
W/m² 183,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1400
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 29,0 / 20,4 °C
Leaving DB / WB 13,7 / 12,3 °C
Coil ADP 9,8 °C
Bypass Factor 0,200
Resulting RH 47 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 50 L/s
Standard L/s 50 L/s
Actual max L/(s-m²) 6,62 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 50 L/s
Standard L/s 50 L/s
Actual max L/(s-m²) 6,62 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 15 L/s
L/(s-m²) 2,00 L/(s-m²)

L/s/person 7,50 L/s/person

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Air System Design Load Summary for Distribuição Refeitório - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:42

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1400 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	6 m²	239	-	6 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	150 W	123	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	2	127	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	29	8	5%	0	0
>> Total Zone Loads	-	609	166	-	0	0
Zone Conditioning	-	639	166	-	-49	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	50 L/s	0	-	50 L/s	0	-
Ventilation Load	15 L/s	248	292	15 L/s	52	0
Supply Fan Load	50 L/s	2	-	50 L/s	-2	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	30	-	5%	0	-
>> Total System Loads	-	920	459	-	1	0
Central Cooling Coil	-	920	458	-	0	0
>> Total Conditioning	-	920	458	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Estar Copeira - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:44

Air System Information

Air System Name **Estar Copeira - 1º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **4,0** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **1,2** kW
Sensible coil load **0,9** kW
Coil L/s at Jan 1500 **61** L/s
Max block L/s **61** L/s
Sum of peak zone L/s **61** L/s
Sensible heat ratio **0,785**
m²/kW **3,4**
W/m² **294,1**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1500**
OA DB / WB **38,9 / 26,1** °C
Entering DB / WB **26,4 / 18,3** °C
Leaving DB / WB **13,9 / 12,5** °C
Coil ADP **10,8** °C
Bypass Factor **0,200**
Resulting RH **45** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **61** L/s
Standard L/s **61** L/s
Actual max L/(s-m²) **15,31** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **61** L/s
Standard L/s **61** L/s
Actual max L/(s-m²) **15,31** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **8** L/s
L/(s-m²) **2,00** L/(s-m²)

L/s/person **8,00** L/s/person

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Air System Design Load Summary for Estar Copeira - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:44

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	12 m²	506	-	12 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	80 W	66	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	1	65	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	36	4	5%	0	0
>> Total Zone Loads	-	765	83	-	0	0
Zone Conditioning	-	744	83	-	-41	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	61 L/s	0	-	61 L/s	0	-
Ventilation Load	8 L/s	139	170	8 L/s	45	0
Supply Fan Load	61 L/s	3	-	61 L/s	-3	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	38	-	5%	0	-
>> Total System Loads	-	923	253	-	1	0
Central Cooling Coil	-	923	253	-	0	0
>> Total Conditioning	-	923	253	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Farmácia Satélite - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:45

Air System Information

Air System Name **Farmácia Satélite - 1º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **6,9** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **1,3** kW
Sensible coil load **1,0** kW
Coil L/s at Jan 1500 **60** L/s
Max block L/s **60** L/s
Sum of peak zone L/s **60** L/s
Sensible heat ratio **0,754**
m²/kW **5,3**
W/m² **188,1**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1500**
OA DB / WB **38,9 / 26,1** °C
Entering DB / WB **27,4 / 18,9** °C
Leaving DB / WB **13,8 / 12,3** °C
Coil ADP **10,4** °C
Bypass Factor **0,200**
Resulting RH **44** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **60** L/s
Standard L/s **60** L/s
Actual max L/(s-m²) **8,68** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **60** L/s
Standard L/s **60** L/s
Actual max L/(s-m²) **8,68** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **11** L/s
L/(s-m²) **1,59** L/(s-m²)

L/s/person **11,00** L/s/person

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Air System Design Load Summary for Farmácia Satélite - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:45

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	10 m²	394	-	10 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	138 W	114	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	1	65	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	36	4	5%	0	0
>> Total Zone Loads	-	747	83	-	0	0
Zone Conditioning	-	750	83	-	-49	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	60 L/s	0	-	60 L/s	0	-
Ventilation Load	11 L/s	188	236	11 L/s	53	0
Supply Fan Load	60 L/s	3	-	60 L/s	-3	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	37	-	5%	0	-
>> Total System Loads	-	979	319	-	2	0
Central Cooling Coil	-	979	320	-	0	0
>> Total Conditioning	-	979	320	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Hortifruti - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:47

Air System Information

Air System Name Hortifruti - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 5,4 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 1,6 kW
Sensible coil load 1,3 kW
Coil L/s at Jan 1600 87 L/s
Max block L/s 87 L/s
Sum of peak zone L/s 87 L/s
Sensible heat ratio 0,810
m²/kW 3,4
W/m² 291,6
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 26,2 / 18,1 °C
Leaving DB / WB 14,0 / 12,5 °C
Coil ADP 11,0 °C
Bypass Factor 0,200
Resulting RH 44 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 87 L/s
Standard L/s 87 L/s
Actual max L/(s-m²) 16,14 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,00 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 87 L/s
Standard L/s 87 L/s
Actual max L/(s-m²) 16,14 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 10 L/s
L/(s-m²) 1,85 L/(s-m²)

L/s/person 10,00 L/s/person

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Air System Design Load Summary for Hortifruti - 1º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/22/202
01:4

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window& Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	19 m²	795	-	19 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	108 W	91	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	93	-	0	0	-
People	1	66	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	52	4	5%	0	0
>> Total Zone Loads	-	1096	83	-	0	0
Zone Conditioning	-	1048	83	-	-54	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	87 L/s	0	-	87 L/s	0	-
Ventilation Load	10 L/s	170	215	10 L/s	59	0
Supply Fan Load	87 L/s	4	-	87 L/s	-4	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	55	-	5%	0	-
>> Total System Loads	-	1276	298	-	1	0
Central Cooling Coil	-	1276	299	-	0	0
>> Total Conditioning	-	1276	299	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Lavagem/Envase/Param - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:48

Air System Information

Air System Name Lavagem/Envase/Param - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 11,7 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 3,4 kW
Sensible coil load 2,5 kW
Coil L/s at Jan 1500 151 L/s
Max block L/s 151 L/s
Sum of peak zone L/s 151 L/s
Sensible heat ratio 0,731
m²/kW 3,4
W/m² 291,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 27,3 / 19,0 °C
Leaving DB / WB 13,6 / 12,2 °C
Coil ADP 10,2 °C
Bypass Factor 0,200
Resulting RH 45 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 151 L/s
Standard L/s 151 L/s
Actual max L/(s-m²) 12,92 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 151 L/s
Standard L/s 151 L/s
Actual max L/(s-m²) 12,92 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 28 L/s
L/(s-m²) 2,39 L/(s-m²)

L/s/person 7,00 L/s/person

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Air System Design Load Summary for Lavagem/Envase/Param - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:48

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	21 m²	879	-	21 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	234 W	194	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	500 W	462	-	0	0	-
People	4	258	316	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	90	16	5%	0	0
>> Total Zone Loads	-	1883	332	-	0	0
Zone Conditioning	-	1913	332	-	-123	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	151 L/s	0	-	151 L/s	0	-
Ventilation Load	28 L/s	482	585	28 L/s	133	0
Supply Fan Load	151 L/s	7	-	151 L/s	-7	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	94	-	5%	0	-
>> Total System Loads	-	2496	917	-	3	0
Central Cooling Coil	-	2496	917	-	0	0
>> Total Conditioning	-	2496	917	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Necrotério - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:50

Air System Information

Air System Name Necrotério - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 18,7 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 12,8 kW
Sensible coil load 7,4 kW
Coil L/s at Jan 1600 264 L/s
Max block L/s 264 L/s
Sum of peak zone L/s 264 L/s
Sensible heat ratio 0,579
m²/kW 1,5
W/m² 682,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 37,9 / 25,7 °C
Leaving DB / WB 14,7 / 13,2 °C
Coil ADP 8,9 °C
Bypass Factor 0,200
Resulting RH 45 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 264 L/s
Standard L/s 264 L/s
Actual max L/(s-m²) 14,13 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 264 L/s
Standard L/s 264 L/s
Actual max L/(s-m²) 14,13 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 251 L/s
L/(s-m²) 13,42 L/(s-m²)

L/s/person 251,03 L/s/person

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Air System Design Load Summary for Necrotério - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:50

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window& Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	23 m²	941	-	23 m²	344	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	37 m²	1527	-	37 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	374 W	314	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	93	-	0	0	-
People	1	66	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	147	4	5%	17	0
>> Total Zone Loads	-	3088	83	-	361	0
Zone Conditioning	-	2954	83	-	-354	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	264 L/s	0	-	264 L/s	0	-
Ventilation Load	251 L/s	4270	5294	251 L/s	348	0
Supply Fan Load	264 L/s	12	-	264 L/s	-12	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	154	-	5%	18	-
>> Total System Loads	-	7391	5377	-	0	0
Central Cooling Coil	-	7391	5377	-	0	0
>> Total Conditioning	-	7391	5377	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Nutri/Adm - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:52

Air System Information

Air System Name **Nutri/Adm - 1º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **6,8** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **2,5** kW
Sensible coil load **1,7** kW
Coil L/s at Dec 1500 **101** L/s
Max block L/s **101** L/s
Sum of peak zone L/s **101** L/s
Sensible heat ratio **0,696**
m²/kW **2,7**
W/m² **363,8**
Water flow@ 5,6 °K rise **N/A**

Load occurs at **Dec 1500**
OA DB / WB **38,3 / 26,1** °C
Entering DB / WB **27,9 / 19,6** °C
Leaving DB / WB **13,7 / 12,3** °C
Coil ADP **10,2** °C
Bypass Factor **0,200**
Resulting RH **46** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **101** L/s
Standard L/s **101** L/s
Actual max L/(s-m²) **14,81** L/(s-m²)

Fan motor BHP **0,01** BHP
Fan motor kW **0,00** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **101** L/s
Standard L/s **101** L/s
Actual max L/(s-m²) **14,81** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **24** L/s
L/(s-m²) **3,53** L/(s-m²)

L/s/person **8,00** L/s/person

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Air System Design Load Summary for Nutri/Adm - 1º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/22/2023
01:52

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	13 m²	515	-	13 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	136 W	113	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	400 W	369	-	0	0	-
People	3	194	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	60	12	5%	0	0
>> Total Zone Loads	-	1251	249	-	0	0
Zone Conditioning	-	1255	249	-	-87	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	101 L/s	0	-	101 L/s	0	-
Ventilation Load	24 L/s	399	504	24 L/s	94	0
Supply Fan Load	101 L/s	5	-	101 L/s	-5	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	63	-	5%	0	-
>> Total System Loads	-	1721	753	-	2	0
Central Cooling Coil	-	1721	753	-	0	0
>> Total Conditioning	-	1721	753	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Nutricionista - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:54

Air System Information

Air System Name **Nutricionista - 1º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **7,5** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **3,9** kW
Sensible coil load **2,9** kW
Coil L/s at Feb 1600 **190** L/s
Max block L/s **190** L/s
Sum of peak zone L/s **190** L/s
Sensible heat ratio **0,753**
m²/kW **1,9**
W/m² **514,7**
Water flow@ 5,6 °K rise **N/A**

Load occurs at **Feb 1600**
OA DB / WB **38,6 / 26,0** °C
Entering DB / WB **27,0 / 19,0** °C
Leaving DB / WB **14,3 / 12,9** °C
Coil ADP **11,2** °C
Bypass Factor **0,200**
Resulting RH **46** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **190** L/s
Standard L/s **190** L/s
Actual max L/(s-m²) **25,31** L/(s-m²)

Fan motor BHP **0,01** BHP
Fan motor kW **0,01** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **190** L/s
Standard L/s **190** L/s
Actual max L/(s-m²) **25,31** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **31** L/s
L/(s-m²) **4,13** L/(s-m²)

L/s/person **7,75** L/s/person

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Air System Design Load Summary for Nutricionista - 1º Pav		
Project Name: HMPNA - Saquarema		03/22/2023
Prepared by: CAWS Projetos		01:54

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Feb 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	99	-	2 m²	-	-
Wall Transmission	10 m²	385	-	10 m²	151	-
Roof Transmission	10 m²	823	-	10 m²	123	-
Window Transmission	2 m²	178	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	5 m²	221	-	5 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	150 W	126	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	186	-	0	0	-
People	4	263	316	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	114	16	5%	18	0
>> Total Zone Loads	-	2393	332	-	370	0
Zone Conditioning	-	2261	332	-	-25	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	190 L/s	0	-	190 L/s	0	-
Ventilation Load	31 L/s	517	622	31 L/s	20	0
Supply Fan Load	190 L/s	9	-	190 L/s	-9	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	120	-	5%	19	-
>> Total System Loads	-	2907	954	-	5	0
Central Cooling Coil	-	2907	953	-	0	0
>> Total Conditioning	-	2907	953	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Ortopedia - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:56

Air System Information

Air System Name Ortopedia - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 8,9 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 2,3 kW
Sensible coil load 1,5 kW
Coil L/s at Jan 1600 86 L/s
Max block L/s 86 L/s
Sum of peak zone L/s 86 L/s
Sensible heat ratio 0,680
m²/kW 3,9
W/m² 254,6
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 28,6 / 20,1 °C
Leaving DB / WB 13,7 / 12,3 °C
Coil ADP 10,0 °C
Bypass Factor 0,200
Resulting RH 47 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 86 L/s
Standard L/s 86 L/s
Actual max L/(s-m²) 9,66 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,00 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 86 L/s
Standard L/s 86 L/s
Actual max L/(s-m²) 9,66 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 2,70 L/(s-m²)

L/s/person 8,00 L/s/person

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Air System Design Load Summary for Ortopedia - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:56

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window& Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
WindowTransmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	13 m²	541	-	13 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	178 W	150	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	3	197	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	51	12	5%	0	0
>> Total Zone Loads	-	1078	249	-	0	0
Zone Conditioning	-	1078	249	-	-89	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	86 L/s	0	-	86 L/s	0	-
Ventilation Load	24 L/s	403	477	24 L/s	96	0
Supply Fan Load	86 L/s	4	-	86 L/s	-4	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	54	-	5%	0	-
>> Total System Loads	-	1540	726	-	3	0
Central Cooling Coil	-	1540	726	-	0	0
>> Total Conditioning	-	1540	726	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Plantão 1 - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:57

Air System Information

Air System Name **Plantão 1 - 1º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **6,7** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **2,0** kW
Sensible coil load **1,5** kW
Coil L/s at Jan 1500 **99** L/s
Max block L/s **99** L/s
Sum of peak zone L/s **99** L/s
Sensible heat ratio **0,762**
m²/kW **3,3**
W/m² **299,8**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1500**
OA DB / WB **38,9 / 26,1** °C
Entering DB / WB **26,7 / 18,6** °C
Leaving DB / WB **14,0 / 12,5** °C
Coil ADP **10,8** °C
Bypass Factor **0,200**
Resulting RH **46** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **99** L/s
Standard L/s **99** L/s
Actual max L/(s-m²) **14,83** L/(s-m²)

Fan motor BHP **0,01** BHP
Fan motor kW **0,00** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **99** L/s
Standard L/s **99** L/s
Actual max L/(s-m²) **14,83** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **15** L/s
L/(s-m²) **2,24** L/(s-m²)

L/s/person **7,50** L/s/person

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Air System Design Load Summary for Plantão 1 - 1º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/22/2023
01:57

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	21 m²	850	-	21 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	134 W	111	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	2	129	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	59	8	5%	0	0
>> Total Zone Loads	-	1241	166	-	0	0
Zone Conditioning	-	1204	166	-	-76	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	99 L/s	0	-	99 L/s	0	-
Ventilation Load	15 L/s	260	312	15 L/s	82	0
Supply Fan Load	99 L/s	5	-	99 L/s	-5	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	62	-	5%	0	-
>> Total System Loads	-	1530	478	-	2	0
Central Cooling Coil	-	1530	478	-	0	0
>> Total Conditioning	-	1530	478	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Plantão 2 - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:59

Air System Information

Air System Name **Plantão 2 - 1º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **5,2** m²
Location **Saquarema, Brazil**

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**

Central Cooling Coil Sizing Data

Total coil load **1,9** kW
Sensible coil load **1,4** kW
Coil L/s at Jan 1700 **93** L/s
Max block L/s **93** L/s
Sum of peak zone L/s **93** L/s
Sensible heat ratio **0,750**
m²/kW **2,7**
W/m² **364,5**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1700**
OA DB / WB **37,8 / 25,8** °C
Entering DB / WB **26,7 / 18,7** °C
Leaving DB / WB **14,0 / 12,6** °C
Coil ADP **10,9** °C
Bypass Factor **0,200**
Resulting RH **46** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **93** L/s
Standard L/s **93** L/s
Actual max L/(s-m²) **17,91** L/(s-m²)

Fan motor BHP **0,01** BHP
Fan motor kW **0,00** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **93** L/s
Standard L/s **93** L/s
Actual max L/(s-m²) **17,91** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **15** L/s
L/(s-m²) **2,88** L/(s-m²)

L/s/person **7,50** L/s/person

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Air System Design Load Summary for Plantão 2 - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
01:59

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1700 COOLING OA DB / WB 37,8 °C / 25,8 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	19 m²	803	-	19 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	104 W	88	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	93	-	0	0	-
People	2	134	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	56	8	5%	0	0
>> Total Zone Loads	-	1174	166	-	0	0
Zone Conditioning	-	1118	166	-	-75	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	93 L/s	0	-	93 L/s	0	-
Ventilation Load	15 L/s	241	307	15 L/s	81	0
Supply Fan Load	93 L/s	4	-	93 L/s	-4	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	59	-	5%	0	-
>> Total System Loads	-	1422	473	-	2	0
Central Cooling Coil	-	1422	474	-	0	0
>> Total Conditioning	-	1422	474	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Preparo de Carnes - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:00

Air System Information

Air System Name Preparo de Carnes - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 4,8 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 1,6 kW
Sensible coil load 1,4 kW
Coil L/s at Dec 1500 99 L/s
Max block L/s 99 L/s
Sum of peak zone L/s 99 L/s
Sensible heat ratio 0,841
m²/kW 2,9
W/m² 343,1
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1500
OA DB / WB 38,3 / 26,1 °C
Entering DB / WB 25,6 / 17,7 °C
Leaving DB / WB 14,0 / 12,6 °C
Coil ADP 11,1 °C
Bypass Factor 0,200
Resulting RH 44 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 99 L/s
Standard L/s 99 L/s
Actual max L/(s-m²) 20,64 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,00 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 99 L/s
Standard L/s 99 L/s
Actual max L/(s-m²) 20,64 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 8 L/s
L/(s-m²) 1,67 L/(s-m²)

L/s/person 8,00 L/s/person

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Air System Design Load Summary for Preparo de Carnes - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:00

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	18 m²	754	-	18 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	96 W	80	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	300 W	277	-	0	0	-
People	1	65	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	59	4	5%	0	0
>> Total Zone Loads	-	1234	83	-	0	0
Zone Conditioning	-	1185	83	-	-43	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	99 L/s	0	-	99 L/s	0	-
Ventilation Load	8 L/s	134	178	8 L/s	49	0
Supply Fan Load	99 L/s	5	-	99 L/s	-5	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	62	-	5%	0	-
>> Total System Loads	-	1385	261	-	2	0
Central Cooling Coil	-	1385	261	-	0	0
>> Total Conditioning	-	1385	261	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Recepção/Lavagem Veg - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:02

Air System Information

Air System Name Recepção/Lavagem Veg - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 5,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 2,8 kW
Sensible coil load 2,3 kW
Coil L/s at Jan 1500 164 L/s
Max block L/s 164 L/s
Sum of peak zone L/s 164 L/s
Sensible heat ratio 0,826
m²/kW 1,9
W/m² 514,9
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,8 / 17,9 °C
Leaving DB / WB 14,2 / 12,7 °C
Coil ADP 11,3 °C
Bypass Factor 0,200
Resulting RH 45 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 164 L/s
Standard L/s 164 L/s
Actual max L/(s-m²) 30,46 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 164 L/s
Standard L/s 164 L/s
Actual max L/(s-m²) 30,46 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 15 L/s
L/(s-m²) 2,78 L/(s-m²)

L/s/person 7,50 L/s/person

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Air System Design Load Summary for Recepção/Lavagem Veg - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:02

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	39 m²	1604	-	39 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	108 W	90	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	2	129	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	98	8	5%	0	0
>> Total Zone Loads	-	2060	166	-	0	0
Zone Conditioning	-	1925	166	-	-83	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	164 L/s	0	-	164 L/s	0	-
Ventilation Load	15 L/s	262	316	15 L/s	94	0
Supply Fan Load	164 L/s	8	-	164 L/s	-8	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	103	-	5%	0	-
>> Total System Loads	-	2298	482	-	3	0
Central Cooling Coil	-	2298	483	-	0	0
>> Total Conditioning	-	2298	483	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Refeitório - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:04

Air System Information

Air System Name Refeitório - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 26,0 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 13,1 kW
Sensible coil load 7,9 kW
Coil L/s at Jan 1600 331 L/s
Max block L/s 331 L/s
Sum of peak zone L/s 331 L/s
Sensible heat ratio 0,604
m²/kW 2,0
W/m² 503,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 33,5 / 23,2 °C
Leaving DB / WB 13,7 / 12,3 °C
Coil ADP 8,8 °C
Bypass Factor 0,200
Resulting RH 47 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 331 L/s
Standard L/s 331 L/s
Actual max L/(s-m²) 12,74 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 331 L/s
Standard L/s 331 L/s
Actual max L/(s-m²) 12,74 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 211 L/s
L/(s-m²) 8,12 L/(s-m²)

L/s/person 7,54 L/s/person

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Air System Design Load Summary for Refeitório - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:04

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	44 m²	1814	-	44 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	520 W	437	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	186	-	0	0	-
People	28	1511	986	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	197	49	5%	0	0
>> Total Zone Loads	-	4145	1035	-	0	0
Zone Conditioning	-	4131	1035	-	-450	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	331 L/s	0	-	331 L/s	0	-
Ventilation Load	211 L/s	3561	4149	211 L/s	468	0
Supply Fan Load	331 L/s	15	-	331 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	207	-	5%	0	-
>> Total System Loads	-	7915	5184	-	3	0
Central Cooling Coil	-	7915	5184	-	0	0
>> Total Conditioning	-	7915	5184	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sala de Exames - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:05

Air System Information

Air System Name Sala de Exames - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 5,6 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 2,0 kW
Sensible coil load 1,3 kW
Coil L/s at Jan 1500 63 L/s
Max block L/s 63 L/s
Sum of peak zone L/s 63 L/s
Sensible heat ratio 0,641
m²/kW 2,9
W/m² 348,4
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 30,1 / 21,2 °C
Leaving DB / WB 13,7 / 12,3 °C
Coil ADP 9,6 °C
Bypass Factor 0,200
Resulting RH 49 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 63 L/s
Standard L/s 63 L/s
Actual max L/(s-m²) 11,30 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 63 L/s
Standard L/s 63 L/s
Actual max L/(s-m²) 11,30 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 4,29 L/(s-m²)

L/s/person 8,00 L/s/person

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Air System Design Load Summary for Sala de Exames - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:05

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	8 m²	323	-	8 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	112 W	93	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	3	194	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	37	12	5%	0	0
>> Total Zone Loads	-	786	249	-	0	0
Zone Conditioning	-	795	249	-	-68	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	63 L/s	0	-	63 L/s	0	-
Ventilation Load	24 L/s	413	451	24 L/s	73	0
Supply Fan Load	63 L/s	3	-	63 L/s	-3	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	39	-	5%	0	-
>> Total System Loads	-	1251	700	-	2	0
Central Cooling Coil	-	1251	700	-	0	0
>> Total Conditioning	-	1251	700	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sala de Gesso - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:07

Air System Information

Air System Name **Sala de Gesso - 1º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **7,9** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **1,9** kW
Sensible coil load **1,5** kW
Coil L/s at Jan 1400 **92** L/s
Max block L/s **92** L/s
Sum of peak zone L/s **92** L/s
Sensible heat ratio **0,752**
m²/kW **4,1**
W/m² **244,6**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1400**
OA DB / WB **38,6 / 26,0** °C
Entering DB / WB **26,9 / 18,7** °C
Leaving DB / WB **13,8 / 12,4** °C
Coil ADP **10,6** °C
Bypass Factor **0,200**
Resulting RH **45** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **92** L/s
Standard L/s **92** L/s
Actual max L/(s-m²) **11,67** L/(s-m²)

Fan motor BHP **0,01** BHP
Fan motor kW **0,00** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **92** L/s
Standard L/s **92** L/s
Actual max L/(s-m²) **11,67** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **15** L/s
L/(s-m²) **1,90** L/(s-m²)

L/s/person **7,50** L/s/person

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Air System Design Load Summary for Sala de Gesso - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:07

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1400 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	17 m²	694	-	17 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	158 W	129	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	138	-	0	0	-
People	2	127	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	54	8	5%	0	0
>> Total Zone Loads	-	1141	166	-	0	0
Zone Conditioning	-	1138	166	-	-73	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	92 L/s	0	-	92 L/s	0	-
Ventilation Load	15 L/s	253	314	15 L/s	78	0
Supply Fan Load	92 L/s	4	-	92 L/s	-4	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	57	-	5%	0	-
>> Total System Loads	-	1453	480	-	1	0
Central Cooling Coil	-	1453	480	-	0	0
>> Total Conditioning	-	1453	480	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sala de Suturas - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:08

Air System Information

Air System Name Sala de Suturas - 1º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 9,3 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 2,5 kW
Sensible coil load 1,8 kW
Coil L/s at Jan 1400 106 L/s
Max block L/s 106 L/s
Sum of peak zone L/s 106 L/s
Sensible heat ratio 0,708
m²/kW 3,7
W/m² 271,4
Water flow@ 5,6 °K rise N/A

Load occurs at Jan 1400
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 27,8 / 19,5 °C
Leaving DB / WB 13,8 / 12,4 °C
Coil ADP 10,3 °C
Bypass Factor 0,200
Resulting RH 46 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 106 L/s
Standard L/s 106 L/s
Actual max L/(s-m²) 11,43 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,00 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 106 L/s
Standard L/s 106 L/s
Actual max L/(s-m²) 11,43 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 2,58 L/(s-m²)

L/s/person 8,00 L/s/person

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Air System Design Load Summary for Sala de Suturas - 1º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:08

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1400 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	19 m²	772	-	19 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	186 W	152	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	138	-	0	0	-
People	3	190	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	63	12	5%	0	0
>> Total Zone Loads	-	1314	249	-	0	0
Zone Conditioning	-	1313	249	-	-104	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	106 L/s	0	-	106 L/s	0	-
Ventilation Load	24 L/s	405	487	24 L/s	110	0
Supply Fan Load	106 L/s	5	-	106 L/s	-5	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	66	-	5%	0	-
>> Total System Loads	-	1788	736	-	1	0
Central Cooling Coil	-	1788	736	-	0	0
>> Total Conditioning	-	1788	736	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 01 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:11

Air System Information

Air System Name **Sistema 01 - 1º Pavimento**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **74,9** m²
Location **Saquarema, Brazil**

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**

Central Cooling Coil Sizing Data

Total coil load **12,6** kW
Sensible coil load **8,8** kW
Coil L/s at Dec 1600 **485** L/s
Max block L/s **485** L/s
Sum of peak zone L/s **485** L/s
Sensible heat ratio **0,702**
m²/kW **6,0**
W/m² **168,0**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Dec 1600**
OA DB / WB **38,0 / 26,0** °C
Entering DB / WB **28,0 / 19,4** °C
Leaving DB / WB **12,9 / 11,5** °C
Coil ADP **9,2** °C
Bypass Factor **0,200**
Resulting RH **43** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **485** L/s
Standard L/s **485** L/s
Actual max L/(s-m²) **6,48** L/(s-m²)

Fan motor BHP **0,51** BHP
Fan motor kW **0,40** kW
Fan static **450** Pa

Outdoor Ventilation Air Data

Design airflow L/s **121** L/s
L/(s-m²) **1,62** L/(s-m²)

L/s/person **10,08** L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Unidade SI+AC-S1-1ºPav	1	6,1	Jan 1700	461	0,6	74,9	6,16

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Air System Design Load Summary for Sistema 01 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:11

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,0 °C / 26,0 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	3 m²	383	-	3 m²	-	-
Wall Transmission	30 m²	1246	-	30 m²	437	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	3 m²	256	-	3 m²	117	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	32 m²	1312	-	32 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1498 W	1259	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	600 W	557	-	0	0	-
People	12	789	949	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	290	47	5%	28	0
>> Total Zone Loads	-	6092	997	-	582	0
Zone Conditioning	-	6213	997	-	-23	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	438 L/s	0	-	438 L/s	0	-
Ventilation Load	121 L/s	1906	2757	121 L/s	407	0
Supply Fan Load	485 L/s	404	-	485 L/s	-404	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	305	-	5%	29	-
>> Total System Loads	-	8828	3754	-	8	0
Central Cooling Coil	-	8828	3754	-	0	0
>> Total Conditioning	-	8828	3754	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 02 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:14

Air System Information

Air System Name **Sistema 02 - 1º Pavimento**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **12,0** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **3,5** kW
Sensible coil load **3,0** kW
Coil L/s at Jan 1600 **195** L/s
Max block L/s **195** L/s
Sum of peak zone L/s **195** L/s
Sensible heat ratio **0,856**
m²/kW **3,5**
W/m² **289,5**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1600**
OA DB / WB **38,6 / 26,0** °C
Entering DB / WB **25,9 / 17,6** °C
Leaving DB / WB **13,2 / 12,1** °C
Coil ADP **11,0** °C
Bypass Factor **0,150**
Resulting RH **43** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **195** L/s
Standard L/s **195** L/s
Actual max L/(s·m²) **16,24** L/(s·m²)

Fan motor BHP **0,20** BHP
Fan motor kW **0,16** kW
Fan static **450** Pa

Outdoor Ventilation Air Data

Design airflow L/s **19** L/s
L/(s·m²) **1,58** L/(s·m²)

L/s/person **9,50** L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
Zone 1							
Isolamento+AC-S2-1ºPav	1	2,5	Jan 1700	185	0,4	12,0	15,43

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Air System Design Load Summary for Sistema 02 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:14

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	18 m²	763	-	18 m²	270	-
Roof Transmission	10 m²	867	-	10 m²	123	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	5 m²	208	-	5 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	240 W	202	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	186	-	0	0	-
People	2	108	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	117	4	5%	20	0
>> Total Zone Loads	-	2449	74	-	413	0
Zone Conditioning	-	2366	74	-	93	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	195 L/s	0	-	195 L/s	0	-
Ventilation Load	19 L/s	322	427	19 L/s	45	0
Supply Fan Load	195 L/s	162	-	195 L/s	-162	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	122	-	5%	21	-
>> Total System Loads	-	2972	501	-	-3	0
Central Cooling Coil	-	2972	501	-	0	0
>> Total Conditioning	-	2972	501	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 03 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:17

Air System Information

Air System Name **Sistema 03 - 1º Pavimento**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **47,2** m²
Location **Saquarema, Brazil**

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**

Central Cooling Coil Sizing Data

Total coil load **12,6** kW
Sensible coil load **7,5** kW
Coil L/s at Jan 1600 **299** L/s
Max block L/s **299** L/s
Sum of peak zone L/s **299** L/s
Sensible heat ratio **0,592**
m²/kW **3,7**
W/m² **267,5**
Water flow@ 5,6 °K rise **N/A**

Load occurs at **Jan 1600**
OA DB / WB **38,6 / 26,0** °C
Entering DB / WB **33,5 / 23,5** °C
Leaving DB / WB **12,8 / 11,8** °C
Coil ADP **9,1** °C
Bypass Factor **0,150**
Resulting RH **53** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **299** L/s
Standard L/s **299** L/s
Actual max L/(s-m²) **6,34** L/(s-m²)

Fan motor BHP **0,31** BHP
Fan motor kW **0,25** kW
Fan static **450** Pa

Outdoor Ventilation Air Data

Design airflow L/s **189** L/s
L/(s-m²) **4,00** L/(s-m²)

L/s/person **7,56** L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Aplic.Medic-S3-1ºPav	1	3,8	Jan 1900	284	0,0	47,2	6,02

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Air System Design Load Summary for Sistema 03 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:17

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	22 m²	916	-	22 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	944 W	793	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	186	-	0	0	-
People	25	1643	1978	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	177	99	5%	0	0
>> Total Zone Loads	-	3714	2076	-	0	0
Zone Conditioning	-	3906	2076	-	-232	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	299 L/s	0	-	299 L/s	0	-
Ventilation Load	189 L/s	3140	3070	189 L/s	486	0
Supply Fan Load	299 L/s	249	-	299 L/s	-249	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	186	-	5%	0	-
>> Total System Loads	-	7481	5146	-	5	0
Central Cooling Coil	-	7481	5146	-	0	0
>> Total Conditioning	-	7481	5146	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 04 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:18

Air System Information

Air System Name Sistema 04 - 1º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 114,6 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 32,7 kW
Sensible coil load 21,1 kW
Coil L/s at Dec 1600 1051 L/s
Max block L/s 1051 L/s
Sum of peak zone L/s 1051 L/s
Sensible heat ratio 0,645
m²/kW 3,5
W/m² 285,0
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1600
OA DB / WB 38,0 / 26,0 °C
Entering DB / WB 29,4 / 20,9 °C
Leaving DB / WB 12,8 / 11,8 °C
Coil ADP 9,9 °C
Bypass Factor 0,150
Resulting RH 48 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 1051 L/s
Standard L/s 1050 L/s
Actual max L/(s-m²) 9,17 L/(s-m²)

Fan motor BHP 1,10 BHP
Fan motor kW 0,88 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 371 L/s
L/(s-m²) 3,24 L/(s-m²)

L/s/person 7,27 L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Espera 1+Rec-S4-1º Pav	1	9,5	Dec 1700	712	1,0	101,0	7,05
Capela-S4-1º Pav	1	0,8	Dec 1900	60	0,1	5,5	10,85
Classif de Risco-S4-1ºPa	1	3,0	Jan 1600	226	0,5	8,1	27,96

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Air System Design Load Summary for Sistema 04 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/22/2023
02:18

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 38,0 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	22 m²	1501	-	22 m²	-	-
Wall Transmission	33 m²	1186	-	33 m²	481	-
Roof Transmission	8 m²	1123	-	8 m²	185	-
Window Transmission	22 m²	1875	-	22 m²	859	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	25 m²	1014	-	25 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2292 W	1926	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	600 W	557	-	0	0	-
People	51	3351	4034	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	627	202	5%	76	0
>> Total Zone Loads	-	13160	4236	-	1602	0
Zone Conditioning	-	13598	4236	-	-11	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	1025 L/s	0	-	1025 L/s	0	-
Ventilation Load	371 L/s	5937	7352	371 L/s	819	0
Supply Fan Load	1051 L/s	876	-	1051 L/s	-876	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	658	-	5%	80	-
>> Total System Loads	-	21069	11588	-	12	0
Central Cooling Coil	-	21069	11589	-	0	0
>> Total Conditioning	-	21069	11589	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 05 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:01

Air System Information

Air System Name Sistema 05 - 1º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 11,7 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 2,6 kW
Sensible coil load 1,7 kW
Coil L/s at Jan 1600 85 L/s
Max block L/s 85 L/s
Sum of peak zone L/s 85 L/s
Sensible heat ratio 0,661
m²/kW 4,4
W/m² 225,5
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 30,8 / 21,5 °C
Leaving DB / WB 13,7 / 12,6 °C
Coil ADP 10,7 °C
Bypass Factor 0,150
Resulting RH 45 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 85 L/s
Standard L/s 85 L/s
Actual max L/(s-m²) 7,24 L/(s-m²)

Fan motor BHP 0,09 BHP
Fan motor kW 0,07 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 39 L/s
L/(s-m²) 3,33 L/(s-m²)

L/s/person 19,50 L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Isolamento+AC-S5-1ºPav	1	1,1	Dec 1900	80	0,2	11,7	6,88

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Air System Design Load Summary for Sistema 05 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:01

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	11 m²	416	-	11 m²	167	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 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	234 W	197	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	186	-	0	0	-
People	2	108	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	45	4	5%	8	0
>> Total Zone Loads	-	952	74	-	176	0
Zone Conditioning	-	990	74	-	24	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	47 L/s	0	-	47 L/s	0	-
Ventilation Load	39 L/s	636	820	39 L/s	37	0
Supply Fan Load	85 L/s	71	-	85 L/s	-71	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	48	-	5%	9	-
>> Total System Loads	-	1744	894	-	-1	0
Central Cooling Coil	-	1744	894	-	0	0
>> Total Conditioning	-	1744	894	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 06 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:04

Air System Information

Air System Name Sistema 06 - 1º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 103,9 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 27,1 kW
Sensible coil load 16,9 kW
Coil L/s at Jan 1500 684 L/s
Max block L/s 684 L/s
Sum of peak zone L/s 684 L/s
Sensible heat ratio 0,623
m²/kW 3,8
W/m² 260,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 33,4 / 22,9 °C
Leaving DB / WB 12,9 / 11,8 °C
Coil ADP 9,3 °C
Bypass Factor 0,150
Resulting RH 44 %
Design supply temp 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 684 L/s
Standard L/s 683 L/s
Actual max L/(s-m²) 6,58 L/(s-m²)

Fan motor BHP 0,72 BHP
Fan motor kW 0,57 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 419 L/s
L/(s-m²) 4,03 L/(s-m²)

L/s/person 27,93 L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Sala Vermelha-S6-1º Pav	1	8,6	Jan 1700	650	0,3	103,9	6,25

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Air System Design Load Summary for Sistema 06 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:04

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window& Skylight Solar Loads	3 m²	150	-	3 m²	-	-
Wall Transmission	1 m²	46	-	1 m²	21	-
Roof Transmission	0 m²	0	-	0 m²	0	-
WindowTransmission	3 m²	268	-	3 m²	117	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	3 m²	260	-	3 m²	114	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	80 m²	3308	-	80 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2078 W	1723	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1500 W	1385	-	0	0	-
People	15	968	1187	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	405	59	5%	13	0
>> Total Zone Loads	-	8514	1246	-	264	0
Zone Conditioning	-	8772	1246	-	-634	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	626 L/s	0	-	626 L/s	0	-
Ventilation Load	419 L/s	7110	8974	419 L/s	1206	0
Supply Fan Load	684 L/s	570	-	684 L/s	-570	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	426	-	5%	13	-
>> Total System Loads	-	16878	10220	-	15	0
Central Cooling Coil	-	16878	10220	-	0	0
>> Total Conditioning	-	16878	10220	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 07 - 1º Pavimento		
Project Name: HMPNA - Saquarema		03/25/2023
Prepared by: CAWS Projetos		08:07

Air System Information

Air System Name Sistema 07 - 1º Pavimento
 Equipment Class SPLT AHU
 Air System Type SZCAV

Number of zones 1
 Floor Area 26,4 m²
 Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
 Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
 Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 7,5 kW
 Sensible coil load 6,2 kW
 Coil L/s at Jan 1500 387 L/s
 Max block L/s 387 L/s
 Sum of peak zone L/s 387 L/s
 Sensible heat ratio 0,832
 m²/kW 3,5
 W/m² 283,1
 Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
 OA DB / WB 38,9 / 26,1 °C
 Entering DB / WB 26,2 / 17,8 °C
 Leaving DB / WB 12,9 / 11,8 °C
 Coil ADP 10,5 °C
 Bypass Factor 0,150
 Resulting RH 42 %
 Design supply temp. 12,0 °C
 Zone T-stat Check 1 of 1 OK
 Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 387 L/s
 Standard L/s 386 L/s
 Actual max L/(s-m²) 14,65 L/(s-m²)

Fan motor BHP 0,41 BHP
 Fan motor kW 0,32 kW
 Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 44 L/s
 L/(s-m²) 1,67 L/(s-m²)

L/s/person 14,67 L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Raio X+Vestibário-1º Pav	1	3,9	Jan 1700	293	0,0	21,8	13,42
Recepção+Digit.-1º Pav	1	1,0	Jan 1700	75	0,0	4,6	16,25

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Air System Design Load Summary for Sistema 07 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:07

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	44 m²	1841	-	44 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	528 W	438	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2300 W	2124	-	0	0	-
People	3	194	237	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	230	12	5%	0	0
>> Total Zone Loads	-	4826	249	-	0	0
Zone Conditioning	-	4900	249	-	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	387 L/s	0	-	387 L/s	0	-
Ventilation Load	44 L/s	758	1004	44 L/s	324	0
Supply Fan Load	387 L/s	322	-	387 L/s	-322	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	241	-	5%	0	-
>> Total System Loads	-	6221	1253	-	2	0
Central Cooling Coil	-	6221	1253	-	0	0
>> Total Conditioning	-	6221	1253	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 08 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:10

Air System Information

Air System Name Sistema 08 - 1º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 19,3 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 3,6 kW
Sensible coil load 2,7 kW
Coil L/s at Dec 1600 159 L/s
Max block L/s 159 L/s
Sum of peak zone L/s 159 L/s
Sensible heat ratio 0,754
m²/kW 5,3
W/m² 188,2
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1600
OA DB / WB 38,0 / 26,0 °C
Entering DB / WB 27,3 / 18,9 °C
Leaving DB / WB 13,0 / 11,9 °C
Coil ADP 10,5 °C
Bypass Factor 0,150
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 159 L/s
Standard L/s 159 L/s
Actual max L/(s-m²) 8,25 L/(s-m²)

Fan motor BHP 0,17 BHP
Fan motor kW 0,13 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 32 L/s
L/(s-m²) 1,66 L/(s-m²)

L/s/person 16,00 L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Sala Dist+E stoc.S8-1ºPav	1	2,0	Jan 1700	151	0,0	19,3	7,84

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Air System Design Load Summary for Sistema 08 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:10

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 38,0 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	30 m²	1259	-	30 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	386 W	324	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	186	-	0	0	-
People	2	131	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	95	8	5%	0	0
>> Total Zone Loads	-	1995	166	-	0	0
Zone Conditioning	-	1988	166	-	-66	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	159 L/s	0	-	159 L/s	0	-
Ventilation Load	32 L/s	518	727	32 L/s	201	0
Supply Fan Load	159 L/s	133	-	159 L/s	-133	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	100	-	5%	0	-
>> Total System Loads	-	2738	894	-	2	0
Central Cooling Coil	-	2738	894	-	0	0
>> Total Conditioning	-	2738	894	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 09 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:12

Air System Information

Air System Name Sistema 09 - 1º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 159,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 36,6 kW
Sensible coil load 25,0 kW
Coil L/s at Feb 1600 1503 L/s
Max block L/s 1503 L/s
Sum of peak zone L/s 1503 L/s
Sensible heat ratio 0,683
m²/kW 4,3
W/m² 229,9
Water flow@ 5,6 °K rise N/A

Load occurs at Feb 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 28,6 / 20,7 °C
Leaving DB / WB 14,8 / 13,8 °C
Coil ADP 12,3 °C
Bypass Factor 0,150
Resulting RH 52 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 1503 L/s
Standard L/s 1501 L/s
Actual max L/(s-m²) 9,43 L/(s-m²)

Fan motor BHP 1,58 BHP
Fan motor kW 1,25 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow/L/s 421 L/s
L/(s-m²) 2,64 L/(s-m²)

L/s/person 7,80 L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Aplic Med Reidr.S9-1ºPav	1	2,6	Jan 1900	243	0,2	28,2	8,62
Obs. Pediátrica.S9-1ºPav	1	2,4	Jan 1700	218	0,0	23,6	9,22
Espera_Recp_Tri.S9-1ºPav	1	5,3	Feb 1700	491	0,4	69,4	7,07
Atend.Imed+Post.S9-1ºPav	1	3,1	Feb 1700	289	0,6	24,9	11,61
Consultório 1A-1º Pav	1	1,1	Apr 1600	106	0,1	6,3	16,80
Consultório 2A-1º Pav	1	0,9	Jan 1700	82	0,0	7,0	11,67

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Air System Design Load Summary for Sistema 09 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:12

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Feb 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	10 m²	601	-	10 m²	-	-
Wall Transmission	38 m²	1478	-	38 m²	567	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	10 m²	888	-	10 m²	390	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	7 m²	598	-	7 m²	263	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	70 m²	2921	-	70 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	3187 W	2678	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1850 W	1718	-	0	0	-
People	54	3559	4434	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	722	222	5%	61	0
>> Total Zone Loads	-	15163	4656	-	1281	0
Zone Conditioning	-	16003	4656	-	-252	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	1425 L/s	0	-	1425 L/s	0	-
Ventilation Load	421 L/s	6997	6970	421 L/s	1466	0
Supply Fan Load	1503 L/s	1252	-	1503 L/s	-1252	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	758	-	5%	64	-
>> Total System Loads	-	25011	11626	-	26	0
Central Cooling Coil	-	25011	11626	-	0	0
>> Total Conditioning	-	25011	11626	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 10 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:15

Air System Information

Air System Name Sistema 10 - 1º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 9,7 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 3,1 kW
Sensible coil load 2,3 kW
Coil L/s at Dec 1700 139 L/s
Max block L/s 139 L/s
Sum of peak zone L/s 139 L/s
Sensible heat ratio 0,730
m²/kW 3,1
W/m² 320,0
Water flow@ 5,6 °K rise N/A

Load occurs at Dec 1700
OA DB / WB 37,3 / 25,8 °C
Entering DB / WB 27,3 / 19,4 °C
Leaving DB / WB 13,8 / 12,8 °C
Coil ADP 11,4 °C
Bypass Factor 0,150
Resulting RH 46 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 139 L/s
Standard L/s 139 L/s
Actual max L/(s-m²) 14,33 L/(s-m²)

Fan motor BHP 0,15 BHP
Fan motor kW 0,12 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 32 L/s
L/(s-m²) 3,30 L/(s-m²)

L/s/person 16,00 L/s/person

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
Zone 1							
Isolamento+AC-S10-1ºPav	1	1,8	Jan 1900	132	0,3	9,7	13,61

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Air System Design Load Summary for Sistema 10 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:15

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1700 COOLING OA DB / WB 37,3 °C / 25,8 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	17 m²	719	-	17 m²	256	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	9 m²	376	-	9 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	194 W	165	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	187	-	0	0	-
People	2	134	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	79	8	5%	13	0
>> Total Zone Loads	-	1658	166	-	269	0
Zone Conditioning	-	1594	166	-	16	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	108 L/s	0	-	108 L/s	0	-
Ventilation Load	32 L/s	473	672	32 L/s	85	0
Supply Fan Load	139 L/s	116	-	139 L/s	-116	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	83	-	5%	13	-
>> Total System Loads	-	2266	838	-	-2	0
Central Cooling Coil	-	2266	838	-	0	0
>> Total Conditioning	-	2266	838	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 11 - 1º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:19

Air System Information

Air System Name **Sistema 11 - 1º Pavimento**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **115,4** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **21,0** kW
Sensible coil load **15,1** kW
Coil L/s at Dec 1600 **960** L/s
Max block L/s **960** L/s
Sum of peak zone L/s **960** L/s
Sensible heat ratio **0,718**
m²/kW **5,5**
W/m² **182,1**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Dec 1600**
OA DB / WB **38,0 / 26,0** °C
Entering DB / WB **27,5 / 19,8** °C
Leaving DB / WB **14,5 / 13,5** °C
Coil ADP **12,2** °C
Bypass Factor **0,150**
Resulting RH **50** %
Design supply temp. **14,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **960** L/s
Standard L/s **960** L/s
Actual max L/(s-m²) **8,32** L/(s-m²)

Fan motor BHP **1,01** BHP
Fan motor kW **0,80** kW
Fan static **450** Pa

Outdoor Ventilation Air Data

Design airflow L/s **210** L/s
L/(s-m²) **1,82** L/(s-m²)

L/s/person **8,75** L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Enferm. Fem. S11 -1º Pav	1	42,5	8,0	210,0	0,00	0,00	69,0	0,0	69,0
Enferm.Masc.1-S11 -1ºPav	1	30,0	6,0	308,4	0,00	0,00	49,0	0,0	49,0
Enferm.Masc.2-S11 -1ºPav	1	24,3	6,0	235,4	0,00	0,00	42,0	0,0	42,0
Posto Enferm. S11 -1ºPav	1	18,6	4,0	158,5	0,00	0,00	50,0	0,0	50,0
Totals (incl. Space Multipliers)				912,3					210,0

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Air System Design Load Summary for Sistema 11 - 1º Pavimento

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
08:19

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 38,0 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	98 m²	4074	-	98 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2308 W	1939	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1900 W	1764	-	0	0	-
People	24	1577	1898	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	468	95	5%	0	0
>> Total Zone Loads	-	9822	1993	-	0	0
Zone Conditioning	-	10532	1993	-	-413	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	787 L/s	0	-	787 L/s	0	-
Ventilation Load	210 L/s	3265	3926	210 L/s	1228	0
Supply Fan Load	960 L/s	800	-	960 L/s	-800	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	491	-	5%	0	-
>> Total System Loads	-	15089	5920	-	14	0
Central Cooling Coil	-	15089	5922	-	0	0
>> Total Conditioning	-	15089	5922	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for CCIH/CVE/CRU/CRP - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:21

Air System Information

Air System Name CCIH/CVE/CRU/CRP - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 21,0 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 8,2 kW
Sensible coil load 7,0 kW
Coil L/s at Jan 1500 504 L/s
Max block L/s 504 L/s
Sum of peak zone L/s 504 L/s
Sensible heat ratio 0,849
m²/kW 2,6
W/m² 391,5
Water flow@ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,5 / 17,6 °C
Leaving DB / WB 14,0 / 12,5 °C
Coil ADP 11,1 °C
Bypass Factor 0,200
Resulting RH 44 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 504 L/s
Standard L/s 504 L/s
Actual max L/(s-m²) 24,00 L/(s-m²)

Fan motor BHP 0,03 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 504 L/s
Standard L/s 504 L/s
Actual max L/(s-m²) 24,00 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 32 L/s
L/(s-m²) 1,52 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
CCTH/CVE/CRO/CRP-2ºPav	1	21,0	4,0	478,7	0,00	0,00	32,0	0,0	32,0
Totals (incl. Space Multipliers)				478,7					32,0

Air System Design Load Summary for CCIH/CVE/CRU/CRP - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:21

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	285	-	2 m²	-	-
Wall Transmission	9 m²	323	-	9 m²	132	-
Roof Transmission	21 m²	3046	-	21 m²	480	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	25 m²	1036	-	25 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	420 W	348	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	600 W	554	-	0	0	-
People	4	272	533	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	302	27	5%	35	0
>> Total Zone Loads	-	6347	560	-	725	0
Zone Conditioning	-	6104	560	-	-61	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	476 L/s	0	-	476 L/s	0	-
Ventilation Load	32 L/s	534	682	32 L/s	62	0
Supply Fan Load	504 L/s	23	-	504 L/s	-23	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	317	-	5%	36	-
>> Total System Loads	-	6979	1242	-	14	0
Central Cooling Coil	-	6979	1243	-	0	0
>> Total Conditioning	-	6979	1243	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Descanso Médicos - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:25

Air System Information

Air System Name Descanso Médicos - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 11,5 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,2 kW
Sensible coil load 4,0 kW
Coil L/s at Jan 1500 269 L/s
Max block L/s 269 L/s
Sum of peak zone L/s 269 L/s
Sensible heat ratio 0,769
m²/kW 2,2
W/m² 449,0
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 26,2 / 18,4 °C
Leaving DB / WB 13,9 / 12,5 °C
Coil ADP 10,9 °C
Bypass Factor 0,200
Resulting RH 47 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 269 L/s
Standard L/s 269 L/s
Actual max L/(s-m²) 23,37 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 269 L/s
Standard L/s 269 L/s
Actual max L/(s-m²) 23,37 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 31 L/s
L/(s-m²) 2,70 L/(s-m²)

L/s/person 7,75 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Descanso Médico - 2º Pav	1	11,5	4,0	255,3	0,00	0,00	31,0	0,0	31,0
Totals (incl. Space Multipliers)				255,3					31,0

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Air System Design Load Summary for Descanso Médicos - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	84	-	2 m²	-	-
Wall Transmission	9 m²	281	-	9 m²	135	-
Roof Transmission	12 m²	1668	-	12 m²	263	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	11 m²	460	-	11 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	230 W	191	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	4	272	533	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	161	27	5%	24	0
>> Total Zone Loads	-	3388	560	-	500	0
Zone Conditioning	-	3251	560	-	-41	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	269 L/s	0	-	269 L/s	0	-
Ventilation Load	31 L/s	539	631	31 L/s	36	0
Supply Fan Load	269 L/s	12	-	269 L/s	-12	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	169	-	5%	25	-
>> Total System Loads	-	3972	1191	-	8	0
Central Cooling Coil	-	3972	1191	-	0	0
>> Total Conditioning	-	3972	1191	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Direção Adm. - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:27

Air System Information

Air System Name Direção Adm. - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 12,9 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,1 kW
Sensible coil load 4,1 kW
Coil L/s at Jan 1500 286 L/s
Max block L/s 286 L/s
Sum of peak zone L/s 286 L/s
Sensible heat ratio 0,816
m²/kW 2,5
W/m² 392,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,7 / 17,8 °C
Leaving DB / WB 13,8 / 12,3 °C
Coil ADP 10,8 °C
Bypass Factor 0,200
Resulting RH 45 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 286 L/s
Standard L/s 286 L/s
Actual max L/(s-m²) 22,20 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 286 L/s
Standard L/s 286 L/s
Actual max L/(s-m²) 22,20 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 1,86 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Direção Adm - 2ºPav	1	12,9	3,0	272,1	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				272,1					24,0

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Air System Design Load Summary for Direção Adm. - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:27

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1 m²	143	-	1 m²	-	-
Wall Transmission	6 m²	214	-	6 m²	87	-
Roof Transmission	13 m²	1871	-	13 m²	295	-
Window Transmission	1 m²	89	-	1 m²	39	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	7 m²	286	-	7 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	258 W	214	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	450 W	416	-	0	0	-
People	3	204	400	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	172	20	5%	21	0
>> Total Zone Loads	-	3609	420	-	443	0
Zone Conditioning	-	3521	420	-	-24	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	286 L/s	0	-	286 L/s	0	-
Ventilation Load	24 L/s	417	513	24 L/s	21	0
Supply Fan Load	286 L/s	13	-	286 L/s	-13	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	180	-	5%	22	-
>> Total System Loads	-	4132	933	-	6	0
Central Cooling Coil	-	4132	934	-	0	0
>> Total Conditioning	-	4132	934	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Direção Geral - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:29

Air System Information

Air System Name Direção Geral - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 22,8 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 7,1 kW
Sensible coil load 6,1 kW
Coil L/s at Jan 1500 424 L/s
Max block L/s 424 L/s
Sum of peak zone L/s 424 L/s
Sensible heat ratio 0,852
m²/kW 3,2
W/m² 312,2
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,8 / 17,6 °C
Leaving DB / WB 13,9 / 12,4 °C
Coil ADP 11,0 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 424 L/s
Standard L/s 424 L/s
Actual max L/(s-m²) 18,60 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 424 L/s
Standard L/s 424 L/s
Actual max L/(s-m²) 18,60 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 35 L/s
L/(s-m²) 1,54 L/(s-m²)

L/s/person 17,50 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Direção Geral-2ºPav	1	22,8	2,0	402,9	0,00	0,00	35,0	0,0	35,0
Totals (incl. Space Multipliers)				402,9					35,0

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Air System Design Load Summary for Direção Geral - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:29

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1 m²	143	-	1 m²	-	-
Wall Transmission	8 m²	273	-	8 m²	111	-
Roof Transmission	23 m²	3307	-	23 m²	522	-
Window Transmission	1 m²	89	-	1 m²	39	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	12 m²	489	-	12 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	456 W	378	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	300 W	277	-	0	0	-
People	2	136	267	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	255	13	5%	34	0
>> Total Zone Loads	-	5347	280	-	705	0
Zone Conditioning	-	5174	280	-	-41	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	424 L/s	0	-	424 L/s	0	-
Ventilation Load	35 L/s	604	772	35 L/s	33	0
Supply Fan Load	424 L/s	20	-	424 L/s	-20	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	267	-	5%	35	-
>> Total System Loads	-	6065	1052	-	8	0
Central Cooling Coil	-	6065	1053	-	0	0
>> Total Conditioning	-	6065	1053	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Farmácia - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:31

Air System Information

Air System Name Farmácia - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 5,5 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 2,0 kW
Sensible coil load 1,8 kW
Coil L/s at Jan 1500 156 L/s
Max block L/s 156 L/s
Sum of peak zone L/s 156 L/s
Sensible heat ratio 0,886
m²/kW 2,8
W/m² 363,2
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,3 / 18,3 °C
Leaving DB / WB 15,9 / 14,6 °C
Coil ADP 13,6 °C
Bypass Factor 0,200
Resulting RH 51 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 156 L/s
Standard L/s 156 L/s
Actual max L/(s-m²) 28,34 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 156 L/s
Standard L/s 156 L/s
Actual max L/(s-m²) 28,34 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 8 L/s
L/(s-m²) 1,45 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Farmácia-2ºPav	1	5,5	1,0	148,1	0,00	0,00	8,0	0,0	8,0
Totals (incl. Space Multipliers)				148,1					8,0

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Air System Design Load Summary for Farmácia - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:31

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	6 m²	798	-	6 m²	126	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	12 m²	485	-	12 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	110 W	91	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	1	65	79	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	77	4	5%	6	0
>> Total Zone Loads	-	1607	83	-	132	0
Zone Conditioning	-	1545	83	-	-23	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	156 L/s	0	-	156 L/s	0	-
Ventilation Load	8 L/s	138	144	8 L/s	28	0
Supply Fan Load	156 L/s	7	-	156 L/s	-7	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	80	-	5%	7	-
>> Total System Loads	-	1771	227	-	5	0
Central Cooling Coil	-	1771	227	-	0	0
>> Total Conditioning	-	1771	227	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Gerência Enfermagem - 2º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
08:33

Air System Information

Air System Name Gerência Enfermagem - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 22,7 m²
Location Saguarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 8,2 kW
Sensible coil load 6,8 kW
Coil L/s at Dec 1500 486 L/s
Max block L/s 486 L/s
Sum of peak zone L/s 486 L/s
Sensible heat ratio 0,836
m²/kW 2,8
W/m² 359,7
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1500
OA DB / WB 38,3 / 26,1 °C
Entering DB / WB 25,5 / 17,6 °C
Leaving DB / WB 13,9 / 12,4 °C
Coil ADP 11,0 °C
Bypass Factor 0,200
Resulting RH 44 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 486 L/s
Standard L/s 486 L/s
Actual max L/(s-m²) 21,42 L/(s-m²)

Fan motor BHP 0,03 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 486 L/s
Standard L/s 486 L/s
Actual max L/(s-m²) 21,42 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 35 L/s
L/(s-m²) 1,54 L/(s-m²)

L/s/person 8,75 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Gerência Enferm - 2º Pav	1	22,7	4,0	461,8	0,00	0,00	35,0	0,0	35,0
Totals (incl. Space Multipliers)				461,8					35,0

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Air System Design Load Summary for Gerência Enfermagem - 2º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
08:33

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	292	-	2 m²	-	-
Wall Transmission	10 m²	356	-	10 m²	148	-
Roof Transmission	23 m²	3268	-	23 m²	522	-
Window Transmission	2 m²	172	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	12 m²	495	-	12 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	454 W	376	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	600 W	554	-	0	0	-
People	4	272	533	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	289	27	5%	37	0
>> Total Zone Loads	-	6074	560	-	785	0
Zone Conditioning	-	5914	560	-	-38	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	486 L/s	0	-	486 L/s	0	-
Ventilation Load	35 L/s	585	778	35 L/s	31	0
Supply Fan Load	486 L/s	23	-	486 L/s	-23	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	304	-	5%	39	-
>> Total System Loads	-	6825	1338	-	10	0
Central Cooling Coil	-	6825	1339	-	0	0
>> Total Conditioning	-	6825	1339	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Laboratório - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:35

Air System Information

Air System Name Laboratório - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 15,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 6,1 kW
Sensible coil load 5,3 kW
Coil L/s at Jan 1500 466 L/s
Max block L/s 466 L/s
Sum of peak zone L/s 466 L/s
Sensible heat ratio 0,863
m²/kW 2,5
W/m² 398,1
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,3 / 18,4 °C
Leaving DB / WB 15,9 / 14,6 °C
Coil ADP 13,5 °C
Bypass Factor 0,200
Resulting RH 51 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 466 L/s
Standard L/s 465 L/s
Actual max L/(s-m²) 30,23 L/(s-m²)

Fan motor BHP 0,03 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 466 L/s
Standard L/s 465 L/s
Actual max L/(s-m²) 30,23 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 1,56 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Laboratório - 2ºPav	1	15,4	3,0	442,3	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				442,3					24,0

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Air System Design Load Summary for Laboratório - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:35

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	15 m²	2234	-	15 m²	352	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	38 m²	1603	-	38 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	308 W	255	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	300 W	277	-	0	0	-
People	3	204	400	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	229	20	5%	18	0
>> Total Zone Loads	-	4802	420	-	370	0
Zone Conditioning	-	4611	420	-	-79	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	466 L/s	0	-	466 L/s	0	-
Ventilation Load	24 L/s	416	421	24 L/s	91	0
Supply Fan Load	466 L/s	22	-	466 L/s	-22	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	240	-	5%	18	-
>> Total System Loads	-	5289	841	-	10	0
Central Cooling Coil	-	5289	842	-	0	0
>> Total Conditioning	-	5289	842	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for NIR - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:37

Air System Information

Air System Name NIR - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 10,3 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,2 kW
Sensible coil load 4,3 kW
Coil L/s at Jan 1500 305 L/s
Max block L/s 305 L/s
Sum of peak zone L/s 305 L/s
Sensible heat ratio 0,823
m²/kW 2,0
W/m² 505,8
Water flow@ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,7 / 17,9 °C
Leaving DB / WB 14,1 / 12,6 °C
Coil ADP 11,2 °C
Bypass Factor 0,200
Resulting RH 45 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 305 L/s
Standard L/s 305 L/s
Actual max L/(s-m²) 29,66 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 305 L/s
Standard L/s 305 L/s
Actual max L/(s-m²) 29,66 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 2,33 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
NIR - 2ºPav	1	10,3	3,0	290,2	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				290,2					24,0

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Air System Design Load Summary for NIR - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:37

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	10 m²	1494	-	10 m²	236	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	32 m²	1383	-	32 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	206 W	171	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	450 W	416	-	0	0	-
People	3	204	400	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	183	20	5%	12	0
>> Total Zone Loads	-	3851	420	-	247	0
Zone Conditioning	-	3666	420	-	-85	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	305 L/s	0	-	305 L/s	0	-
Ventilation Load	24 L/s	415	501	24 L/s	96	0
Supply Fan Load	305 L/s	14	-	305 L/s	-14	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	193	-	5%	12	-
>> Total System Loads	-	4288	921	-	9	0
Central Cooling Coil	-	4288	922	-	0	0
>> Total Conditioning	-	4288	922	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Plantão - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:39

Air System Information

Air System Name Plantão - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 11,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 4,7 kW
Sensible coil load 4,0 kW
Coil L/s at Jan 1500 340 L/s
Max block L/s 340 L/s
Sum of peak zone L/s 340 L/s
Sensible heat ratio 0,854
m²/kW 2,4
W/m² 414,7
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,7 / 18,6 °C
Leaving DB / WB 15,9 / 14,6 °C
Coil ADP 13,4 °C
Bypass Factor 0,200
Resulting RH 50 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 340 L/s
Standard L/s 340 L/s
Actual max L/(s-m²) 29,83 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 340 L/s
Standard L/s 340 L/s
Actual max L/(s-m²) 29,83 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 29 L/s
L/(s-m²) 2,54 L/(s-m²)

L/s/person 14,50 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Plantão - 2º Pav	1	11,4	2,0	323,3	0,00	0,00	17,0	0,0	17,0
Totals (incl. Space Multipliers)				323,3					17,0

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Air System Design Load Summary for Plantão - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:39

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	10 m²	1494	-	10 m²	236	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	35 m²	1438	-	35 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	228 W	189	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	2	129	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	167	8	5%	12	0
>> Total Zone Loads	-	3510	166	-	247	0
Zone Conditioning	-	3364	166	-	-100	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	311 L/s	0	-	311 L/s	0	-
Ventilation Load	29 L/s	487	523	29 L/s	115	0
Supply Fan Load	340 L/s	16	-	340 L/s	-16	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	176	-	5%	12	-
>> Total System Loads	-	4042	689	-	11	0
Central Cooling Coil	-	4042	690	-	0	0
>> Total Conditioning	-	4042	690	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Posto de Enfermagem - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:41

Air System Information

Air System Name Posto de Enfermagem - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 12,3 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 4,8 kW
Sensible coil load 4,1 kW
Coil L/s at Jan 1500 368 L/s
Max block L/s 368 L/s
Sum of peak zone L/s 368 L/s
Sensible heat ratio 0,871
m²/kW 2,6
W/m² 386,9
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,4 / 18,5 °C
Leaving DB / WB 16,1 / 14,7 °C
Coil ADP 13,7 °C
Bypass Factor 0,200
Resulting RH 51 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 368 L/s
Standard L/s 368 L/s
Actual max L/(s-m²) 29,91 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 368 L/s
Standard L/s 368 L/s
Actual max L/(s-m²) 29,91 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 19 L/s
L/(s-m²) 1,54 L/(s-m²)

L/s/person 9,50 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Posto de Enfem - 2º Pav	1	12,3	2,0	349,5	0,00	0,00	19,0	0,0	19,0
Totals (incl. Space Multipliers)				349,5					19,0

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Air System Design Load Summary for Posto de Enfermagem - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:41

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	12 m²	1784	-	12 m²	281	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	33 m²	1351	-	33 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	246 W	204	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	2	136	267	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	181	13	5%	14	0
>> Total Zone Loads	-	3795	280	-	295	0
Zone Conditioning	-	3613	280	-	-64	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	368 L/s	0	-	368 L/s	0	-
Ventilation Load	19 L/s	327	330	19 L/s	74	0
Supply Fan Load	368 L/s	17	-	368 L/s	-17	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	190	-	5%	15	-
>> Total System Loads	-	4147	610	-	8	0
Central Cooling Coil	-	4147	612	-	0	0
>> Total Conditioning	-	4147	612	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto 01 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:43

Air System Information

Air System Name Quarto 01 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 10,7 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,1 kW
Sensible coil load 4,3 kW
Coil L/s at Jan 1500 298 L/s
Max block L/s 298 L/s
Sum of peak zone L/s 298 L/s
Sensible heat ratio 0,848
m²/kW 2,1
W/m² 472,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 26,1 / 17,9 °C
Leaving DB / WB 14,2 / 12,7 °C
Coil ADP 11,2 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 298 L/s
Standard L/s 297 L/s
Actual max L/(s-m²) 27,81 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 298 L/s
Standard L/s 297 L/s
Actual max L/(s-m²) 27,81 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 33 L/s
L/(s-m²) 3,08 L/(s-m²)

L/s/person 33,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 01 - 2ºPav	1	10,7	1,0	282,7	0,00	0,00	17,0	0,0	17,0
Totals (incl. Space Multipliers)				282,7					17,0

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Air System Design Load Summary for Quarto 01 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:43

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	11 m²	1552	-	11 m²	245	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	35 m²	1606	-	35 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	214 W	177	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	1	53	35	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	179	2	5%	12	0
>> Total Zone Loads	-	3751	37	-	257	0
Zone Conditioning	-	3539	37	-	-124	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	265 L/s	0	-	265 L/s	0	-
Ventilation Load	33 L/s	548	733	33 L/s	130	0
Supply Fan Load	298 L/s	14	-	298 L/s	-14	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	188	-	5%	13	-
>> Total System Loads	-	4289	770	-	6	0
Central Cooling Coil	-	4289	770	-	0	0
>> Total Conditioning	-	4289	770	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto 02 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:45

Air System Information

Air System Name Quarto 02 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 15,1 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 5,6 kW
Sensible coil load 4,8 kW
Coil L/s at Jan 1500 328 L/s
Max block L/s 328 L/s
Sum of peak zone L/s 328 L/s
Sensible heat ratio 0,844
m²/kW 2,7
W/m² 373,7
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 26,1 / 17,8 °C
Leaving DB / WB 14,1 / 12,5 °C
Coil ADP 11,1 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 328 L/s
Standard L/s 327 L/s
Actual max L/(s-m²) 21,70 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 328 L/s
Standard L/s 327 L/s
Actual max L/(s-m²) 21,70 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 36 L/s
L/(s-m²) 2,38 L/(s-m²)

L/s/person 18,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 02 - 2º Pav	1	15,1	2,0	311,3	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				311,3					24,0

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Air System Design Load Summary for Quarto 02 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:45

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	10 m²	332	-	10 m²	150	-
Roof Transmission	15 m²	2190	-	15 m²	345	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	21 m²	871	-	21 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	302 W	250	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	2	106	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	197	4	5%	25	0
>> Total Zone Loads	-	4131	74	-	520	0
Zone Conditioning	-	3946	74	-	-75	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	292 L/s	0	-	292 L/s	0	-
Ventilation Load	36 L/s	598	804	36 L/s	71	0
Supply Fan Load	328 L/s	15	-	328 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	207	-	5%	26	-
>> Total System Loads	-	4766	877	-	6	0
Central Cooling Coil	-	4766	878	-	0	0
>> Total Conditioning	-	4766	878	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto 03 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:47

Air System Information

Air System Name Quarto 03 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 14,9 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,3 kW
Sensible coil load 4,6 kW
Coil L/s at Dec 1500 333 L/s
Max block L/s 333 L/s
Sum of peak zone L/s 333 L/s
Sensible heat ratio 0,880
m²/kW 2,8
W/m² 353,2
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1500
OA DB / WB 38,3 / 26,1 °C
Entering DB / WB 25,5 / 17,4 °C
Leaving DB / WB 14,0 / 12,5 °C
Coil ADP 11,1 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 333 L/s
Standard L/s 333 L/s
Actual max L/(s-m²) 22,36 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 333 L/s
Standard L/s 333 L/s
Actual max L/(s-m²) 22,36 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 1,61 L/(s-m²)

L/s/person 12,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 03 - 2ºPav	1	14,9	2,0	316,5	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				316,5					24,0

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Air System Design Load Summary for Quarto 03 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
08:47

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1 m²	60	-	1 m²	-	-
Wall Transmission	9 m²	309	-	9 m²	135	-
Roof Transmission	15 m²	2135	-	15 m²	341	-
Window Transmission	1 m²	86	-	1 m²	39	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	21 m²	857	-	21 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	298 W	247	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	2	106	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	199	4	5%	26	0
>> Total Zone Loads	-	4184	74	-	540	0
Zone Conditioning	-	4008	74	-	-51	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	333 L/s	0	-	333 L/s	0	-
Ventilation Load	24 L/s	401	555	24 L/s	50	0
Supply Fan Load	333 L/s	15	-	333 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	209	-	5%	27	-
>> Total System Loads	-	4634	629	-	11	0
Central Cooling Coil	-	4633	629	-	0	0
>> Total Conditioning	-	4633	629	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto 04 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:03

Air System Information

Air System Name **Quarto 04 - 2º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **14,7 m²**
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **5,8 kW**
Sensible coil load **4,8 kW**
Coil L/s at Dec 1500 **330 L/s**
Max block L/s **330 L/s**
Sum of peak zone L/s **330 L/s**
Sensible heat ratio **0,829**
m²/kW **2,5**
W/m² **396,7**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Dec 1500**
OA DB / WB **38,3 / 26,1 °C**
Entering DB / WB **26,1 / 17,9 °C**
Leaving DB / WB **14,0 / 12,5 °C**
Coil ADP **11,0 °C**
Bypass Factor **0,200**
Resulting RH **43 %**
Design supply temp. **12,0 °C**
Zone T-stat Check **1 of 1 OK**
Max zone temperature deviation **0,0 °K**

Supply Fan Sizing Data

Actual max L/s **330 L/s**
Standard L/s **330 L/s**
Actual max L/(s-m²) **22,46 L/(s-m²)**

Fan motor BHP **0,02 BHP**
Fan motor kW **0,02 kW**
Fan static **25 Pa**

Return Fan Sizing Data

Actual max L/s **330 L/s**
Standard L/s **330 L/s**
Actual max L/(s-m²) **22,46 L/(s-m²)**

Fan motor BHP **0,00 BHP**
Fan motor kW **0,00 kW**
Fan static **0 Pa**

Outdoor Ventilation Air Data

Design airflow L/s **40 L/s**
L/(s-m²) **2,72 L/(s-m²)**

L/s/person **20,00 L/s/person**

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 04 - 2ºPav	1	14,7	2,0	313,6	0,00	0,00	22,0	0,0	22,0
Totals (incl. Space Multipliers)				313,6					22,0

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Air System Design Load Summary for Quarto 04 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:03

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1 m²	60	-	1 m²	-	-
Wall Transmission	9 m²	309	-	9 m²	135	-
Roof Transmission	15 m²	2107	-	15 m²	336	-
Window Transmission	1 m²	86	-	1 m²	39	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	21 m²	853	-	21 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	294 W	244	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	2	106	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	197	4	5%	26	0
>> Total Zone Loads	-	4146	74	-	536	0
Zone Conditioning	-	3971	74	-	-79	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	290 L/s	0	-	290 L/s	0	-
Ventilation Load	40 L/s	641	923	40 L/s	74	0
Supply Fan Load	330 L/s	15	-	330 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	207	-	5%	27	-
>> Total System Loads	-	4835	997	-	7	0
Central Cooling Coil	-	4835	997	-	0	0
>> Total Conditioning	-	4835	997	-	0	0
Key:	Positive values are clq loads Negative values are htq loads			Positive values are htq loads Negative values are clq loads		

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Air System Sizing Summary for Quarto 05 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:06

Air System Information

Air System Name Quarto 05 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 17,9 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 6,7 kW
Sensible coil load 5,6 kW
Coil L/s at Jan 1500 386 L/s
Max block L/s 386 L/s
Sum of peak zone L/s 386 L/s
Sensible heat ratio 0,844
m²/kW 2,7
W/m² 371,7
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 26,1 / 17,8 °C
Leaving DB / WB 14,1 / 12,6 °C
Coil ADP 11,1 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 386 L/s
Standard L/s 386 L/s
Actual max L/(s-m²) 21,57 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 386 L/s
Standard L/s 386 L/s
Actual max L/(s-m²) 21,57 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 43 L/s
L/(s-m²) 2,40 L/(s-m²)

L/s/person 21,50 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 05 - 2º Pav	1	17,9	2,0	366,9	0,00	0,00	28,0	0,0	28,0
Totals (incl. Space Multipliers)				366,9					28,0

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Air System Design Load Summary for Quarto 05 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:06

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1 m²	50	-	1 m²	-	-
Wall Transmission	11 m²	368	-	11 m²	166	-
Roof Transmission	18 m²	2596	-	18 m²	409	-
Window Transmission	1 m²	89	-	1 m²	39	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	23 m²	945	-	23 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	358 W	297	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	2	106	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	232	4	5%	31	0
>> Total Zone Loads	-	4868	74	-	645	0
Zone Conditioning	-	4643	74	-	-83	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	343 L/s	0	-	343 L/s	0	-
Ventilation Load	43 L/s	714	961	43 L/s	76	0
Supply Fan Load	386 L/s	18	-	386 L/s	-18	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	243	-	5%	32	-
>> Total System Loads	-	5619	1034	-	7	0
Central Cooling Coil	-	5619	1035	-	0	0
>> Total Conditioning	-	5619	1035	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto 06 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:09

Air System Information

Air System Name Quarto 06 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 17,7 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 7,0 kW
Sensible coil load 6,0 kW
Coil L/s at Jan 1600 428 L/s
Max block L/s 428 L/s
Sum of peak zone L/s 428 L/s
Sensible heat ratio 0,863
m²/kW 2,5
W/m² 393,2
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 25,9 / 17,7 °C
Leaving DB / WB 14,2 / 12,7 °C
Coil ADP 11,3 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 428 L/s
Standard L/s 428 L/s
Actual max L/(s-m²) 24,17 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 428 L/s
Standard L/s 428 L/s
Actual max L/(s-m²) 24,17 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 40 L/s
L/(s-m²) 2,26 L/(s-m²)

L/s/person 20,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 06 - 2º Pav	1	17,7	2,0	406,4	0,00	0,00	28,0	0,0	28,0
Totals (incl. Space Multipliers)				406,4					28,0

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Air System Design Load Summary for Quarto 06 - 2º Pav

Project Name: HMPNA - Ssquarema
Prepared by: CAWS Projetos

03/25/2023
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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1 m²	53	-	1 m²	-	-
Wall Transmission	37 m²	1332	-	37 m²	554	-
Roof Transmission	18 m²	2501	-	18 m²	405	-
Window Transmission	1 m²	89	-	1 m²	39	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	14 m²	570	-	14 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	354 W	297	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	186	-	0	0	-
People	2	108	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	257	4	5%	50	0
>> Total Zone Loads	-	5393	74	-	1048	0
Zone Conditioning	-	5066	74	-	-49	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	388 L/s	0	-	388 L/s	0	-
Ventilation Load	40 L/s	648	881	40 L/s	26	0
Supply Fan Load	428 L/s	20	-	428 L/s	-20	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	270	-	5%	52	-
>> Total System Loads	-	6004	955	-	10	0
Central Cooling Coil	-	6004	956	-	0	0
>> Total Conditioning	-	6004	956	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto 07 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:10

Air System Information

Air System Name **Quarto 07 - 2º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **12,9** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **5,6** kW
Sensible coil load **4,9** kW
Coil L/s at Jan 1500 **344** L/s
Max block L/s **344** L/s
Sum of peak zone L/s **344** L/s
Sensible heat ratio **0,868**
m²/kW **2,3**
W/m² **434,5**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1500**
OA DB / WB **38,9 / 26,1** °C
Entering DB / WB **25,7 / 17,5** °C
Leaving DB / WB **14,0 / 12,5** °C
Coil ADP **11,1** °C
Bypass Factor **0,200**
Resulting RH **43** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **344** L/s
Standard L/s **343** L/s
Actual max L/(s-m²) **26,65** L/(s-m²)

Fan motor BHP **0,02** BHP
Fan motor kW **0,02** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **344** L/s
Standard L/s **343** L/s
Actual max L/(s-m²) **26,65** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **31** L/s
L/(s-m²) **2,40** L/(s-m²)

L/s/person **31,00** L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 07 - 2ºPav	1	12,9	1,0	326,5	0,00	0,00	19,0	0,0	19,0
Totals (incl. Space Multipliers)				326,5					19,0

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Air System Design Load Summary for Quarto 07 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	285	-	2 m²	-	-
Wall Transmission	7 m²	258	-	7 m²	105	-
Roof Transmission	13 m²	1871	-	13 m²	295	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	26 m²	1061	-	26 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	258 W	214	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	1	53	35	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	205	2	5%	24	0
>> Total Zone Loads	-	4312	37	-	502	0
Zone Conditioning	-	4117	37	-	-77	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	313 L/s	0	-	313 L/s	0	-
Ventilation Load	31 L/s	519	699	31 L/s	75	0
Supply Fan Load	344 L/s	16	-	344 L/s	-16	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	216	-	5%	25	-
>> Total System Loads	-	4868	736	-	7	0
Central Cooling Coil	-	4868	737	-	0	0
>> Total Conditioning	-	4868	737	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto 08 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:13

Air System Information

Air System Name Quarto 08 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 16,7 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 6,3 kW
Sensible coil load 5,2 kW
Coil L/s at Jan 1500 354 L/s
Max block L/s 354 L/s
Sum of peak zone L/s 354 L/s
Sensible heat ratio 0,835
m²/kW 2,7
W/m² 374,6
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 26,3 / 17,9 °C
Leaving DB / WB 14,1 / 12,5 °C
Coil ADP 11,0 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 354 L/s
Standard L/s 354 L/s
Actual max L/(s-m²) 21,20 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 354 L/s
Standard L/s 354 L/s
Actual max L/(s-m²) 21,20 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 43 L/s
L/(s-m²) 2,57 L/(s-m²)

L/s/person 21,50 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto 08 - 2ºPav	1	16,7	2,0	336,3	0,00	0,00	26,0	0,0	26,0
Totals (incl. Space Multipliers)				336,3					26,0

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Air System Design Load Summary for Quarto 08 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:13

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	17 m²	2422	-	17 m²	382	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	30 m²	1260	-	30 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	334 W	277	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	2	106	70	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	213	4	5%	19	0
>> Total Zone Loads	-	4463	74	-	401	0
Zone Conditioning	-	4268	74	-	-115	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	311 L/s	0	-	311 L/s	0	-
Ventilation Load	43 L/s	713	961	43 L/s	121	0
Supply Fan Load	354 L/s	16	-	354 L/s	-16	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	223	-	5%	20	-
>> Total System Loads	-	5221	1035	-	10	0
Central Cooling Coil	-	5221	1035	-	0	0
>> Total Conditioning	-	5221	1035	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto de descanso 1 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:15

Air System Information

Air System Name Quarto de descanso 1 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 16,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 6,0 kW
Sensible coil load 4,8 kW
Coil L/s at Feb 1500 335 L/s
Max block L/s 335 L/s
Sum of peak zone L/s 335 L/s
Sensible heat ratio 0,800
m²/kW 2,7
W/m² 363,7
Water flow @ 5,6 °K rise N/A

Load occurs at Feb 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,9 / 18,1 °C
Leaving DB / WB 14,1 / 12,7 °C
Coil ADP 11,2 °C
Bypass Factor 0,200
Resulting RH 46 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 335 L/s
Standard L/s 334 L/s
Actual max L/(s-m²) 20,41 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 335 L/s
Standard L/s 334 L/s
Actual max L/(s-m²) 20,41 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 31 L/s
L/(s-m²) 1,89 L/(s-m²)

L/s/person 7,75 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto de desc.1 - 2ºPav	1	16,4	4,0	318,0	0,00	0,00	31,0	0,0	31,0
Totals (incl. Space Multipliers)				318,0					31,0

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Air System Design Load Summary for Quarto de descanso 1 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:15

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Feb 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	107	-	2 m²	-	-
Wall Transmission	9 m²	323	-	9 m²	135	-
Roof Transmission	16 m²	2275	-	16 m²	375	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	11 m²	460	-	11 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	328 W	272	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	4	272	533	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	199	27	5%	29	0
>> Total Zone Loads	-	4178	560	-	617	0
Zone Conditioning	-	4009	560	-	-38	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	335 L/s	0	-	335 L/s	0	-
Ventilation Load	31 L/s	536	635	31 L/s	31	0
Supply Fan Load	335 L/s	15	-	335 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	209	-	5%	31	-
>> Total System Loads	-	4769	1195	-	8	0
Central Cooling Coil	-	4769	1195	-	0	0
>> Total Conditioning	-	4769	1195	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto de descanso 2 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:16

Air System Information

Air System Name Quarto de descanso 2 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 16,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 6,0 kW
Sensible coil load 4,8 kW
Coil L/s at Feb 1500 335 L/s
Max block L/s 335 L/s
Sum of peak zone L/s 335 L/s
Sensible heat ratio 0,800
m²/kW 2,7
W/m² 363,7
Water flow @ 5,6 °K rise N/A

Load occurs at Feb 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,9 / 18,1 °C
Leaving DB / WB 14,1 / 12,7 °C
Coil ADP 11,2 °C
Bypass Factor 0,200
Resulting RH 46 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 335 L/s
Standard L/s 334 L/s
Actual max L/(s-m²) 20,41 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 335 L/s
Standard L/s 334 L/s
Actual max L/(s-m²) 20,41 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 31 L/s
L/(s-m²) 1,89 L/(s-m²)

L/s/person 7,75 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto de desc 2 - 2º Pav	1	16,4	4,0	318,0	0,00	0,00	31,0	0,0	31,0
Totals (incl. Space Multipliers)				318,0					31,0

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Air System Design Load Summary for Quarto de descanso 2 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/202
09:1

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Feb 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	107	-	2 m²	-	-
Wall Transmission	9 m²	323	-	9 m²	135	-
Roof Transmission	16 m²	2275	-	16 m²	375	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	11 m²	460	-	11 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	328 W	272	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	4	272	533	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	199	27	5%	29	0
>> Total Zone Loads	-	4178	560	-	617	0
Zone Conditioning	-	4009	560	-	-38	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	335 L/s	0	-	335 L/s	0	-
Ventilation Load	31 L/s	536	635	31 L/s	31	0
Supply Fan Load	335 L/s	15	-	335 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	209	-	5%	31	-
>> Total System Loads	-	4769	1195	-	8	0
Central Cooling Coil	-	4769	1195	-	0	0
>> Total Conditioning	-	4769	1195	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto de descanso 3 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:18

Air System Information

Air System Name Quarto de descanso 3 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 16,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 6,0 kW
Sensible coil load 4,8 kW
Coil L/s at Feb 1500 335 L/s
Max block L/s 335 L/s
Sum of peak zone L/s 335 L/s
Sensible heat ratio 0,800
m²/kW 2,7
W/m² 363,7
Water flow@ 5,6 °K rise N/A

Load occurs at Feb 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,9 / 18,1 °C
Leaving DB / WB 14,1 / 12,7 °C
Coil ADP 11,2 °C
Bypass Factor 0,200
Resulting RH 46 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 335 L/s
Standard L/s 334 L/s
Actual max L/(s-m²) 20,41 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 335 L/s
Standard L/s 334 L/s
Actual max L/(s-m²) 20,41 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 31 L/s
L/(s-m²) 1,89 L/(s-m²)

L/s/person 7,75 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto de desc.3 - 2ºPav	1	16,4	4,0	318,0	0,00	0,00	31,0	0,0	31,0
Totals (incl. Space Multipliers)				318,0					31,0

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Air System Design Load Summary for Quarto de descanso 3 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:18

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Feb 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	107	-	2 m²	-	-
Wall Transmission	9 m²	323	-	9 m²	135	-
Roof Transmission	16 m²	2275	-	16 m²	375	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	11 m²	460	-	11 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	328 W	272	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	4	272	533	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	199	27	5%	29	0
>> Total Zone Loads	-	4178	560	-	617	0
Zone Conditioning	-	4009	560	-	-38	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	335 L/s	0	-	335 L/s	0	-
Ventilation Load	31 L/s	536	635	31 L/s	31	0
Supply Fan Load	335 L/s	15	-	335 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	209	-	5%	31	-
>> Total System Loads	-	4769	1195	-	8	0
Central Cooling Coil	-	4769	1195	-	0	0
>> Total Conditioning	-	4769	1195	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto de descanso 4 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:20

Air System Information

Air System Name Quarto de descanso 4 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 14,5 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,4 kW
Sensible coil load 4,8 kW
Coil L/s at Jan 1500 427 L/s
Max block L/s 427 L/s
Sum of peak zone L/s 427 L/s
Sensible heat ratio 0,899
m²/kW 2,7
W/m² 371,3
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,5 / 18,4 °C
Leaving DB / WB 16,1 / 14,7 °C
Coil ADP 13,7 °C
Bypass Factor 0,200
Resulting RH 50 %
Design supply temp 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 427 L/s
Standard L/s 426 L/s
Actual max L/(s-m²) 29,42 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 427 L/s
Standard L/s 426 L/s
Actual max L/(s-m²) 29,42 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 1,66 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto de desc.4 - 2º	1	14,5	3,0	405,2	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				405,2					24,0

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Air System Design Load Summary for Quarto de descanso 4 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:20

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	6 m²	655	-	6 m²	-	-
Wall Transmission	14 m²	460	-	14 m²	209	-
Roof Transmission	14 m²	2002	-	14 m²	316	-
Window Transmission	6 m²	536	-	6 m²	234	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 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	290 W	240	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	3	159	106	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	207	5	5%	38	0
>> Total Zone Loads	-	4352	111	-	797	0
Zone Conditioning	-	4190	111	-	1	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	427 L/s	0	-	427 L/s	0	-
Ventilation Load	24 L/s	413	431	24 L/s	-8	0
Supply Fan Load	427 L/s	20	-	427 L/s	-20	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	218	-	5%	40	-
>> Total System Loads	-	4840	542	-	13	0
Central Cooling Coil	-	4840	543	-	0	0
>> Total Conditioning	-	4840	543	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto de descanso 5 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:23

Air System Information

Air System Name Quarto de descanso 5 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 13,8 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,5 kW
Sensible coil load 4,9 kW
Coil L/s at Jan 1600 433 L/s
Max block L/s 433 L/s
Sum of peak zone L/s 433 L/s
Sensible heat ratio 0,899
m²/kW 2,5
W/m² 398,7
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1600
OA DB / WB 38,6 / 26,0 °C
Entering DB / WB 25,3 / 18,2 °C
Leaving DB / WB 15,8 / 14,5 °C
Coil ADP 13,5 °C
Bypass Factor 0,200
Resulting RH 50 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 433 L/s
Standard L/s 433 L/s
Actual max L/(s-m²) 31,39 L/(s-m²)

Fan motor BHP 0,03 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 433 L/s
Standard L/s 433 L/s
Actual max L/(s-m²) 31,39 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 1,74 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto de desc.5 - 2º	1	13,8	3,0	411,6	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				411,6					24,0

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Air System Design Load Summary for Quarto de descanso 5 - 2º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
09:23

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600 COOLING OA DB / WB 38,6 °C / 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	8 m²	845	-	8 m²	-	-
Wall Transmission	16 m²	569	-	16 m²	233	-
Roof Transmission	11 m²	1512	-	11 m²	245	-
Window Transmission	8 m²	710	-	8 m²	312	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	3 m²	133	-	3 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	276 W	232	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	93	-	0	0	-
People	3	162	106	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	213	5	5%	39	0
>> Total Zone Loads	-	4469	111	-	829	0
Zone Conditioning	-	4297	111	-	-8	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	433 L/s	0	-	433 L/s	0	-
Ventilation Load	24 L/s	408	442	24 L/s	0	0
Supply Fan Load	433 L/s	20	-	433 L/s	-20	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	223	-	5%	41	-
>> Total System Loads	-	4949	553	-	14	0
Central Cooling Coil	-	4949	554	-	0	0
>> Total Conditioning	-	4949	554	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto de descanso 6 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:25

Air System Information

Air System Name Quarto de descanso 6 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 10,7 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 4,6 kW
Sensible coil load 3,8 kW
Coil L/s at Jan 1500 320 L/s
Max block L/s 320 L/s
Sum of peak zone L/s 320 L/s
Sensible heat ratio 0,819
m²/kW 2,3
W/m² 430,2
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,6 / 18,7 °C
Leaving DB / WB 15,8 / 14,5 °C
Coil ADP 13,4 °C
Bypass Factor 0,200
Resulting RH 52 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 320 L/s
Standard L/s 320 L/s
Actual max L/(s-m²) 29,83 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 320 L/s
Standard L/s 320 L/s
Actual max L/(s-m²) 29,83 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 2,23 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto descanso 6 - 2ºP	1	10,7	3,0	304,3	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				304,3					24,0

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Air System Design Load Summary for Quarto de descanso 6 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	84	-	2 m²	-	-
Wall Transmission	7 m²	200	-	7 m²	96	-
Roof Transmission	13 m²	1857	-	13 m²	293	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	9 m²	352	-	9 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	215 W	178	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	3	204	400	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	157	20	5%	23	0
>> Total Zone Loads	-	3304	420	-	491	0
Zone Conditioning	-	3188	420	-	-23	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	320 L/s	0	-	320 L/s	0	-
Ventilation Load	24 L/s	417	414	24 L/s	24	0
Supply Fan Load	320 L/s	15	-	320 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	165	-	5%	25	-
>> Total System Loads	-	3785	834	-	11	0
Central Cooling Coil	-	3785	835	-	0	0
>> Total Conditioning	-	3785	835	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto Psig 04-Pediatric - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:29

Air System Information

Air System Name Quarto Psig 04-Pediatric - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 14,2 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 6,0 kW
Sensible coil load 5,0 kW
Coil L/s at Jan 1500 346 L/s
Max block L/s 346 L/s
Sum of peak zone L/s 346 L/s
Sensible heat ratio 0,837
m²/kW 2,4
W/m² 420,7
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 26,1 / 17,9 °C
Leaving DB / WB 14,1 / 12,6 °C
Coil ADP 11,2 °C
Bypass Factor 0,200
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 346 L/s
Standard L/s 346 L/s
Actual max L/(s-m²) 24,37 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 346 L/s
Standard L/s 346 L/s
Actual max L/(s-m²) 24,37 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 38 L/s
L/(s-m²) 2,68 L/(s-m²)

L/s/person 38,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto Psig. 03(P)-2ºPav	1	14,2	1,0	328,8	0,00	0,00	22,0	0,0	22,0
Totals (incl. Space Multipliers)				328,8					22,0

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Air System Design Load Summary for Quarto Psiq 04-Pediatric - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:29

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	14 m²	2060	-	14 m²	325	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	41 m²	1700	-	41 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	284 W	235	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	1	68	133	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	208	7	5%	16	0
>> Total Zone Loads	-	4363	140	-	341	0
Zone Conditioning	-	4134	140	-	-129	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	308 L/s	0	-	308 L/s	0	-
Ventilation Load	38 L/s	631	834	38 L/s	139	0
Supply Fan Load	346 L/s	16	-	346 L/s	-16	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	218	-	5%	17	-
>> Total System Loads	-	4999	974	-	11	0
Central Cooling Coil	-	4999	974	-	0	0
>> Total Conditioning	-	4999	974	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto Psiquiatria 01 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:31

Air System Information

Air System Name **Quarto Psiquiatria 01 - 2º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **11,9** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **4,6** kW
Sensible coil load **3,9** kW
Coil L/s at Jan 1500 **326** L/s
Max block L/s **326** L/s
Sum of peak zone L/s **326** L/s
Sensible heat ratio **0,850**
m²/kW **2,6**
W/m² **385,0**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1500**
OA DB / WB **38,9 / 26,1** °C
Entering DB / WB **26,0 / 18,8** °C
Leaving DB / WB **16,1 / 14,8** °C
Coil ADP **13,7** °C
Bypass Factor **0,200**
Resulting RH **51** %
Design supply temp. **14,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **326** L/s
Standard L/s **326** L/s
Actual max L/(s·m²) **27,40** L/(s·m²)

Fan motor BHP **0,02** BHP
Fan motor kW **0,02** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **326** L/s
Standard L/s **326** L/s
Actual max L/(s·m²) **27,40** L/(s·m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **31** L/s
L/(s·m²) **2,61** L/(s·m²)

L/s/person **31,00** L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto Psiq. 01 - 2ºP	1	11,9	1,0	309,8	0,00	0,00	18,0	0,0	18,0
Totals (incl. Space Multipliers)				309,8					18,0

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Air System Design Load Summary for Quarto Psiquiatria 01 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:31

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	12 m²	1726	-	12 m²	272	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	27 m²	1119	-	27 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	238 W	197	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	1	68	133	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	160	7	5%	14	0
>> Total Zone Loads	-	3363	140	-	286	0
Zone Conditioning	-	3195	140	-	-91	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	295 L/s	0	-	295 L/s	0	-
Ventilation Load	31 L/s	514	548	31 L/s	101	0
Supply Fan Load	326 L/s	15	-	326 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	168	-	5%	14	-
>> Total System Loads	-	3893	688	-	10	0
Central Cooling Coil	-	3893	688	-	0	0
>> Total Conditioning	-	3893	688	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto Psiquiatria 02 - 2º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
09:32

Air System Information

Air System Name Quarto Psiquiatria 02 - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 9,6 m²
Location Saguarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 4,6 kW
Sensible coil load 3,9 kW
Coil L/s at Jan 1500 327 L/s
Max block L/s 327 L/s
Sum of peak zone L/s 327 L/s
Sensible heat ratio 0,846
m²/kW 2,1
W/m² 482,8
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,9 / 18,8 °C
Leaving DB / WB 16,0 / 14,7 °C
Coil ADP 13,5 °C
Bypass Factor 0,200
Resulting RH 51 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 327 L/s
Standard L/s 327 L/s
Actual max L/(s-m²) 34,11 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 327 L/s
Standard L/s 327 L/s
Actual max L/(s-m²) 34,11 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 32 L/s
L/(s-m²) 3,33 L/(s-m²)

L/s/person 32,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto Psiq. 02 - 2º Pav	1	9,6	1,0	311,1	0,00	0,00	15,0	0,0	15,0
Totals (incl. Space Multipliers)				311,1					15,0

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Air System Design Load Summary for Quarto Psiquiatria 02 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:32

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window& Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	10 m²	1393	-	10 m²	220	-
WindowTransmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	36 m²	1505	-	36 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	192 W	159	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	1	68	133	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	161	7	5%	11	0
>> Total Zone Loads	-	3378	140	-	231	0
Zone Conditioning	-	3200	140	-	-117	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	295 L/s	0	-	295 L/s	0	-
Ventilation Load	32 L/s	537	573	32 L/s	128	0
Supply Fan Load	327 L/s	15	-	327 L/s	-15	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	169	-	5%	12	-
>> Total System Loads	-	3921	713	-	7	0
Central Cooling Coil	-	3921	713	-	0	0
>> Total Conditioning	-	3921	713	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Quarto Psiquiatria 03 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:34

Air System Information

Air System Name **Quarto Psiquiatria 03 - 2º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **14,2** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **6,2** kW
Sensible coil load **5,1** kW
Coil L/s at Jan 1500 **346** L/s
Max block L/s **346** L/s
Sum of peak zone L/s **346** L/s
Sensible heat ratio **0,822**
m²/kW **2,3**
W/m² **437,0**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1500**
OA DB / WB **38,9 / 26,1** °C
Entering DB / WB **26,4 / 18,1** °C
Leaving DB / WB **14,1 / 12,6** °C
Coil ADP **11,1** °C
Bypass Factor **0,200**
Resulting RH **43** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **346** L/s
Standard L/s **346** L/s
Actual max L/(s-m²) **24,37** L/(s-m²)

Fan motor BHP **0,02** BHP
Fan motor kW **0,02** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **346** L/s
Standard L/s **346** L/s
Actual max L/(s-m²) **24,37** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **44** L/s
L/(s-m²) **3,10** L/(s-m²)

L/s/person **44,00** L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Quarto Psiq. 03(P)-2ºPav	1	14,2	1,0	328,8	0,00	0,00	22,0	0,0	22,0
Totals (incl. Space Multipliers)				328,8					22,0

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Air System Design Load Summary for Quarto Psiquiatria 03 - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:34

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	14 m²	2060	-	14 m²	325	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	41 m²	1700	-	41 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	284 W	235	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	100 W	92	-	0	0	-
People	1	68	133	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	208	7	5%	16	0
>> Total Zone Loads	-	4363	140	-	341	0
Zone Conditioning	-	4134	140	-	-149	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	302 L/s	0	-	302 L/s	0	-
Ventilation Load	44 L/s	731	966	44 L/s	155	0
Supply Fan Load	346 L/s	16	-	346 L/s	-16	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	218	-	5%	17	-
>> Total System Loads	-	5099	1106	-	6	0
Central Cooling Coil	-	5099	1106	-	0	0
>> Total Conditioning	-	5099	1106	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Rack - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:36

Air System Information

Air System Name Rack - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 4,4 m²
Location Saquarema, Brazil

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

Central Cooling Coil Sizing Data

Total coil load 3,1 kW
Sensible coil load 2,8 kW
Coil L/s at Jan 1500 218 L/s
Max block L/s 218 L/s
Sum of peak zone L/s 218 L/s
Sensible heat ratio 0,926
m²/kW 1,4
W/m² 699,4
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 24,8 / 16,9 °C
Leaving DB / WB 14,0 / 12,5 °C
Coil ADP 11,3 °C
Bypass Factor 0,200
Resulting RH 44 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 218 L/s
Standard L/s 218 L/s
Actual max L/(s-m²) 49,50 L/(s-m²)

Fan motor BHP 0,01 BHP
Fan motor kW 0,01 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 218 L/s
Standard L/s 218 L/s
Actual max L/(s-m²) 49,50 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 4 L/s
L/(s-m²) 0,91 L/(s-m²)

L/s/person 4,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Rack - 2º Pav	1	4,4	1,0	206,9	0,00	0,00	4,0	0,0	4,0
Totals (incl. Space Multipliers)				206,9					4,0

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Air System Design Load Summary for Rack - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:36

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	4 m²	638	-	4 m²	101	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	22 m²	912	-	22 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	88 W	73	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1000 W	924	-	0	0	-
People	1	68	133	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	131	7	5%	5	0
>> Total Zone Loads	-	2746	140	-	106	0
Zone Conditioning	-	2632	140	-	-10	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	218 L/s	0	-	218 L/s	0	-
Ventilation Load	4 L/s	69	88	4 L/s	22	0
Supply Fan Load	218 L/s	10	-	218 L/s	-10	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	137	-	5%	5	-
>> Total System Loads	-	2849	228	-	7	0
Central Cooling Coil	-	2849	228	-	0	0
>> Total Conditioning	-	2849	228	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sala de Reunião - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:37

Air System Information

Air System Name **Sala de Reunião - 2º Pav**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **17,0** m²
Location **Saquarema, Brazil**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflowrates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **7,8** kW
Sensible coil load **5,8** kW
Coil L/s at Jan 1500 **376** L/s
Max block L/s **376** L/s
Sum of peak zone L/s **376** L/s
Sensible heat ratio **0,739**
m²/kW **2,2**
W/m² **459,6**
Water flow @ 5,6 °K rise **N/A**

Load occurs at **Jan 1500**
OA DB / WB **38,9 / 26,1** °C
Entering DB / WB **26,5 / 18,7** °C
Leaving DB / WB **13,8 / 12,4** °C
Coil ADP **10,6** °C
Bypass Factor **0,200**
Resulting RH **47** %
Design supply temp. **12,0** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0,0** °K

Supply Fan Sizing Data

Actual max L/s **376** L/s
Standard L/s **376** L/s
Actual max L/(s-m²) **22,11** L/(s-m²)

Fan motor BHP **0,02** BHP
Fan motor kW **0,02** kW
Fan static **25** Pa

Return Fan Sizing Data

Actual max L/s **376** L/s
Standard L/s **376** L/s
Actual max L/(s-m²) **22,11** L/(s-m²)

Fan motor BHP **0,00** BHP
Fan motor kW **0,00** kW
Fan static **0** Pa

Outdoor Ventilation Air Data

Design airflow L/s **53** L/s
L/(s-m²) **3,12** L/(s-m²)

L/s/person **7,57** L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Sala de Reunião - 2º Pav	1	17,0	7,0	357,1	0,00	0,00	53,0	0,0	53,0
Totals (incl. Space Multipliers)				357,1					53,0

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Air System Design Load Summary for Sala de Reunião - 2º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
09:37

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	285	-	2 m²	-	-
Wall Transmission	7 m²	251	-	7 m²	102	-
Roof Transmission	17 m²	2524	-	17 m²	398	-
Window Transmission	2 m²	179	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	9 m²	369	-	9 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	340 W	282	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	150 W	139	-	0	0	-
People	7	476	933	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	225	47	5%	29	0
>> Total Zone Loads	-	4730	980	-	607	0
Zone Conditioning	-	4600	980	-	-41	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	376 L/s	0	-	376 L/s	0	-
Ventilation Load	53 L/s	921	1057	53 L/s	36	0
Supply Fan Load	376 L/s	17	-	376 L/s	-17	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	236	-	5%	30	-
>> Total System Loads	-	5775	2037	-	8	0
Central Cooling Coil	-	5775	2038	-	0	0
>> Total Conditioning	-	5775	2038	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sala de TI - 2º Pav

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:39

Air System Information

Air System Name Sala de TI - 2º Pav
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 11,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 5,1 kW
Sensible coil load 4,3 kW
Coil L/s at Dec 1500 373 L/s
Max block L/s 373 L/s
Sum of peak zone L/s 373 L/s
Sensible heat ratio 0,835
m²/kW 2,2
W/m² 449,8
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1500
OA DB / WB 38,3 / 26,1 °C
Entering DB / WB 25,4 / 18,6 °C
Leaving DB / WB 15,9 / 14,6 °C
Coil ADP 13,5 °C
Bypass Factor 0,200
Resulting RH 52 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 373 L/s
Standard L/s 373 L/s
Actual max L/(s-m²) 32,71 L/(s-m²)

Fan motor BHP 0,02 BHP
Fan motor kW 0,02 kW
Fan static 25 Pa

Return Fan Sizing Data

Actual max L/s 373 L/s
Standard L/s 373 L/s
Actual max L/(s-m²) 32,71 L/(s-m²)

Fan motor BHP 0,00 BHP
Fan motor kW 0,00 kW
Fan static 0 Pa

Outdoor Ventilation Air Data

Design airflow L/s 24 L/s
L/(s-m²) 2,11 L/(s-m²)

L/s/person 8,00 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Sala de TI - 2º Pav	1	11,4	3,0	354,3	0,00	0,00	24,0	0,0	24,0
Totals (incl. Space Multipliers)				354,3					24,0

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Air System Design Load Summary for Sala de TI - 2º Pav

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
09:39

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	10 m²	1362	-	10 m²	217	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	34 m²	1468	-	34 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	228 W	189	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	450 W	416	-	0	0	-
People	3	204	400	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	182	20	5%	11	0
>> Total Zone Loads	-	3821	420	-	228	0
Zone Conditioning	-	3671	420	-	-86	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	373 L/s	0	-	373 L/s	0	-
Ventilation Load	24 L/s	401	429	24 L/s	102	0
Supply Fan Load	373 L/s	17	-	373 L/s	-17	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	191	-	5%	11	-
>> Total System Loads	-	4280	849	-	11	0
Central Cooling Coil	-	4280	848	-	0	0
>> Total Conditioning	-	4280	848	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 01 - 2º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:41

Air System Information

Air System Name Sistema 01 - 2º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 10,0 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 4,6 kW
Sensible coil load 4,1 kW
Coil L/s at Dec 1500 290 L/s
Max block L/s 290 L/s
Sum of peak zone L/s 290 L/s
Sensible heat ratio 0,891
m²/kW 2,2
W/m² 462,2
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1500
OA DB / WB 38,3 / 26,1 °C
Entering DB / WB 25,3 / 17,3 °C
Leaving DB / WB 13,5 / 12,4 °C
Coil ADP 11,4 °C
Bypass Factor 0,150
Resulting RH 44 %
Design supply temp 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 290 L/s
Standard L/s 290 L/s
Actual max L/(s-m²) 28,97 L/(s-m²)

Fan motor BHP 0,30 BHP
Fan motor kW 0,24 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 15 L/s
L/(s-m²) 1,50 L/(s-m²)

L/s/person 7,50 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Isolamento+AC-S1-2ºPav	1	10,0	2,0	275,2	0,00	0,00	15,0	0,0	15,0
Totals (incl. Space Multipliers)				275,2					15,0

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Air System Design Load Summary for Sistema 01 - 2º Pavimento

Project Name: HMPNA - Saguarema
Prepared by: CAWS Projetos

03/25/2023
09:41

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	4 m²	309	-	4 m²	-	-
Wall Transmission	18 m²	768	-	18 m²	262	-
Roof Transmission	10 m²	1433	-	10 m²	229	-
Window Transmission	4 m²	343	-	4 m²	156	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	3 m²	111	-	3 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	200 W	166	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	2	129	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	172	8	5%	32	0
>> Total Zone Loads	-	3617	166	-	679	0
Zone Conditioning	-	3447	166	-	172	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	290 L/s	0	-	290 L/s	0	-
Ventilation Load	15 L/s	249	337	15 L/s	30	0
Supply Fan Load	290 L/s	241	-	290 L/s	-241	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	181	-	5%	34	-
>> Total System Loads	-	4119	503	-	-6	0
Central Cooling Coil	-	4119	504	-	0	0
>> Total Conditioning	-	4119	504	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 02 - 2º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:44

Air System Information

Air System Name Sistema 02 - 2º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 51,5 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 19,5 kW
Sensible coil load 17,3 kW
Coil L/s at Jan 1500 1400 L/s
Max block L/s 1400 L/s
Sum of peak zone L/s 1400 L/s
Sensible heat ratio 0,888
m²/kW 2,6
W/m² 379,2
Water flow @ 5,6 °K rise N/A

Load occurs at Jan 1500
OA DB / WB 38,9 / 26,1 °C
Entering DB / WB 25,4 / 18,3 °C
Leaving DB / WB 15,2 / 14,1 °C
Coil ADP 13,3 °C
Bypass Factor 0,150
Resulting RH 50 %
Design supply temp. 14,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 1400 L/s
Standard L/s 1399 L/s
Actual max L/(s-m²) 27,18 L/(s-m²)

Fan motor BHP 1,47 BHP
Fan motor kW 1,17 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 82 L/s
L/(s-m²) 1,59 L/(s-m²)

L/s/person 10,25 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Purificação S2-2ºPav	1	10,3	1,0	265,5	0,00	0,00	17,0	0,0	17,0
Preparo+Desinf S2-2ºPav	1	20,5	3,0	466,7	0,00	0,00	32,0	0,0	32,0
Guarda+Esteril S2-2ºPav	1	15,8	3,0	475,7	0,00	0,00	25,0	0,0	25,0
Paramentação S2-2ºPav	1	4,9	1,0	121,8	0,00	0,00	8,0	0,0	8,0
Totals (incl. Space Multipliers)				1329,7					82,0

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Air System Design Load Summary for Sistema 02 - 2º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:44

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500 COOLING OA DB / WB 38,9 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	12 m²	514	-	12 m²	-	-
Wall Transmission	18 m²	647	-	18 m²	264	-
Roof Transmission	48 m²	6934	-	48 m²	1093	-
Window Transmission	12 m²	1073	-	12 m²	468	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	46 m²	1911	-	46 m²	0	-
Ceiling	6 m²	652	-	6 m²	0	-
Overhead Lighting	1030 W	854	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	700 W	647	-	0	0	-
People	8	516	633	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	687	32	5%	91	0
>> Total Zone Loads	-	14434	664	-	1917	0
Zone Conditioning	-	14034	664	-	682	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	1400 L/s	0	-	1400 L/s	0	-
Ventilation Load	82 L/s	1415	1517	82 L/s	346	0
Supply Fan Load	1400 L/s	1166	-	1400 L/s	-1166	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	722	-	5%	96	-
>> Total System Loads	-	17337	2181	-	-42	0
Central Cooling Coil	-	17337	2186	-	0	0
>> Total Conditioning	-	17337	2186	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 03 - 2º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:45

Air System Information

Air System Name Sistema 03 - 2º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 127,4 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 43,1 kW
Sensible coil load 35,6 kW
Coil L/s at Dec 1500 2312 L/s
Max block L/s 2312 L/s
Sum of peak zone L/s 2312 L/s
Sensible heat ratio 0,825
m²/kW 3,0
W/m² 338,2
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1500
OA DB / WB 38,3 / 26,1 °C
Entering DB / WB 26,0 / 17,9 °C
Leaving DB / WB 13,3 / 12,2 °C
Coil ADP 11,0 °C
Bypass Factor 0,150
Resulting RH 44 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 2312 L/s
Standard L/s 2311 L/s
Actual max L/(s·m²) 18,15 L/(s·m²)

Fan motor BHP 2,43 BHP
Fan motor kW 1,93 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 242 L/s
1 l/(s·m²) 1,90 l/(s·m²)

L/s/person 16,13 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Sala de Equip. S3-2ºPav	1	4,6	1,0	107,4	0,00	0,00	8,0	0,0	8,0
Área Col Trat-S3-2ºPav	1	76,5	5,0	1251,5	0,00	0,00	158,0	0,0	158,0
Área Col Trat 2-S3-2ºPav	1	40,1	7,0	701,2	0,00	0,00	61,0	0,0	61,0
Serviço-S3 - 2ºPav	1	6,2	2,0	136,5	0,00	0,00	15,0	0,0	15,0
Totals (incl. Space Multipliers)				2196,6					242,0

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Air System Design Load Summary for Sistema 03 - 2º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:45

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window& Skylight Solar Loads	2 m²	82	-	2 m²	-	-
Wall Transmission	18 m²	508	-	18 m²	262	-
Roof Transmission	127 m²	18259	-	127 m²	2914	-
WindowTransmission	2 m²	172	-	2 m²	78	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	99 m²	4206	-	99 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2548 W	2112	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1201 W	1110	-	0	0	-
People	15	1020	2000	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1373	100	5%	163	0
>> Total Zone Loads	-	28842	2099	-	3417	0
Zone Conditioning	-	28282	2099	-	810	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	2155 L/s	0	-	2155 L/s	0	-
Ventilation Load	242 L/s	3902	5435	242 L/s	881	0
Supply Fan Load	2312 L/s	1927	-	2312 L/s	-1927	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	1442	-	5%	171	-
>> Total System Loads	-	35553	7534	-	-65	0
Central Cooling Coil	-	35553	7535	-	0	0
>> Total Conditioning	-	35553	7535	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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Air System Sizing Summary for Sistema 04 - 2º Pavimento

Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

03/25/2023
09:47

Air System Information

Air System Name Sistema 04 - 2º Pavimento
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 18,6 m²
Location Saquarema, Brazil

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone L/s Sizing Sum of space airflowrates
Space L/s Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 6,0 kW
Sensible coil load 5,2 kW
Coil L/s at Dec 1500 351 L/s
Max block L/s 351 L/s
Sum of peak zone L/s 351 L/s
Sensible heat ratio 0,863
m²/kW 3,1
W/m² 323,3
Water flow @ 5,6 °K rise N/A

Load occurs at Dec 1500
OA DB / WB 38,3 / 26,1 °C
Entering DB / WB 25,7 / 17,6 °C
Leaving DB / WB 13,5 / 12,3 °C
Coil ADP 11,3 °C
Bypass Factor 0,150
Resulting RH 43 %
Design supply temp. 12,0 °C
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0,0 °K

Supply Fan Sizing Data

Actual max L/s 351 L/s
Standard L/s 351 L/s
Actual max L/(s-m²) 18,88 L/(s-m²)

Fan motor BHP 0,37 BHP
Fan motor kW 0,29 kW
Fan static 450 Pa

Outdoor Ventilation Air Data

Design airflow L/s 29 L/s
L/(s-m²) 1,56 L/(s-m²)

L/s/person 14,50 L/s/person

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
Isolamento+AC-S4-2ºPav	1	18,6	2,0	333,7	0,00	0,00	29,0	0,0	29,0
Totals (incl. Space Multipliers)				333,7					29,0

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Project Name: HMPNA - Saquarema
Prepared by: CAWS Projetos

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 38,3 °C / 26,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 15,0 °C / 9,7 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window& Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	11 m²	301	-	11 m²	156	-
Roof Transmission	19 m²	2666	-	19 m²	425	-
WindowTransmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	11 m²	462	-	11 m²	0	-
Ceiling	1 m²	108	-	1 m²	0	-
Overhead Lighting	372 W	308	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	200 W	185	-	0	0	-
People	2	129	158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	208	8	5%	29	0
>> Total Zone Loads	-	4367	166	-	610	0
Zone Conditioning	-	4198	166	-	162	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	351 L/s	0	-	351 L/s	0	-
Ventilation Load	29 L/s	481	656	29 L/s	94	0
Supply Fan Load	351 L/s	293	-	351 L/s	-293	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	218	-	5%	31	-
>> Total System Loads	-	5191	822	-	-7	0
Central Cooling Coil	-	5191	823	-	0	0
>> Total Conditioning	-	5191	823	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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