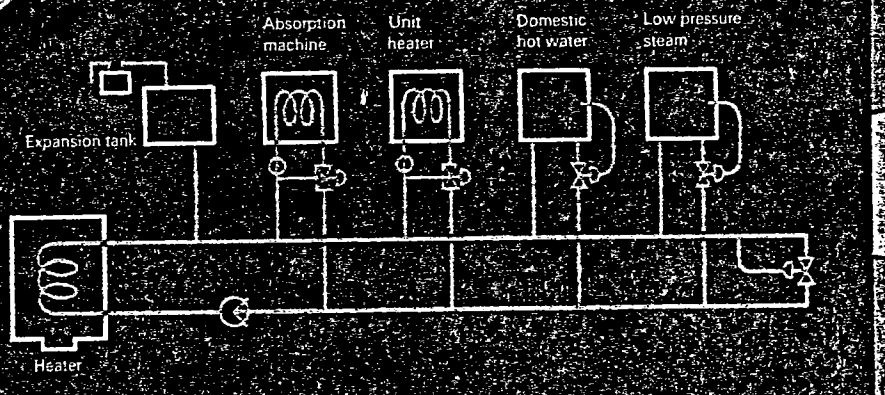
thermal liquids

NEW IN HEATING

OFF 20



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thermal liquids

A NEW CONCEPT IN HEATING

DSW 322704

STLCOPCB4074355

CONVERT TO

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 — 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, p. 3) is vented to an atmospheric liquid trap, usually enabling the heaters to be classified as non-pressurized vessels. Non-pressurized or low pressure heating equipment requires only minimum attention by non-licensed personnel.

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.

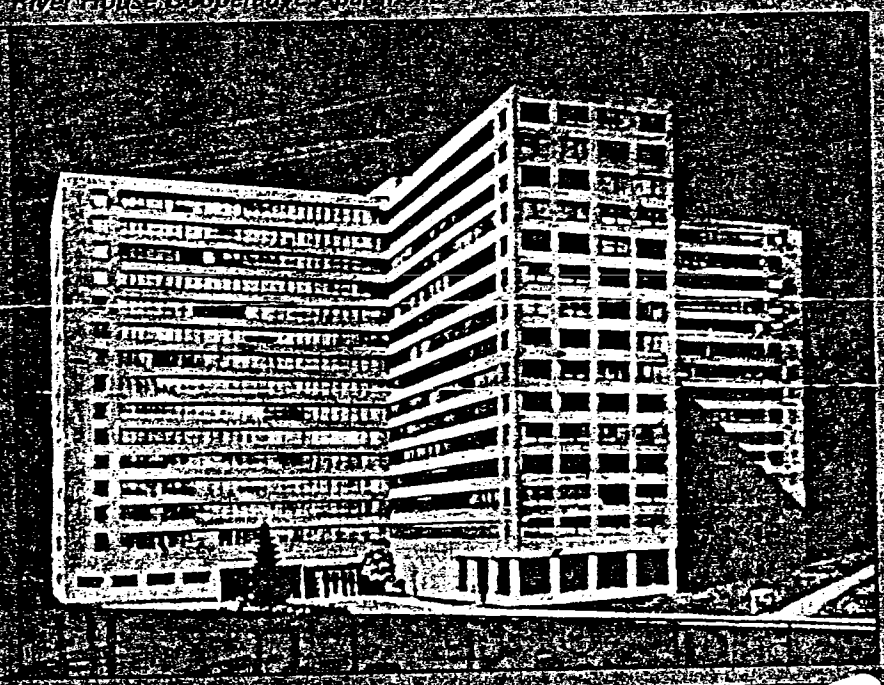
Easy Conversion and Installation

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



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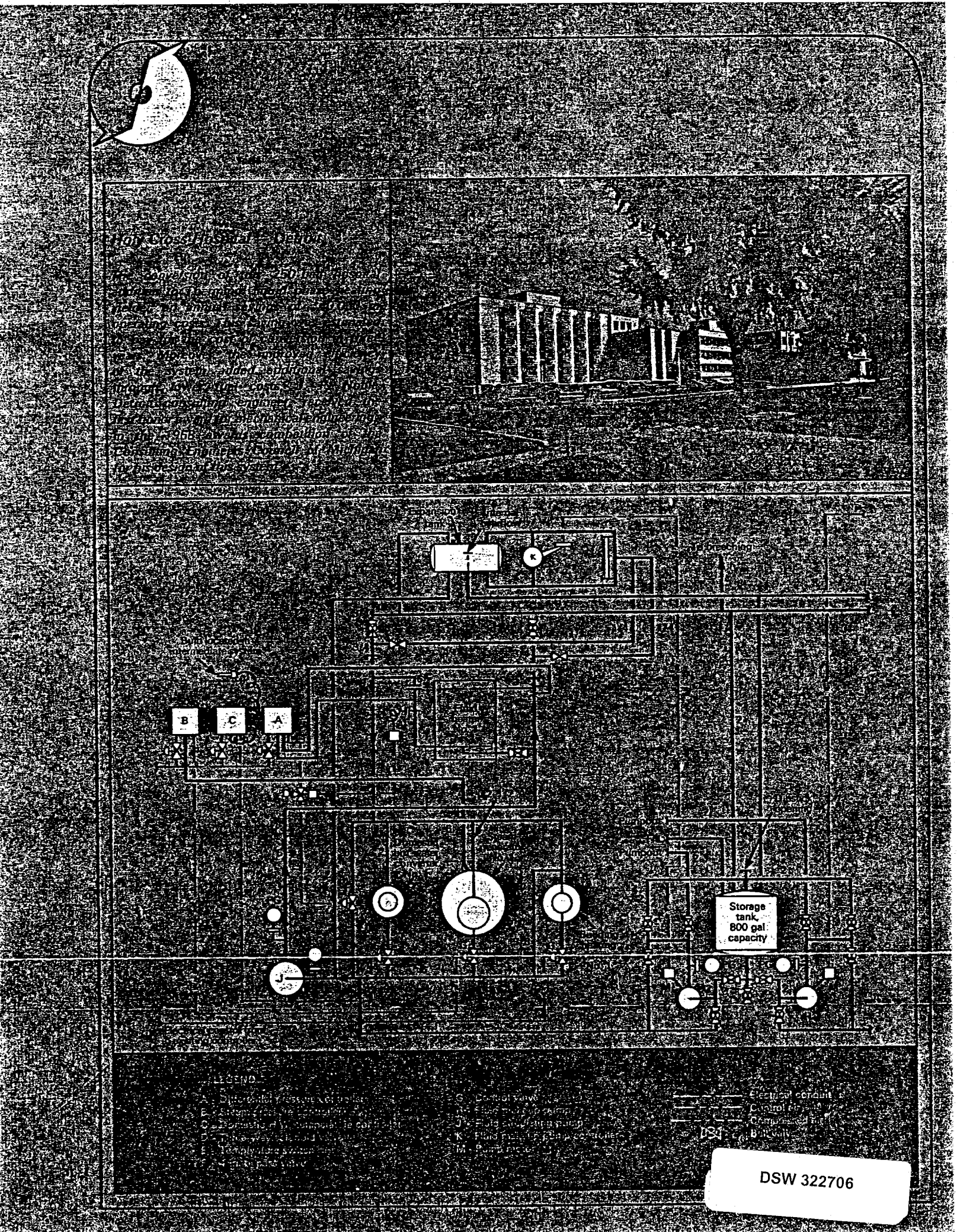

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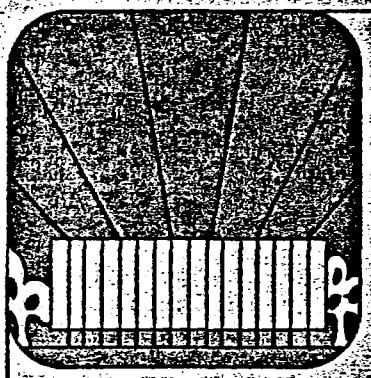


TOTAL THERMINOL SYSTEMS IN

NEW

BUILDINGS

From open flame, to steam, to liquid phase fluids. Unhappy with early direct-fired heating, engineers centralized the fire and used steam to bridge the gap. Now you can bridge that gap more efficiently with new, high temperature liquid phase heating. Some examples of the ways others have designed Therminol into their heating systems are detailed on this page.

Therminol Versus Steam in an Eleven Story Hospital

Kaiser Engineers sought the most economical heating system for the Tower addition to an Oakland, Calif. Hospital. Consequently, they made a detailed analysis of steam versus Therminol for their 243,000 square foot expansion. Their findings:

- Therminol's initial installation cost is *$21,850 less than steam.*

The reduction in capital costs was due to the elimination of low and high pressure steam boilers, deaerator feed water heaters, condensate drainage system for absorption chillers, steam piping, related equipment and mechanical equipment floor space.

- Therminol's operating cost is *$8,000 less than steam;* a 22 percent annual savings.

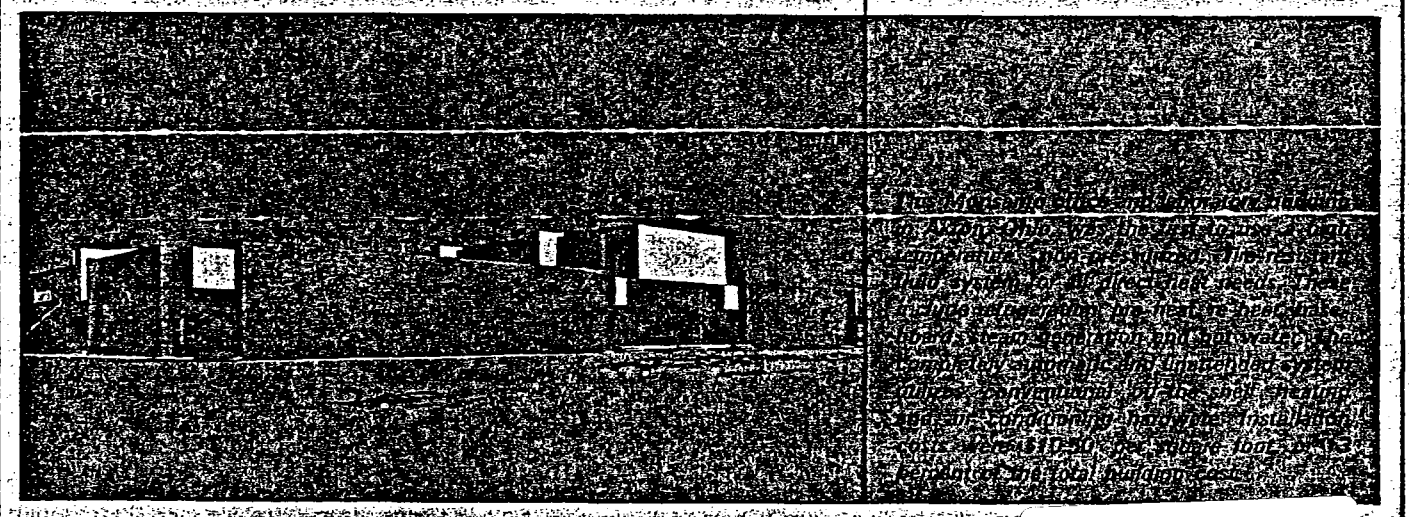
The reduction in annual operating costs were due primarily to the anticipated added thermal efficiency of the Therminol System and the reduction in preventative maintenance and repair. It was projected that if licensed boiler operators had been required, as is generally the case, an additional operating savings of approximately $25,000 per year would have been realized by utilizing the Therminol System approach.

In addition to these outstanding cost savings, the study found Therminol:

1. Provided excellent response to building load changes.
2. Presented no need for boiler blowdown and venting.
3. Offered increased safety because of the non-pressure characteristics of the system.

On this basis, a number of hospitals have used Therminol in their heating systems or incorporated it into their designs.

Diagrams detailing the design of these two systems are on the next page.



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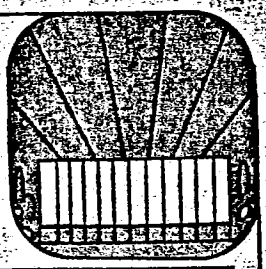
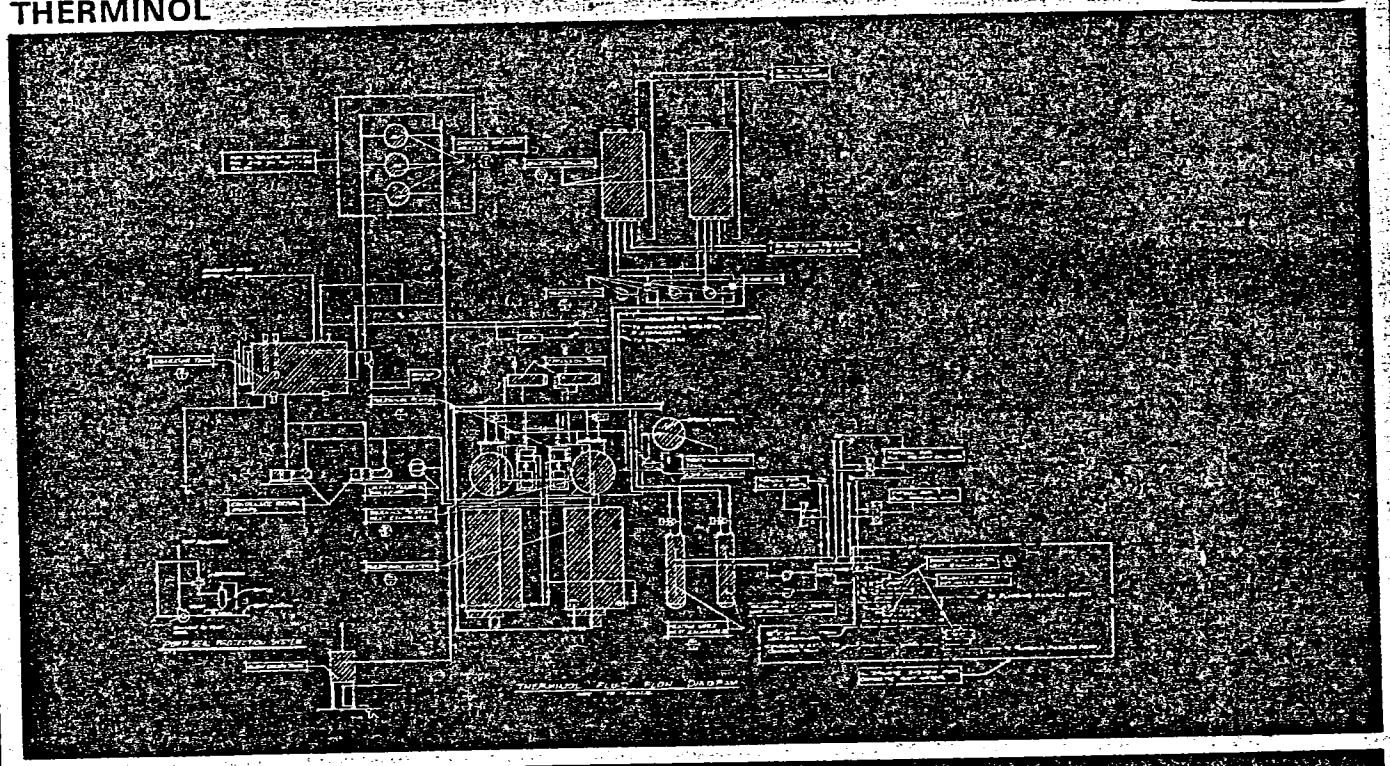
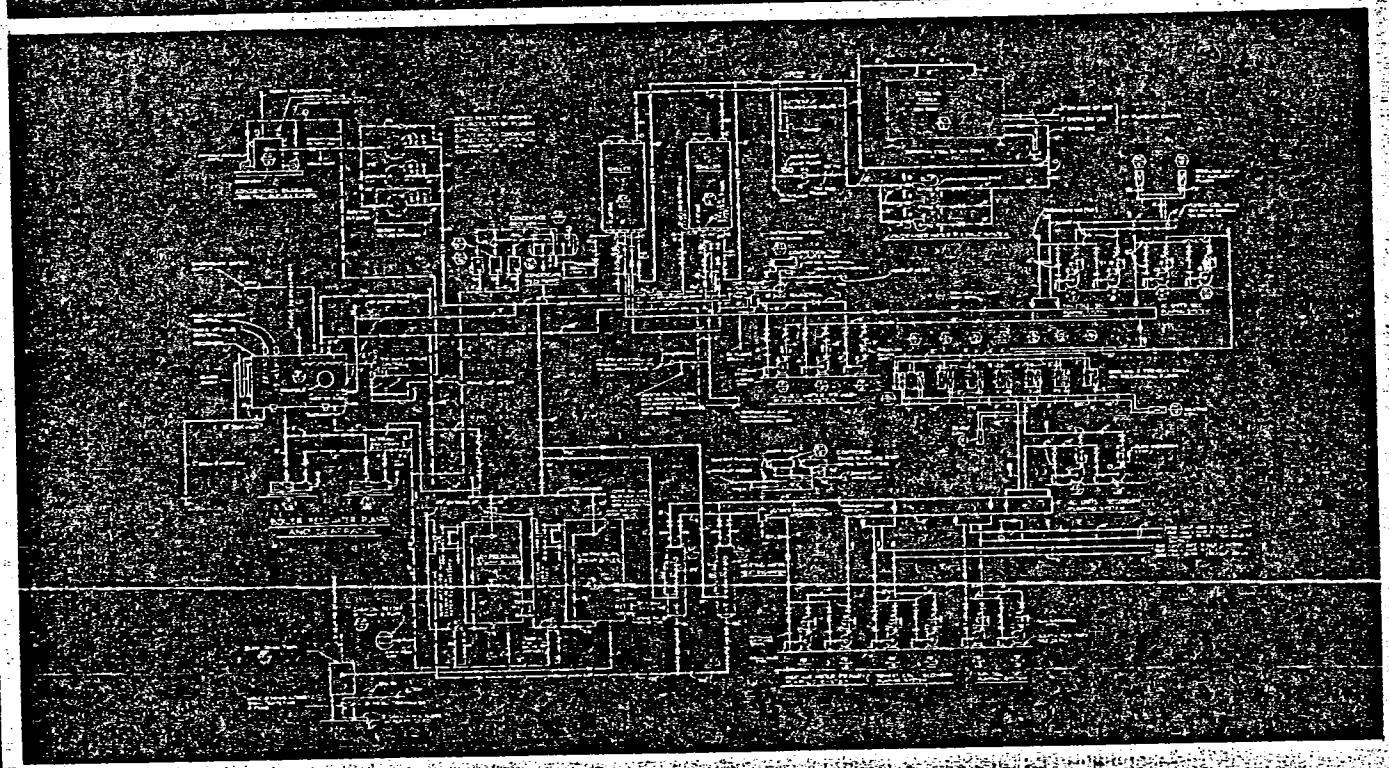
These two blueprint designs of a Therminol liquid heating system (top) compared to a conventional steam system (bottom) dramatize the reasons Therminol reduces installation and operating costs. The basic simplicity of a Therminol system — without five high pressure steam boilers, a smaller water treatment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



THERMINOL





STEAM

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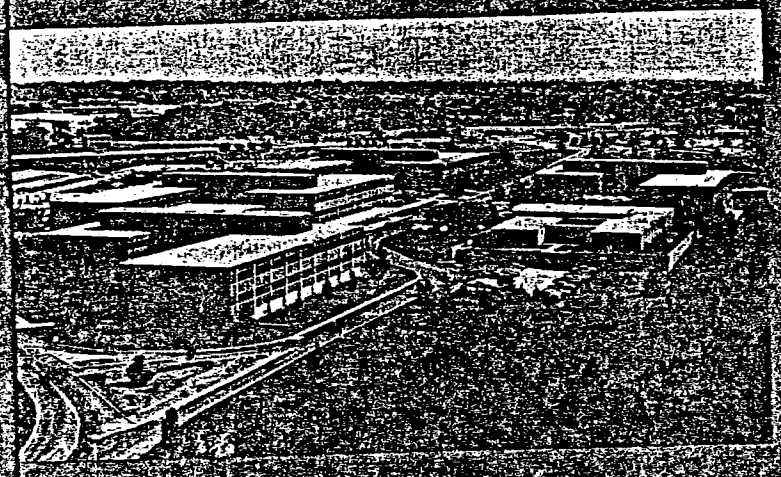
THERMINOL FOR HEATING AND COOLING IN

CAMPUS-TYPE BUILDINGS



In addition to high rise structures, Therminol heating systems offer considerable savings for campus type buildings. Ferris & Hamlin, Inc., St. Louis consulting engineers, prepared a feasibility study comparing a conventional system of high pressure steam distribution to four variations of Therminol systems.

The Monsanto office complex in Creve Coeur, Missouri, was used as a basis for comparison. This complex comprises a powerhouse and five office buildings totalling 425,000 square feet, including a cafeteria and kitchen.

Here's a summary of the five systems and their comparative costs:

System	Description	Initial and Operating Cost
No. 1	High pressure steam distribution to the five office buildings, with steam pressure reduced in each building to 40 lbs. psig. Low pressure steam was distributed to heating coils in the air conditioning units. A central all-electric motor driven centrifugal water chilling system with condensing water pumps and cooling tower would be installed in the powerhouse. Chilled water mains would be run parallel to the steam mains in the tunnels with branches to the air conditioning units in each building.	$80,997
No. 2	Varies from No. 1 only in that Therminol heating replaces pressure boilers. Therminol supply and return piping are used from powerhouse to each building. At each building a booster pump with a three-way valve would be installed to reduce the temperature of Therminol from 650 to about 225°. The Therminol would then be pumped to heating coils in the air conditioning units. The water chilling system would be the same as in No. 1.	$82,555
No. 3	This system is the same as No. 2 except that centrifugal water chillers would be replaced by absorption units in the powerhouse. The boiler plant and condensing water pumps would be increased to meet additional load from the absorption units.	$83,211
No. 4	This system varies from No. 1 only in that absorption units would be installed in each building. Condensing water from a central cooling tower and condensing water pumps at the powerhouse will supply condensing water through the tunnels to these units.	$94,806
No. 5	This system varies from No. 1 only in that [illegible] cooling towers and condensing water pumps would be installed to each building.	$77,476

This report's conclusion for this campus application: Therminol heating system costs less than a conventional system using high pressure steam. And, in addition to eliminating an operating engineer on each shift, the Therminol system would offer no trap maintenance, no water treatment and lower liability insurance rates.

DSW 322709

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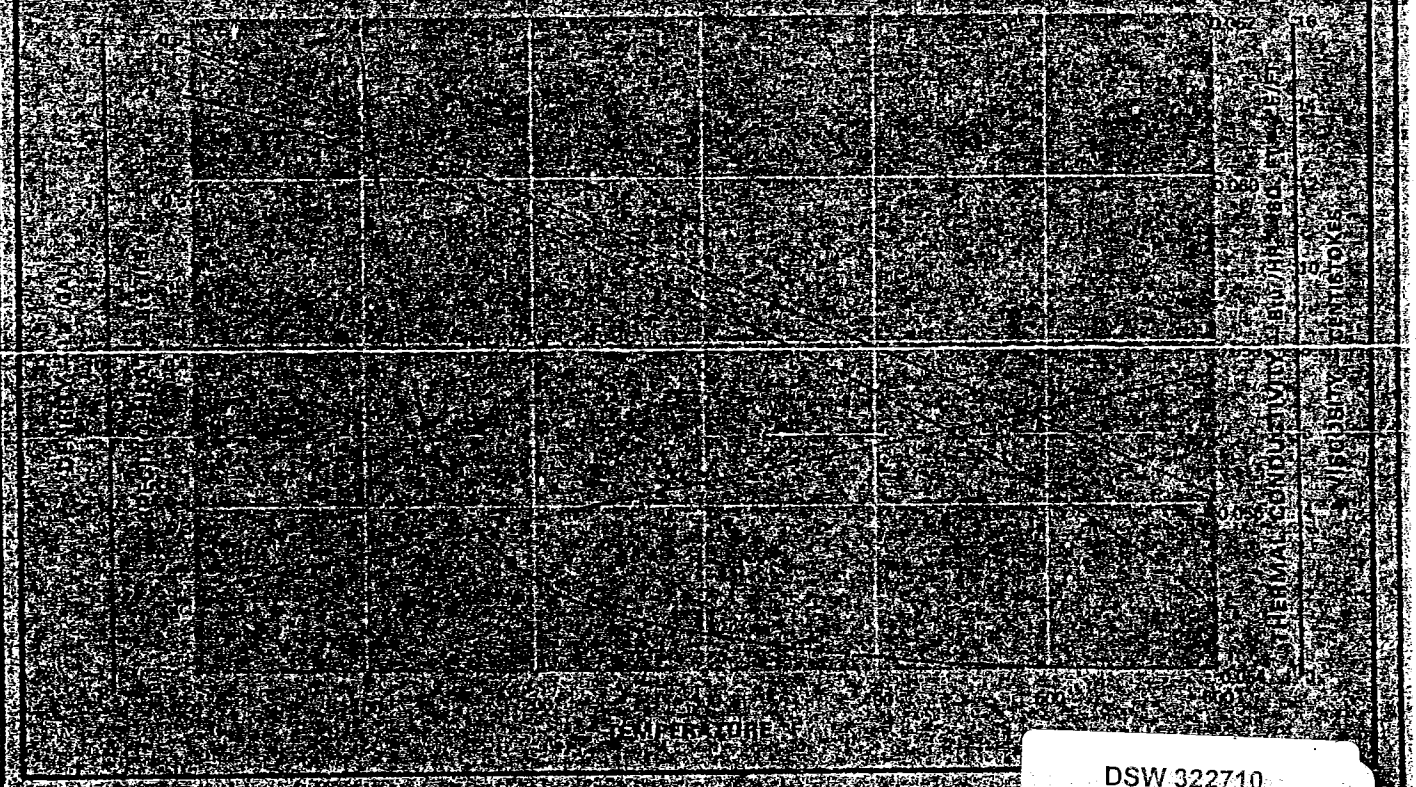
THERMINOL FR-1

The Monsanto Therminol heat transfer fluids have been used for a number of years in a variety of heat transfer applications from rubber molding to resin cooking. 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 flash point and will not support combustion over its use temperature range. Therminol FR-1 is so fire resistant it has been certified by UL and approved by Factory Mutual.

THERMINOL FR-1
Typical Properties

Composition	chlorinated biphenyls
Appearance	oily, clear, nearly colorless liquid
Pour Point	2°F.
Density @ 75°F.	11.56 lbs./gal.
Flash Point	360°F.
Fire Point	none to boiling
AIT	greater than 1200°F.
Boiling Range	
10%	620°F.
Dry Point	680°F.

PHYSICAL PROPERTIES—Therminol FR-1



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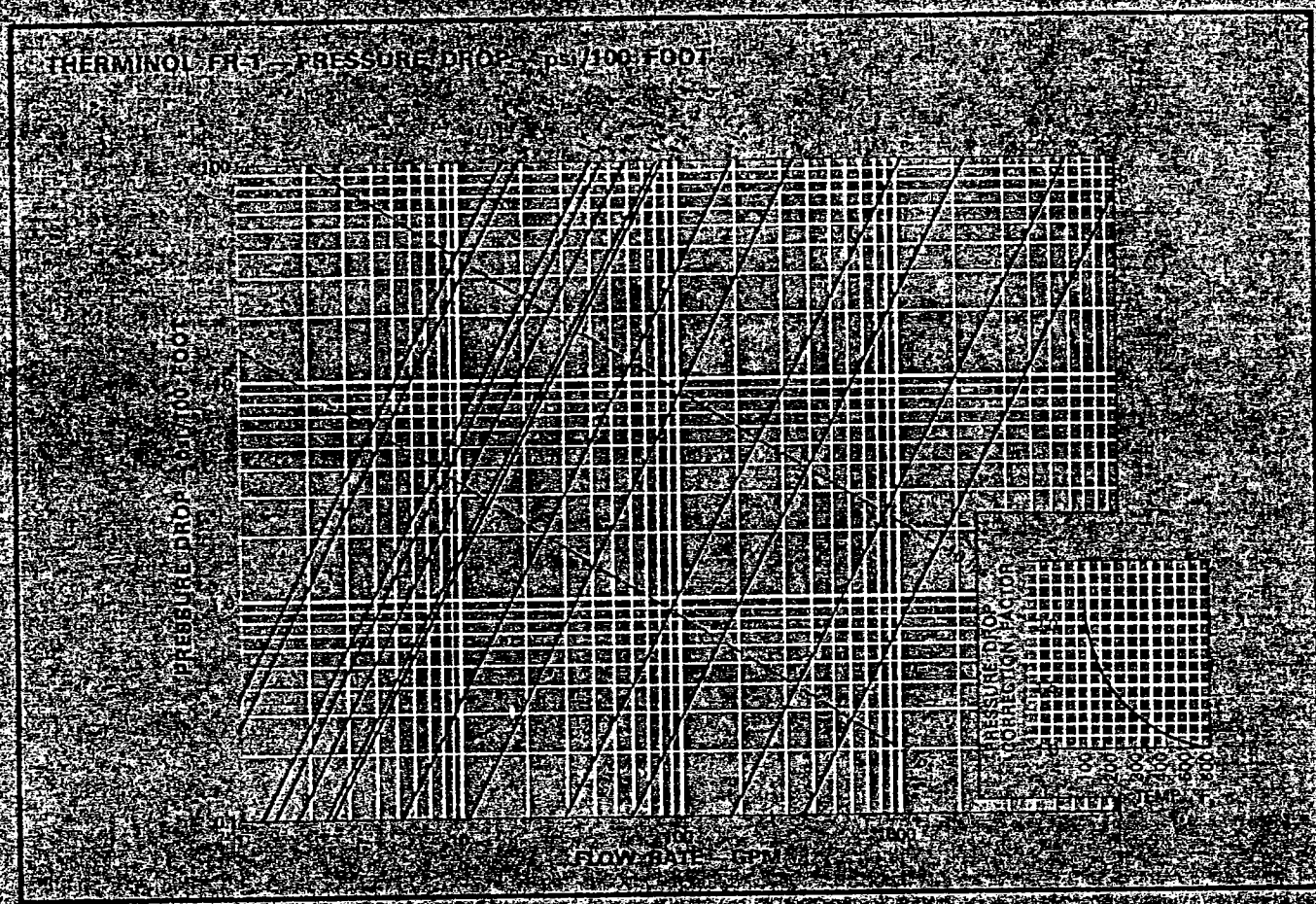

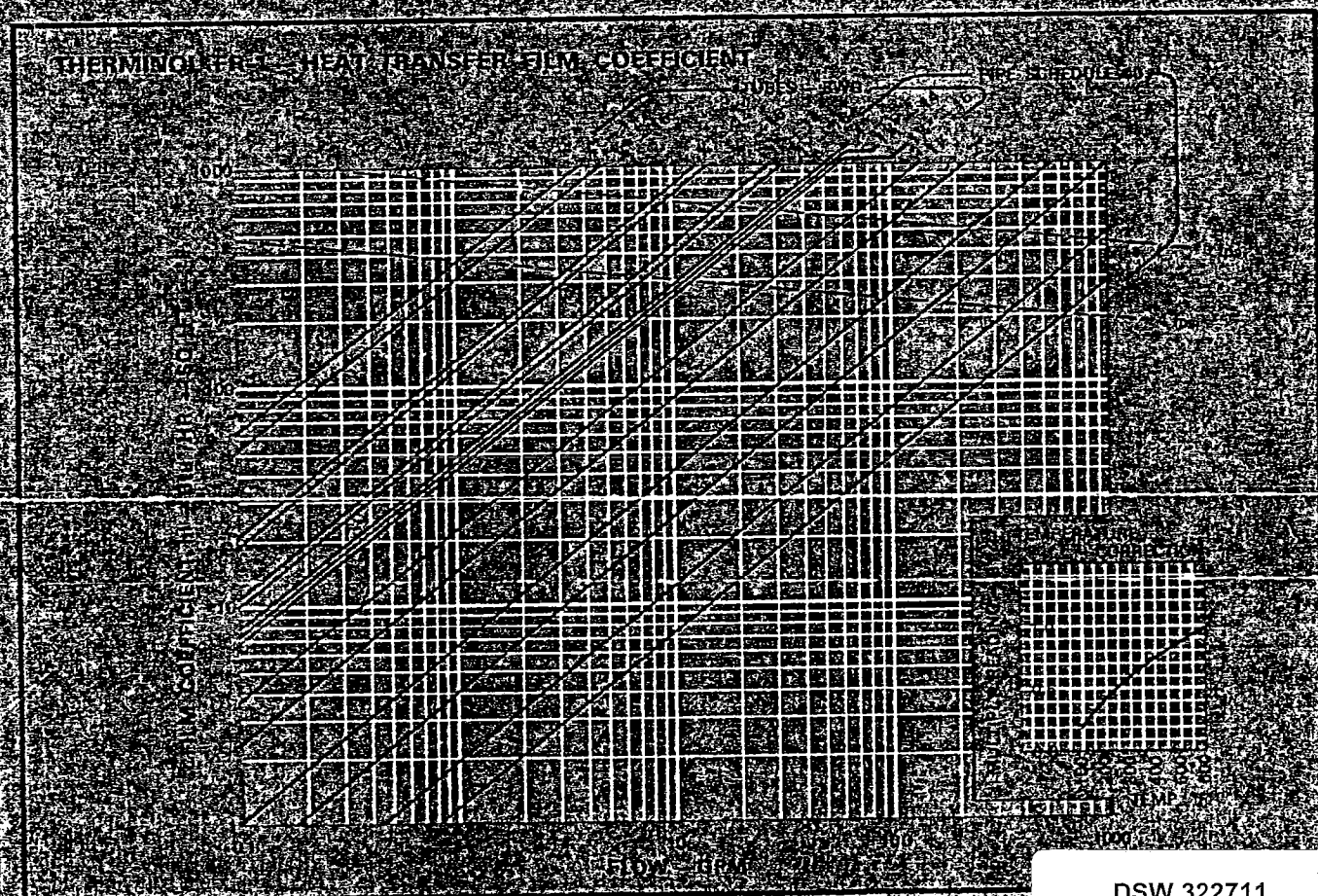

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DO YOU NEED MORE INFORMATION?

If the Therminol concept of heating system design interests you, let's talk some more. Our local fluid specialist can give specific answers to your questions about designing and specifying a Therminol system. Or tell you more about high temperature, liquid phase heating in general.

JUST SEND IN THIS CARD!

☐ Call for an appointment.
☐ Drop by any time.

Name_____

Title_____

Company_____

Address_____

City, State_____ ZIP_____

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THERMINOL FR-1

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THERMINOL FR-1

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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, unpressurized system free from leaks 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.

Environmental Considerations

Therminol FR is a stable, long-lasting chemical. Consequently, measures to avoid environmental contamination through spillage, leakage, or careless disposal should be observed.

Therminol FR heat transfer fluids contain polychlorinated biphenyls (PCB). PCB residues in small amounts have been found in the environment, and some studies indicate that they may be harmful to certain forms of animal life. Every care should be taken by users of Therminol FR fluids, or any other PCB-containing products, to prevent entry into the environment through spills, leaks, disposal, vaporization or everyday use and handling.

DSW 322714

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