U-MAX

YS ENERGY

THERMAL OIL HEATER

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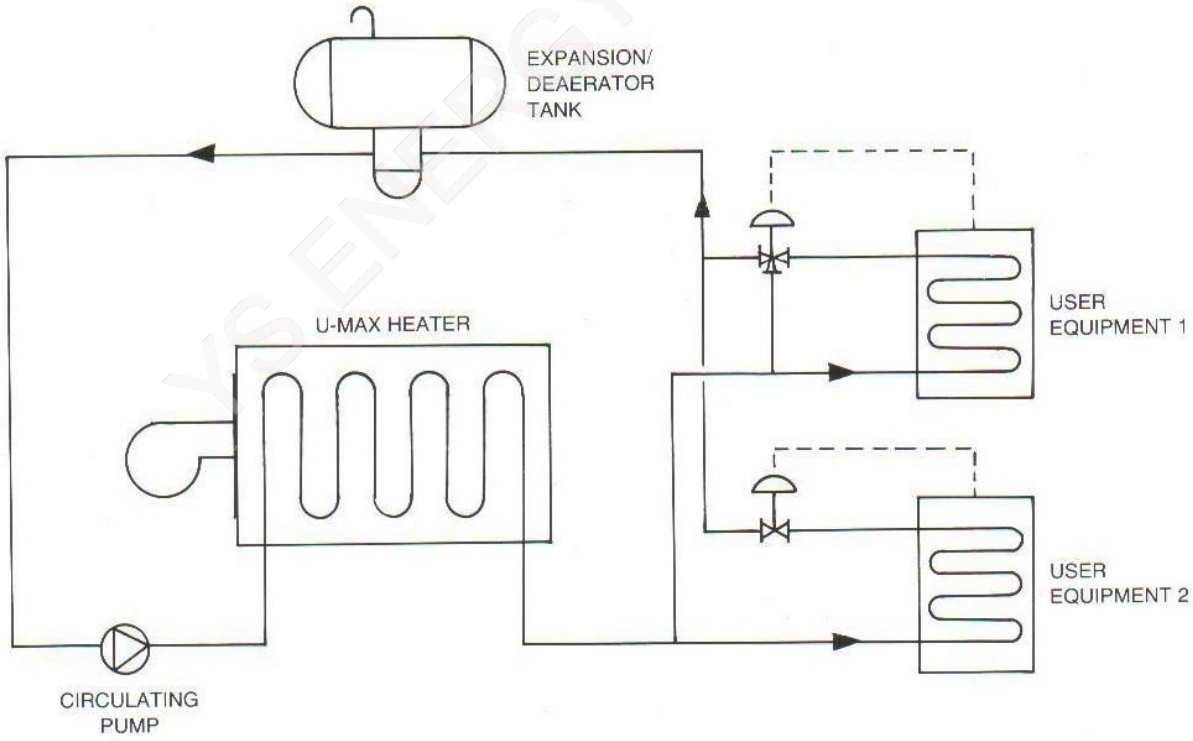
U-MAX THERMAL OIL HEATING SYSTEM

The heating of machines, process equipment and vessels by mean of high pressure not water or steam is generally known. With this kind of heating, hot water or steam serve as the heat transfer medium.

An efficient and economical alternative for process heating is the use of THERMAL OIL (mineral or synthetic) as the heat transfer fluid.

The U-Max process heating system makes use of such thermal oil as its heat transfer medium and it essentially comprise of:

(a) A packaged, fully automatic oil or gas fired U-Max heater in which the thermal oil can be heated to 300 deg.C at near atmospheric pressure.
(b) A user equipment circuit through which the high temperature thermal oil is circulated by means of a pump in a closed cycle and the heat is dissipated to the process through appropriate heat exchangers.
(c) An expansion tank to accommodate expansion of the thermal oil.
(d) A deaerator to vent any trapped or liberated air or gasses to prevent insulating pocket in heat transfer surface and cavitation in the circulating pump.



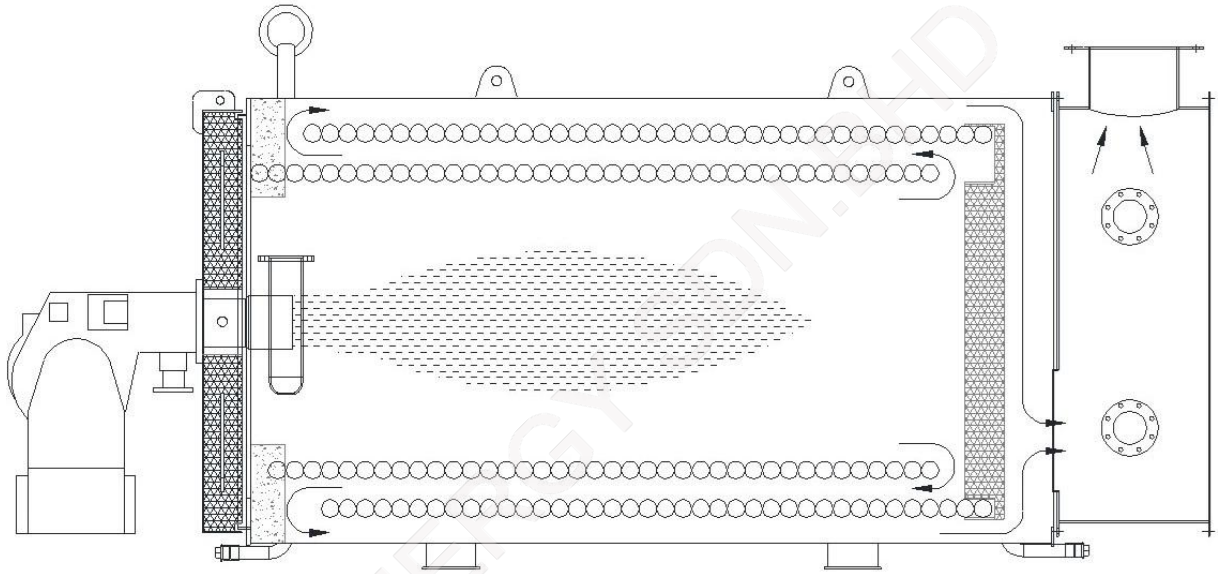
FLOW DIAGRAM

DESIGN AND OPERATION

THE HEATER

The U-Max Heater is a skid mounted, fully automatic package thermal oil heater of three pass design. The heater is designed and constructed to ASME Code and is fusion welded throughout by certified welders.

It embodies an inner helical tube coil which forms the integrated combustion and radiant heat absorption chamber and an outer concentric coil which forms the convective heat recovery section.



THE BURNER

The U-Max heater is filled with a fully automatic, pressure jet fuel atomising burner. The burner may be specified for operation for most grades of fuel oil and gases.

THE CIRCULATION PUMP

The standard circulating pump supplied is of specifically selected single stage centrifugal type which is compatible with high temperature thermal oil operation. The size of pump supplied is to be based on heater size, type of thermal oil used and the system's flow resistance.

CONTROL AND SAFETY

The U-Max heater is fully automatic and is equipped with audio-visual alarms and automatic burner cut-off which will be activated in the event of abnormal operating conditions.

The complete set of thermostatic controller, safety interlock, indicators and alarm are housed in a modular control cabinet.

The major safety controls with audio-visual alarm and automatic burner cut-off are built in for the following abnormal operating conditions.

- High thermal oil outlet temperature activated by thermostatic controller
- High exhaust flue gas temperature activated by thermostatic controller
- Low thermal oil level in expansion tank activated by level switch
- Low thermal oil flow activated by differential pressure switch
- Flame failure activated by photo-resistor

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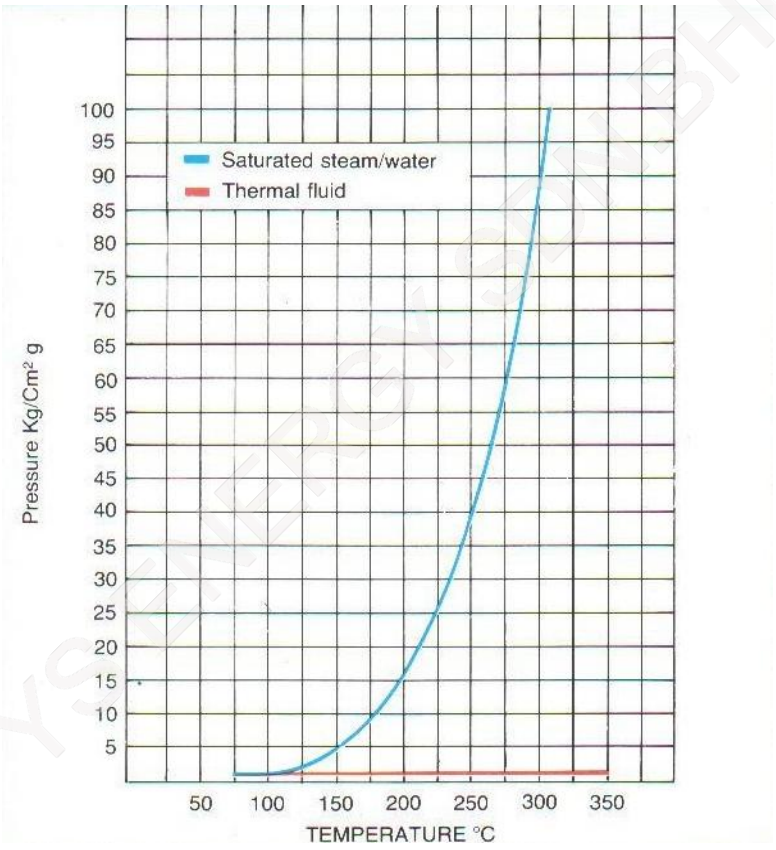
ADVANTAGES OF A THERMAL OIL HEATING PLANT

OPERATION WITHOUT PRESSURE

With thermal oil heating, high heat transfer oil temperature of up to 300 deg.C can be achieved at near atmospheric pressure. Whereas, with saturated steam, a pressure of 86kg/sq.cmg (1230 psig) is required to abtian the same temperature. A low pressure thermal oil system assures of higher efficiency, safety and lower investments is simple and inexpensive pipework, fittings and heat exchangers.



NO EXPLOSION HAZARDS

The U-Max thermal oil heating plant is a non-pressurised system with atmospheric venting through the expansion tank.

The thermal oil which is circulated in a cycle through the system remains in the liquid phase over the operating temperature range thus eliminating any possibility of undue vapour pressure build-up.

With elaborate control and safety instrumentation built in, the U-Max heater automatically shuts off in case of abnormal operating condition.

EXEMPTION FROM STATUTORY REGULATION

In most countries, thermal oil heater are outside the jurisdiction of Statutory Boiler regulation. Costly annual shutdown for inspection and employment of certified and registered boilermen are therefore avoided.

NO CORROSION OR SCALE FORMATION

Thermal oils are a blend of synthetic or mineral oils. They are non-corrosive and do not contain any suspended or dissolved solids like water. There is therefore no need for expensive demineralisation system and corrosion inhibitor to protect the heater, pipework, fittings and heat exchangers.

MINIMAL MAINTENANCE

Maintenance for a thermal oil heating system is minimal apart from the preventive servicing of combustion equipment. Unlike a steam heating system; valves, traps and condensate pump are required to be serviced regularly to ensure efficient energy utilisation and conservation.

OPERATIONAL ECONOMY

It is much more economical to run a U-Max thermal oil heating plant than a steam plant. The savings in fuel cost alone could be as high as 25 percent.

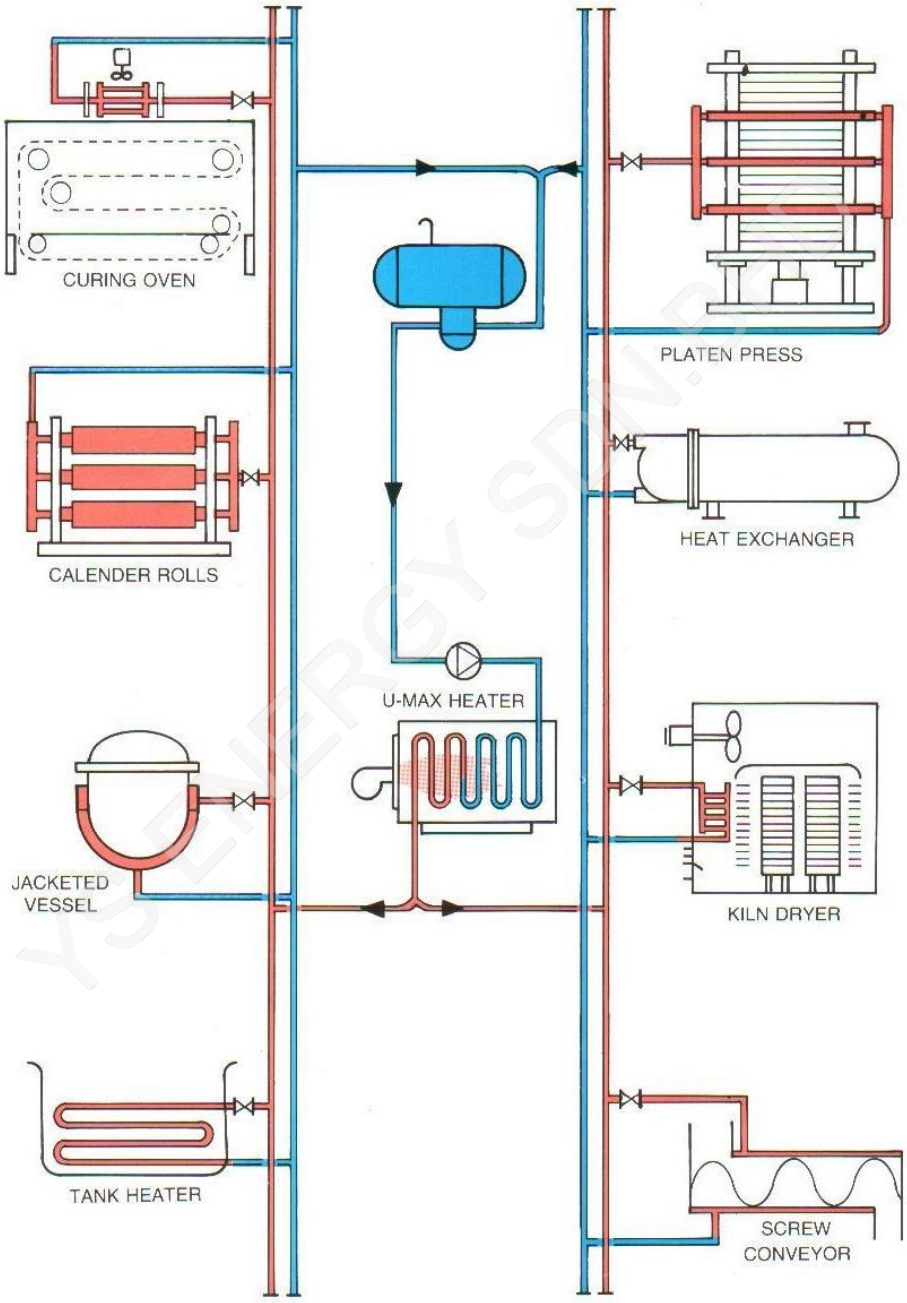
A steam plant is generally much more complicated in design with essential devices and secondary system like steam traps, condensate return system, and feed water treatment and blowdown facilities.

Steam trap leaks and flash steam losses condensate are prevalent in most steam plants as they are difficult to detect and eliminate. Energy losses from these areas alone contribute significantly to a high fuel bill.

The unavoidable water treatment costs, blowdown wastage and usually incomplete condensate recovery add on substantially to a high running cost.

In comparison, a thermal oil plant is runned as a closed system with no open and losses and complicated and costly secondary system.

TYPICAL THERMAL OIL HEATED PROCESS PLANTS AND EQUIPMENT



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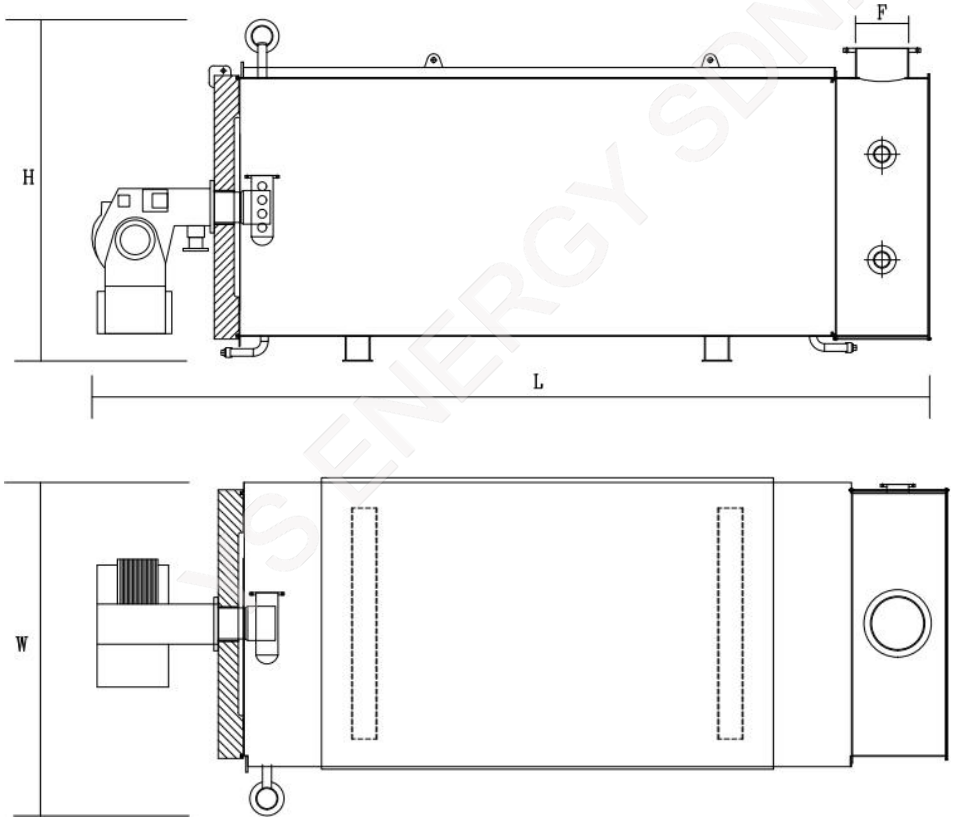
SPECIFICATIONS AND DIMENSIONS

SPECIFICATIONS

MODEL NO.	UMX-2	UMX-4	UMX-6	UMX-8	UMX-10	UMX-15	UMX-20	UMX-25	UMX-30	UMX-35	UMX-45	UMX-60
Heat output Kcal x 1000	200	400	600	800	1000	1500	2000	2500	3000	3500	4500	6000
Fuel consumption natural gas, Nm3/hr	27	53	80	107	133	200	267	333	400	467	600	800
Circulation pump capacity, m3/hr	15	25	40	55	70	105	140	175	210	245	245	420
Pump motor power motor size, kW	2.0	4.0	5.5	8.0	10	15	30	37	45	55	55	110

*Fuel consumption based on net calorific value at 8333 Kcal/Nm3(standard m3) With 90% overall thermal oil heater efficiency.



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Overall length (L) mm	2640	3150	4030	4390	4960	5310	6780	7370	7350	9350	10200	12000
Overall height (H) mm	1480	1980	1980	2080	2080	2590	2590	2950	3250	3450	3450	3860
Overall width (W) mm	1370	1520	1520	1980	1980	2590	2590	2820	3120	3320	3320	3760
Flue diameter (F) mm	150	200	250	250	300	350	400	450	500	540	573	770

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FIELDS OF APPLICATION

RUBBER INDUSTRY	Crumb rubber drying, rubber product curing and vulcanisation.
TEXTILE INDUSTRY	Fibre and dye stuff fixation, fabric drying, coating and integration of fabrics with plastic.
WOOD PROCESSING INDUSTRY	Heating of wood processes, kiln drying and plywood presses.
PAPER AND CARDBOARD INDUSTRY	Heating of drying cylinder, calender rolls and drying chamber
PALM OIL INDUSTRY	Heating of storage tank and deodorising plant.
PLASTIC INDUSTRY	Heating of calender rolls, melting kettles, heating of plastic presses and moulds.
BITUMEN AND TAR PROCESSING INDUSTRY	Tank farms, cargo handling and mixing facilities.
SOAP AND WASH POWDER INDUSTRY	Heating of autoclaves, vats, continuous saponification plant, spray drier for wash powder.
FOOD INDUSTRY	Boiling vessels, hot air ovens and thermal driers.
CHEMICAL INDUSTRY	Heating of autoclaves, boilers for grease and agitators. Heating of reactors and drying plants.
METAL INDUSTRY	For coating plants, surface pre-treatment and finishing plants.
LAUNDRY PLANT	For hot water and clothes drying.

YS ENERGY **SDN BHD**

OFFICE :
26-2B, Jalan Temenggung 7/9, Section 9, Bandar Mahkota Cheras,
43200 Cheras,Selangor Darul Ehsan, Malaysia.

FACTORY :
23, Jalan Seri Pagi, Section BS3, Bukit Sentosa, 48300 Rawang, Selangor Darul Ehsan.

Tel : 03 – 9010 5098, 03 – 9011 4276
Fax : 03 – 9010 5097