

# “Heat exchangers are the heart of process industry”

HRS Process Systems Ltd is a part of HRS Group, which is one of the leading heat exchanger specialists in the world. The company offers innovative and cost effective heat transfer solutions to various process industries. In this interview with IPF, **V Gokul Das**, Managing Director, HRS Process Systems Ltd, offers insight into heat exchangers industry and growth plans for the company in India.

## How important are heat exchangers for process industry?

Heat exchangers are the heart of process industry. They define process and energy efficiency, as well as profitability for the organisation. Heat exchangers have different application areas in the process industry, like condensers, coolers, heater, reboiler, heat recovery, etc. There is hardly any process that does not require heat exchangers. Depending on application heat exchangers would determine the yield of product (recovery) or enable the process reaction with either heat addition or removal.

In mechanical industry, heat exchangers find application for various heating and cooling requirement of the machinery fluid. The heat exchangers can be as simple as the radiators used in automobiles or fan coil unit of the air conditioners to be the most complicated tubular heat exchangers used for cooling of fluids in the nuclear reactor or critically designed for chemical reaction process heating and cooling. Thus, knowledge of heat exchanger and right selection plays a critical role in energy efficiency and profitability.

## HRS Process Systems has been a pioneer in heat transfer technology. How has been the growth journey of the company in India?

HRS PSL has been a pioneer in launching the corrugated tube shell & tube heat exchanger in process industry, under the brand ECOFLUX.



Beginning with modest turnover of Rs 30 million in 2003, today we are Rs 1 billion company. We had our share of growing the hard way, educating customer on the advantages of this revolutionary technology advancement and not only convince them to try our heat exchanger but also to prove that these can deliver to the requirements. Customers started with simple heat exchanger for water cooling and heat applications we quickly grew to offer ECOFLUX heat exchangers to the chemical process industry for various application across the industry segments like petrochemicals, agrochemicals, fertilisers, pharma, oil & fats, steel, power, cement, and a host of other process industries. HRS has also launched these heat exchangers in the food sector for processing of various pulpy fruits, vegetable extracts, fruit based beverages, milk, yogurt, cream and many similar products with technology for pasteurisation, sterilisation and UHT

processes. Today, HRS is a well known brand for innovative heat transfer technology.

## What are the advantages of heat exchangers offered HRS Process? Which end-user industries are your key customers?

Corrugated tubes based shell and tube heat exchangers offered by HRS has the best features of two predominantly used heat exchanger in the process industry, viz., shell & plain tube and plate type heat exchanger. Corrugated tubes are produced by indenting a smooth tube with a corrugation pattern, which is unique to the company offering the technology. HRS has developed their own heat transfer design program to co-relate the performance of their proprietary corrugated tube design for various applications. The advantages of corrugated tube heat exchanger are:

- ❑ Compact tubular heat exchanger, in some cases less than half the size of a traditional plain tube heat exchanger
- ❑ Uniform thermal processing
- ❑ Long running times due to turbulent flow substantially reducing fouling
- ❑ Higher working temperatures and pressures
- ❑ Higher coefficients result in closer temperature approaches between product and service fluids
- ❑ High response to cleaning-in-place
- ❑ Very low maintenance costs

□ Excellent energy recovery through high percentage of regeneration HRS caters to various industries across the process and food industry viz, petrochemicals, agrochemicals, fertilisers, pharma, oil & fats, steel, power, cement, and a host of other process industries.

**Of various types of heat exchangers (such as shell and tube, plate type, etc) used in the process industry, which are experiencing high demand?**

Shell and tube heat exchanger are the back bone of the industry since they can be designed to various designs and various standards TEMA, ASME, API, PED, etc. STHes can be designed for extreme operating conditions like high or low temperature, pressure, corrosive material, fouling material, etc. hence these are versatile and find numerous application in the process industry. Plate heat exchangers are the second most popular heat exchanger widely used for medium and lower temperatures and pressures and for clean fluids. These have very high heat recovery potential for similar heat duty as compare to STHes. However, plate heat exchangers are limited in applications because of elastomer gasket (rubber).

HRS ECOFLUX corrugated tube heat exchanger is able to cater to both these segments and thus able to offer solutions where one of the parameters become limiting for STHes or PHEs, as it overcomes disadvantages of both these types of heat exchangers. HRS offers complete heat exchanger solution with ECOFLUX corrugated tube heat exchanger, Funke-HRS plate type heat exchanger and HRS shell and tube heat exchanger for various applications. HRS can provide ECOFLUX corrugated tube heat exchanger in various material of construction, viz, SS 304/316/L, 904L SMO, duplex, inconel, copper, cupro-nickel, hastelloy titanium and tantalum. Thus, we have a wide range of material to suit applications in various process industries.

**What should be the key parameters to be considered while selecting heat exchangers?**

Heat exchanger selection is one of the most crucial aspect while designing a process plant. Heat exchangers define the process efficiency and productivity. Right design and selection of the heat exchanger can reduce maintenance time and cost. Wrong selection can be catastrophic with drop in performance, productivity loss, leakages, intermixing and hazard to plant and personnel. The following needs to be considered at the minimum while selecting the heat exchanger:

- Process fluids - liquid or gaseous, corrosive or non corrosive, fouling or non fouling etc
- Physical and chemical properties of the fluids
- Process conditions - temperature, pressure, allowable pressure drop
- Material compatibility of fluids
- Hazard zone analysis details
- Mechanical code requirements

Once a preliminary heat exchanger type selection is done, that needs to be evaluated based on process requirement, limitations, energy cost, RoI - cost of ownership/ budget, to arrive at not only energy efficient, but also cost effective heat exchanger.

**What are the emerging trends in heat exchangers?**

Heat exchangers have predominantly been similar over the past 100 years for shell and tube type heat exchanger (work horse of industry) and close to 50 years for plate type heat exchanger. However, each of these types has grown multifold with specialised units for various applications. Shell and tube heat exchangers use not only smooth tubes but also have finned tubes, corrugated tubes, helix, twisted tubes, corrugated and finned tubes, etc. These are used for different applications with different material combination to give most effective and long lasting solutions to the process industry. Plate type heat exchanger has different types of

embossing (stamping) and different size (LxB) of plates to cater to various thermal design requirements. Development of different type of flexible gaskets has enabled plate heat exchanger use in many new areas. Combination of plate and shell has resulted in different heat exchangers for special applications including the highly compact high area, welded 'bloc' heat exchanger. Thus, there have been new trends in application engineering and development of combination technology heat exchanger for various applications.

**What is the outlook for heat exchangers market in India?**

Indian process industry has been having a good growth with investments in chemicals, petrochemicals, agrochemicals, fertiliser, pharma and other sectors. With the growth in agriculture produce requirement of fertilisers and pesticides has increased, pharma industry has been witnessing a good growth and is expected to grown in the coming years. Key economy segments like oil and gas, petrochemical, power, steel and cement also have investments with infrastructure projects. Thus, we feel there is good potential for growth in the segment. Interestingly with the growth in consumer demand for various food materials there has been a robust growth in requirement of heat exchanger in the food processing sector too.

**What are your growth plans for the company?**

HRS today is Rs 1 billion company with aggressive growth plan in the next 5 years. We plan to grow in various industry segments and enhance our reach to every corner of the country. We plan to have investment in expanding our facility to cater to the growing market demand for our products and services. We also have plans to focus on growing international market of ASEAN countries, Africa and Latin America, apart from working with group companies in developed economy of Europe and the US.