

Engineers at their best

**THERMO OIL HEATER**  
**THERMAL FLUID SYSTEM**



**SURIA ENGINEERING**  
Engineers And Turnkey Contractors



## **COMPANY PROFILE**

**SURIA ENGINEERING** enjoys a unique status among its competitors in the field of engineering, fabrication and turnkey operations. We are engaged in manufacturing of wide range of machinery & plants. We also provide services for complete engineering of projects and their turnkey operations.

**SURIA ENGINEERING**, established in 1995, has completed a series of projects for the renowned engineering and production companies of Pakistan.

Our Chief Executive **Mr. FAROOQUE SURIA** completed his Engineering in 1975 and he has vast experience of Machinery Manufacturing , Installation and Commissioning of Plants spread over three decades to his credit. His enviable professional and technical expertise is the key ingredient to all our projects .

**SURIA ENGINEERING** can manage Turnkey Projects comprising of Mechanical and Electrical works. Turnkey projects provide ease to the customers as they have a single point of reference in planning, designing, fabrication, installation & commissioning phases.

## **EXPERTISE**

**SURIA ENGINEERING** has a team of experts having varied experience in the field of engineering with professional training and education acquired from institutes of repute domestically and internationally.

## **ECONOMY:**

Quality and Economy seldom go together, but at **SURIA ENGINEERING** we make it possible due to innovative ideas and team work.

## **QUALITY OBJECTIVES:**

Quality Workmanship and Optimum satisfaction of customers are our main objectives

## **THERMAL FLUID SYSTEM (TFS)**

Thermal Fluid System is an efficient means of supplying indirect heat to one or more processing machines via a high temperature and low pressure arrangement.

### **THE SYSTEM CONSISTS OF:**

- (i) Combustion chamber with heating coil**
- (ii) Hot oil circulating pump**
- (iii) Expansion tank**
- (iv) Oil storage or catch tank**
- (v) Burner**
- (vi) Electric control panel**
- (vii) Pipe work and controls**

### **SYSTEM DESCRIPTION :**

It is a closed loop system where hot oil circulating pump takes (or sucks) oil from the processing machines or equipment and sends the same to combustion chamber where its temperature is elevated by heat of burner. The hot oil then goes to the heat consumer (processing machines or equipment) and transfer heat to the product being processed. The relatively low temperature oil then comes again to the pump inlet. The pump sends the oil to the combustion chamber for reheating and hence the closed cycle is completed. Thermal oil is circulated in the system through pipes, valves, strainer and other safety equipment.

The Expansion Tank, located at the highest point in the system, holds any excess thermal oil due to fluid expansion at an elevated temperature. The expansion tank is equipped with low level switch to ensure a preset oil level. As soon as the oil level goes below the level set at the switch, it shuts down the system.

As the expansion tank is located at an elevation and holds a preset level of oil, it is a safeguard to the heating coil which should always be full of oil to avoid any damage against excessive heat of burners.

The expansion tank is open to atmosphere for vent and is connected to the pump inlet and storage tank. The overflow from the Expansion Tank is collected in the Storage Tank which is also open to atmosphere.

The electric control panel is equipped with Temperature Controllers and a Burner Programmer. The system is shuts down at a preset temperature which depends on the process requirements.

## APPLICATION OF THERMAL FLUID SYSTEM

TFS is used in the following industries:.

- (I) Chemical plants
- (ii) Textile processing
- (iii) Food processing
- (iv) Wood processing
- (v) Plastic & rubber processing
- (vi) Metal, paper and cardboard processing  
and many more.

**THERMAL OIL HEATER**



**THERMAL OIL HEATER PIPING**



## **BENEFITS OF**

**THERMAL FLUID SYSTEM**

**OVER**

**STEAM SYSTEM**

### **1. EFFICIENCY**

As it is a closed cycle system, the losses are minimum. The average temperature difference is 50 degrees centigrade i.e. we have to heat the oil by 50 degrees to achieve its maximum temperature which may be between 200 to 300 degrees centigrade. If maximum temperature is 200 degrees c, then the incoming temperature of the oil to the combustion chamber is minimum 150 degrees c.

It is an open cycle system. The steam after transferring its heat is condensed. The average temperature of condensate which reaches the boiler room and water feed tank is in the range of 60 to 70 degrees centigrade. The temperature of steam at 100 psi is about 165 degrees c. Here the Temperature difference is about 105 degrees c i.e. is the steam boiler burner has to heat the water and steam by about 105 degrees c and hence more fuel is required.

### **2. SAFETY**

As it is a low pressure system and vented to atmosphere through expansion tank, it is a safe system.

It is a high pressure system and less safer than the Thermal Fluid System (TFS).

### **3. LICENSED OPERATOR**

All TFS's operate at a very low pressure i. e. between 30 to 50 psi and do not require licensed operators. Hence again it is cost effective as far as operating cost is concerned.

Being a high pressure system, the law requires a full-time licensed stationary boiler/engineering operator. This increases the operating cost.

## **BENEFITS OF**

**THERMAL FLUID SYSTEM**

**OVER**

**STEAM SYSTEM**

### **4. INITIAL INVESTMENT**

In Pakistan, initial cost of a TFS is less than a Steam System.

Initial cost is also high as it needs a water softening plant and an economizer etc. as well.

### **5. ANNUAL INSPECTION**

It does not require any annual inspection from government authorities and hence no production loss throughout the year.

It requires annual inspection and interruptions in the production are obvious.

### **6. MAINTENANCE**

It requires no traps, condensate return and blow down valves. Therefore the regular maintenance is minimal.

Steam system requires regular maintenance which is focussed on steam traps, valves, condensate, return pump and water treatment etc. Also frequent water analysis is required to ensure the water input to boiler.

### **7. TEMPERATURE CONTROL**

TFS provides efficient and uniform heating because of minimum variation in temperature. This gives us smooth heating. Also it consumes lesser time in heating / drying.

Because of fluctuation in steam pressure, there is a lot of variation in temperature of steam. This gives us uneven heating. Also it consumes more time in heating / drying.

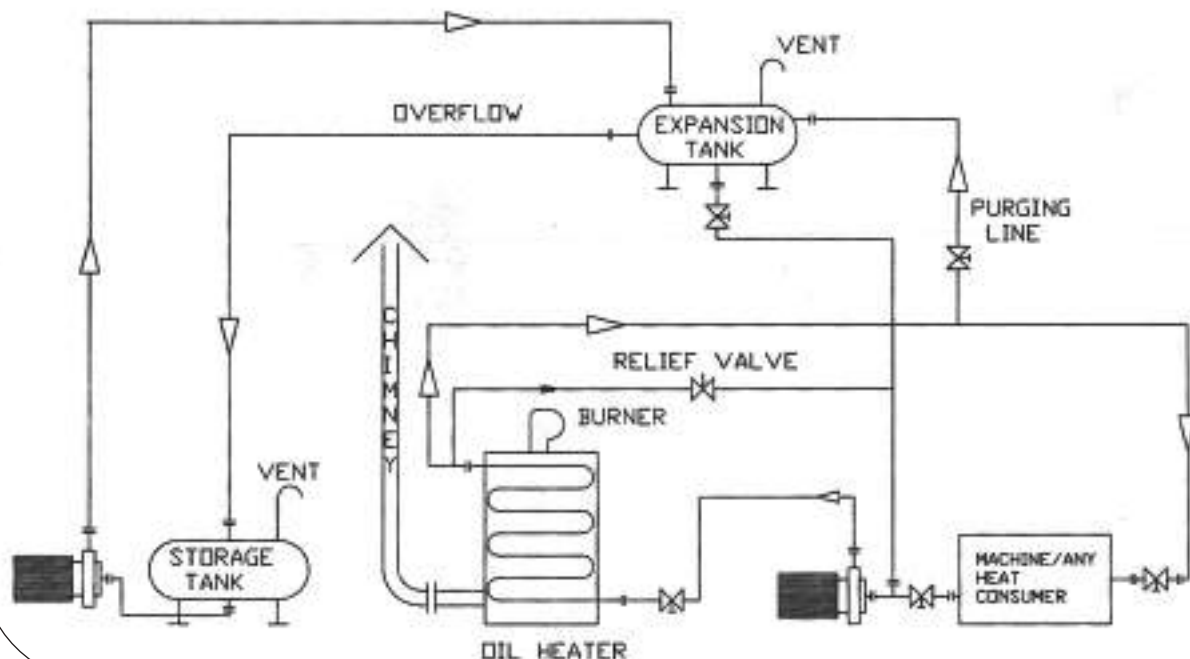


## OVERALL EFFICIENCY:

From the foregoing it is concluded that in a Thermo Oil Heater many losses are avoided. It is evident from experience that a TFS is about 25% more economical and more efficient system than a Steam Boiler System.

This saving and increase in efficiency of a TFS comes to about 40% when compared with a Direct Gas Heating System conventionally used in various industries.

## A TYPICAL DIAGRAM OF THERMAL FLUID SYSTEM





## **SURIA THERMO OIL HEATER**

Available in different capacities ranging from 300,000 to 1500,000 kcals/hr, SURIA THERMO Oil Heater is a skid mounted maintenance free compact unit. Presently it is in use by many industries throughout the country.

It has a three-pass combustion chamber which utilizes maximum heat of the flue gases and hence makes the unit cost-effective.

SURIA THERMO is robust in construction and available in vertical as well as horizontal designs. Special imported high temperature hot oil circulating pumps are used to circulate the oil through heater and heat consumers.

Dual fuel (gas / diesel) burner is the main feature of SURIA THERMO. In SURIA THERMO, control is carried out by a programmer in automatic electric control panel which handles the digital signals. Therefore the system becomes so simple that presence of an operator is required only to turn on the starter key and periodically check the status of the unit in terms of temperature and pressure of the system. Temperature controller and pressure switches make the system auto and safe as well.

SURIA ENGINEERING offers turnkey projects and assist in installation, commissioning, operation, staff training and after-sales service to its valued customers all over Pakistan and abroad.

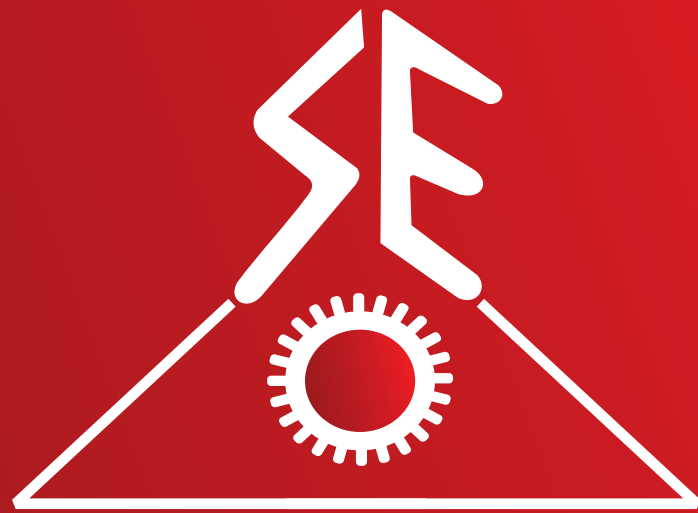
### **A FEW OF OUR VALUED CUSTOMERS ARE :**

- SIEMENS PAKISTAN ENGINEERING CO. LTD S.I.T.E KARACHI
- M/S HAMDARD LABORATORIES (WAQF) PAKSITAN. (KHI, LHR & PSW)
- M/S NAURUS (PVT) LTD. S.I.T.E KARACHI
- M/S KARACHI ELECTRIC SUPPLY COMPANY.
- M/S TEXTILE CHEMICAL INDUSTRY S.I.T.E. KARACHI
- M/S PAKISTAN SYNTHETIC LTD. HUB BALUCHISTAN.

**SURIA ENGINEERING has experience of fabrication and installation of many kinds of machinery and equipment, few are as follows:**

- ❁ FLAKE ICE PLANTS
- ❁ VAPOUR PHASE DRYING OVEN(AUTOCLAVE)
- ❁ POWER TRANSFORMER TANKS (MVA)
- ❁ CHEMICAL PLANTS
- ❁ S.STEEL REACTORS
- ❁ S.STEEL CONDENSERS
- ❁ PASTE MIXERS
- ❁ VACUUM DRYERS
- ❁ TRAY DRYERS
- ❁ DRUM DRYERS
- ❁ SPRAY DRYERS
- ❁ FILTER PRESSES
- ❁ STORAGE TANKS
- ❁ STEEL STRUCTURES
- ❁ RUBBER FILLING MACHINE
- ❁ CARTON CASING MACHINE
- ❁ PIPING WORKS OF ALL SIZES





Engineers at their best

**D-50, Asif Agency ware house, S.I.T.E., Karachi.**

**Ph: -92-21-32584377, Cell: 92-300-8238213 Fax: 92-21-3258802**

**E-mail: [info@suriaengineering.com](mailto:info@suriaengineering.com) [suriaengineering@yahoo.com](mailto:suriaengineering@yahoo.com)**

**[www.suriaengineering.com](http://www.suriaengineering.com)**