The Leaders in Heat Exchange Technology

HEAT EXCHANGERS & PRESSURE VESSELS

ABOUT US:

Enersys, a techno-professionally sound company, has core competence in Design and Manufacturing of process plant equipment's for heating/cooling technology. For more than 3 decades our technical leaders have worked in this field with worldwide exposure. With proven track record of providing technology products with prompt services, we have established ourselves in Process Plant Equipment Consultancy, Design, Manufacturing and Commissioning of High Efficiency Process Heating /Cooling / Waste Heat Recovery Systems, Energy Conservation, Solar heating, etc. for industrial clients. Our equipment’s are designed and manufactured as per Indian / International codes like IS, IBR, ASME, API, TEMA, DIN, BS, etc.

ENERSYS serves industrial and commercial customers to-

- Address variety of process plant and heating applications with completely engineered, custom designed total solution using latest technology.
- Provides “built to last” systems of highest quality, safety, reliability and maintainability in compliance with all regulations and standards at very affordable cost.
- Fully computerized database, design analysis & drawings managed by competent engineering staff to offer quick & efficient service.
- Provides design details & drawing for client to fabricate some parts at site to reduce cost/time.
- Highly reliable due to its vast experience, large network of associated and supply partners.

Enersys offers high quality efficient and cost effective products for an extensive range of processing applications across a diverse spectrum of industries like chemical, petrochemical, food & beverage, paper & pulp, pharmaceutical, edible oil & fats, bio diesel, oil & gas, textile, steel, power, effluent treatment, automotive, space heating, refrigeration, air conditioning, and various other process Industries. Our global expertise assures you the most up-to-date solutions ensuring sustainability with competitive edge.

We use clinical approach to evaluate your plant / process for energy efficiency and offer most optimum heat exchange solutions, thereby delivering quality solutions that ensure sustainability with a competitive edge.
PRODUCTS

1. Heat Exchangers:
   A. Finned Tube Heat Exchangers
      • Air Heater with Steam/ Hot water/ Thermal Fluid
      • Process Air & gas Dehumidifiers
      • Acetone Methanol Condensers
      • Air Cooled Heat Exchangers
      • Finned Tube Economizers for gas Fired Boilers
   B. Shell and Tube type Heat Exchangers
      • All Types of TEMA Heat Exchangers
      • Floating Head Design for Petroleum
      • “U” bend Shell and tube Type heat Exchangers
      • Special Design Heat Exchangers for Food, Pharmaceutical, Sanitary.
         i. Large Heat Exchangers for Chemical, Food and Beverages
         ii. Small compact size for Dairy Purpose
         iii. Medium Size for CIP
      • Corrugated Tube Shell and Tube heat Exchangers
      • Pipe in Pipe Heat Exchangers
      • Hair Pin Heat Exchangers
   C. Other Heat Exchangers:
      • Trombone Gas Condensers
      • Air Heaters for Cement kilns

2. Waste Heat Recovery Systems:
   • Hot Water generators
   • Steam Boiler
   • Thermic Fluid Heaters
   • Steam Super heaters
   • Economizers
   • Feed Water Pre Heaters
   • Air Pre Heaters
   • Water Pre Heaters
   • Exhaust Heat Recovery

3. Pressure Vessels:
   • Retention Vessels, Bleachers
   • Deareator

4. Process Equipment’s
5. Storage Tanks
6. Boiler House Accessories & Chimneys
7. Solar heating Projects for Industrial Applications.
1. HEAT EXCHANGERS

Enersys offers high quality efficient and cost effective heat exchangers for an extensive range of processing applications across a diverse spectrum of industries like chemical, petrochemical, food & beverage, paper & pulp, pharmaceutical, edible oil & fats, bio diesel, oil & gas, textile, steel, cement, rubber, power, effluent treatment, automotive, space heating, refrigeration, air conditioning, and various other process Industries.

We use clinical approach to evaluate your plant / process for energy efficiency and offer most optimum heat exchange solutions, thereby delivering quality solutions that ensure sustainability with a competitive edge.

Enersys sets the industry standard for heat exchangers. Quality is the cornerstone of our products from start to finish. Our engineering specialists work closely with you to custom design the most efficient, cost effective heat exchanger for your thermal transfer requirements.

A. FINNED TUBE HEAT EXCHANGERS

Enersys supplies heat exchangers with finned tubes of various designs and material combinations.

- L Type Finned Tubes
- G Type Finned Tubes
- Extruded Fin Tubes
- Plain Type Finned Tubes
- Rectangular fin twin-tubes
- Crimped Spiral Wound Finned Tubes.
- Fins materials: Aluminum, SS 304 / SS 316, MS (G.I.), Copper
- Tube Material: SS 304 / SS 316, MS (G.I.), Copper, Brass, Cupro-nickel.
- Casing Material: Stainless steel or Carbon steel.
a) Process Air heaters with Steam / Hot Water / Thermal Fluid

Enersys Fin tube type hot air generators are required in various industrial heating and drying operations. Heat sources may be steam, thermal fluid, pressurized hot water, electricity or combinations of these.

Rectangular “L” base Type Finned Tubes Used in Air Heaters for Dairy Industry for Optimum Contact for Maximizing the Heat Transfer Properties
b) **Process Air and Gas Coolers and Dehumidifiers**

Enersys has many years of experience in thermal dehumidifying (drying) of process air and process gas. The Enersys Dehumidifiers offers a total conditioning of the process air with respect to temperature and humidity, which is important in many drying systems - especially spray-drying systems.

Enersys Dehumidifiers are efficient and suitable for sanitary applications e.g. to prevent organic deposits and to prevent wet outer surfaces. The units are easy to access and to clean efficiently - both mechanical and by CIP. Therefore they are widely used within food industry and pharmaceutical industry.

Enersys supplies a large range of capacities of Dehumidifiers. They are adapted to many available coolant e.g. brine, low temperature thermal fluid, ice water or refrigerants. For the re-heater section, any heating fluid can be used i.e. steam, thermal fluid, hot water or electrical heating.
c) **Acetone / Methanol Solvent Condensers for Pharmaceutical (Insulated)**

MOC: Stainless Steel – SS 316 / SS304

1. Tubes, Fins and Casing: SS 316 (for all Contact parts),
2. Support Frame and Cladding: SS 304

Supplied with / without heat optimization (Pre-cooling & RE-heating) modules

**d) AIR COOLED HEAT EXCHANGERS**

The applications include air fin coolers for:

- Refinery Services, Oil And Gas (Gaseous and liquid hydrocarbons)
- Hot Water, Quench Oil, Transformer Oil and Lube Oil system
- Exhaust Gas Recirculation Cooler
- Refrigeration Air Fin Products
- Inter / After coolers, Oil Coolers

MOC: Galvanized CS, SS, Copper, Aluminums fins with SS / CS tubes

The advantages of closed loop air cooled heat exchangers are:

- No need of cooling water or other cooling media and no pollution of cooling fluids
- Flexibility for any plant location and plot plan arrangement (installation over other units)
- Reduction of maintenance costs (cleaning limited, when needed, to the inside of exchanger tubes)

**e) FINNED TUBE ECONOMISERS FOR GAS FIRED BOILERS**

In case of boiler system, economizer can be provided to utilize the flue gas heat for pre-heating the boiler feed water. On the other hand, in an air pre-heater, the waste heat is used to heat combustion air. In both the cases, there is a corresponding reduction in the fuel requirements of the boiler.
B. SHELL AND TUBE TYPE HEAT EXCHANGERS (TEMA DESIGN)

The shell-and-tube heat exchanger is the most common type of heat exchanger used in any industry. These heat exchangers can be used in almost all process heat transfer applications. Enersys designs and manufactures all types of Shell & Tube Heat Exchangers either according to classification as per TEMA standards or custom designed units for special applications.

Applications: Heating / cooling in -
- Oil - water coolers and heater
- Steam - Oil heater
- Steam condensers
- Heat Recovery steam generator
- Transformer oil cooling systems
- Food and Beverages
- Refinery Services (liquid hydrocarbons)
- IC Engine Jacket Hot Water, Quench Oil, Transformer Oil and Lube Oil

From the documentation of raw materials in compliance with ASME code, to the precision machining of tube-sheets and bonnets, to final finishing, testing and documentation, Enersys Heat Exchangers are manufactured to deliver superior performance and trouble-free operation, even in the most demanding processing environments.

Common Markets/Applications:
- Hydraulics
- Compressor After-cooler
- Engines
- Lube Oil Coolers
- Steam / vapour Condensers
- Condensate Cooler
- Evaporators
- Re-boilers
- Pharmaceutical
- Distillery
- Manufacturing Plants
- Seal Water Cooler Wastewater Treatment
- Digester Heating/Cooling
- Heat Recovery
- Effluent Gas
- Petrochemical
- Refinery
- Pulp and Paper
- Metal/Ore Processing
- Fuel Oil Heater/Cooler
- Marine Heat Exchanger
- Gearbox Cooler
- Process Heating/Cooling
- Drilling Platforms On / Off shore

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a. **Floating Head Design For Petroleum Processing**

In this design, one tube sheet is fixed relative to the shell, and the other is free to float within the shell. This permits free expansion of the tube bundle, as well the cleaning of both the insides and outsides of the tubes. Most favorable for petroleum refineries. There are various types of floating head constructions. The two most common are the pull-through with backing device (TEMA S) and pull-through (TEMA T) designs.

Shown in Picture: Floating Head Design Supplied by Enersys to Fouman Chimie Gostar, Iran

b. **‘U’ Bend Shell And Tube Heat Exchangers**

Enersys has many years of experience in supplying ‘U’ Bend Shell and Tube Heat Exchangers. The in-house tube bending facility to enables us to maintain the quality and the precision required for manufacturing of the U bend coils.

**CODE:** TEMA Type AEU or BEU can meet TEMA “B”, “C” and “R”, ASME Section VIII Div.1.

- Allows for differential thermal expansion between shell and tubes
- High heat transfer surface area.
- Capable of withstanding thermal shock.
- The most economical.
- Bundle can be removed for shell side cleaning and maintenance.

c. **Hair Pin Heat Exchangers**

Hairpin heat exchangers utilize true counter-current flow. Unlike multi-pass shell-and-tube designs where correction factors are used to account for inefficiencies resulting from co-current passes, this process maximizes temperature differences between shell side and tube side fluids. When a process calls for a temperature cross (hot fluid outlet temperature is below cold fluid outlet temperature), a hairpin heat exchanger is the most efficient design, with fewer sections and less surface area.

**APPLICATIONS:**

- FOOD
- PHARMA
- CRITICAL PROCESS
- DAIRY
- AUTOMOBILE
d. Special Design Heat Exchangers: for Food, Pharmaceutical, Sanitary

i. Large Heat Exchangers for Chemical, Food & Beverages
Our applications specialists can offer custom-made heat exchangers, and help you choosing technical and economical solutions optimized as per your process energy saving requirements.

Larger unit up to 1500 mm in diameter and 6 m in length, along with smaller units

- Heat Transfer area ranges from 1.0 m² to 100 m²
- Available in both options – Plain Tube & Corrugated Tube.
- Ideal for Projects in Chemical & Pharmaceutical Industry.
- Designs as per TEMA Class ‘B’, ‘C’ AND ‘R’ as well as ASME Sec-VII, Div.1.
- SS or Copper materials used as per compatibility with fluid media
- Polished surfaces are provided as required for sanitary applications

ii. Medium Size Sanitary Heat Exchangers for CIP
A new series of heat exchangers designed and engineered for the pharmaceutical and food industries and suitable all applications requiring compliance with FDA specifications. This advanced design also ensures correct operation in applications requiring the highest standards of cleanliness.

- SS 316 materials used as standard
- Highly Polished surfaces are provided as required for sanitary applications

iii. Compact Sanitary Heat Exchangers in SS316 or Titanium for Dairy

Applications
- Pharmaceutical, Biotech, Clean Steam, Blood Plasma
- Food Processing, Beverage, Dairy, Brewery, Juice
- Cosmetics, Fragrances
e. Corrugated Tubes Shell and tube heat Exchangers

- Higher heat transfer co-efficient
- Economical Reduced Fouling
- Low maintenance & operating cost:
- Longer running times.
- Homogenous Thermal treatment
- Smaller footprint due to smaller sizes.
- Efficient and Versatile

C. OTHER HEAT EXCHANGERS :

a. Trombone Gas Condensers:

Used in Chemical Process Industries

MOC: Carbon Steel, SS

b. Air Pre-heaters for Cement Klin.

We have supplied 180 Tons 6 Module Unit for Cement Klin for Birla Cement

MOC: Tubes: CS & SS

Casing: CS
2. WASTE HEAT RECOVERY SYSTEMS

Any exhaust gas stream with temperatures above 150°C has the potential for significant waste heat recovery. Typical examples include plant process heating, combustion air pre-heating, boiler feed water pre-heating and furnace exhaust heat. In addition to savings in everyday fuel consumption, many facilities can market and sell carbon credits back to industry. State funding is often available for waste heat recovery projects helping to reduce capital costs and expedite system payback.

Enersys heat recovery systems are designed for ease of installation at industrial facilities. We can generate clean, reliable, and low-cost energy from a wide range of processes. Enersys offers solution to improve the efficiency of these industrial processes while increasing financial returns.

**Various Sources for Waste Heat Recovery:**

- Hot Flue Gas from all boilers, thermal fluid heater systems and related processes
- Exhaust gases heat from all type of D.G. Sets (HSD fired, LPG fired, and heavy fuel oil fired).
- Jacket heat recovery from engines.
- Exhaust heat recovery from gas turbine exhaust. Paper mills Steel plants Oil & gas refineries Textile process Food and pharmaceutical Gas compressor stations
- Hot waste gases from :-  
  - Scrap steel furnace  
  - Cement kilns  
  - Industrial Furnace  
  - Glass plants  
  - Waste gases from chemical process  
  - Incinerators

**Various Solutions and Products for Waste Heat Recovery:**

- Hot Water generators  
- Steam Boiler  
- Thermic Fluid Heaters  
- Steam Super heaters  
- Economizers  
- Feed Water Pre Heaters  
- Air Pre Heaters  
- Water Pre Heaters  
- Exhaust Heat Recovery

(Hood Exhaust Recovery Units for Paper Plants)
DG Set Exhaust Heat Recovery Units (Pressurized Hot Water) for Heating Heavy Oil (Replacing Electrical Heating) at a Major Steel Plant

Illustration on Waste Heat Recovery and Benefits:
3. PRESSURE VESSELS

Enersys has acquired thorough knowledge and experience in design and manufacturing of pressure vessels as per ASME Sec-VIII, Div-1 and all the related standards for materials and inspection. Our design engineers have prolonged experience to design various parts as per the rules of relevant standard. Enersys has own quality management system with standard procedures, sample forms and records formats in QC system and QC manuals besides the ones provided by ASME, which are only for WPS (Welding procedure specification) and PQR (Procedure qualification record), but not for other manufacturing activities.

Pressure vessels are used in a variety of applications for Oil & Gas, Petrochemicals, Refineries, Water Treatment Plants, Refrigeration Plants and other Chemical Industries. They appear in these sectors as industrial compressed air receivers, domestic hot water storage tanks, distillation towers, pressure reactors, autoclaves, pneumatic reservoirs, hydraulic reservoirs under pressure, storage vessels for liquefied gases, shells of heat exchangers, etc.

Enersys vessels are engineered with adequate safety factor, corrosion allowance, conservative design temperature and pressure. Necessary nondestructive testing, such as ultrasonic testing, radiography, and pressure tests (hydro or pneumatic) is carried out by experienced engineers.

DEAERATORS

A Deareators is used for the removal of air and other dissolved gases from the feed water to steam generating boilers. The dissolved oxygen in boiler feed water causes serious corrosion damage in steam systems by attaching to the walls of equipment and forming oxides (rust). It also combines with any dissolved carbon dioxide to form carbonic acid that causes further corrosion.

**Design Features**

- Self-adjusting spring-loaded spray valves provide a uniform spray pattern over varying loads.
- Increased spray distance ensures maximum heating and deaeration in the first stage.
- Upward flow of steam counter to the downward flow of water provides final contact of the deaerated water with the purest and hottest steam.
- Liberally sized equalizers pass flashing steam between heater and storage vessels under upset conditions.
- Optimum space below the tray stack provides reduced steam velocities for even distribution.
4. PROCESS EQUIPMENTS

The process vessel use heat, pressure and/or vacuum to change a product condition and are mainly used for hydrolysis, neutralization, crystallization, distillation evaporation and storage in food, medicine, and chemical industries.

Reactors are used for a variety of process operations such as solids dissolution, product mixing, chemical reactions, batch distillation, crystallization, liquid/liquid extraction and polymerization. In some cases, they are not referred to as reactors but have a name which reflects the role they perform (such as crystallizer, or bioreactor).

These are usually fabricated in steel, stainless steel, glass-lined steel, glass or exotic alloy. Liquids and solids are usually charged via connections in the top cover of the reactor. Vapors and gases also discharge through connections in the top. Liquids are usually discharged out of the bottom.

Within the chemical and pharmaceutical industries, external cooling jackets are generally preferred as they make the vessel easier to clean.
HOT WATER GENERATORS: Solid Fuel, FO, Gas Fired:

We manufacture an exclusive range of superior quality Hot Water Generators. Vented systems provide temperatures up to 98°C. Pressurized systems are essentially closed loop required for indirect heating and provide temperatures up to 150°C without boiling or steam formation. We provide different capacities in either Coil type or Shell and Tube type constructions. Our hot water generator are specially designed to operate on various fuels like coal, bio-mass, heavy oil, light oil, gas and duel fuel. Finding several applications, vented systems are used for direct hot water consumptions.

5. STORAGE TANKS SS304 / 316 / Carbon Steel

Above Ground | Horizontal | Vertical | Field Erected Tanks

Description:
- Available in IS 803 and API 650 designs
- Designed for earthquake zones, wind and snow loading

Options:
- Heating coils for viscous products.
- Exterior insulation, heat tracing.
- Level indicators.
- Special linings for corrosive liquids, chemicals, potable water or food grade applications
- Pump mounting platform
- Compartmentalized configurations
- Static head design
6. BOILER HOUSE ACCESSORIES & CHIMNEYS

a. DESIGN OF BOILER STACK

Our design experts have experience of more than 36 years in designs of self-supported steel chimney / stack required for minimizing atmospheric pollution due to flue gas from boiler, thermal fluid heater, hot water generator, hot air generator, IC engine, furnace, etc. Designs are done as per the requirements of specific industry and country.

Design considerations of the stack

a) Mechanical design and construction comply with standard procedures outlined in IS 6533-1971

b) Height selection is as per norms of Pollution Control Board taking into consideration the location of site, surrounding topography and building structures, quantum of emission (SOx, NOx and Particulate content)

c) Various guidelines outlined in the code for design of stack are followed for design of holding down bolts, base plate, foundation etc.

d) The design is checked for stresses and stability against earthquake, wind and found that the design is safe against these factors.

e) The dynamic analysis is carried out to ensure the safety of the design. Finally it involves a CAD drawing of the designed stack.
**Design, Engineering & Drawing**

We have a strong Engineering team equipped with up to date Codes and Standards along with latest Software’s for the Mechanical Design of Heat Exchangers, Pressure Vessels and columns. The Engineering drawings are prepared by our experienced Engineers / Draftsmen who are well conversant with all latest versions of AutoCAD. We also design special duty/custom built machines and systems as per the specifications and process requirements.

**Production & Planning**

Our manufacturing department is systematically and professionally managed with a well experienced team of technical personnel. Our Works Manager ensures production targets are met. Works Manager is assisted by Production Planning Department which works out the production schedules using various tools. Every care is taken to ensure that quality and delivery terms are met. We maintain excellent relations with our labor.

**Procurement**

Our procurement department has identified and short-listed the suppliers / Vendors approved by the Engineering Consultants / Surveyors for raw materials & bought-out items. The procurement is made considering the factors of Quality, cost and delivery and on basis of our periodic Vendor Rating.

**Quality control & testing**

Our Quality control Department headed by Quality Control Manager is responsible for ensuring the quality of raw materials, workmanship and testing used during manufacturing as per Code requirements. All the raw materials are identified and tested to ensure the quality of the materials. Our Engineers are on vigilance during every stage of manufacturing. Each and every equipment is tested and inspected before shipment.
PARTIAL LIST OF CUSTOMERS

MANUFACTURING INDUSTRIES
Merloni Termo Sanitari (I) Ltd
Alfa Laval (I) Ltd., Pune
DSM Engineering Plastics (India) Pvt Ltd
Forbes Marshall Pvt.Ltd, Pune
Thermax Ltd., Pune
Mather & Platt Pumps Ltd, Pune
Kirloskar Power Equip. Ltd.,
Thermotech Systems Ltd
A.T.E Enterprises Private Limited
Master Handlers Pvt Ltd
Forbes Marshall Pvt Ltd (FKW)
Forbes Vyncke Private Ltd
M E Energy Pvt Ltd

Ross Boilers
Solar Industries India Ltd
Shah Alloys Ltd, Ahmedabad
Spirax Marshall Pvt Ltd
Aqua Clean Systems Pvt Ltd
Universal Forces Industeries
Jindal Industries Ltd,
Shefali Rolls, Ahmedabad,
Uranium Corporation of India,
SPX Flow Technology
Allevard IAI Suspensions Pvt Ltd

PROCESS INDUSTRIES
The Simbholi Sugar Mills Ltd.,
Anthea Aromatics Pvt Ltd
Roha Dychem Pvt Ltd
TRP Sealing Systems Pvt Ltd
Pushpam Foods & Begreaves Pvt Ltd
3 M India Ltd
R.C.F. Ltd. Chembur
Aquapharm Chemical Pvt.Ltd
Nutri Feeds & Farms Pvt Ltd
Bectors Food Spl Ltd
Renuka Sugar Ltd., Dist. Belgaum.,
Katraj Dairy, Pune
EID Parry, Distillery Division, T.N,
Covalent Laboratories, Hyderabad
Micro Inks Limited
Schreiber Dynamix Dairies Ltd
LO’real India Ltd., Chakan, Pune,
Ranbaxy Laboratories Ltd
Nutricia (Danone) International Pvt Ltd
Ruchi Soya Industries
Aurobindo Pharma
Shiv Health Foods
Punjab Modi Dairy
Jay Chemicals, Gujrat
Gomukh Freezen Food
Jagatjit Industries, Kapurthala.

GLOBAL CUSTOMERS
Fouman Chimie Gostar, Tehran, Iran (Floating Head Shell & Tube Heat Exchangers)
Salomil Company, Alexandria, EGYPT (Energy Conservation Solution in Laminate Plant)
Alfa Industries Ltd., Dar-es Salaam, Tanzania (Steam Deaerators)
Spenomatic Ltd. Nairobi, Kenya. (Heat Exchangers)
ES Power System, Thailand (Process Vessels)
Lalan Rubber Ltd., Sri Lanka (For Latex Glove Plant heating System)
P.T. Indorama, Indonesia (Plant Heating Systems)
Clear Water Engineered Chemistry, San Antonio, Texas USA (Process plant Efficiency)
- CHEMICAL
- PHARMACEUTICAL
- OIL & GAS
- PETROCHEMICALS
- FOOD & BEVERAGES
- DAIRY
- PAPER AND PULP
- SUGAR
- MACHINE MANUFACTURERS
- POWER GENERATION
- TEXTILES
- BIOTECH
- REFRIGERATION

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