THERMINOL FOR DRAMATIC SAVINGS

When the need to modernize a heating system arises, you will find that Therminol liquid phase heating offers:

- *Superior operating efficiency.*
- *Automatic unattended systems mean minimum attention by non-licensed personnel.*
- *Maintenance reduced by up to 80 percent.*
- *Easy conversion and installation.*

Operating Savings

The use of high temperature *Therminol* eliminates the need for system pressurization. A high temperature primary loop (see diagram below) is vented to atmosphere, and thus the heaters usually are not classified as pressure vessels. This in turn eliminates the need for a crew of licensed boiler operators, a major factor in the cost of many old systems.

Cut Maintenance Costs

Operation of the new plant is entirely automatic except for preventive and operational maintenance and system shutdown and startup. These operations can be performed by the regular building maintenance staff.

Easy Conversion and Installation

Installation basically involves replacing steam boilers with fluid heaters. A steam generator can furnish hot water during the conversion to minimize inconvenience to your building's occupants.
Each of the fluid heaters are connected to heat exchangers. These converters generate hot water for building heating and domestic hot water heating and steam for kitchen equipment, garage heating systems and the building ventilation. Two pumps recirculate the fluid between heaters and converters.

Space No Problem

All system changes can be confined to the previous boiler room area. Existing piping and equipment for the secondary services, including building heating service pumps, domestic hot water pumps, and condensate receivers remain in place. Thus, your building's services can continue to utilize water and steam as before.

River House Cooperative Apartments — Detroit

This system, which has been in operation for more than five years, provides an annual savings of $36,000 compared to the old steam systems; $25,000 through the elimination of licensed boiler operators and $11,000 through reduced fuel costs. The latter saving results from an increase in over-all efficiency from 60 percent with the old system to 83 percent with the new, and from switching to gas firing.

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thermal liquids

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These two blueprint designs of a Therminol liquid heating system (top) compared to a conventional steam system (bottom) dramatize the reasons Therminol reduces installation and operating costs. *The basic simplicity of a* Therminol system — without five high pressure steam boilers, a reduced water treatment system, aerator, etc. — *makes it more efficient and takes up less space.*

THERMINOL

STEAM

PHYSICAL PROPERTIES—Therminol FR-1

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The Monsanto Therminol heat transfer fluids have been used for a number of years in a variety of heat transfer applications; from rubber rolling to food processing. Therminol FR-1 represents the best fluid for space heating systems. Therminol FR-1 is unique. It permits installation of a non-pressurized system operating with a liquid which has no fire point and will not support combustion. Therminol FR-1 is so fire-resistant, it has been certified by UL and approved by Factory Mutual.

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THERMINOL FR SAFETY OF HANDLING

On the basis of animal toxicity studies, THERMINOL FR may be considered only slightly toxic from the standpoint of accidental massive skin exposure or accidental ingestion. Similarly, single exposures to high concentrations of vapors (when heated sufficiently to volatilize) or high concentrations of decomposition products (if the fluid is accidentally discharged into the fire chamber) are not serious hazards because the irritating character of such concentrations *preclude voluntary exposure.*

Repeated or prolonged skin exposure should be avoided since THERMINOL FR acts as a solvent for fats and oils of the skin. *Removal* of these natural, protective barriers can lead to drying and chapping such as occurs with exposures to paint thinners. More important, THERMINOL FR may be absorbed if it is allowed to remain on the unbroken skin. For these reasons, we recommend that *the skin be washed with soap* and water if there is contact. A skin burn resulting from accidental contact with hot fluid should be treated in the normal manner for any thermal burn due to hot oils.

Because of its low vapor pressure, there is no significant vapor inhalation hazard when THERMINOL FR is at room temperature. For example, there is no vapor exposure problem while transferring the fluid from its shipping container to the heat transfer system. *On the other hand,* the vapors emitted by THERMINOL FR heated to elevated temperatures are injurious on prolonged exposure. It is indicated that the "threshold limit value" or atmospheric vapor concentration which cannot be safely exceeded (on a daily basis) *is 0.5 – 1.0 milligrams of THERMINOL FR vapor* per cubic meter of air in the workroom. In heat transfer installations, the fluid must be used in a closed system free from leaks with the expansion tank vented with the expansion tank vent trapped so as to condense any vapors. *Accordingly, there should be little or no opportunity for* workers to come in contact with vapors.

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