Thermal Oil Heater

Steam is typically used as a heat medium in heating systems. But at high temperatures, steam requires a corresponding high operating pressure. In industrial process a high temperature fluid is often required, and achieving this steam can be controversial and expensive. Thermal oil heaters are widely used for supplying heat up to 300°C at very low pressure, typically just the pressure required to pump the oil through the system. Comparing this to other heating fluids, e.g. steam, it would require a pressure of 85 bar to achieve this temperature.

Oil heater boiler room

Scan this code To access the Pakman product selection application and select this product.

Scan this code to receive a 3D product file.

More info about this product.

Advantages

systems, in comparison to other heating systems e.g. steam offer many advantages :

- Low pressure
- High temperature (Consequently smaller heating surface is required)
- No risk of corrosion (effectively a preservative, thus longer life)
- No risk of freezing when the plant is shut down
- No scale deposits (The heating surface shall be clean, thus retaining efficiency)
- No water softener for pretreatment of boiler feed
- No chemical dosing system
- No heat loss due to hot condensate and flash steam
- No steam traps
- No Blow down
- No risk of explosion by compressed gas
- No Deaereators & Condensation Tanks
- No vaccum Breaker
- No supervision required
- Less maintenance required
- Higher performance & efficiency
- More safety
- More reliable
- Accurate temperature control
- Quiet in operation (no steam stroke & flash steam noise)
- Easy to operate
- Rugged long life construction

Industrial Applications

Thermal oil heaters are used in the following industries:

- Cement industry
- Chemical / petrochemical industry
- Polymer industry
- Textile industry
- Leather industry
- Oil industry
- Glue industry
- Food processing industry
- Metal industry
- Tyre industry
- Design & Construction

Thermal Oil Heater

- Bitumen & Tar processing industry
- Paper mills industry
- Wood industry
- Soap & Detergent industry
- Pharmaceutical industry
- Paint & Varnish industry
- Packing & Packaging industry
- Glass industry
- Industrial Laundries

The design & construction of Thermal Oil Heaters require special skills. Due to the fact that we have a permanent top level quality control, we can offer Thermal Oil Heaters featuring the highest heating surface area, efficiency, safety, reliability & durability. The design is based on a forced circulation heater with two coaxial cylindrical tube coils, in which the flue gas is conducted in a three pass counter flow system as described below:

1st Pass - The rediant heat from the flame of the burner is transferred to the thermal oil in the main combustion chamber .

2nd Pass - Combustion gases then pass the space between the inner and outer tube coils, where the heat is transferred by convection.

3rdPass - The last convection pass is between the outer coil and the heater's shell, where combusting gases are hereafter cooled.

This principle ensures that maximum heat transfer is achieved before the combustion gases exit the heater, thus ensuring high thermal efficiency. Maximum heat transfer is also affected by thermal fluid velocity and heating surface area. To maintain optimum fluid velocity and hence low heat flux rate, the coil cross sectional and surface area is generously designed to keep film and bulk temperatures and linear velocity low to achieve maximum heat transfer and low pressure drop and also to protect the oil from degradation. The design philosophy ensures thet the film temperature in tubes is not exceeded beyond its permissible limits. We carry out analysis to determine whether this requirement is met for the parts of the tubes exposed to flame impingement. The maximum film temperature is also used to calculate the service life of thermal oil. Low film temperature, ensures longer life of thermal oil. The film temperature is at its highest, when the oil is subjected to the greatest thermal stress. Our thermal design ensures a modest volume of the thermal oil relative to the heater capacity and allows thermal expansion due to the high oil temperature. Furthermore, coil life is extended by optimizing length to diameter ratio, heat flux rate and series flow.

Packman supplies a comprehensive set of safety controls for thermal oil heaters. The logic of control

elements comply with the stringent regulations enforced by DIN 4754. There are many safety interlocks, incorporated in the system. All of our heaters incorporate continuous flow monitoring with differential pressure controllers. The flow monitoring is an essential element, as it measures and monitors the minimum flow rate and if it drops below a certain minimum value, it shut down the firing system.

Also the thermostats in the supply and return oil and in the flue gas are interlocked to the firing system and shall prevent an inadmissible temperature rise in the system. A level switch is also mounted in the expansion tank which is interlocked with the feed pump and burner.

Packman will integrate your desired control requirements from basic relay logic to advanced PLC to interface with your plant.

Product Capacity Calculation & Selection:

The oil heater selected based on type of project, load of process, configuration and layout to arrangement boilers.

The better way to select the capacity of the boiler is following below steps:

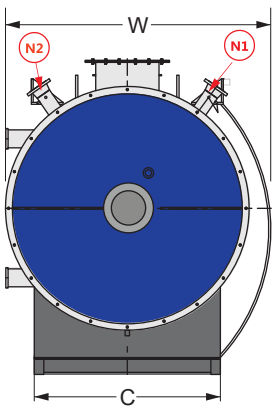
1- Calculate the maximum heat load based on your building type

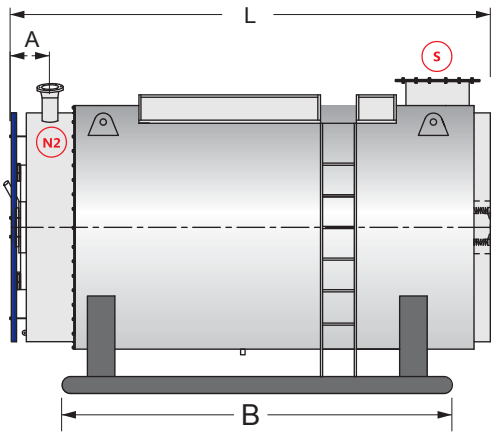
2- Adding 20% to maximum load for coefficient of confidence

3- Consider the 80% average efficiency for hot oil boiler

4- Determined the number of boiler you have: for 2 boiler you should normally select one boiler up to 75% full load and for 3 boiler you can select based on 50 % of full load for each boiler

Finally you can select the model from the table in bellow.





(Design Data)		
Item No.	Description	Specification
1	Heater configuration	Horizontal
2	Heating capacity range	From 250.000 to 4.000.000 Kcal/h
3	Max. Operating temp. of thermal oil	300 °C
4	Design temp. of thermal oil	350 °C
5	Differential temp. of thermal oil	25 °C or 40 °C
6	Permissible operating Pressure	8.5 bar g
7	Design pressure	10 bar g
8	Pneumatic or hydrostatic test pressure	15 bar g
9	Thermal efficiency	83-85%
10	No. of circulation of flue gasses	3 pass
11	Coil material	St 35.8 according to DIN 17175
12	Shell material	Corte plate 9 CrNiCup 3-2-4 according to DIN 1.8962
13	Return chamber material	17 Mn 4 according to DIN 17155 (1.0481)
14	Heater standard	According to DIN 4754
15	Shell insulation	Rock wool, Thk. 150 mm, Density 120 kg/m3
16	Shell cover	Stainless steel SS 304, Thk. 1.5 mm
17	Test type	100%Radiography, Pneumatic, Penetration

Model NO.	(Kcal/h)	L(mm)	L(mm)	D(mm)	H(mm)	Ø(mm)	DN(mm)
PTOH - 250	250	2900	2200	1200	1700	210	65
PTOH - 500	500	3000	2400	1500	2000	335	80
PTOH - 750	750	3300	2600	1750	2300	390	100
PTOH - 1000	1.000.000	3700	2900	2000	2600	400	100
PTOH - 1250	1.250.000	3800	3100	2000	2800	490	125
PTOH - 1500	1.500.000	4100	3300	2000	2900	515	125
PTOH - 1750	1.750.000	4500	3500	2300	3000	540	150
PTOH - 2000	2.000.000	4800	3800	2300	3100	560	150
PTOH - 2250	2.250.000	5300	4200	2300	3100	600	150
PTOH - 2500	2.500.000	5600	4500	2300	3100	630	150
PTOH - 2750	2.750.000	5850	4750	2300	3100	665	150
PTOH - 3000	3.000.000	6100	5000	2300	3100	700	150
PTOH - 3250	3.250.000	6400	5300	2500	3300	725	200
PTOH - 3500	3.500.000	6750	5500	2500	3300	750	200
PTOH - 3750	3.750.000	6950	5700	2500	3300	775	200
PTOH - 4000	4.000.000	7250	6000	2500	3300	800	200