

# Heat recovery Energy savings Environmental sustainability



**spirax**  
**sarco**

*First for Steam Solutions*

EXPERTISE | SOLUTIONS | SUSTAINABILITY

# Your partner in energy recovery

Designing heat exchange systems is a complex procedure. For the system to be designed to meet current regulations, you need a partner able to understand your processes. Spirax Sarco assists you in every phase of the project, offering qualified system commissioning and customer services.

Efficiency, compact size and easy maintenance have always been the guidelines that have characterised our designs starting with our very first heat exchanger. Now all this is reflected in our range of solutions dedicated to heat exchange and energy recovery.

Our specialists are able to create complete "turn-key" solutions. Our proven experience in system engineering ensures that our designs meet all health, safety and environmental standards guaranteeing reliability, productivity and energy efficiency. The result is a significant reduction in production costs and pollutant emissions.



## Consulting

- Free evaluation of critical systems.
- System efficiency improvements with consequent reduction of CO2 emissions.
- Economic analysis of energy recovery with relevant calculation of return on investment.

## Design

- Solutions meet: CE – PED – ATEX and other specific process and system specifications.
- Global network of specialists.
- Ability and flexibility to meet all the user's needs.
- Project management able to follow the entire project life cycle.
- Packages created with more than 80% Spirax Sarco components.



## Production capacity

- Nova Milanese facilities for steam products, heat exchangers, and control valves.
- Cernusco sul Naviglio facilities dedicated to package assembly and pneumatic and electronic component line products.
- Departments dedicated to full Factory Acceptance Tests (FAT).
- Exclusive strategic agreements with international partners.
- Use of innovative technologies integrated in Spirax Sarco products.

## Country-wide service

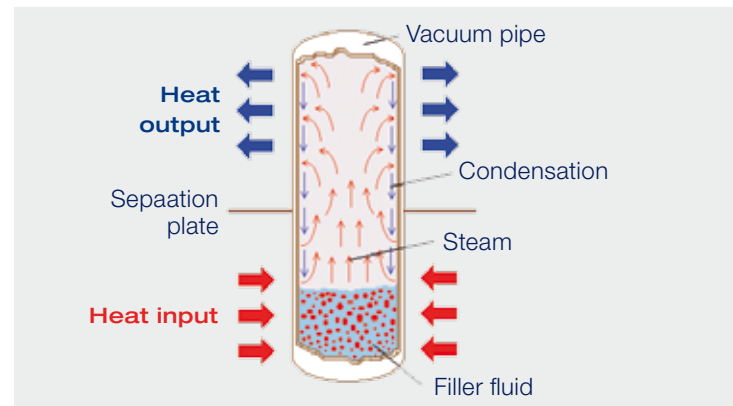
- Over 100 technicians and sales representatives dedicated to over 10,000 customers.
- Extensive specialised engineering service network.
- Process quality and efficiency tests.
- Maintenance contracts specific to system type.
- Training.
- Fast delivery of spare parts and components.

# Technology

## Heat pipe operations

Heat is exchanged in a group of "Heat Pipes" through a conveying liquid confined in a vacuum in sealed pipes. A separation plate divides the pipe bundle exchange surfaces, a portion in contact with the hot flow and a portion in contact with the cold flow.

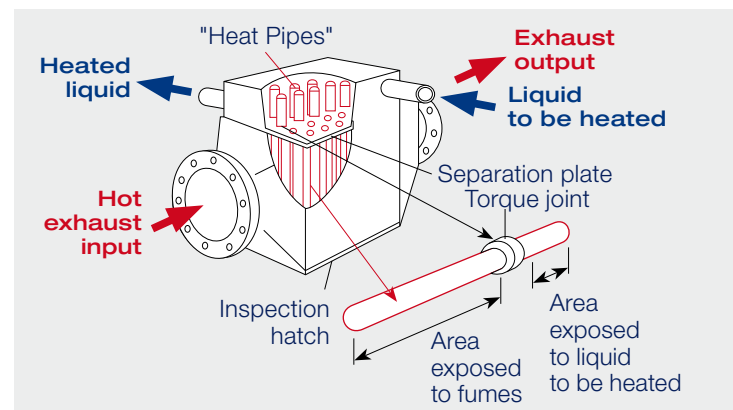
In the part of the pipe in contact with the hot flow, the conveying liquid evaporates absorbing heat, then flows towards the part in contact with the cold flow and thus condenses releasing heat to then return to the hot part: thus a natural circulation of the conveying liquid is generated inside the pipe to permit fast heat transmission.



## Main technical specifications

- Standard executions up to 550°C; special executions for higher temperatures (up to over 900°C), upon request.
- Filler fluid: distilled water, ethyl alcohol, diathermic oil and ammonia for standard use; other liquids for special uses.
- Smooth or finned pipes.
- Variable diameters according to the application.
- Materials used: carbon steel, steel alloys, copper, stainless steel (AISI 304 and AISI 316) and special steels.

## Typical exchanger layout



## Benefits

- Lower energy recovery costs.
- Reduction in recovery unit volume and size.
- Drastic reduction in maintenance costs thanks to easy inspection.
- Minimum scaling and fouling impact on exchanger efficiency.
- Intrinsic redundancy: each pipe is a heat exchanger which, if broken, does not significantly compromise the entire recovery unit's operations.
- No mechanical strain due to pipe heat dilation (no dilation joints required).
- Possibility of increasing the heat exchange surface with finned pipes.
- Low load loss.
- Net separation of liquids involved in heat exchange.

## Consolidated technology



- 25 years of research in the heat pipe field.
- 11 patents.
- Continuous investments in Research and Development
- 3 new patent applications.
- Development of new products and construction techniques.

# Heat exchange

## Gas-air



These heat recovery units are designed to provide hot air from the heat recovery of exhaust gas. This heated air can thus be used in several ways, from preheating for combustion to use in production cycles or building heating. Standard sizes are available from 30 to 2000 thermal kW and numerous custom solutions for even higher potential.



Where weight, size, scaling and corrosion phenomena make the use traditional exchangers unadvisable, gas-air Heat Pipe exchangers are the most efficient and economic solution in energy recovery.



## Gas-water



Gas-water heat pipe exchangers are designed to produce hot/heated water from exhaust gas and general exhaust heat recovery. The hot/heated water can be used to feed boilers, for heating and for domestic hot water production.

Dimensioning, configuration and gas flow is normally the result of a custom design that Spirax Sarco creates according to the specific system.



## Gas-steam



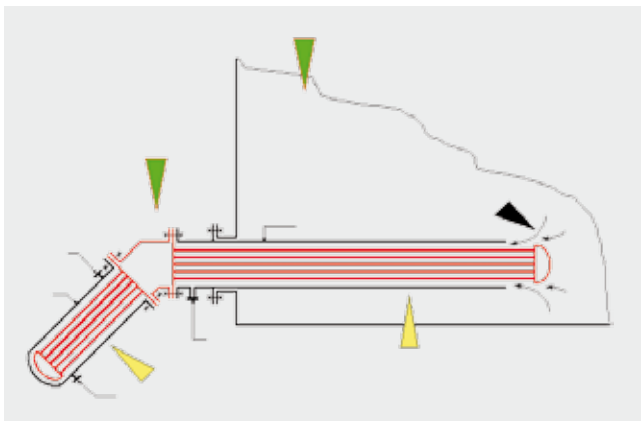
Indirect steam generation is the SxS solution that distinguishes our Heat Pipe heat exchangers from those normally offered by traditional competitors. Producing saturated or heated steam from low kg/h to high t/h at pressures up to over 50 bar is our strength in the heating area where our company has always operated offering specific products and innovative solutions. Safety, efficient control and simple installation are guaranteed by our components and our preassembled and certified units.

If required, we can provide a "turn-key" solution with supervision system and/or interfaces with

existent DCS. Energy recovery, proactive maintenance and the calculation of returns on investment are an added value to our range.



## Special applications



- Heating unit in high viscosity liquid tanks (petroleum and crude oil).
- Forced lubrication liquid cooling units for transformers or compressors in general.
- Gas scrubber unit with pre-cooling and post-heating.

Current and future special applications developed with our customers are important challenges to be faced.



## Main applications/markets

Industry	Heat source	Typical applications
Metal works	Furnaces in general and sintering machines	Combustion air preheating; heated process water, room heating and domestic use
Food industry	Ovens, vacuum pumps	Saturated steam production; combustion air preheating, hot process water, cooling exchanger absorption, room heating and domestic use
Chemical and petrochemical industry	Cracking process systems, thermal oxidation systems, fertilizer production systems	Heated process water preheating, cooling exchanger absorption, room heating and domestic use; pipe/tank laying
Construction and automotive materials	Cement, glass production furnaces	Combustion air preheating; heated process water, room heating and domestic use
Energy production and cogeneration	Turbines, diesel and plant fuel generators or exchangers	Pre-heat combustion air, hot water for process, heating or sanitary use; pre-heat heavy fuel oil, production of superheated steam
Waste processing	Incinerators and water purification plants	Heated process water preheating, room heating or domestic use; heavy combustion oil preheating; Heated steam production
Public and retail buildings	Boilers, solar panels, Alternative heating systems	Boiler combustion air or feed water preheating; hot process water, room heating or domestic use

# Traditional SxS exchangers for energy recovery

## Double "kettle"

- High level steam production – low entrainment
- Up to 1000 kg/h @ 10 bar
- Reduced size
- Material in contact with feed water and steam: AISI 316
- Standard controls/safety devices
- Full PED certification



## "Piggy-back" type

- Industrial type steam production
- Up to 2,000 kg/h @ 10 bar
- Materials: carbon and stainless steels (AISI 304/AISI 316)
- Standard controls/safety devices
- Full PED certification



## "Pipe bundle" exchangers

- Single or multi-stage
- Hot water production
- Hot air production
- Diathermic oil or other liquid heating
- Heavy-duty applications
- Materials selected based on application specifications
- PED certification and compliance with main sector regulations



## Experience

When allowed by recovery exhaust gas and process features, Spirax Sarco is able to provide a wide range of traditional solutions based on heat pipe heat exchanger technology. This range of exchangers is especially indicated for applications where recovery gases are "clean", thus they do not contain corrosives, encrustations or solid particles. The application field is the recovery of fumes from methane gas combustion or other low residue gases/fuels. In these use conditions, the traditional Spirax Sarco heat pipe recovery unit series is able to guarantee efficiency with acceptable average working life and reduced maintenance needs.

## Group companies

### Africa

South Africa

### Americas

Argentina  
Brazil  
Canada  
Mexico  
USA

### Asia

China  
India  
Japan  
Korea  
Malaysia  
Singapore  
Taiwan  
Thailand

### Australasia

Australia  
New Zealand

### Europe

Austria  
Belgium  
Czech Republic  
Denmark  
Finland  
France  
Germany  
Italy  
Norway  
Poland  
Portugal  
Russia  
Slovak Republic  
Spain  
Sweden  
Switzerland  
Turkey  
UK

## Sales offices

### Africa

Egypt  
Kenya

### Americas

Colombia  
Venezuela

### Asia

Hong Kong  
Indonesia  
Pakistan  
Philippines  
Vietnam

### Europe

Austria  
Hungary  
Ireland  
Romania  
Ukraine

### Middle East

UAE

## Distributors

### Africa

Algeria  
Cameroon  
Ethiopia  
Ghana  
Ivory Coast  
Libya  
Madagascar  
Malawi  
Mauritius  
Morocco  
Namibia  
Senegal  
Sudan  
Tanzania  
Tunisia  
Uganda  
Zambia  
Zimbabwe

### Americas

Bolivia  
Chile  
Colombia  
Costa Rica  
Dominican Republic  
Ecuador  
El Salvador  
Guatemala  
Honduras  
Jamaica  
Nicaragua  
Panama  
Paraguay  
Peru  
Trinidad and Tobago  
Uruguay  
Venezuela

### Asia

Bangladesh

### Australasia

Fiji

### Europe

Bulgaria  
Croatia  
Cyprus  
Estonia  
Greece  
Iceland  
Latvia  
Lithuania  
Malta  
Netherlands  
Romania  
Slovenia

### Middle East

Bahrain  
Iran  
Israel  
Jordan  
Kuwait  
Lebanon  
Oman  
Qatar  
Saudi Arabia  
Syria



Some products, services or solutions may not be available in certain markets

Spirax-Sarco S.r.l.  
Via per Cinisello, 18 - 20834 Nova Milanese (MB)  
Tel.: 0362 49 17.1 - Fax: 0362 49 17 307  
[www.SpiraxSarco.com](http://www.SpiraxSarco.com)

**spirax**  
**/sarco**