

FACTS ABOUT INDOOR CLIMATE SYSTEMS

DIRIVENT® FOR PRECISE TEMPERATURE AND HUMIDITY CONTROL IN WYETH MEDICA'S HIGH-BAY PHARMACEUTICAL WAREHOUSE, IRELAND

Wyeth Medica Ireland, a subsidiary of American Home Products, manufactures a range of pharmaceutical products at their plant in Newbridge, Ireland.

A recent expansion of the plant incorporated a new and fully automated high-bay warehouse for storing and distributing finished products.

The warehouse, called the AS/RS building, was designed by Munck Autech (Norway). The building is 130 m long, 27 m wide and 26 m high and holds 13,500 pallets at any time. A complete picking and retrieval system handles between 200 and 300 pallets in a 24-period.

Since the new warehouse has the cladding fitted directly to the self-supporting racking system, the building is built from inside to outside.

Maintaining the right indoor climate is very important for pharmaceutical products and Wyeth Medica specified year-round internal conditions to be held at a temperature of 20°C ± -4°C and 45-60% relative humidity throughout the building volume. The maximum



Wyeth Medica's high-bay warehouse for pharmaceuticals in Newbridge, Ireland.

temperature differential between the floor and ceiling is 0.15°C per meter.

Dirivent air conditioning and destratification system
The solution chosen by Flakt and Jacobs Engineering, the consulting engineers, was the DIRIVENT air conditioning and destratification system, which has been successfully used in many similar buildings where stringent temperature conditions are required for storing products such as chocolate.

DIRIVENT is a high-velocity induction-type air distribution system. In Wyeth Medica's warehouse, strategically placed DIRIVENT nozzle outlets, sited at high level along the racking aisles, are capable of transporting conditioned air downwards as far as 30 metres.

With induction ratios up to 60:1, conditioned air is rapidly mixed by induction to give air turnover rates in excess of 40 per hour to achieve uniform temperature and humidity within the building volume.

DIRIVENT heating, air conditioning, destratification and humidification system designed and supplied by Flakt Woods Projects, Ireland. Overall design and construction management for the total pharmaceutical project: Jacobs Engineering.

TECHNICAL INFORMATION

General

Wyeth Medica's high-bay pharmaceutical warehouse has an area of 3,600 m², a volume of 88,000 m³ and a height of 28 m. Flakt Contracting Ireland's scope of supply included the controls and piping in addition to the DIRIVENT heating, air conditioning and humidification system.

Conditioned air is supplied from a central air handling unit, type EU 84, sited on a mezzanine platform at one end of the building, and is distributed via 90 Dirivent jet nozzles.

Eight space sensors, located at high and low level within the racking system, detect and control average temperature and humidity in the warehouse.

Technical data

Outdoor design:	Summer	27°C, 50% RH
	Winter	-4°C, 90% RH
Indoor requirements:		20 ± 4°C
		45-60% RH
Stratification:		0.15°C per metre
Building U value:		0.45 w/m ² k
Infiltration:		0.20 AC per hour (max.)
Floor area:		3,600 m ² , vol. 88,000 m ³

HVAC system

Heating system:	500 kW (hot water)
Cooling capacity:	360 kW (chilled water)
Humidification:	Steam-generated, 116 kg/hr
Conditioned air flow, EU 84 AHU:	22.5 m ³ /sec.
Outdoor air flow:	5.4 m ³ /sec.
Noise level:	NC 55 internally



The ductwork and nozzles are contained within the roof steelwork and do not interfere with the automatic craneage and handling systems.

Results

Temperature and humidity sensor readings during operation.

	POINT A	POINT B	POINT C	POINT D
High level 23 m	20.8°C 48.4%	20.8°C 47.2%	20.3°C 48.3%	20.8°C 48.1%
Low level 2.5 m	19.7°C 52.9%	20.2°C 47.9%	20.4°C 48.3%	20.0°C 49.8%

Average temperature:	20.4°C
Average relative humidity:	48.2%