

Gas Absorption Reversible Heat Pump System

Gambro Dasco

Medolla (Modena) - Italy



caring for the environment



The HVAC system, installed at the Gambro Dasco S.p.A. facility in the city of Medolla (Italy), serves a 2-story building, consisting of offices and conference rooms. The 13,700 square feet ground floor and the 13,380 square feet first floor, cover a combined area of 27,000 square feet, which serves approximately 105 employees. The outdoor Heating and Cooling equipment consists of a Gas Fired Water-Ammonia Absorption system, manufactured by ROBUR and constructed with the following

array of models:

- 1 factory-assembled Absorption Heat Pump Link RTAR300-600 (5 GAHP-AR units – 25 Tons);
- 2 factory-assembled Absorption Chiller Links RTCF180-00 LB (6 ACF60-00 LB units – 30 Tons);
- 1 factory-assembled Link (specifically configured for this application) consisting of 2 Absorption Chillers ACF60 HR (with Heat Recovery) coupled with 2 high-efficiency outdoor AY00-119 heating modules (boilers).



Heating



Cooling



DHW

This technological solution permits exceptional gas savings during the winter (282,500 cubic foot) and a great reduction of electrical consumption (18,500 BTU/h in comparison with the utilization of electric chillers) during the summer.



The outdoor equipment incorporates an ice storage system, with 2 storage tanks and a heat exchanger. For the on-demand production of hot water for sanitary use, an additional plate heat exchanger was installed. The number of Heat Pumps (GAHP-AR) is designed to cover the winter heating base load while the boilers (AY00-119) cover peak demand.

Two additional systems were implemented to reduce the number of chillers and provide energy savings during the summer. First, the installation of two thermal storage tanks with a capacity of 1,717 gallons (6500 litres) filled with PCM (Phase Change Material) allows for a 23% reduction in cooling equipment. Second, the installation of 2 Absorption Chillers with heat

recovery, designed to operate during the day. As a result, a gas inlet of 189,800 BTU/h can generate 121,000 BTU/h cooling capacity and 143,400 BTU/h free heating output simultaneously, covering the needs of hot water for sanitary use. In the summer, the process is characterized by a 2-phase operation: recharge by night and running by day. Six ACF60-00 LB units are required to recharge the thermal storage plant from 8:00 pm to 8:00 am.

Thermal energy is transferred to the storage tanks, containing the PCM nodules. By means of phase changing, the nodules' fluid solidifies at a temperature of approximately 37.4 °F (3 °C), which is then released during the day to the cooling system. Normally, the entire cooling demand is satisfied by the thermal storage tanks. When the cooling demand raises, the Gas Fired Absorption Chillers switch-on, supplementing the total system cooling capacity.

Building type	Biomedical industry
Surface	27,000 sq. ft.
Energy distribution system	Fan coils
Unit number and type	5 GAHP-AR Gas Absorption Reversible Heat Pumps + 6 ACF60-00 LB Gas Absorption Chillers + 2 ACF60-00 HR Gas Absorption Chillers with Heat Recovery + 2 AY00-119 Gas Boilers
Heating capacity	672,000 BTU/h
Cooling capacity	973,000 BTU/h

