



Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.

a unit of Monsanto Company

800 N. Lindbergh Boulevard

St. Louis, Missouri 63166

Phone: (314) 694-1000

2-6

THERMINOL HEAT TRANSFER FLUIDS
USED IN BUILDING SPACE HEATERS

Commercial and large residential buildings have converted their heating systems to Therminol and significantly reduced their operating costs.

In general, these systems provide total energy requirements except electricity. Monsanto's Akron office and laboratory complex is heated by Therminol. The system is described as:

"a dual duct, variable volume heating and cooling system. Two main air conditioning systems are used: one for office space at 20% makeup air and the second for laboratories at 100% makeup air.

Present building space air conditioned is 34,000 sq. ft. Total building is 42,000 sq. ft. Cooling capability is 323 tons, provided by an absorption machine using lithium bromide refrigerant to cool the chilled water loop.

Condenser cooling water for the absorption machine is provided by an air coil cooling tower. Therminol 55 at 310°F provides direct heat to the concentrator of the absorption machine.

Therminol 55 at 400°F is heated by two 4.5 M BTU/HR liquid tube heaters with a lead-lag control function. The 400°F Therminol 55 is circulated to a main header where secondary pumping provides constant temperature fluid from 160° to 375°F to the various users.

Users include pre-heat and re-heat coils in the two main air handling systems; low pressure steam generator; domestic hot water; unit heaters; baseboard perimeter heaters, and the absorption machine.

0471062

NOTICE: "Nothing contained herein is to be construed as a recommendation to use any product in conflict with any patent. MONSANTO MAKES NO WARRANTIES AS TO THE FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY OF ANY PRODUCT REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations, and disclaims all liability for any resulting loss or damage."

TOWOLDMON0032695

WATER_PCB-00017164

The lead/lag control automatically cycles the heaters on or off line in sequence as heat requirement dictates. The entire system is automated and is unattended.

The heating and cooling systems are over-sized to provide a 50% expansion of the building.

Cost for the total air conditioning system was about \$10.50/sq.ft. of building, which was very competitive with steam and hot water systems for that time and area."

Cost savings with a Therminol system can be significant. In most areas, a licensed boiler operator is required to operate a pressure vessel such as the normal steam boiler. The Therminol system, being at atmospheric pressure, does not normally require an operating attendant. In fact, the normal Therminol heating system will run very well unattended. Overall thermal efficiency many times is also increased providing additional savings.

Therminol 44, 55, 60 and 66 are natural fluids for heating applications. Other examples of operating systems are:

- High-rise Apartments
- Hospitals

0471063