

Heating and Cooling with Gas Absorption Heat Pumps

Holiday Inn Hotel

Mozzo (Bergamo), Italy



Environmental responsibility and energy savings are emerging as key factors in the hotel sector. Actually, these were the guidelines for the construction of the new Holiday Inn hotel located just a few miles from Bergamo, in Northern Italy. These efforts have been recognized: the Holiday Inn hotel has received a nomination for the 2008 European Design Award for the remarkable attention to building materials as well as its unique heating and cooling system. The Holiday Inn hotel offers 98 well equipped rooms with air conditioning and an exclusive 1,400 sq. ft. meeting room. Stefano Civettini, an experienced HVAC designer of Crs Impianti, was commissioned to design the heating and cooling system of the new hotel. Actually, the plan aimed at reducing energy consumption, even if it meant increasing the initial investment, since energy is by far the most

significant expenditure in the hotel sector. “We are committed to reducing energy consumption in comparison to other similar facilities” Mr. Civettini says. “This requirement has been successfully fulfilled with Robur Gas Absorption Heat Pumps. With Robur systems, the payback period is even quicker, less than 4 years, due to a significant reduction in heating costs of 40% every year“. The system consists of four air handling units, equipped with energy recovery units where energy is transferred from the return air stream to the supply air stream. In addition, wall and ceiling mounted fan coils. Domestic hot water is provided by five 2,640 gal storage tanks, thus allowing excellent control. The Robur system capabilities are as follows: in heating mode, 1,486,000 Btu/h heating capacity, 233,000 Btu/h heat recovery capability for the production



Heating



Cooling



DHW



of DHW and 1,387,000 Btu/h (115.5 tons) cooling capacity. Overall requirements are satisfied by five preassembled gas-fired absorption links with reversible cycle heat pumps, chillers for cooling and chillers with heat recovery. The links have been installed on the roof, thus saving space.

Robur units can produce hot water up to 140°F for heating (even at external temperature of -20°F) and chilled water down to 37.4°F for cooling. In addition, system optimization settings help in the regulation of outlet water temperature at

122°F in winter and at 44.6°F in summer, while summer heat recovery provides 233,000 Btu/h heating capacity for free domestic hot water, which satisfies the majority of the hotel's demand. Free domestic hot water is also supplied by Robur preassembled gas fired condensing boiler units and by a solar system, both installed on the roof. The use of Gas Absorption Heat Pumps has reduced both energy consumption and maintenance costs. In winter, the average efficiency of the system, (GUE - Gas Utilization Efficiency), is close to 1.26, this means that

Unit number and type	2 Robur RTAR - Reversible Gas Absorption Heat Pumps Heating capacity: 898,000 Btu/h Cooling capacity: 533,000 Btu/h (44.4 Tons)
	1 Robur RTCF HR - Gas-fired Absorption Chiller link for cooling with heat recovery Cooling capacity: 304,000 Btu/h (25.3 Tons) Heating capacity with recovery: 232,000 Btu/h
	2 Robur RTCF - Gas-fired Absorption Chiller links for cooling Cooling capacity: 550,000 Btu/h (45.8 Tons)
	1 Robur RTY - Gas-fired Condensing Boiler link for heating Heating capacity: 587,000 Btu/h
Heating capacity	1,486,000 Btu/h
Cooling capacity	1,387,000 Btu/h (115.5 Tons)
Capacity of recovery unit	233,000 Btu/h

Gas Absorption Heat Pumps are over 40% more efficient than condensing boilers. In summer, the average electrical load is approx. 20 kW only, less than one tenth of what is required by similar electrical systems, resulting in cost savings up to \$16,200 (exchange rate at 1.35 Eur) per year compared to systems with condensing boilers and electric chillers. Due to its high efficiency, Robur Gas Absorption Heat Pumps save the equivalent of 9 Toe (Tons of oil equivalent), reducing an equivalent of 289 tons of coal combustion products as

well as 26 tons of CO₂. High energy efficiency, low electrical load, reduced environmental impact and integration with solar systems: these are the reasons why the Holiday Inn hotel near Bergamo is a remarkable example in the Italian hotel sector. Actually, the Holiday Inn hotel represents the perfect combination of technologically advanced products, the appreciation for well made things with attention to cost savings and environmental awareness.