Client	X
Project Number	00-2020
Subject	Elektrownia
Venting zone	Hala Maszynowni
Season	Lato +30
Date	03-08-2009
Calculation author	BK

Main dimensions			
Room length	l	92,00	[m]
Room width	b	42,00	[m]
Surface area of shop	A	3 864,00	[m²]
Maximum building height (roof ridge)	h	37,00	[m]
Mean room height	h av	36,50	[m]
Volume of shop	VR	141 036	[m³]
Degree of obstruction	VB	0,50	[-]
Net volume of shop	VRN	70 518	[m³]

Meteorological data			
External air temperature	te	30,0	[°C]
Mean wind speed	U∞	0,00	[m/s]

Internal thermal load			
Thermal load from Q'-process	Q'	2 630,00	[kW]
Degree of room loading	µT	0,60	[-]

External thermal load			
Thermal loads from outside	Q'A	40,00	[kW]

Total thermal load			
Total thermal flow	Q'g	2 670,00	[kW]
Specific internal heat of net shop volume	Q'i	37,86	[W/m³]

Air temperatures / Air displacement			
Exhaust air temperature	t out	43,6	[°C]
Change in exhaust temperature	Δt out	13,6	[K]
Displacement of outdoor air (per hour)	LW	6,45	[1/h]
Height of neutral zone from ground	NZ	32,03	[m]

Aggregate of the flows of the air volume for the incoming and outgoing air			
Incoming natural volumetric flow of air	V in	454 678	[m³/h]
Outgoing natural volumetric flow of air	V out	608 639	[m³/h]
Incoming mechanical volumetric flow of air	V' in	173 400	[m³/h]
Outgoing mechanical volumetric flow of air	V' out	45 000	[m³/h]

Aggregate of the surfaces for the incoming / outgoing air			
For incoming air (geometric)	Ag in	120,64	[m²]
For incoming air (aerodynamic)	Aw in	36,19	[m²]
For outgoing air (geometric)	Ag out	211,00	[m²]
For outgoing air (aerodynamic)	Aw out	84,40	[m²]

Specifications of the surfaces of incoming / outgoing air

Opening No. 1, Brama			
Mid-point opening	h opm	2,00	[m]
Discharge coefficient	cv	0,95	[-]
Geometric surface	Ag	0,00	[m²]
Aerodynamic surface	Aw	0,00	[m²]
Coefficient of wind resistance	cw	0,00	[-]
Air mass flow	m'	0,00	[kg/s]
Volumetric air flow	V'	0,00	[m³/s]
Volumetric air flow (per hour)	V'2	0,00	[m³/h]
Air velocity in opening	v	0,00	[m/s]
Pressure difference	Δp	0,00	[Pa]

Opening No. 2, Dolny otwór napowietrzania			
Mid-point opening	h opm	8,93	[m]
Discharge coefficient	cv	0,30	[-]
Geometric surface	Ag	47,84	[m²]
Aerodynamic surface	Aw	14,35	[m²]
Coefficient of wind resistance	cw	0,00	[-]
Air mass flow	m'	65,15	[kg/s]
Volumetric air flow	V'	56,27	[m³/s]
Volumetric air flow (per hour)	V'2	202 578	[m³/h]
Air velocity in opening	v	1,18	[m/s]
Pressure difference	Δp	-8,90	[Pa]

Opening No. 3, Górny otwór w ścianie			
Mid-point opening	h opm	16,58	[m]
Discharge coefficient	cv	0,30	[-]
Geometric surface	Ag	72,80	[m²]
Aerodynamic surface	Aw	21,84	[m²]
Coefficient of wind resistance	cw	0,00	[-]
Air mass flow	m'	81,08	[kg/s]
Volumetric air flow	V'	70,03	[m³/s]
Volumetric air flow (per hour)	V'2	252 100	[m³/h]
Air velocity in opening	v	0,96	[m/s]
Pressure difference	Δp	-5,95	[Pa]

Opening No. 4, Wywietrzaki na dachu			
Mid-point opening	h opm	37,80	[m]
Discharge coefficient	cv	0,40	[-]
Geometric surface	Ag	211,00	[m²]
Aerodynamic surface	Aw	84,40	[m²]
Coefficient of wind resistance	cw	0,00	[-]
Air mass flow	m'	-187,48	[kg/s]
Volumetric air flow	V'	-169,07	[m³/s]
Volumetric air flow (per hour)	V'2	-608 639	[m³/h]
Air velocity in opening	v	-0,80	[m/s]
Pressure difference	Δp	2,22	[Pa]

Ventilator No. 1, Nawiew mechaniczny

Mid-point opening	h opm	6,75	[m]
Flow temperature of the air mass	t	30,00	[°C]
Flow of the air mass	m'	55,77	[kg/s]
Volumetric air flow	V'	48,17	[m³/s]
Volumetric air flow (per hour)	V'2	173 400	[m³/h]

Ventilator No. 2, Wywiew mechaniczny

Mid-point opening	h opm	22,00	[m]
Flow temperature of the air mass	t	37,00	[°C]
Flow of the air mass	m'	-14,15	[kg/s]
Volumetric air flow	V'	-12,50	[m³/s]
Volumetric air flow (per hour)	V'2	-45 000	[m³/h]

This program is a calculation tool using Kirchhoff's laws described in numerous scientific publications. This is a method of calculating the balance of air mass streams in rooms in buildings understood as nodes and the balance of pressure lowering in independent streams understood as independent circuits.|This program requires the user to possess and apply engineering knowledge and to understand physical phenomena occurring in the natural ventilation of buildings.
The results of the program's calculations will always correspond to the adopted criteria and the input data which have been entered, for which only the user is responsible.

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