Heating load, DIN EN 12831

Project number	**New Project**
Project name	**Electric Heat Warehouse**

project address

building owner

planner

site inspector

Project comment:

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Building data

DIN EN 12831 - detailed process

Description

Building number	001
Building name	Building

Parameters

Building/air tightness of building shell

- ☐ Category Ia (according to EnEV with room ventilation system)
- ☒ Category Ib (according to EnEV without room ventilation system)
- ☐ Category II (with medium tightness)
- ☐ Category III (with little tightness)
- ☐ Category IV (with high permeability)

Building location

- ☐ good screen
- ☒ Moderate screen
- ☐ No screen

Building dimensions/storage capacity

- ☐ Light
- ☒ Moderately heavy/heavy

Relative values

$C_{effective}$ 50 Wh/(m³K)

H_{Abs} 0.5 W/K τ 112 h

* Only fill in if an outside temperature correction is to be made and/or reheating outputs are intended.
Fixed according to 3.6.4 supplement or value from calculation procedure according to EnEV(WSchV) or precise calculation.

Temperatures

Outside temperature	θ_a	-3	°C	Annual average outside temperature	θ_{ME}	10 °C
Outside temperature correction	$\Delta\vartheta_a$	0	K			
Nominal outside temperature	θ_e	-3	°C			

Inside temperature according to

☒ Standard ☐ Agreement see form sheet

Geometry

Width	b_{bdg}	11.51	m	No. of storeys	N	2
Length	l_{bdg}	2.59	m	Height	h_{bdg}	5.1 m
Ground area	A_{bdg}	29.8	m²			

Earth contact

Depth of floor slab	*z	0	m	Groundwater depth	T	2.00 m
Perimetre of the floor slab	*P	28.19	m	Period. fluctuation factor	f_{g1}	1.45
Parameter-B'	*B'	2.11	m	Groundwater influence factor	G_W	1.15

* values may deviate room by room

Ventilation

Air tightness of building envelope	n_{50}	3.0 h^{-1}
Simultaneously effective ventilation heat share	ζ_V	0.5
Heat provision efficiency (heat recovery system, manufacture's specification or limit value)	$\eta_{HeatRecoverySystem}$	0.00

Auxiliary heating achievement

☐ No calculation

☐ Calculation on basis of usage profile

Lowering phase	t_{abs}	h
Reheat time	t_{RH}	h
Air change(in lowering phase)	n_{Abs}	h^{-1}

☒ Calculation on basis of temperature drop

Inner temperature drop	θ_{RH}	0.0	K
Lowering phase	t_{abs}	0.0	h
Reheat time	t_{RH}	0.0	h
Air change(in lowering phase)	n_{Abs}	0.10	h^{-1}
Reheating factor	$\mathbf{f_{RH}}$		**W/m²**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room design conditions

DIN EN 12831 - detailed process

$No._{Bldg}$	Building	$No._{FL}$	Storey	$No._{R}$	Room	θ_{int} °C	n_{Min} 1/h	t_{abs} h	t_{RH} h
001	Building	0	Ground floor	001	ENTRANCE HALL	18	0.5	0.0	0.0
001	Building	0	Ground floor	002	LOWER GALLERY	18	0.5	0.0	0.0
001	Building	0	Ground floor	003	LOWER GALLERY 2	18	0.5	0.0	0.0
001	Building	0	Ground floor	004	MAIN LOUNGE	21	0.5	0.0	0.0
001	Building	0	Ground floor	005	DINING ROOM	21	0.5	0.0	0.0
001	Building	0	Ground floor	006	KITCHEN	18	1.5	0.0	0.0
001	Building	0	Ground floor	007	LOUNGE 1/2	21	0.5	0.0	0.0
001	Building	0	Ground floor	008	BED ROOM 1 / DRESSING ROOM	18	0.5	0.0	0.0
001	Building	0	Ground floor	009	BEDROOM 2	18	0.5	0.0	0.0
001	Building	0	Ground floor	010	GAMES ROOM 1	21	0.5	0.0	0.0
001	Building	0	Ground floor	011	GAMES ROOM 2	21	0.5	0.0	0.0
001	Building	0	Ground floor	012	UTILITY/BOOT ROOM	18	0.5	0.0	0.0
001	Building	0	Ground floor	013	CLOAK ROOM	18	1.5	0.0	0.0
001	Building	0	Ground floor	014	EN SUITE 1	22	1.5	0.0	0.0
001	Building	0	Ground floor	015	ENSUITE 2	22	1.5	0.0	0.0
001	Building	0	Ground floor	016	GYM	21	0.5	0.0	0.0
001	Building	0	Ground floor	017	CLOAK ROOM/WC	18	1.5	0.0	0.0
001	Building	0	Ground floor	018	PLANT ROOM	14	1.5	0.0	
001	Building	1	1. Upper floor	001	LANDING	18	0.5	0.0	0.0
001	Building	1	1. Upper floor	002	SITTING ROOM	21	0.5	0.0	0.0
001	Building	1	1. Upper floor	003	THOMASBED ROOM / DRESSING AREA	18	0.5	0.0	0.0
001	Building	1	1. Upper floor	004	BED ROOM 4 / DRESSING AREA	18	0.5	0.0	0.0
001	Building	1	1. Upper floor	005	GUEST ROOM 1	18	0.5	0.0	0.0
001	Building	1	1. Upper floor	006	GUEST ROOM 2	18	0.5	0.0	0.0
001	Building	1	1. Upper floor	007	EN SUITE 3	22	1.5	0.0	0.0
001	Building	1	1. Upper floor	008	EN SUITE 4	22	1.5	0.0	0.0
001	Building	1	1. Upper floor	009	SHOWER ROOM	22	1.5	0.0	0.0

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	001	ENTRANCE HALL

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	13.85	m	Height above ground	h	1.20	m
Length	l_R	5.03	m	Height correction factor	ε	1.00	
Room ground area	A_r	69.7	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	167.3	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	ew	1	13.85	2.70	37.4	17.2	20.2	e	-3	1.00	0.30	0.05	0.35	7.1	148
N	ewd	1	13.80	1.25	17.2	0.0	17.2	e	-3	1.00	2.00	0.05	2.05	35.3	741
S	iw	1	11.44	2.70	30.9	1.4	29.5	b	21	-0.14	1.80		1.80	-7.6	-159
S	id	1	0.66	2.10	1.4	0.0	1.4	b	21	-0.14	2.00		2.00	-0.4	-8
E	iw	1	4.57	2.70	12.3	0.0	12.3	b	21	-0.14	1.80		1.80	-3.2	-67
S	ew	1	6.68	2.70	18.0	8.9	9.1	e	-3	1.00	0.30	0.05	0.35	3.2	67
S	ewd	1	3.14	1.20	3.8	0.0	3.8	e	-3	1.00	2.00	0.05	2.05	7.7	162
S	ed	1	1.56	2.10	3.3	0.0	3.3	e	-3	1.00	2.00	0.05	2.05	6.7	141
S	ewd	1	1.58	1.20	1.9	0.0	1.9	e	-3	1.00	2.00	0.05	2.05	3.9	82
S	ew	1	0.37	2.70	1.0	0.0	1.0	e	-3	1.00	0.30	0.05	0.35	0.3	7
w	iw	1	2.34	2.70	6.3	1.7	4.7	b	18	0.00	1.80		1.80	0.0	0
w	id	1	0.79	2.10	1.7	0.0	1.7	b	18	0.00	2.00		2.00	0.0	0
w	iw	1	2.42	2.70	6.5	1.9	4.7	b	18	0.00	1.80		1.80	0.0	0
w	id	1	0.89	2.10	1.9	0.0	1.9	b	18	0.00	2.00		2.00	0.0	0
w	iw	1	2.07	2.70	5.6	0.0	5.6	u	14	0.18	1.80	0.05	1.85	1.8	38
N	ew	1	2.36	2.70	6.4	0.0	6.4	e	-3	1.00	0.30	0.05	0.35	2.2	47
H	gf	1	9.17	9.17	84.1	0.0	84.1	g		0.38	0.25	0.05	0.23	12.1	254
H	ce	1	3.50	3.50	12.2	0.0	12.2	b	18	0.00	0.25		0.25	0.0	0
H	rf	1	6.79	6.79	46.1	0.0	46.1	e	-3	1.00	0.20	0.05	0.25	11.5	242
H	ce	1	2.14	2.14	4.6	0.0	4.6	e	-3	1.00	0.25	0.05	0.30	1.4	29
H	ce	1	5.27	5.27	27.8	0.0	27.8	e	-3	1.00	0.25	0.05	0.30	8.3	175
H	ce	1	4.56	4.56	20.8	0.0	20.8	e	-3	1.00	0.25	0.05	0.30	6.2	131
Transmission heat loss							H_T / Φ_T							**96.5**	**2030**

Min volumetric flow	$\dot{V}_{Min}$	83.6 m³/h	597
From natural infiltration	$\dot{V}_{inf}$	30.1 m³/h	215
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	$\dot{V}_{therm}$	**83.6 m³/h**	

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Ventilation heat loss	H_V / Φ_V		28.44	597
Standard heat load	$\Phi_{HL,Net}$	37.7 W/m²	15.7 W/m³	2627
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**2627**

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	002	LOWER GALLERY

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	9.18	m	Height above ground	h	1.20	m
Length	l_R	3.39	m	Height correction factor	ε	1.00	
Room ground area	A_r	31.1	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	74.6	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	iw	1	4.20	2.70	11.3	0.0	11.3	b	18	0.00	1.80		1.80	0.0	0
N	iw	1	4.65	2.70	12.6	1.8	10.7	b	18	0.00	1.80		1.80	0.0	0
N	id	1	0.87	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
E	iw	1	3.26	2.70	8.8	2.1	6.7	b	21	-0.14	1.80		1.80	-1.7	-36
E	id	1	0.98	2.10	2.1	0.0	2.1	b	21	-0.14	2.00		2.00	-0.6	-12
S	ew	1	8.74	2.70	23.6	5.9	17.7	e	-3	1.00	0.30	0.05	0.35	6.2	130
S	ewd	1	1.25	1.20	1.5	0.0	1.5	e	-3	1.00	2.00	0.05	2.05	3.1	64
S	ewd	1	1.25	1.20	1.5	0.0	1.5	e	-3	1.00	2.00	0.05	2.05	3.1	64
S	ewd	1	1.19	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	2.9	62
S	ewd	1	1.25	1.20	1.5	0.0	1.5	e	-3	1.00	2.00	0.05	2.05	3.1	64
w	iw	1	2.78	2.70	7.5	1.9	5.7	b	18	0.00	1.80		1.80	0.0	0
w	id	1	0.89	2.10	1.9	0.0	1.9	b	18	0.00	2.00		2.00	0.0	0
H	gf	1	6.06	6.06	36.7	0.0	36.7	g		0.38	0.25	0.05	0.23	5.3	111
H	rf	1	5.77	5.77	33.3	0.0	33.3	e	-3	1.00	0.20	0.05	0.25	8.3	175
Transmission heat loss						**H_T / Φ_T**								**29.7**	**622**

Min volumetric flow	$\dot{V}_{Min}$	37.3 m³/h	266
From natural infiltration	$\dot{V}_{inf}$	9.0 m³/h	64
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**37.3 m³/h**	
Ventilation heat loss	H_v / Φ_V	12.68	266

Standard heat load	$\Phi_{HL,Net}$	28.6 W/m² 11.9 W/m³	888
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**		**888**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	003	LOWER GALLERY 2

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	16.10	m	Height above ground	h	1.20	m
Length	l_R	1.88	m	Height correction factor	ε	1.00	
Room ground area	A_r	30.2	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	72.5	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	iw	1	1.12	2.70	3.0	0.0	3.0	u	14	0.18	1.80	0.05	1.85	1.0	21
w	iw	1	3.85	2.70	10.4	1.8	8.6	b	21	-0.14	1.80		1.80	-2.2	-46
w	id	1	0.87	2.10	1.8	0.0	1.8	b	21	-0.14	2.00		2.00	-0.5	-11
w	iw	1	7.74	2.70	20.9	1.9	19.0	b	21	-0.14	1.80		1.80	-4.9	-103
w	id	1	0.91	2.10	1.9	0.0	1.9	b	21	-0.14	2.00		2.00	-0.5	-11
w	iw	1	2.81	2.70	7.6	0.0	7.6	b	22	-0.19	1.80		1.80	-2.6	-55
w	iw	1	0.58	2.70	1.6	0.0	1.6	b	18	0.00	1.80		1.80	0.0	0
E	ew	1	15.25	2.70	41.2	12.4	28.8	e	-3	1.00	0.30	0.05	0.35	10.1	212
E	ewd	1	10.34	1.20	12.4	0.0	12.4	e	-3	1.00	2.00	0.05	2.05	25.4	534
H	gf	1	6.58	6.58	43.3	0.0	43.3	g		0.38	0.25	0.05	0.23	6.2	131
H	rf	1	6.58	6.58	43.3	0.0	43.3	e	-3	1.00	0.20	0.05	0.25	10.8	227
Transmission heat loss						**H_T / Φ_T**								**42.8**	**899**

Min volumetric flow	$\dot{V}_{Min}$	36.2 m³/h	259
From natural infiltration	$\dot{V}_{inf}$	8.7 m³/h	62
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**36.2 m³/h**	
Ventilation heat loss	H_v / Φ_V	12.32	259

Standard heat load	$\Phi_{HL,Net}$	38.3 W/m²	16.0 W/m³	1157
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**1157**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	004	MAIN LOUNGE

Standard inner temperature	θ_{int}	21	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	12.14	m	Height above ground	h	1.20	m
Length	l_R	6.38	m	Height correction factor	ε	1.00	
Room ground area	A_r	77.4	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	185.7	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	ew	1	0.36	2.70	1.0	0.0	1.0	e	-3	1.00	0.30	0.05	0.35	0.3	8
w	ew	1	9.37	2.70	25.3	8.9	16.4	e	-3	1.00	0.30	0.05	0.35	5.7	138
w	ed	1	1.84	2.00	3.7	0.0	3.7	e	-3	1.00	2.00	0.05	2.05	7.5	181
w	ed	1	2.22	2.00	4.4	0.0	4.4	e	-3	1.00	2.00	0.05	2.05	9.1	218
w	ewd	1	0.67	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.6	39
N	ew	1	7.23	2.70	19.5	1.6	17.9	e	-3	1.00	0.30	0.05	0.35	6.3	151
N	ewd	1	0.65	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.6	39
N	ewd	1	0.65	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.6	39
E	ew	1	12.65	2.70	34.2	9.8	24.4	e	-3	1.00	0.30	0.05	0.35	8.5	205
E	ewd	1	0.65	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.6	38
E	ed	1	1.76	2.00	3.5	0.0	3.5	e	-3	1.00	2.00	0.05	2.05	7.2	173
E	ed	1	2.36	2.00	4.7	0.0	4.7	e	-3	1.00	2.00	0.05	2.05	9.7	232
E	ewd	1	0.67	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.6	39
S	ew	1	4.12	2.70	11.1	6.0	5.1	e	-3	1.00	0.30	0.05	0.35	1.8	43
S	ed	1	3.00	2.00	6.0	0.0	6.0	e	-3	1.00	2.00	0.05	2.05	12.3	296
S	iw	1	2.88	2.70	7.8	0.0	7.8	b	18	0.12	1.80		1.80	1.8	42
w	iw	1	2.41	2.70	6.5	4.0	2.5	b	21	0.00	1.80		1.80	0.0	0
w	id	1	2.01	2.00	4.0	0.0	4.0	b	21	0.00	2.00		2.00	0.0	0
H	gf	1	9.53	9.53	90.8	0.0	90.8	g		0.46	0.25	0.05	0.23	15.7	377
H	rf	1	9.24	9.24	85.4	0.0	85.4	e	-3	1.00	0.20	0.05	0.25	21.4	513
Transmission heat loss						H_T / Φ_T								**115.3**	**2771**

Min volumetric flow	$\dot{V}_{Min}$	92.9 m³/h		758
From natural infiltration	$\dot{V}_{inf}$	33.4 m³/h		273
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h		0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h		0
Thermally effective volumetric flow	$\dot{V}_{therm}$	**92.9 m³/h**		
Ventilation heat loss	H_V / Φ_V		31.57	758

Standard heat load	$\Phi_{HL,Net}$	45.6 W/m²	19.0 W/m³	3528

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0
Design heating capacity	$\Phi_{HeatingCapacity,}$		**3528**

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	005	DINING ROOM

Standard inner temperature	θ_{int}	21	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	8.39	m	Height above ground	h	1.20	m
Length	l_R	6.13	m	Height correction factor	ε	1.00	
Room ground area	A_r	51.4	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	123.3	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
E	ew	1	0.21	2.70	0.6	0.0	0.6	e	-3	1.00	0.30	0.05	0.35	0.2	5
E	iw	1	2.32	2.70	6.3	4.0	2.2	b	21	0.00	1.80		1.80	0.0	0
E	id	1	2.01	2.00	4.0	0.0	4.0	b	21	0.00	2.00		2.00	0.0	0
E	iw	1	5.66	2.70	15.3	0.0	15.3	b	18	0.12	1.80		1.80	3.4	83
N	ew	1	0.55	2.70	1.5	17.2	0.0	e	-3	1.00	0.30	0.05	0.35	0.0	0
N	ewd	1	0.55	31.06	17.2	0.0	17.2	e	-3	1.00	2.00	0.05	2.05	35.3	847
w	ew	1	0.81	2.70	2.2	0.0	2.2	e	-3	1.00	0.30	0.05	0.35	0.8	18
H	gf	1	7.37	7.37	54.3	0.0	54.3	g		0.46	0.25	0.05	0.23	9.4	225
H	rf	1	7.33	7.33	53.7	0.0	53.7	e	-3	1.00	0.20	0.05	0.25	13.4	322
H	ce	1	0.07	0.07	0.0	0.0	0.0	e	-3	1.00	0.25	0.05	0.30	0.0	0
Transmission heat loss						**H_T / Φ_T**								**62.5**	**1500**

Min volumetric flow	$\dot{V}_{Min}$	61.7 m³/h	503
From natural infiltration	$\dot{V}_{inf}$	14.8 m³/h	121
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**61.7 m³/h**	
Ventilation heat loss	H_V / Φ_V	20.97	503

Standard heat load	$\Phi_{HL,Net}$	39.0 W/m²	16.3 W/m³	2004
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**2004**

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	006	KITCHEN

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	11.84	m	Height above ground	h	1.20	m
Length	l_R	5.83	m	Height correction factor	ε	1.00	
Room ground area	A_r	69.1	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	165.7	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	iw	1	2.67	2.70	7.2	0.0	7.2	b	21	-0.14	1.80		1.80	-1.9	-39
N	ew	1	4.12	2.70	11.1	6.0	5.1	e	-3	1.00	0.30	0.05	0.35	1.8	38
N	ed	1	3.00	2.00	6.0	0.0	6.0	e	-3	1.00	2.00	0.05	2.05	12.3	259
N	ew	1	1.40	2.70	3.8	0.0	3.8	e	-3	1.00	0.30	0.05	0.35	1.3	28
E	ew	1	6.66	2.70	18.0	8.0	10.0	e	-3	1.00	0.30	0.05	0.35	3.5	73
E	ed	1	4.00	2.00	8.0	0.0	8.0	e	-3	1.00	2.00	0.05	2.05	16.4	345
S	ew	1	12.60	2.70	34.0	4.0	30.0	e	-3	1.00	0.30	0.05	0.35	10.5	220
S	ewd	1	0.91	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	47
S	ewd	1	0.91	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	47
S	ed	1	0.88	2.10	1.9	0.0	1.9	e	-3	1.00	2.00	0.05	2.05	3.8	80
w	iw	1	6.67	2.70	18.0	0.0	18.0	b	21	-0.14	1.80		1.80	-4.6	-97
H	gf	1	9.10	9.10	82.9	0.0	82.9	g		0.38	0.25	0.05	0.23	11.9	250
H	rf	1	9.06	9.06	82.0	0.0	82.0	e	-3	1.00	0.20	0.05	0.25	20.5	430
Transmission heat loss						**H_T / Φ_T**								**79.9**	**1681**

Min volumetric flow	$\dot{V}_{Min}$	248.6 m³/h		1775
From natural infiltration	$\dot{V}_{inf}$	29.8 m³/h		213
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h		0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h		0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**248.6 m³/h**		
Ventilation heat loss	H_V / Φ_V		84.53	1775

Standard heat load	$\Phi_{HL,Net}$	50.1 W/m²	20.9 W/m³	3457
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**3457**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	007	LOUNGE 1/2

Standard inner temperature	θ_{int}	21	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	11.05	m	Height above ground	h	1.20	m
Length	l_R	5.09	m	Height correction factor	ε	1.00	
Room ground area	A_r	56.2	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	134.9	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	iw	1	12.22	2.70	33.0	1.4	31.6	b	18	0.12	1.80		1.80	7.1	171
N	id	1	0.66	2.10	1.4	0.0	1.4	b	18	0.12	2.00		2.00	0.3	8
E	iw	1	1.57	2.70	4.2	0.0	4.2	b			1.80		1.80		
S	ew	1	11.55	2.70	31.2	4.3	26.9	e	-3	1.00	0.30	0.05	0.35	9.4	226
S	ewd	1	0.90	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	53
S	ewd	1	0.90	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	53
S	ewd	1	0.90	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	53
S	ewd	1	0.90	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	53
S	ew	1	1.04	2.70	2.8	0.0	2.8	e	-3	1.00	0.30	0.05	0.35	1.0	24
w	ew	1	1.89	2.70	5.1	1.1	4.0	e	-3	1.00	0.30	0.05	0.35	1.4	33
w	ewd	1	0.91	1.25	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.3	56
w	iw	1	4.47	2.70	12.1	0.0	12.1	b	18	0.12	1.80		1.80	2.7	65
H	gf	1	8.85	8.85	78.3	0.0	78.3	g		0.46	0.25	0.05	0.23	13.5	325
H	ce	1	4.56	4.56	20.8	0.0	20.8	b	18	0.12	0.25		0.25	0.7	16
H	ce	1	4.59	4.59	21.1	0.0	21.1	b	18	0.12	0.25		0.25	0.7	16
H	ce	1	3.47	2.07	7.2	0.0	7.2	b	22	-0.04	0.25		0.25	-0.1	-2
H	ce	1	5.08	5.08	25.8	0.0	25.8	b	18	0.12	0.25		0.25	0.8	19
H	ce	1	1.12	1.12	1.3	0.0	1.3	e	-3	1.00	0.25	0.05	0.30	0.4	9
H	ce	1	2.50	2.50	6.3	0.0	6.3	e	-3	1.00	0.25	0.05	0.30	1.9	45
H	ce	1	0.32	0.32	0.1	0.0	0.1	e	-3	1.00	0.25	0.05	0.30	0.0	1
Transmission heat loss														**50.9**	**1224**

Transmission heat loss: H_T / Φ_T

Min volumetric flow	$\dot{V}_{Min}$	67.5 m³/h	551
From natural infiltration	$\dot{V}_{inf}$	24.3 m³/h	198
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	$\dot{V}_{therm}$	**67.5 m³/h**	
Ventilation heat loss	H_V / Φ_V	22.94	551

Standard heat load	$\Phi_{HL,Net}$	31.6 W/m²	13.2 W/m³	1775

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0
Design heating capacity	$\Phi_{HeatingCapacity,}$		**1775**

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	008	BED ROOM 1 / DRESSING ROOM

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	8.09	m	Height above ground	h	1.20	m
Length	l_R	5.82	m	Height correction factor	ε	1.00	
Room ground area	A_r	47.1	m²	Mechanical ventilation			
Storey height	h_G	5.10	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	4.80	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	225.9	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	ew	1	5.90	2.70	15.9	1.4	14.5	e	-3	1.00	0.30	0.05	0.35	5.1	106
N	ewd	1	1.20	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	3.0	62
N	ew	1	1.28	2.70	3.4	0.0	3.4	e	-3	1.00	0.30	0.05	0.35	1.2	25
N	ew	1	1.20	2.70	3.2	1.4	1.8	e	-3	1.00	0.30	0.05	0.35	0.6	13
N	ewd	1	1.19	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	2.9	61
E	iw	1	1.67	2.70	4.5	1.8	2.7	b	18	0.00	1.80		1.80	0.0	0
E	id	1	0.86	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
E	iw	1	1.88	2.70	5.1	0.0	5.1	b	22	-0.19	1.80		1.80	-1.7	-37
S	iw	1	4.30	2.70	11.6	0.0	11.6	b	18	0.00	1.80		1.80	0.0	0
E	iw	1	2.48	2.70	6.7	1.9	4.8	b	18	0.00	1.80		1.80	0.0	0
E	id	1	0.89	2.10	1.9	0.0	1.9	b	18	0.00	2.00		2.00	0.0	0
E	iw	1	0.58	2.70	1.6	0.0	1.6	b	18	0.00	1.80		1.80	0.0	0
S	iw	1	4.04	2.70	10.9	1.5	9.4	b	22	-0.19	1.80		1.80	-3.2	-67
S	id	1	0.77	2.00	1.5	0.0	1.5	b	22	-0.19	2.00		2.00	-0.6	-12
E	iw	1	1.24	2.70	3.4	0.0	3.4	b	22	-0.19	1.80		1.80	-1.1	-24
S	iw	1	1.81	2.70	4.9	0.0	4.9	b	22	-0.19	1.80		1.80	-1.7	-35
w	ew	1	8.58	2.70	23.2	1.4	21.7	e	-3	1.00	0.30	0.05	0.35	7.6	160
w	ewd	1	1.20	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	3.0	62
H	gf	1	7.77	7.77	60.4	0.0	60.4	g		0.38	0.25	0.05	0.23	8.7	182
H	rf	1	3.81	3.81	14.5	0.0	14.5	e	-3	1.00	0.20	0.05	0.25	3.6	76
H	ce	1	6.73	6.73	45.3	0.0	45.3	e	-3	1.00	0.25	0.05	0.30	13.6	286
H	ce	1	0.72	0.72	0.5	0.0	0.5	e	-3	1.00	0.25	0.05	0.30	0.2	3
Transmission heat loss						**H_T / Φ_T**								**41.2**	**861**

Min volumetric flow	$\dot{V}_{Min}$	113.0 m³/h	806
From natural infiltration	$\dot{V}_{inf}$	40.7 m³/h	290
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	$\dot{V}_{therm}$	**113.0 m³/h**	

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Ventilation heat loss	H_V / Φ_V		38.40	806
Standard heat load	$\Phi_{HL,Net}$	35.4 W/m²	7.4 W/m³	1668
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**1668**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	009	BEDROOM 2

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.00	
Width	b_R	4.64	m	Height above ground	h	1.20	m
Length	l_R	4.02	m	Height correction factor	ε	1.00	
Room ground area	A_r	18.7	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	44.9	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	ew	1	4.09	2.70	11.1	0.0	11.1	e	-3	1.00	0.30	0.05	0.35	3.9	81
E	iw	1	4.06	2.70	11.0	0.0	11.0	b	21	-0.14	1.80		1.80	-2.8	-59
S	iw	1	4.81	2.70	13.0	1.8	11.2	b	18	0.00	1.80		1.80	0.0	0
S	id	1	0.87	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
w	iw	1	1.81	2.70	4.9	2.2	2.7	b	22	-0.19	1.80		1.80	-0.9	-20
w	id	1	1.08	2.00	2.2	0.0	2.2	b	22	-0.19	2.00		2.00	-0.8	-17
S	iw	1	2.29	2.70	6.2	0.0	6.2	b	22	-0.19	1.80		1.80	-2.1	-45
w	iw	1	1.88	2.70	5.1	1.8	3.3	b	18	0.00	1.80		1.80	0.0	0
w	id	1	0.86	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
N	ew	1	0.27	2.70	0.7	0.0	0.7	e	-3	1.00	0.30	0.05	0.35	0.3	5
H	gf	1	4.89	4.89	23.9	0.0	23.9	g		0.38	0.25	0.05	0.23	3.4	72
H	rf	1	4.57	4.57	20.9	0.0	20.9	e	-3	1.00	0.20	0.05	0.25	5.2	110
Transmission heat loss						**H_T / Φ_T**								**6.2**	**127**

Min volumetric flow	$\dot{V}_{Min}$	22.4 m³/h	160
From natural infiltration	$\dot{V}_{inf}$	0.0 m³/h	0
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**22.4 m³/h**	
Ventilation heat loss	H_V / Φ_V	7.63	160

Standard heat load	$\Phi_{HL,Net}$	15.4 W/m² 6.4 W/m³	288
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**		**288**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	010	GAMES ROOM 1

Standard inner temperature	θ_{int}	21	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	9.93	m	Height above ground	h	1.20	m
Length	l_R	5.79	m	Height correction factor	ε	1.00	
Room ground area	A_r	57.4	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	137.9	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
S	ew	1	10.75	2.70	29.0	6.4	22.6	e	-3	1.00	0.30	0.05	0.35	7.9	190
S	ed	1	1.17	2.10	2.5	0.0	2.5	e	-3	1.00	2.00	0.05	2.05	5.0	121
S	ed	1	1.17	2.10	2.5	0.0	2.5	e	-3	1.00	2.00	0.05	2.05	5.0	121
S	ewd	1	1.25	1.20	1.5	0.0	1.5	e	-3	1.00	2.00	0.05	2.05	3.1	74
w	iw	1	3.26	2.70	8.8	2.1	6.7	b	18	0.12	1.80		1.80	1.5	36
w	id	1	0.98	2.10	2.1	0.0	2.1	b	18	0.12	2.00		2.00	0.5	12
w	iw	1	4.06	2.70	11.0	0.0	11.0	b	18	0.12	1.80		1.80	2.5	59
N	ew	1	1.31	2.70	3.5	1.4	2.1	e	-3	1.00	0.30	0.05	0.35	0.7	18
N	ewd	1	0.02	77.05	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	2.9	70
N	ew	1	6.63	2.70	17.9	1.4	16.5	e	-3	1.00	0.30	0.05	0.35	5.8	138
N	ewd	1	1.20	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	3.0	71
E	iw	1	4.06	2.70	11.0	0.0	11.0	b	18	0.12	1.80		1.80	2.5	59
N	iw	1	2.60	2.70	7.0	1.6	5.4	b	18	0.12	1.80		1.80	1.2	29
N	id	1	0.78	2.10	1.6	0.0	1.6	b	18	0.12	2.00		2.00	0.4	10
E	ew	1	3.25	2.70	8.8	1.8	7.0	e	-3	1.00	0.30	0.05	0.35	2.5	59
E	ed	1	0.84	2.10	1.8	0.0	1.8	e	-3	1.00	2.00	0.05	2.05	3.6	87
H	gf	1	8.18	8.18	66.8	0.0	66.8	g		0.46	0.25	0.05	0.23	11.6	278
H	rf	1	7.97	7.97	63.4	0.0	63.4	e	-3	1.00	0.20	0.05	0.25	15.9	381
Transmission heat loss						**H_T / Φ_T**								**75.6**	**1813**

Min volumetric flow	$\dot{V}_{Min}$	68.9 m³/h	562
From natural infiltration	$\dot{V}_{inf}$	24.8 m³/h	202
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	$\dot{V}_{therm}$	**68.9 m³/h**	

Ventilation heat loss	H_V / Φ_V		23.44	562
Standard heat load	$\Phi_{HL,Net}$	41.3 W/m² 17.2 W/m³		2374
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Design heating capacity	$\Phi_{HeatingCapacity,}$		**2374**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	011	GAMES ROOM 2

Standard inner temperature	θ_{int}	21	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.00	
Width	b_R	4.74	m	Height above ground	h	1.20	m
Length	l_R	2.55	m	Height correction factor	ε	1.00	
Room ground area	A_r	12.1	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	29.0	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
S	iw	1	5.85	2.70	15.8	0.0	15.8	u	14	0.28	1.80	0.05	1.85	8.1	195
w	ew	1	3.14	2.70	8.5	0.0	8.5	e	-3	1.00	0.30	0.05	0.35	3.0	71
E	iw	1	3.26	2.70	8.8	1.8	7.0	b	18	0.12	1.80		1.80	1.6	38
E	id	1	0.87	2.10	1.8	0.0	1.8	b	18	0.12	2.00		2.00	0.5	11
H	gf	1	3.93	3.93	15.5	0.0	15.5	g		0.46	0.25	0.05	0.23	2.7	64
H	ce	1	2.87	2.87	8.2	0.0	8.2	b	18	0.12	0.25		0.25	0.3	6
H	ce	1	2.58	2.58	6.7	0.0	6.7	b	22	-0.04	0.25		0.25	-0.1	-2
H	ce	1	1.24	1.24	1.5	0.0	1.5	e	-3	1.00	0.25	0.05	0.30	0.5	11
Transmission heat loss						**H_T / Φ_T**								**16.6**	**394**

Min volumetric flow	$\dot{V}_{Min}$	14.5 m³/h	118
From natural infiltration	$\dot{V}_{inf}$	0.0 m³/h	0
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**14.5 m³/h**	
Ventilation heat loss	H_v / Φ_V	4.93	118

Standard heat load	$\Phi_{HL,Net}$	42.5 W/m²	17.7 W/m³	513

Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0

Design heating capacity	**$\Phi_{HeatingCapacity,}$**	**513**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	012	UTILITY/BOOT ROOM

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	4.75	m	Height above ground	h	1.20	m
Length	l_R	3.48	m	Height correction factor	ε	1.00	
Room ground area	A_r	16.5	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	39.6	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	iw	1	5.87	2.70	15.8	1.8	14.0	u	14	0.18	1.80	0.05	1.85	4.6	96
N	id	1	0.86	2.10	1.8	0.0	1.8	u	14	0.18	2.00	0.05	2.05	0.7	14
E	iw	1	2.28	2.70	6.1	1.9	4.3	b	18	0.00	1.80		1.80	0.0	0
E	id	1	0.89	2.10	1.9	0.0	1.9	b	18	0.00	2.00		2.00	0.0	0
E	iw	1	2.13	2.70	5.8	0.0	5.8	b	18	0.00	1.80		1.80	0.0	0
S	ew	1	3.84	2.70	10.4	1.4	9.0	e	-3	1.00	0.30	0.05	0.35	3.1	66
S	ewd	1	1.15	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	2.8	59
w	ew	1	4.76	2.70	12.9	0.0	12.9	e	-3	1.00	0.30	0.05	0.35	4.5	95
H	gf	1	4.78	4.78	22.9	0.0	22.9	g		0.38	0.25	0.05	0.23	3.3	69
H	ce	1	4.68	4.68	21.9	0.0	21.9	b	21	-0.14	0.25		0.25	-0.8	-16
H	ce	1	0.94	0.94	0.9	0.0	0.9	e	-3	1.00	0.25	0.05	0.30	0.3	6
Transmission heat loss						**H_T / Φ_T**								**18.5**	**389**

Min volumetric flow	$\dot{V}_{Min}$	19.8 m³/h	142
From natural infiltration	$\dot{V}_{inf}$	4.8 m³/h	34
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**19.8 m³/h**	
Ventilation heat loss	H_v / Φ_V	6.74	142

Standard heat load	$\Phi_{HL,Net}$	32.0 W/m²	13.3 W/m³	529

Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0

Design heating capacity	**$\Phi_{HeatingCapacity,}$**	**529**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	013	CLOAK ROOM

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.00	
Width	b_R	1.71	m	Height above ground	h	1.20	m
Length	l_R	1.53	m	Height correction factor	ε	1.00	
Room ground area	A_r	2.6	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	6.3	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	iw	1	2.18	2.70	5.9	0.0	5.9	b	18	0.00	1.80		1.80	0.0	0
E	iw	1	2.19	2.70	5.9	1.7	4.3	b	18	0.00	1.80		1.80	0.0	0
E	id	1	0.79	2.10	1.7	0.0	1.7	b	18	0.00	2.00		2.00	0.0	0
S	ew	1	2.00	2.70	5.4	0.0	5.4	e	-3	1.00	0.30	0.05	0.35	1.9	40
H	gf	1	2.06	2.06	4.2	0.0	4.2	g		0.38	0.25	0.05	0.23	0.6	13
H	ce	1	2.04	2.04	4.2	0.0	4.2	b	21	-0.14	0.25		0.25	-0.1	-3
Transmission heat loss						**H_T / Φ_T**								**2.4**	**50**

Min volumetric flow	$\dot{V}_{Min}$	9.4 m³/h	67
From natural infiltration	$\dot{V}_{inf}$	0.0 m³/h	0
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**9.4 m³/h**	
Ventilation heat loss	H_v / Φ_V	3.20	67

Standard heat load	$\Phi_{HL,Net}$	44.6 W/m² 18.6 W/m³	117
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**		**117**

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	014	EN SUITE 1

Standard inner temperature	θ_{int}	22	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.00	
Width	b_R	4.45	m	Height above ground	h	1.20	m
Length	l_R	2.93	m	Height correction factor	ε	1.00	
Room ground area	A_r	13.1	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	31.3	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
S	iw	1	4.96	2.70	13.4	1.7	11.7	b	21	0.04	1.80		1.80	0.8	21
S	id	1	0.86	2.00	1.7	0.0	1.7	b	21	0.04	2.00		2.00	0.1	3
w	ew	1	2.10	2.70	5.7	0.0	5.7	e	-3	1.00	0.30	0.05	0.35	2.0	50
N	iw	1	1.81	2.70	4.9	0.0	4.9	b	18	0.16	1.80		1.80	1.4	35
w	iw	1	1.17	2.70	3.2	0.0	3.2	b	18	0.16	1.80		1.80	0.9	23
N	iw	1	4.04	2.70	10.9	1.5	9.4	b	18	0.16	1.80		1.80	2.7	67
N	id	1	0.77	2.00	1.5	0.0	1.5	b	18	0.16	2.00		2.00	0.5	12
E	iw	1	2.27	2.70	6.1	0.0	6.1	b	18	0.16	1.80		1.80	1.8	44
H	gf	1	4.05	4.05	16.4	0.0	16.4	g		0.48	0.25	0.05	0.23	3.0	74
H	ce	1	4.05	4.05	16.4	0.0	16.4	e	-3	1.00	0.25	0.05	0.30	4.9	123
Transmission heat loss						**H_T / Φ_T**								**18.1**	**452**

Min volumetric flow	$\dot{V}_{Min}$	47.0 m³/h		400
From natural infiltration	$\dot{V}_{inf}$	0.0 m³/h		0
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h		0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h		0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**47.0 m³/h**		
Ventilation heat loss	H_V / Φ_V		15.98	400

Standard heat load	$\Phi_{HL,Net}$	65.3 W/m²	27.2 W/m³	852
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**852**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	015	ENSUITE 2

Standard inner temperature	θ_{int}	22	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.00	
Width	b_R	2.20	m	Height above ground	h	1.20	m
Length	l_R	1.51	m	Height correction factor	ε	1.00	
Room ground area	A_r	3.3	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	8.0	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	iw	1	1.63	2.70	4.4	0.0	4.4	b	18	0.16	1.80		1.80	1.3	32
N	iw	1	2.36	2.70	6.4	0.0	6.4	b	18	0.16	1.80		1.80	1.8	46
E	iw	1	1.63	2.70	4.4	2.2	2.2	b	18	0.16	1.80		1.80	0.6	16
E	id	1	1.08	2.00	2.2	0.0	2.2	b	18	0.16	2.00		2.00	0.7	17
H	gf	1	1.93	1.93	3.7	0.0	3.7	g		0.48	0.25	0.05	0.23	0.7	17
H	rf	1	1.93	1.93	3.7	0.0	3.7	e	-3	1.00	0.20	0.05	0.25	0.9	23
Transmission heat loss						**H_T / Φ_T**								**6.0**	**151**

Min volumetric flow	$\dot{V}_{Min}$	12.0 m³/h	102
From natural infiltration	$\dot{V}_{inf}$	0.0 m³/h	0
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	$\dot{V}_{therm}$	**12.0 m³/h**	

Ventilation heat loss	H_v / Φ_V		4.07	102
Standard heat load	$\Phi_{HL,Net}$	76.1 W/m² 31.7 W/m³		253
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**253**

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	016	GYM

Standard inner temperature	θ_{int}	21	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	6.00	m	Height above ground	h	1.20	m
Length	l_R	4.72	m	Height correction factor	ε	1.00	
Room ground area	A_r	28.3	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	68.0	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	ew	1	5.83	2.70	15.7	2.4	13.4	e	-3	1.00	0.30	0.05	0.35	4.7	112
w	ewd	1	0.99	1.20	1.2	0.0	1.2	e	-3	1.00	2.00	0.05	2.05	2.4	59
w	ewd	1	0.99	1.20	1.2	0.0	1.2	e	-3	1.00	2.00	0.05	2.05	2.4	59
N	iw	1	4.59	2.70	12.4	1.7	10.7	b	22	-0.04	1.80		1.80	-0.8	-19
N	id	1	0.86	2.00	1.7	0.0	1.7	b	22	-0.04	2.00		2.00	-0.1	-3
E	iw	1	6.16	2.70	16.6	1.9	14.7	b	18	0.12	1.80		1.80	3.3	79
E	id	1	0.91	2.10	1.9	0.0	1.9	b	18	0.12	2.00		2.00	0.5	11
H	gf	1	5.94	5.94	35.2	0.0	35.2	g		0.46	0.25	0.05	0.23	6.1	146
H	ce	1	2.40	2.40	5.7	0.0	5.7	b	22	-0.04	0.25		0.25	-0.1	-1
H	ce	1	5.32	5.32	28.3	0.0	28.3	b	18	0.12	0.25		0.25	0.9	21
H	ce	1	1.40	1.40	2.0	0.0	2.0	e	-3	1.00	0.25	0.05	0.30	0.6	14
H	ce	1	1.07	1.07	1.2	0.0	1.2	e	-3	1.00	0.25	0.05	0.30	0.3	8
Transmission heat loss						**H_T / Φ_T**								**20.2**	**486**

Min volumetric flow	$\dot{V}_{Min}$	34.0 m³/h	278
From natural infiltration	$\dot{V}_{inf}$	8.2 m³/h	67
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**34.0 m³/h**	
Ventilation heat loss	H_V / Φ_V	11.57	278

Standard heat load	$\Phi_{HL,Net}$	27.0 W/m²	11.2 W/m³	764

Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0

Design heating capacity	**$\Phi_{HeatingCapacity,}$**	**764**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	017	CLOAK ROOM/WC

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.00	
Width	b_R	3.34	m	Height above ground	h	1.20	m
Length	l_R	1.78	m	Height correction factor	ε	1.00	
Room ground area	A_r	5.9	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	14.2	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
E	ew	1	4.07	2.70	11.0	0.0	11.0	e	-3	1.00	0.30	0.05	0.35	3.8	81
S	iw	1	2.83	2.70	7.6	1.6	6.0	b	21	-0.14	1.80		1.80	-1.5	-32
S	id	1	0.78	2.10	1.6	0.0	1.6	b	21	-0.14	2.00		2.00	-0.5	-10
w	iw	1	4.06	2.70	11.0	0.0	11.0	b	21	-0.14	1.80		1.80	-2.8	-59
N	ew	1	2.84	2.70	7.7	0.0	7.7	e	-3	1.00	0.30	0.05	0.35	2.7	56
H	gf	1	3.39	3.39	11.5	0.0	11.5	g		0.38	0.25	0.05	0.23	1.7	35
H	rf	1	3.39	3.39	11.5	0.0	11.5	e	-3	1.00	0.20	0.05	0.25	2.9	60
Transmission heat loss						**H_T / Φ_T**								**6.3**	**131**

Min volumetric flow	$\dot{V}_{Min}$	21.4 m³/h	152
From natural infiltration	$\dot{V}_{inf}$	0.0 m³/h	0
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**21.4 m³/h**	
Ventilation heat loss	H_V / Φ_V	7.26	152

Standard heat load	$\Phi_{HL,Net}$	47.8 W/m²	19.9 W/m³	283

Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0

Design heating capacity	**$\Phi_{HeatingCapacity,}$**		**283**

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	0	Ground floor
Room	018	PLANT ROOM

Standard inner temperature	θ_{int}	14	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.00	
Width	b_R	4.75	m	Height above ground	h	1.20	m
Length	l_R	2.99	m	Height correction factor	ε	1.00	
Room ground area	A_r	14.2	m²	Mechanical ventilation			
Storey height	h_G	2.70	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.30	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	34.1	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$		m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
S	iw	1	5.85	2.70	15.8	1.8	14.0	b	18		1.80		1.80		
S	id	1	0.86	2.10	1.8	0.0	1.8	b	18		2.00		2.00		
w	ew	1	3.19	2.70	8.6	0.0	8.6	e	-3		0.30	0.05	0.35		
N	iw	1	5.86	2.70	15.8	0.0	15.8	b	21		1.80		1.80		
E	iw	1	1.12	2.70	3.0	0.0	3.0	b	18		1.80		1.80		
E	iw	1	2.07	2.70	5.6	0.0	5.6	b	18		1.80		1.80		
H	gf	1	4.32	4.32	18.7	0.0	18.7	g			0.25	0.05	0.23		
H	ce	1	4.45	4.45	19.8	0.0	19.8	b	18		0.25		0.25		
Transmission heat loss						**H_T / Φ_T**									

Min volumetric flow	$\dot{V}_{Min}$	m³/h
From natural infiltration	$\dot{V}_{inf}$	m³/h
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	m³/h
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	m³/h
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**m³/h**

Ventilation heat loss	H_V / Φ_V			
Standard heat load	$\Phi_{HL,Net}$	W/m²	W/m³	
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	W/m²	
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	001	LANDING

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	9.07	m	Height above ground	h	3.90	m
Length	l_R	2.87	m	Height correction factor	ε	1.00	
Room ground area	A_r	26.0	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	62.4	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	ew	1	1.08	2.40	2.6	1.8	0.8	e	-3	1.00	0.30	0.05	0.35	0.3	6
w	ed	1	0.86	2.10	1.8	0.0	1.8	e	-3	1.00	2.00	0.05	2.05	3.7	78
w	ew	1	0.68	2.40	1.6	0.0	1.6	e	-3	1.00	0.30	0.05	0.35	0.6	12
N	ew	1	6.77	2.40	16.2	2.4	13.9	e	-3	1.00	0.30	0.05	0.35	4.9	102
N	ewd	1	1.98	1.20	2.4	0.0	2.4	e	-3	1.00	2.00	0.05	2.05	4.9	102
N	ew	1	9.14	2.40	21.9	1.7	20.3	e	-3	1.00	0.30	0.05	0.35	7.1	149
N	ewd	1	0.69	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.7	36
N	ewd	1	0.69	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.7	35
E	iw	1	2.14	2.40	5.1	1.6	3.5	b	22	-0.19	1.80		1.80	-1.2	-25
E	id	1	0.76	2.10	1.6	0.0	1.6	b	22	-0.19	2.00		2.00	-0.6	-13
S	iw	1	1.85	2.40	4.4	1.8	2.6	b	18	0.00	1.80		1.80	0.0	0
S	id	1	0.88	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
E	iw	1	0.63	2.40	1.5	0.0	1.5	b	18	0.00	1.80		1.80	0.0	0
E	iw	1	0.65	2.40	1.6	0.0	1.6	b	18	0.00	1.80		1.80	0.0	0
N	iw	1	0.53	2.40	1.3	0.0	1.3	b	18	0.00	1.80		1.80	0.0	0
E	iw	1	1.03	2.40	2.5	0.0	2.5	b	18	0.00	1.80		1.80	0.0	0
w	iw	1	2.77	2.40	6.6	0.0	6.6	b	18	0.00	1.80		1.80	0.0	0
S	iw	1	1.42	2.40	3.4	1.8	1.6	b	18	0.00	1.80		1.80	0.0	0
S	id	1	0.86	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
S	iw	1	2.90	2.40	7.0	0.0	7.0	b	18	0.00	1.80		1.80	0.0	0
H	gf	1	5.08	5.08	25.8	0.0	25.8	b	21	-0.14	0.25		0.25	-0.9	-19
H	gf	1	3.50	3.50	12.2	0.0	12.2	b	18	0.00	0.25		0.25	0.0	0
H	rf	1	6.11	6.11	37.3	0.0	37.3	e	-3	1.00	0.20	0.05	0.25	9.3	196
Transmission heat loss						**H_T / Φ_T**								**31.5**	**659**

Min volumetric flow	$\dot{V}_{Min}$	31.2 m³/h	223
From natural infiltration	$\dot{V}_{inf}$	11.2 m³/h	80
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0

Heating load, DIN EN 12831

New Project Electric Heat Warehouse

Thermally effective volumetric flow	$\dot{V}_{therm}$	**31.2 m³/h**		
Ventilation heat loss	H_V / Φ_V		10.61	223
Standard heat load	$\Phi_{HL,Net}$	33.9 W/m²	14.1 W/m³	881
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	0.0 W/m²	0
Design heating capacity	$\Phi_{HeatingCapacity,}$			**881**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	002	SITTING ROOM

Standard inner temperature	θ_{int}	21	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	4.75	m	Height above ground	h	3.90	m
Length	l_R	4.30	m	Height correction factor	ε	1.00	
Room ground area	A_r	20.4	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	49.0	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
E	ew	1	0.23	2.40	0.6	0.0	0.6	e	-3	1.00	0.30	0.05	0.35	0.2	5
E	ew	1	0.67	2.40	1.6	0.0	1.6	e	-3	1.00	0.30	0.05	0.35	0.6	13
E	ew	1	1.48	2.40	3.5	1.8	1.7	e	-3	1.00	0.30	0.05	0.35	0.6	15
E	ed	1	0.86	2.10	1.8	0.0	1.8	e	-3	1.00	2.00	0.05	2.05	3.7	89
S	ew	1	5.86	2.40	14.1	1.4	12.7	e	-3	1.00	0.30	0.05	0.35	4.4	107
S	ewd	1	1.15	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	2.8	68
w	ew	1	4.76	2.40	11.4	0.0	11.4	e	-3	1.00	0.30	0.05	0.35	4.0	96
N	iw	1	4.31	2.40	10.3	0.0	10.3	b	18	0.12	1.80		1.80	2.3	56
H	gf	1	4.68	4.68	21.9	0.0	21.9	b	18	0.12	0.25		0.25	0.7	16
H	gf	1	2.04	2.04	4.2	0.0	4.2	b	18	0.12	0.25		0.25	0.1	3
H	rf	1	5.13	5.13	26.3	0.0	26.3	e	-3	1.00	0.20	0.05	0.25	6.6	158
H	gf	1	0.49	0.49	0.2	0.0	0.2	e	-3	1.00	0.25	0.05	0.30	0.1	2
Transmission heat loss						**H_T / Φ_T**								**26.1**	**628**

Min volumetric flow	$\dot{V}_{Min}$	24.5 m³/h		200
From natural infiltration	$\dot{V}_{inf}$	8.8 m³/h		72
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h		0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h		0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**24.5 m³/h**		
Ventilation heat loss	H_V / Φ_V		8.33	200
Standard heat load	$\Phi_{HL,Net}$	40.5 W/m²	16.9 W/m³	827
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**827**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	003	THOMASBED ROOM / DRESSING AREA

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	6.00	m	Height above ground	h	3.90	m
Length	l_R	3.62	m	Height correction factor	ε	1.00	
Room ground area	A_r	21.7	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	52.2	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	ew	1	3.04	2.40	7.3	0.0	7.3	e	-3	1.00	0.30	0.05	0.35	2.6	54
N	iw	1	3.20	2.40	7.7	1.6	6.1	b	22	-0.19	1.80		1.80	-2.1	-44
N	id	1	0.78	2.10	1.6	0.0	1.6	b	22	-0.19	2.00		2.00	-0.6	-13
w	iw	1	1.86	2.40	4.5	0.0	4.5	b	22	-0.19	1.80		1.80	-1.5	-32
E	ew	1	6.03	2.40	14.5	4.3	10.2	e	-3	1.00	0.30	0.05	0.35	3.6	75
E	ewd	1	1.20	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	2.9	62
E	ewd	1	2.40	1.20	2.9	0.0	2.9	e	-3	1.00	2.00	0.05	2.05	5.9	124
H	gf	1	5.32	5.32	28.3	0.0	28.3	b	21	-0.14	0.25		0.25	-1.0	-21
H	rf	1	5.37	5.37	28.9	0.0	28.9	e	-3	1.00	0.20	0.05	0.25	7.2	151
Transmission heat loss						**H_T / Φ_T**								**17.0**	**356**

Min volumetric flow	$\dot{V}_{Min}$	26.1 m³/h	186
From natural infiltration	$\dot{V}_{inf}$	6.3 m³/h	45
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**26.1 m³/h**	
Ventilation heat loss	H_V / Φ_V	8.87	186

Standard heat load	$\Phi_{HL,Net}$	24.9 W/m² 10.4 W/m³	542
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**		**542**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	004	BED ROOM 4 / DRESSING AREA

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	5.81	m	Height above ground	h	3.90	m
Length	l_R	3.62	m	Height correction factor	ε	1.00	
Room ground area	A_r	21.1	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	50.5	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	iw	1	2.69	2.40	6.4	1.7	4.8	b	22	-0.19	1.80		1.80	-1.6	-34
N	id	1	0.83	2.00	1.7	0.0	1.7	b	22	-0.19	2.00		2.00	-0.6	-13
E	ew	1	6.35	2.40	15.2	4.3	10.9	e	-3	1.00	0.30	0.05	0.35	3.8	80
E	ewd	1	3.59	1.20	4.3	0.0	4.3	e	-3	1.00	2.00	0.05	2.05	8.8	186
S	iw	1	4.27	2.40	10.3	0.0	10.3	b	21	-0.14	1.80		1.80	-2.6	-55
w	ew	1	3.26	2.40	7.8	1.4	6.4	e	-3	1.00	0.30	0.05	0.35	2.2	47
w	ewd	1	1.17	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	2.9	61
H	gf	1	2.87	2.87	8.2	0.0	8.2	b	21	-0.14	0.25		0.25	-0.3	-6
H	gf	1	4.45	4.45	19.8	0.0	19.8	u	14	0.18	0.25	0.05	0.30	1.0	22
H	rf	1	5.33	5.33	28.4	0.0	28.4	e	-3	1.00	0.20	0.05	0.25	7.1	149
Transmission heat loss						**H_T / Φ_T**								**20.7**	**437**

Min volumetric flow	$\dot{V}_{Min}$	25.3 m³/h		180
From natural infiltration	$\dot{V}_{inf}$	9.1 m³/h		65
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h		0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h		0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**25.3 m³/h**		
Ventilation heat loss	H_V / Φ_V		8.59	180

Standard heat load	$\Phi_{HL,Net}$	29.2 W/m²	12.2 W/m³	616
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**616**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	005	GUEST ROOM 1

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	3.86	m	Height above ground	h	3.90	m
Length	l_R	3.74	m	Height correction factor	ε	1.00	
Room ground area	A_r	14.4	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	34.7	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	iw	1	3.30	2.40	7.9	0.0	7.9	b	18	0.00	1.80		1.80	0.0	0
N	iw	1	1.42	2.40	3.4	1.8	1.6	b	18	0.00	1.80		1.80	0.0	0
N	id	1	0.86	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
E	iw	1	3.64	2.40	8.7	0.0	8.7	b	18	0.00	1.80		1.80	0.0	0
S	ew	1	4.72	2.40	11.3	2.1	9.2	e	-3	1.00	0.30	0.05	0.35	3.2	68
S	ewd	1	0.89	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	46
S	ewd	1	0.89	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	46
w	ew	1	1.88	2.40	4.5	0.0	4.5	e	-3	1.00	0.30	0.05	0.35	1.6	33
H	gf	1	4.56	4.56	20.8	0.0	20.8	b	21	-0.14	0.25		0.25	-0.7	-16
H	rf	1	4.71	4.71	22.2	0.0	22.2	e	-3	1.00	0.20	0.05	0.25	5.5	116
Transmission heat loss						**H_T / Φ_T**								**14.0**	**293**

Min volumetric flow	$\dot{V}_{Min}$	17.3 m³/h	124
From natural infiltration	$\dot{V}_{inf}$	4.2 m³/h	30
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**17.3 m³/h**	
Ventilation heat loss	H_V / Φ_V	5.89	124

Standard heat load	$\Phi_{HL,Net}$	28.9 W/m²	12.0 W/m³	417
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**417**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	006	GUEST ROOM 2

Standard inner temperature	θ_{int}	18	°C	Infiltration			
Air Change Rate	n_{Min}	0.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.03	
Width	b_R	4.46	m	Height above ground	h	3.90	m
Length	l_R	3.07	m	Height correction factor	ε	1.00	
Room ground area	A_r	13.7	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	32.9	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
N	iw	1	2.57	2.40	6.2	1.8	4.3	b	18	0.00	1.80		1.80	0.0	0
N	id	1	0.88	2.10	1.8	0.0	1.8	b	18	0.00	2.00		2.00	0.0	0
E	ew	1	4.32	2.40	10.4	1.1	9.3	e	-3	1.00	0.30	0.05	0.35	3.3	68
E	ewd	1	0.89	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	46
S	ew	1	4.72	2.40	11.3	2.1	9.2	e	-3	1.00	0.30	0.05	0.35	3.2	68
S	ewd	1	0.89	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	46
S	ewd	1	0.89	1.20	1.1	0.0	1.1	e	-3	1.00	2.00	0.05	2.05	2.2	46
w	iw	1	1.83	2.40	4.4	0.0	4.4	b	18	0.00	1.80		1.80	0.0	0
S	iw	1	0.60	2.40	1.4	0.0	1.4	b	18	0.00	1.80		1.80	0.0	0
w	iw	1	0.65	2.40	1.6	0.0	1.6	b	18	0.00	1.80		1.80	0.0	0
w	iw	1	0.63	2.40	1.5	0.0	1.5	b	18	0.00	1.80		1.80	0.0	0
H	gf	1	4.59	4.59	21.1	0.0	21.1	b	21	-0.14	0.25		0.25	-0.8	-16
H	rf	1	4.60	4.60	21.1	0.0	21.1	e	-3	1.00	0.20	0.05	0.25	5.3	111
Transmission heat loss						**H_T / Φ_T**								**17.6**	**369**

Min volumetric flow	$\dot{V}_{Min}$	16.4 m³/h	117
From natural infiltration	$\dot{V}_{inf}$	5.9 m³/h	42
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**16.4 m³/h**	
Ventilation heat loss	H_V / Φ_V	5.59	117

Standard heat load	$\Phi_{HL,Net}$	35.5 W/m² 14.8 W/m³	486
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**		**486**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	007	EN SUITE 3

Standard inner temperature	θ_{int}	22	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	2.46	m	Height above ground	h	3.90	m
Length	l_R	1.70	m	Height correction factor	ε	1.00	
Room ground area	A_r	4.2	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	10.0	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
S	iw	1	3.27	2.40	7.9	1.6	6.2	b	18	0.16	1.80		1.80	1.8	45
S	id	1	0.78	2.10	1.6	0.0	1.6	b	18	0.16	2.00		2.00	0.5	13
w	ew	1	1.82	2.40	4.4	1.5	2.9	e	-3	1.00	0.30	0.05	0.35	1.0	25
w	ewd	1	1.23	1.20	1.5	0.0	1.5	e	-3	1.00	2.00	0.05	2.05	3.0	75
E	iw	1	1.82	2.40	4.4	0.0	4.4	b	18	0.16	1.80		1.80	1.3	31
H	gf	1	2.40	2.40	5.7	0.0	5.7	b	21	0.04	0.25		0.25	0.1	1
H	rf	1	2.41	2.41	5.8	0.0	5.8	e	-3	1.00	0.20	0.05	0.25	1.5	36
Transmission heat loss						**H_T / Φ_T**								**9.2**	**226**

Min volumetric flow	$\dot{V}_{Min}$	15.1 m³/h	128
From natural infiltration	$\dot{V}_{inf}$	1.2 m³/h	10
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**15.1 m³/h**	
Ventilation heat loss	H_V / Φ_V	5.12	128

Standard heat load	$\Phi_{HL,Net}$	85.0 W/m²	35.4 W/m³	356
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**356**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	008	EN SUITE 4

Standard inner temperature	θ_{int}	22	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	2.44	m	Height above ground	h	3.90	m
Length	l_R	1.94	m	Height correction factor	ε	1.00	
Room ground area	A_r	4.7	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	11.4	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	ew	1	3.06	2.40	7.3	1.4	5.9	e	-3	1.00	0.30	0.05	0.35	2.1	52
w	ewd	1	1.20	1.20	1.4	0.0	1.4	e	-3	1.00	2.00	0.05	2.05	3.0	74
S	iw	1	2.70	2.40	6.5	1.7	4.8	b	18	0.16	1.80		1.80	1.4	35
S	id	1	0.83	2.00	1.7	0.0	1.7	b	18	0.16	2.00		2.00	0.5	13
H	gf	1	2.58	2.58	6.7	0.0	6.7	b	21	0.04	0.25		0.25	0.1	2
H	rf	1	2.60	2.60	6.8	0.0	6.8	e	-3	1.00	0.20	0.05	0.25	1.7	42
Transmission heat loss						**H_T / Φ_T**								**8.8**	**218**

Min volumetric flow	$\dot{V}_{Min}$	17.1 m³/h	145
From natural infiltration	$\dot{V}_{inf}$	1.4 m³/h	12
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**17.1 m³/h**	

Ventilation heat loss	H_v / Φ_V		5.81	145
Standard heat load	$\Phi_{HL,Net}$	76.4 W/m² 31.8 W/m³		363
Auxiliary heating achievement	Φ_{RH}	f_{RH} = 0.0 W/m²		0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**363**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room heating load

DIN EN 12831 - detailed process

Building	001	Building
Storey	1	1. Upper floor
Room	009	SHOWER ROOM

Standard inner temperature	θ_{int}	22	°C	Infiltration			
Air Change Rate	n_{Min}	1.5	h^{-1}	Air tightness	n_{50}	3	h^{-1}
Geometry				Exposure coefficient	E	0.02	
Width	b_R	2.61	m	Height above ground	h	3.90	m
Length	l_R	1.28	m	Height correction factor	ε	1.00	
Room ground area	A_r	3.3	m²	Mechanical ventilation			
Storey height	h_G	2.40	m	Supply air volumetric flow	$\dot{V}_{su}$		m³/h
Ceiling thickness	d	0.00	m	-temperature	θ_{su}		°C
Clear room height	H_{room}	2.40	m	-temp.- reduction factor	$f_{v,Su}$		
Room volume	V_R	8.0	m³	Extract air volumetric flow	$\dot{V}_{ex}$		m³/h
Earth contact				Overflow, neighbouring rooms	$\dot{V}_{mech,inf,ij}$	0	m³/h
Depth of floor slab	z	0.00	m	-temperature	$\theta_{mech,inf}$		°C
Perimetre of the floor slab	P		m	-temp.- reduction factor	$f_{v,mech,inf}$		
B' value ☐ Room by room	B'	2.11	m				

Orientation	Element	Number	Width	Length/Hight	Gross area	Subtractive area	Net area	Adjoining	Neighbouring temperature	Correction factors	U-value	Correction factor thermal bridges	Corrected U value	Heat loss coefficient	Transmission heat loss
		N	b	l / h	A_{gross}	A_{sub}	A_{net}	e/u g/b	θ_u/θ_b	e/b_u f_{ij}	U-value	ΔU_{WB}	$U_{c/equiv}$	H_T	Φ_T
			m	m	m²	m²	m²		°C		W/(m²*K)			W/K	Watt
w	iw	1	2.11	2.40	5.1	1.6	3.5	b	18	0.16	1.80		1.80	1.0	25
w	id	1	0.76	2.10	1.6	0.0	1.6	b	18	0.16	2.00		2.00	0.5	13
N	ew	1	3.47	2.40	8.3	0.8	7.5	e	-3	1.00	0.30	0.05	0.35	2.6	66
N	ewd	1	0.69	1.20	0.8	0.0	0.8	e	-3	1.00	2.00	0.05	2.05	1.7	42
E	ew	1	2.11	2.40	5.1	0.0	5.1	e	-3	1.00	0.30	0.05	0.35	1.8	44
H	gf	1	3.47	2.07	7.2	0.0	7.2	b	21	0.04	0.25		0.25	0.1	2
H	rf	1	3.47	2.07	7.2	0.0	7.2	e	-3	1.00	0.20	0.05	0.25	1.8	45
Transmission heat loss						**H_T / Φ_T**								**9.5**	**237**

Min volumetric flow	$\dot{V}_{Min}$	12.0 m³/h	102
From natural infiltration	$\dot{V}_{inf}$	1.0 m³/h	8
From mechanical supply air volumetric flow	$\dot{V}_{su} \cdot f_{V,su}$	0.0 m³/h	0
From mech. infiltrated volumetric flow	$\dot{V}_{mech,inf,e} + \dot{V}_{mech,inf,ij} \cdot f_{V,mech,inf,ij}$	0.0 m³/h	0
Thermally effective volumetric flow	**$\dot{V}_{therm}$**	**12.0 m³/h**	
Ventilation heat loss	H_V / Φ_V	4.08	102

Standard heat load	$\Phi_{HL,Net}$	101.5 W/m²	42.3 W/m³	339
Auxiliary heating achievement	Φ_{RH}	f_{RH} =	0.0 W/m²	0
Design heating capacity	**$\Phi_{HeatingCapacity,}$**			**339**

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room list	DIN EN 12831 - detailed process
Building	Sort according to ☒ Storey ☐ Dwelling unit

0 Ground floor

θ_{int} °C	A_r m²	V_R m³	$\Phi_{T,e}$ Watt	Φ_T Watt	$\Phi_{V,min}$ Watt	$\Phi_{V,inf}$ Watt	$\Phi_{V,su}$ Watt	$\Phi_{V,mech,inf}$ Watt	Φ_{HL} Watt	Φ_{RH} Watt	$\Phi_{HeatingCapacity}$ Watt	q_{HL} W/m²
001 ENTRANCE HALL												
18	69.7	167.3	2265	2030	597	215	0	0	2627	0	2627	37.7
002 LOWER GALLERY												
18	31.1	74.6	670	621	266	64	0	0	888	0	888	28.6
003 LOWER GALLERY 2												
18	30.2	72.5	1124	898	259	62	0	0	1157	0	1157	38.3
004 MAIN LOUNGE												
21	77.4	185.7	2728	2770	758	273	0	0	3528	0	3528	45.6
005 DINING ROOM												
21	51.4	123.3	1418	1501	503	121	0	0	2004	0	2004	39.0
006 KITCHEN												
18	69.1	165.7	1818	1681	1775	213	0	0	3457	0	3457	50.1
007 LOUNGE 1/2												
21	56.2	134.9	931	1224	551	198	0	0	1775	0	1775	31.6
008 BED ROOM 1 / DRESSING ROOM												
18	47.1	225.9	1038	862	806	290	0	0	1668	0	1668	35.4
009 BEDROOM 2												
18	18.7	44.9	269	128	160	0	0	0	288	0	288	15.4
010 GAMES ROOM 1												
21	57.4	137.9	1606	1812	562	202	0	0	2374	0	2374	41.3
011 GAMES ROOM 2												
21	12.1	29.0	342	395	118	0	0	0	513	0	513	42.5
012 UTILITY/BOOT ROOM												
18	16.5	39.6	404	388	142	34	0	0	529	0	529	32.0
013 CLOAK ROOM												
18	2.6	6.3	53	49	67	0	0	0	117	0	117	44.6
014 EN SUITE 1												
22	13.1	31.3	246	453	400	0	0	0	852	0	852	65.3
015 ENSUITE 2												
22	3.3	8.0	40	151	102	0	0	0	253	0	253	76.1
016 GYM												
21	28.3	68.0	398	486	278	67	0	0	764	0	764	27.0
017 CLOAK ROOM/WC												
18	5.9	14.2	232	131	152	0	0	0	283	0	283	47.8
018 PLANT ROOM												
14	14.2	34.1										
	604.3	**1563.2**							**23077**	**0**	**23077**	

1 1. Upper floor

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Room list	DIN EN 12831 - detailed process
Building	Sort according to ☒ Storey ☐ Dwelling unit

θ_{int} °C	A_r m²	V_R m³	$\Phi_{T,e}$ Watt	Φ_T Watt	$\Phi_{V,min}$ Watt	$\Phi_{V,inf}$ Watt	$\Phi_{V,su}$ Watt	$\Phi_{V,mech,inf}$ Watt	Φ_{HL} Watt	Φ_{RH} Watt	$\Phi_{HeatingCapacity}$ Watt	q_{HL} W/m²
001 LANDING												
18	26.0	62.4	716	658	223	80	0	0	881	0	881	33.9
002 SITTING ROOM												
21	20.4	49.0	552	627	200	72	0	0	827	0	827	40.5
003 THOMASBED ROOM / DRESSING AREA												
18	21.7	52.2	466	356	186	45	0	0	542	0	542	24.9
004 BED ROOM 4 / DRESSING AREA												
18	21.1	50.5	545	435	180	65	0	0	616	0	616	29.2
005 GUEST ROOM 1												
18	14.4	34.7	309	293	124	30	0	0	417	0	417	28.9
006 GUEST ROOM 2												
18	13.7	32.9	385	369	117	42	0	0	486	0	486	35.5
007 EN SUITE 3												
22	4.2	10.0	137	228	128	10	0	0	356	0	356	85.0
008 EN SUITE 4												
22	4.7	11.4	168	217	145	12	0	0	363	0	363	76.4
009 SHOWER ROOM												
22	3.3	8.0	197	236	102	8	0	0	339	0	339	101.5
	129.5	**311.1**							**4827**	**0**	**4827**	
Building									**23506**	**0**	**23506**	

Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Building summary			DIN EN 12831 - detailed process
Building			

Thermal loss coefficients			
Transmission heat loss coefficient	$\Sigma H_{T,e}$	853.92	W/K
Ventilation heat loss coefficient	ΣH_V	399.54	W/K
Building heat loss coefficient	$\mathbf{H_{bdg}}$	**1253.46**	**W/K**

Heat loss						
Transmission heat loss outwards	$\Phi_{T,bldg}$				19055	Watt
Air Change Rate	$\Phi_{V,min,bldg}$	=	$0,5 \cdot \Sigma\Phi_{V,min}$	=	4451	Watt ☒
From natural infiltration (rooms nat. ventilated)	$\Phi_{V,inf,bldg}$	=	$\zeta \cdot \Sigma\Phi_{V,inf}$	=	1051	Watt ☐
From mechanical supply air volumetric flow	$\Phi_{V,su,bldg}$		$(1 - \eta_V) \cdot \Sigma\Phi_{V,su}$		0	Watt
From exhaust air volume surplus	$\Phi_{V,mech,inf,bldg}$				0	Watt
From natural infiltration (rooms mech. ventilated)	$\Phi_{V,inf,MB}$				0	Watt
Ventilation heat loss	$\mathbf{\Phi_{V,bldg}}$				**4451**	**Watt**

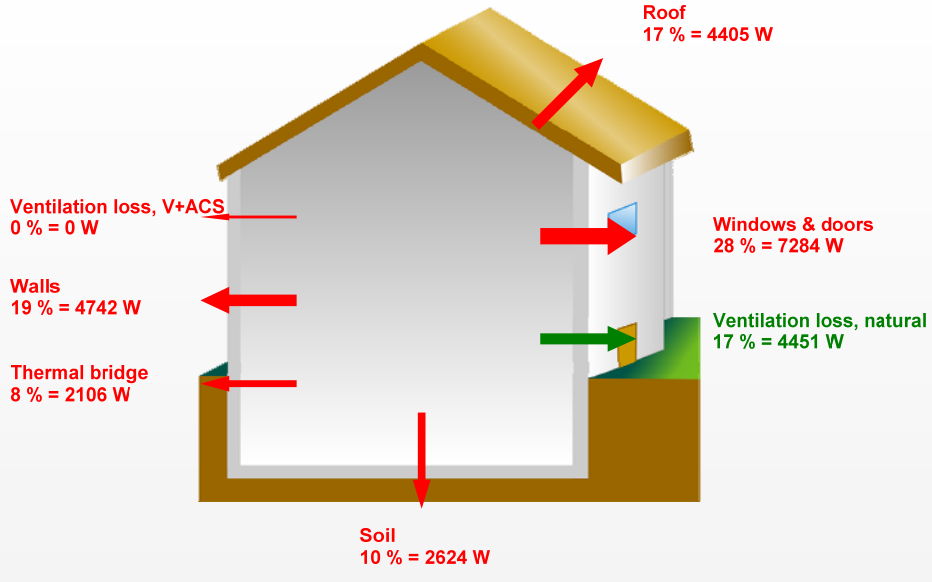
Default building heating load	$\Phi_{N,bldg}$	23506	Watt

Auxiliary heating achievement	$\Phi_{RH,bldg}$	0	Watt

Design heating load	$\Phi_{HL,bldg}$	23506	Watt

Relative values						
Heating load/heated building area	$A_{N,Building}$	719.7	m²	$\Phi_{HL,bldg} / A_{N,bldg}$	32.7	W/m²
Heating load/heated building volume	$V_{N,Building}$	1840.2	m³	$\Phi_{HL,bldg} / V_{N,bldg}$	12.8	W/m³
Heat transmitting enclosing area	A	2281.1	m²			
Spec. transmission heat loss	$\mathbf{H'_T}$				**0.37**	**W/(m²*K)**

DIN EN12831 - Heating load calculation, detailed procedure



Heating load, DIN EN 12831
New Project Electric Heat Warehouse

Legend	DIN EN 12831 - detailed process

List of used formula signs/variables not described in value:

$No._{bdg.}$	Building number
$No._{FL}$	Floor number
$No._{R}$	Room number
Θ_{int}	Room inner temperature
t_{RH}	Duration of heating up phase
n_{min}	Air Change Rate
A_R	Room ground area
V_R	Room volume
$\Phi_{T,e}$	Transmission heat loss outwards
Φ_T	Transmission heat loss
$\Phi_{V,min}$	Ventilation heat loss from min air volumetric flow
$\Phi_{V,inf}$	Ventilation heat loss from air volumetric flow infiltration
$\Phi_{V,su}$	Ventilation heat loss from supply air volumetric flow
$\Phi_{V,mech,inf}$	Ventilation heat loss from surplus exhaust air volumetric flow
Φ_{HL}	Standard heat loss
Φ_{RH}	Heating load, auxiliary heating output
$\Phi_{HeatRecovery,}$	Design heating capacity

Abbreviations, adjoining

E	Outside
u	Neighbouring room unheated
g	Earth contact
b	Neighbouring room heated

Abbreviations for components

ew	Exterior wall
ewd	Exterior window
ed	Exterior door
iw	Interior wall
iwd	Interior window
id	Interior door
ce	Celing
gf	Flooring
rf	Roof

Abbreviations for orientation

H	Horizontal
N	North
NNE	North-north-east
NE	North east
NEE	North-east-east
E	East
SEE	South-east-east
SE	South east
SSE	South-south-east
S	South
SSW	South-south-west
SW	South west
SWW	South-west-west
w	West
NWW	North-west-west
NW	North west
NNW	North-north-west