



innovative air handling units

Sport Hall of Russian Emergency Situation Ministry Irkuck , Russia

Building characteristics

Purpose: The facility in Irkuck belongs to one of 64 unique light 'air' constructions to be soon installed on the territory of the Russian Federation which were designed and patented by ASATI – an american company. This unconventional 'building' in the form of a dome 45x40x13,5m can be used for organizing all types of sports events or serve as a commercial or industrial space.

Area: 1 800m²

Cubic measure being handled by VTS units: 23 400m³

The conception of ventilation system

The scope of requirements concerning the ventilation system mainly covered the following:

- maintaining appropriate air pressure inside the hall in order to guarantee proper structure of the construction and appropriate weather-related performance parameters (wind power)
- ensuring appropriate internal temperature in the winter season (20°C) in spite of extremely unfavourable weather conditions (-41°C)
- exchanging minimum amount of ventilation air resulting from sanitary standards

Guaranteed independence and appropriate operation of the whole sheating and ventilation system were obtained due to the application of independent generators powering ventilation units and electric heaters. The decision regarding the application of this type of energy carrier was forced by great probability of heating media's freezing in case of applying traditional water heaters. The system's reliability was ensured by means of doubling the whole ventilation system and implementing additional exhaust reserve units operating in emergency situations in the mode of supplying air required for maintaining proper hall's construction.



As the design required installation of AHUs outside the hall the type and the construction of applied casing resistant to extremely unfavourable outside temperatures constituted a crucial element of the AHUs' construction.

Solution provided by VTS

The suggested application of VENTUS AHUs gained approval of the investor's representative. A non-skeleton construction ensuring minimal energy loss and elimination of the phenomenon of moisture condensation on the casing's elements enabled significant reduction of the influence of weather conditions. The management process concerning necessary electric energy of over 400kW is realized with the use of 'intelligent' smooth control modules installed in all electric heaters. Eliminating the unfavourable phenomenon of 'overheating' occurring in the case of gradual control lead to reducing the consumption of expensive heat carrier to a great extent. Adjusting optimal AHU sizes in relation to the amount of required ventilation air was reflected in favourable sub-assembly operation parameters ($v=2,0\text{m/s}$) especially visible in the case of ventilation units in the form of a very low demand for electric energy.

General characteristics of used devices		
Number of AHUs	4	
AHUs type	VS	
Configuration	Filter, Electrical Heater, Fan / Filter, Fan	
Operational parameters		
Total AHUs heating capacity [kW]	434	
Total supply AHUs electric power consumption [kW]	11	
Total supply Air Flow Rate [m ³ /h]	34 000	
Average SFP [kW/m ³ /s]/[W/m ³ /h]	1,16	0,32
Noise parameters for loudest unit at 250 Hz		
	Supply	
Inlet [dB]	87	
Outlet [dB]	90	
Environment [dB]	77	