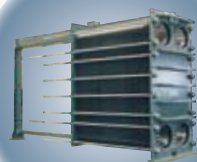


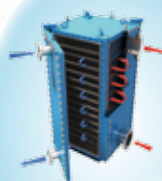
# HEAT EXCHANGERS



*Graphite shell and tubes  
Graphite blocks*



*Welded  
and gasketed  
plates*



*Metallic shell  
and tubes*



**MERSEN**

# Worldwide heat exchanger leader *with*

**M**ERSEN DESIGNS AND MANUFACTURES ANTI CORROSION AND PROCESS EQUIPMENT, INCLUDING PRESSURE VESSELS, HEAT EXCHANGERS, COLUMNS, MIXERS, TURN-KEY SYSTEMS AND PIPING IN A WIDE RANGE OF MATERIALS. HEAT EXCHANGERS FORM A CORE PART OF MERSEN'S EQUIPMENT BUSINESS.

## DESIGN EXPERIENCE TO SERVE YOUR PROJECTS

**M**ersen has designed a comprehensive portfolio combining multiple heat exchanger technologies and materials of construction.

Mersen has over 50 years of thermal design experience and applications expertise. Our engineers have a successful history of designing thermal equipment based on our customers' applications in order to optimise thermal efficiency and easy maintenance.

Several design tools are used to provide thermally efficient heat exchangers that meet specified process constraints

- Thermal design tools (In-house Programs, ASPEN B-JAC, X-Designer ...)
- Mechanical design tools

**50-years**  
thermal and mechanical  
design experience

Performing design tools

**Unrivalled** comprehensive  
range of designs  
and solutions



# solution-oriented approach

## WORLDWIDE PRODUCTION SITES AND LOCAL SERVICE CENTERS



**M**ersen manufactures heat exchangers in its ten worldwide first-class production sites representing more than 220,000 m<sup>2</sup> of factory area.

The production sites are all equipped with the latest technology machines and equipment to ensure performance, productivity and quality.

After-sales service is available in all our manufacturing sites (USA, Morocco, Germany, France, China, UK, India) and local repair-shops in South Africa, Korea, Taiwan, Spain, Brazil, Japan, Italy and the Netherlands.

After-sales service consists of:

- Spare parts delivery.
- Repair and/or refurbishment services.
- On-site supervision of repair work to tube sheets, tubes, etc, available upon request.

After-sales service can be carried out at the Mersen sites as well as directly on the customer's site.

## QUALITY COMMITMENT TO SERVE YOUR PROJECTS

**M**ersen manufactures all its heat exchangers in accordance with international standards: ASME, AS, ADM, JIS, CODAP, RTOD, RCCM and international certifications: ISO9001, ISO 14001, OHSAS 18001, ASME U stamp, PED, SELO, KGS, GOST-R, HAF 601.



**220,000 m<sup>2</sup>**  
of factory area

**10** production sites

Local after-sales  
service

# Comprehensive portfolio of heat exchangers

|        | Design  | Key features  |  |
|--------|---|---|--|
| Blocks | Cylindrical   | <ul style="list-style-type: none"> <li>• Robustness</li> <li>• Wide range of models</li> <li>• Modular design</li> </ul>                                      |  |
|        | Cubic   | <ul style="list-style-type: none"> <li>• Temperature cross application</li> <li>• Compactness</li> <li>• FDA approval</li> </ul>                              |  |
| Tubes  | Shell and tube<br>Coils<br>Bayonets<br>Tube-in-tube | <ul style="list-style-type: none"> <li>• Temperature and pressure resistance</li> <li>• High exchange area application</li> <li>• Easy maintenance</li> </ul> |  |
| Plates | Welded  | HXE dimpled plates  | <ul style="list-style-type: none"> <li>• Easy cleaning on both sides</li> <li>• Accessibility</li> <li>• Free-flow plates for fouling fluids application on one side</li> </ul>        |
|        |   | HXS studded plates  | <ul style="list-style-type: none"> <li>• Easy cleaning on both sides</li> <li>• Accessibility</li> <li>• 2 fouling fluids application</li> </ul>                                       |
|        |   | HXC corrugated plates   | <ul style="list-style-type: none"> <li>• High turbulence</li> <li>• Cost-effective solution for clean fluids application</li> <li>• Option free-flow plates : easy cleaning</li> </ul> |
|        |   | Type S dimpled plates   | <ul style="list-style-type: none"> <li>• Efficiency and reliability</li> <li>• Ideal as condenser</li> <li>• Free thermal expansion (U plates)</li> </ul>                              |
|        | Gasketed  | <ul style="list-style-type: none"> <li>• Cost-effective solution</li> <li>• Large range of plates with more than 45 models</li> </ul>                         |  |

## Materials

Graphite  
SiC



Graphite  
SiC  
Tantalum  
Zirconium  
Titanium  
Nickel alloys  
Stainless steel  
Carbon steel



Tantalum  
Titanium  
Nickel alloys  
Stainless steel  
Carbon steel



Titanium  
Nickel alloys  
Stainless steel  
Carbon steel



# Graphite block heat exchangers

## DESIGN AND MANUFACTURE OF BLOCK HEAT EXCHANGERS FOR OVER 50 YEARS

**M**ERSEN HAS DESIGNED AND MANUFACTURED BLOCK HEAT EXCHANGERS FOR OVER 50 YEARS, WITH MORE THAN 10,000 UNITS IN SERVICE IN ALMOST 50 COUNTRIES.

### MATERIAL EXPERTISE GRAPHILOR® 3

The only impregnated graphite with ultra-fine grain isostatic graphite.

#### PROPERTIES :

- High resistance to corrosion
- Resistance to temperature and thermal shock
- The highest mechanical resistance certified by TÜV.

#### IMPREGNATION

- BS: Phenolic highly cross-linked resin
- C: high-temperature treated carbon → Mersen exclusive
- TH: PTFE → Mersen exclusive

#### EXCEPTIONAL TÜV HOMOLOGATION

- XBS: up to 220°C: G20-00-200 for blocks  
up to 220°C: G30-00-220 for tubes
- XC: up to 430°C: G18-00-400
- XTH: up to 250°C: G15-00-250

**10,000 units**  
in service in almost  
**50 countries**

**430°C**  
maximum temperature  
resistance of Graphilor® 3

In-house supplied  
isostatic graphite

High corrosion resistance  
with exclusive carbon (XC)  
and PTFE (XTH) impregnation

Multi-applications design



### GRAPHITE POLYBLOC® HEAT EXCHANGERS

#### LARGE AND MODULAR DESIGN

- Large exchange surface areas (up to 300 m<sup>2</sup>) and high thermal transfer
- Headers – available in Graphilor®, stainless steel and reactive metals, PTFE or rubber lined steel
- Large range of block size from 140 to 1,800 mm diameter
- Design for high pressure up to 16 barG (service) and 12 barG (process)
- PTFE Bellows - fitted to graphite nozzles to remove pipework stresses
- Drilling adapted to process constraints with large diameter holes for fouling process
- Multi-pass arrangements possible for both process and service sides

#### MATERIAL EXPERTISE

- Rigilor® consisting of a layer of carbon fiber which reinforces the graphite and improves the erosion and abrasion resistance

**EASY MAINTENANCE** - easily dismantled for overhaul, cleaning and validation

#### EXTENSIVE REFERENCE LIST

available upon request for main market such as pickling baths, coolers, evaporators, absorbers, condensers.

## GRAPHITE CUBIC BLOCK HEAT EXCHANGERS

**COMPACTNESS** - slots or double drilling on process side effectively doubling the process side surface area making units ideal for condensing duties

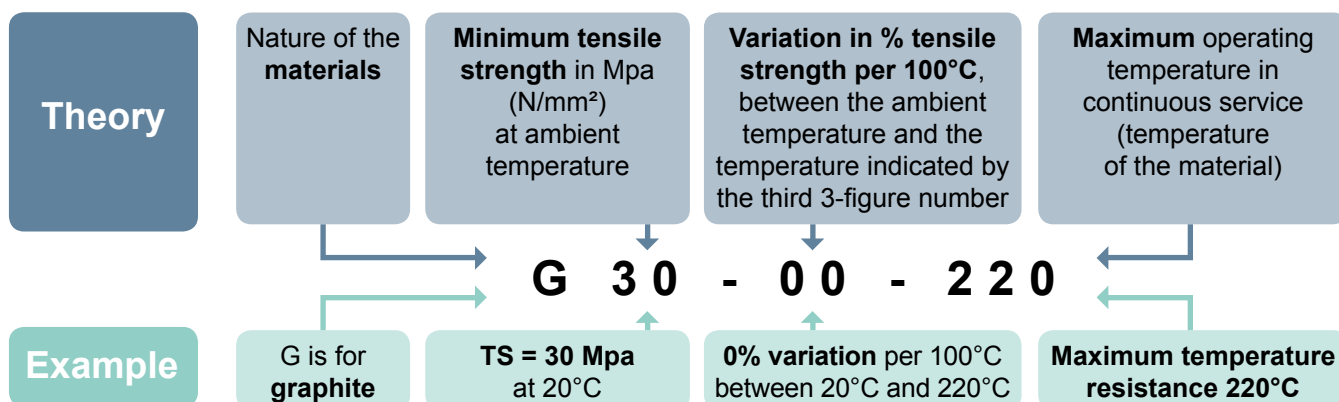
**SPECIAL GMP DESIGN FEATURES** - fully draining and no process to service gaskets

### LARGE AND MODULAR DESIGN

- Headers – available in Graphilor®, carbon and stainless steel, PTFE or rubber lined steel
- No hidden gaskets – single piece core blocks (250mm, 400mm, 500mm and 600mm square and up to 1600mm long)
- Heat exchange areas – from 1m<sup>2</sup> to 100m<sup>2</sup>
- Drilling – adapted to process requirements (6.5mm, 10mm and 16mm holes in single or double drilling patterns)
- Design pressure – up to 10 Bar.G on process and service side
- PTFE Bellows – fitted to graphite nozzles to remove pipework stresses
- Interchanger – optimum solution for corrosive fluids on both process and service side
- Multi pass arrangement - on both process and service side gives the most efficient thermal design using true counter-current flow

**EASY MAINTENANCE** - easily dismantled for overhaul, cleaning and validation

**EXTENSIVE REFERENCE LIST** – available on request for main markets as fine chemical and pharmaceutical, H<sub>2</sub>SO<sub>4</sub> dilution, interchanger for 2 corrosive fluids

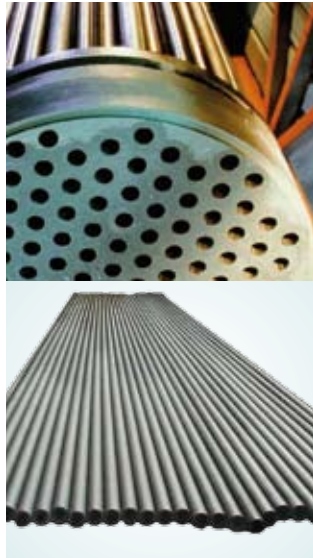


# Graphite shell & tube *heat exchangers*

## WORLDWIDE LEADER IN THE MANUFACTURE OF GRAPHITE TUBES FOR OVER 50 YEARS

**M**ERSEN HAS DESIGNED AND MANUFACTURED GRAPHITE SHELL AND TUBE HEAT EXCHANGERS FOR OVER 50 YEARS WITH UNITS IN SERVICE IN THE MOST DEMANDING PROCESSES, ESPECIALLY IN THE PHOSPHORIC ACID INDUSTRY.

POLYTUBE®, THE GRAPHITE SHELL AND TUBE HEAT EXCHANGER DESIGN IS BASED ON GRAPHILOR® 3, THE UNIQUE IMPREGNATED GRAPHITE WITH ULTRA-FINE GRAIN ISOSTATIC GRAPHITE. THREE TYPES OF IMPREGNATION ARE AVAILABLE (PAGE 5).



OUR GRAPHITE TUBES ARE MANUFACTURED IN FRANCE BY AN EXTRUSION PROCESS WHICH PRODUCES UP TO 6 METER LONG TUBES WITHOUT A JOINT. THE TUBES HAVE THE HIGHEST MECHANICAL RESISTANCE (G30-00-220) CERTIFIED BY TÜV.

THE GRAPHITE SHELL AND TUBE HEAT EXCHANGERS CAN BE ASSEMBLED IN ALL OUR WORLDWIDE WORKSHOPS.

## GRAPHITE POLYTUBE® HEAT EXCHANGERS

### LARGE DESIGN AVAILABLE

- High exchange surface (up to 1,000 m<sup>2</sup>) and high thermal transfer
- Tubes up to 6 meter without joint with reinforced fiber as an option
- Designed for high pressure: 10 barG (service) and 6 barG (process)
- Special shell designs adapted to corrosive service fluids

### GRAPHILOR® 3 MATERIAL EXPERTISE

- High corrosion resistance of Graphilor®
- High temperature resistance up to 220°C protection by Rigilor®, the carbon reinforced fiber homologated by TÜV
- Erosion and abrasion resistance

### GLOBAL MANUFACTURER (6 SITES) AND QUICK MAINTENANCE SERVICE ALL OVER THE WORLD

**EXTENSIVE REFERENCE LIST** upon request for main markets (phosphoric acid evaporators, sulfuric acid heaters, hydrochloric acid re-boilers)

## TESTS AND CONTROLS ARE RELEASED AT EACH STAGE OF PRODUCTION TO GUARANTEE THE BEST QUALITY

### INTERMEDIARY TESTS

- Tube-sheets: pneumatic tests for tightness
- Tubes: 20 bar air under water for mechanical and 9 bar air under water for tightness
- Cemented tubes: pneumatic tests at joint to verify perfect cementing

### FINAL TESTS

- Air in the service side to verify tube cement joints
- Hydraulic pressure test on process and service sides

**VISUAL AND DIMENSIONAL INSPECTIONS** by our quality control and third party if required.



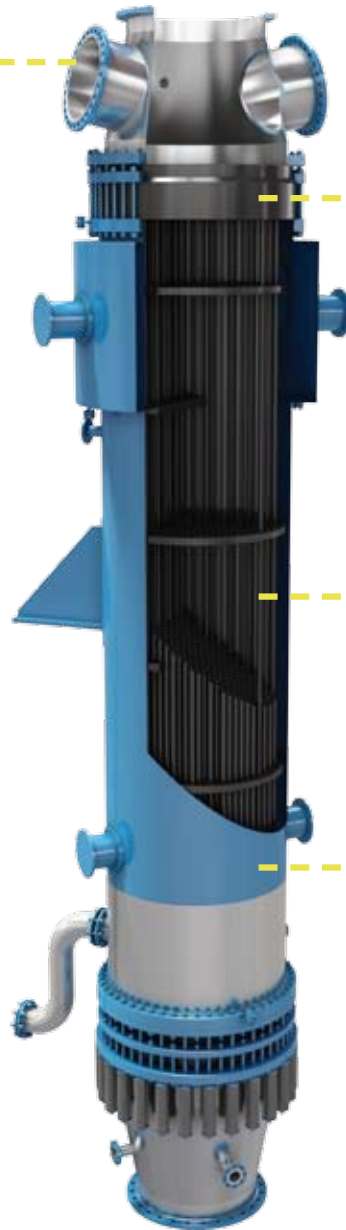


### HEADERS

- Graphilor® 3 XBS standard header with concentric nozzle
- Other materials are available: stainless steel, carbon steel, CL-Clad® or reactive metals (tantalum, zirconium, titanium), rubber lined, PTFE lined..
- Fast dismantling design option for an easy re-tubing.
- Special design according to the process (falling film, multi-pass process, kettle, phosphoric or sulfuric acids)

### TUBE-SHEET

- TÜV homologation G20-00-220
- Monolithic design
- Alternative ML technology for diameters between 36" and 82"
- Rigilor® option to increase abrasion resistance
- Amorphous carbon sleeves to increase erosion resistance
- Graphilor® 3 XC option for severe applications (up to 430°C)



### GRAPHILOR® 3 TUBES BUNDLE

- Tubes in Graphilor® 3 XBS
- TÜV homologation G30-00-220
- Diameters: 25/16, 32/22, 37/25 and 51/38. Special diameter on request

### SHELL

- Diameter 10" – 82"
- Carbon steel shell as a standard
- Other materials are available: stainless steel, rubber lined, high nickel alloys, CL-Clad® or reactive metals (tantalum, zirconium, titanium)

50-years  
of experience

N°1 worldwide  
producer  
of graphite tubes

Exclusivity  
6-meter  
jointless graphite tubes

Option: fiber tubes

Highest mechanical resistance  
for tubes and tubesheet  
certified by TÜV

## Silicon carbide (SiC) *heat exchangers*

### SPECIALLY DESIGNED TO COMPLY WITH SEVERE PROCESSES

Mersen designs and manufactures both shell and tube and block type Silicon Carbide heat exchangers at its American and European production sites. Silicon Carbide is one of the most corrosion resistant materials available for heat exchangers. SiC is completely impervious without any resin impregnation. SiC heat exchangers are resistant in severe environments such as strong acids, bases and chlorinated organics such as sulfuric acid, phosphoric acid, HF, NaOH, HCl...

**More than 300 units already in operation.**

### LARGE DESIGN OPTIONS

- Single or double "O" ring design
- Single fixed tube-sheet design
- Double tube-sheet design
- Materials for construction for shell and headers
- Multi-pass process flow

# Metallic shell & tube *heat exchangers*

## HEAT EXCHANGER EXPERTISE SUPPORTED BY ENGINEERING CAPACITY

- ENGINEERING CAPACITY FOR THERMAL AND MECHANICAL DESIGN
- ASPEN, TASC+ SOFTWARE
- NEW DESIGN OR REVAMPING
- PROCESS KNOW-HOW FOR MANY DESIGNS : STRAIGHT TUBES, U-BUNDLE, KETTLE, COILS, DOUBLE TUBES, SMOOTH OR CORRUGATED TUBES...

## WORLDWIDE INDUSTRIAL SITES

- OXNARD (USA)
- PAGNY-SUR-MOSELLE, BRIGNAIS, GRÉSY (FRANCE)
- LINSINGERICHT ( GERMANY)
- EL JADIDA (MOROCCO)
- SHANGHAI (CHINA)

## MULTI-CONSTRUCTION CODES EXPERIENCE

- INTERNATIONAL STANDARDS: ASME, AS ADM, JIS, CODAP, RTOD, RCCM
- INTERNATIONAL CERTIFICATIONS: ASME U STAMP, PED, ISO 9001, ISO14001, OHSAS18001, SELO, KGS, GHOS-R, HAF 601
- MATERIALS ACCORDING TO ASTM, EN, AS, GB STANDARDS

**Mersen is y**

whenever high-end projects, large equip and heat exchange for a metallic shell and



## our partner

materials, international  
ment, global presence  
expertise are required  
tube heat exchanger.



## UNRIVALED MATERIALS CHOICE WITH KNOW-HOW AND WELDING COMPETENCE

- REACTIVE METALS : TANTALUM, ZIRCONIUM, TITANIUM
- NICKEL ALLOYS, STAINLESS STEEL
- CARBON STEEL
- ALUMINIUM ON REQUEST

## INDUSTRIAL CAPACITIES ESPECIALLY FOR LARGE EQUIPMENT

- WELDING EXPERTISE : GTAW, GMAW, SAW, PAW, FCAW, SMAW
- IN-HOUSE NDT : X RAY, PT, UT, MT, PMI, HELIUM LEAK TEST
- EQUIPMENT UP TO 240 TONS

## INTERNATIONAL PROJECTS MANAGEMENT

- PROJECT MANAGEMENT SYSTEM WITH A DEDICATED PROJECT LEADER
- GLOBAL PROCUREMENT
- MANUFACTURING REPORTING
- TOTAL QUALITY MANAGEMENT PROGRAM

# Metallic shell & tube *heat exchangers*

## CARBON STEEL, STAINLESS STEEL AND NICKEL ALLOYS EQUIPMENT

### FOCUS ON LARGE CAPACITIES

Since the acquisition of Xianda in 2009, Mersen has repeatedly invested to maintain its position of having a state-of-the-art workshop in China. The whole entity covers a total surface area of 150,000 m<sup>2</sup> ground space with **85,000 m<sup>2</sup> of workshop area**. The new production center is equipped with the highest-level industrial capabilities, such as a **thermal treatment furnace**

**for equipment up to 25 meters**, automatic welding machines, **X-Ray rooms for 20-meter length and 5m-diameter equipment**, rolling machines (one of which can handle 120 mm thick material) together with **several cranes** with an accumulated capacity of **400 tons**.



For many years, both international and local customers have acknowledged Mersen Xianda as a leading manufacturer, particularly for the supply and project management of large contracts. The design

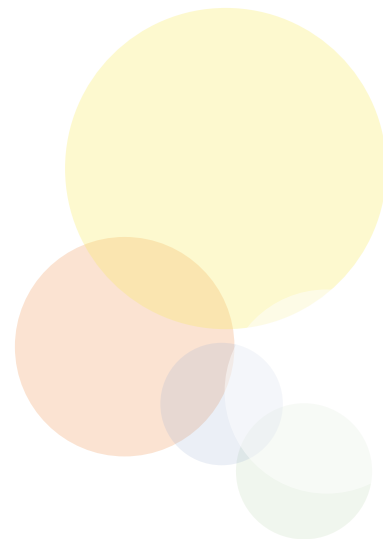
office, bringing together more than one hundred highly skilled experts in design, process and projects management, applies its experience to demanding projects.



**85,000 m<sup>2</sup>**  
workshop in China

High-level industrial  
capabilities

International project  
management





**N°1 worldwide supplier**  
of zirconium equipment to the  
acetic acid producers

Dedicated workshops in  
USA, Europe and China



## ZIRCONIUM AND TITANIUM EQUIPMENT



**Z**irconium is suitable for corrosive environments, notably for the production of acetic acid. Mersen is recognized as the world's number one supplier of zirconium columns, shell and tube heat exchangers and pressure vessels for the major producers of acetic acid.

**T**itanium is suitable for wet chlorine and chlorinated compounds, sea water and oxidizing acids.

A long expertise in design and fabrication of reactive metal equipment combined with an international material sourcing policy allows Mersen to bring quality and cost-effective solutions.

Mersen manufactures zirconium and titanium heat exchangers in plants on three continents.



## TANTALUM EQUIPMENT

**M**ersen produces Tantalum heat exchangers in USA and in its dedicated 3000 m<sup>2</sup> workshop in Germany. Mersen, the home of Tantalum, is deemed to be the worldwide leader for the manufacture of Tantalum equipment.

The unique chemical and physical properties of Tantalum require know-how, specific equipment and highly trained people. A long experience in design, forming and welding Tantalum equipment combined with an international material sourcing policy allows Mersen to bring quality and cost-effective solutions.

Mersen has many reference lists for Tantalum bayonet heaters, U-tube heat exchangers, heating coils for columns, clad tube-sheets that are currently used in fields such as

- Hydrochloric acid
- Sulfuric acid
- Acid concentration
- Nitric acid
- Phosphoric acid
- Strong organic acids
- Bromine
- Pharmaceuticals
- Pickling baths



**Worldwide leader**

for the manufacture of  
Tantalum equipment

**Dedicated Tantalum workshop**

in Germany

Highly skilled welders

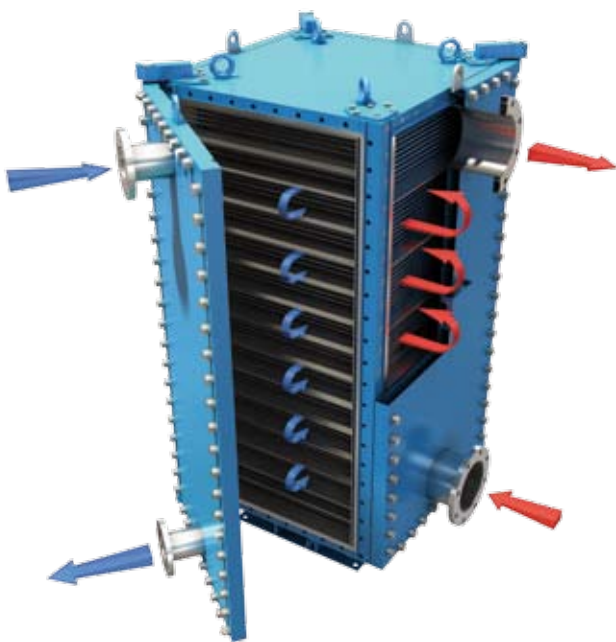
Many reference lists  
for severe applications



# Heatex®<sub>1</sub>, welded plate heat exchangers

## 3 DIFFERENT PROFILES TO COPE WITH YOUR PROCESS CONSTRAINTS

THE HEART OF THE HEATEX® WELDED PLATE HEAT EXCHANGER IS COMPOSED OF THE PLATES, AVAILABLE WITH THREE DIFFERENT PROFILES (CORRUGATED, STUDDED, DIMPLED) WELDED TOGETHER TO FORM A CUBIC PLATE PACK. THE FRAME IS COMPOSED OF FOUR COLUMNS AND TWO END-PLATES INTO WHICH THE PLATE PACK IS MOUNTED. DOORS ARE BOLTED ONTO FOUR FACES OF THE UNIT. THE ALTERNATIVE PLATE PROFILES OFFER THE OPTIMUM SOLUTION BETWEEN THERMAL EFFICIENCY AND MAINTENANCE.



## HXC SUITABLE FOR 2 CLEAN FLUIDS



**B**est solution for petrochemicals, chemicals, coke oven gas treatment, pharmaceuticals applications.

- Corrugated plate type ensures high efficiency
- Area: from 2 m<sup>2</sup> to 280 m<sup>2</sup>
- Regular profile: 5 mm plate gap
- Pressure up to 36 bars
- Temperature: 350°C
- Materials: stainless steel, nickel alloys, titanium, tantalum

High efficiency

Compactness

Competitive solution



## FOCUS ON A PATENTED INNOVATION: HXC FREE-FLOW, THE BEST SOLUTION FOR PROCESS WITH 1 FOULING FLUID AND 1 CLEAN FLUID

- Free flow channel up to 25 mm between plates
- The special design of the plates creates turbulence and high coefficient



## HXE SUITABLE FOR 1 FOULING FLUID



**B**est solution for pulp and paper, sugar, coke over gas treatment, pharmaceuticals applications.

- Area from 1 m<sup>2</sup> to 625 m<sup>2</sup>
- Free gap up to 40 mm on one channel
- Pressure up to 32 bars
- Dimpled plates
- Plates pack can be independent from frame
- Temperature : 350°C
- Materials: carbon steel, stainless steel, nickel alloys, titanium



Independent paired plates design

### **FREE-GAP:**

no retention, no plugging risk

Plate repair or replacement possibility

## HXS SUITABLE FOR 2 FOULING FLUIDS



**B**est solution for sludge/sludge on wastewater treatment plant, sugar factory, PVC stripping process applications.

- Area from 1 m<sup>2</sup> to 300 m<sup>2</sup>
- Pressure up to 25 bars
- Temperature: 250°C
- Studded plates
- Materials: stainless steel, nickel alloys
- Spacing up to 25 mm on both side

Best cleanable solution

Easy access on both sides

No stress rate on plate, less corrosion sensitive



# Dimpled welded plate and shell heat exchanger S type

## AN ALTERNATIVE SOLUTION TO U-TUBE DESIGN

The plate and shell concept is only available with dimpled plates. It is an economical alternative to Heatex® welded plate heat exchanger for solvent condensers, top-column condensers and gas coolers.

It ingeniously combines the efficiency of the welded plate heat exchanger and the reliability of the shell and tubes. A dimpled plate pack is mounted into a cylindrical shell. Materials can be stainless steel and nickel alloys.



Same performance as plate heat exchangers

Same reliability as shell and tube

Temperature resistance up to **350°C**

Pressure resistance up to **25 bars** (plate) and **40 bars** (frame)

Removable plate packs for inspection and cleaning

Free expansion due to unique innovative U-plates design

## THE UNIVERSAL CONDENSER SOLUTION

Some examples of applications :

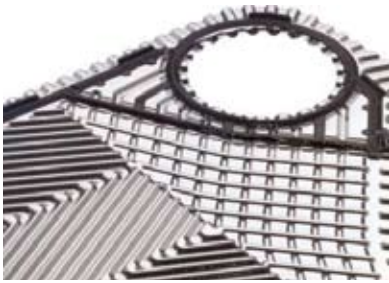
- Solvent condenser overhead
- 2-stages condenser with water at 1<sup>st</sup> stage and glycol at 2<sup>nd</sup> stage
- Double-stage condenser with integrated decanter (200 L)
- Vapor top-column condenser



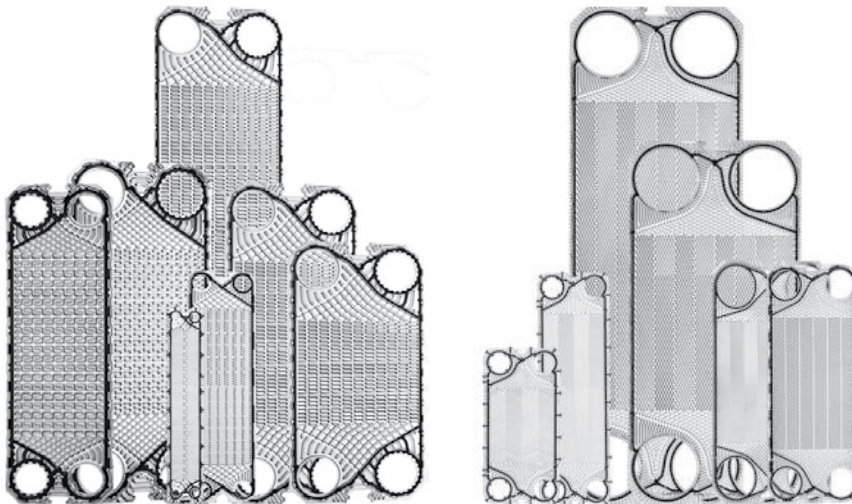


# Gasketed plate heat exchanger

## A WIDE PORTFOLIO TO MATCH YOUR PROCESS CONSTRAINTS



Mersen, as a recognized expert in thermal design and heat exchanger manufacturing, has reached the best compromise for the gasketed plate heat exchanger : plates and gaskets are provided by the market leaders while Mersen Brignais ensures the thermal and mechanical design, the assembly in its manufacturing sites and the maintenance of the gasketed heat exchangers. Mersen's service centers , which are located close to our customers, are a guarantee of highly responsive customer service.



- **STANDARD**  
For industrial applications with no fouling fluids.  
Up to 18 bars / 180°C
- **FREE-FLOW**  
For fluids containing particles. Free gap up to 11 mm
- **SEMI-WELDED**  
For extreme conditions up to 25 bars
- **SAFE PLATES**  
For eliminating the risk of contamination
- **XXL PLATES**  
Large porthole for condensation with low pressure drop

45  
standard  
models

with 2 chevrons

12 free flow  
plates

10 semi-  
welded plates

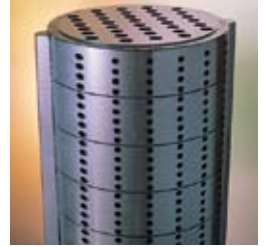
Plates from 0.4  
to 1 mm thick

Up to 3.5m<sup>2</sup>  
per plate

Connection up to  
DN500



# Innovation in heat exchangers



## GRAPHITE HEAT EXCHANGERS

**GRAPHILOR® 3**, the only impregnated graphite with ultra-fine grain isostatic graphite.

### PROPERTIES :

- High resistance to corrosion
- Resistance to temperature and thermal shock
- The highest mechanical resistance certified by TÜV.

### IMPREGNATION

- BS: Phenolic highly cross-linked resin
- C: highly-temperature treated carbon → Mersen exclusive
- TH: PTFE → Mersen exclusive

### EXCEPTIONAL TÜV HOMOLOGATION

- XBS: up to 220°C: G20-00-200 for blocks / up to 220°C: G30-00-220 for tubes
- XC: up to 430°C: G18-00-400
- XTH: up to 250°C: G15-00-250

- Particularly high resistance to corrosion
- Highest mechanical resistance, certified by TÜV
- Temperature resistance up to 230°C and 430°C

### 6-METER-LONG TUBES IN GRAPHILOR® 3 WITHOUT A JOINT

The absence of a joint makes the tubes less fragile. Tubes can be optionally reinforced with carbon fiber.



- Tubes are more mechanically resistant
- G30-00-220 TÜV certification

**RIGILOR®** is a treatment of graphite parts with a carbon fiber based layer. Rigilor® is used for large blocks and tube-sheets.



- Mechanical resistance is doubled
- Erosion resistance is increased six times

**ML TECHNOLOGY** is used to produce blocks with a diameter greater than 36".

- Higher mechanical resistance than monolithic graphite in large diameters
- Similar to small diameter mechanical resistance properties

## METALLIC HEAT EXCHANGERS

### CL-CLAD®

The Mersen Research and Development Department has developed an expertise in materials and innovative processes which has resulted in a new brazing process – CL-Cad® – for tantalum and zirconium cladding of carbon and stainless steels. CL-Clad® plates are used in the manufacture of pressure equipment as well as bonnets and tube-sheets.



### CL-Clad® Flexible technology for bonnet, tubesheet and shell

Full vacuum resistance (thanks to the strong bonding between Tantalum / Zirconium sheet and steel base plate)

Safe design (can be fully welded – gasket-free design)

Mechanical and thermal resistance

**TANTALUM HEATEX** Tantalum welded plate heat exchanger specially designed for pharmaceutical and fine chemical industries, to comply with highly corrosive environments.



### HXC FREE FLOW

The corrugated welded plate heat exchanger has a special design that allows a gap up to 25 mm between plates, with working pressures of up to 14 bar and temperatures of 250°C. The HXC free-flow is suitable for applications with one fouling fluid and one clean fluid.

- High thermal efficiency
- Cleanable on one side
- No risk of plugging





**MERSEN**  
*Expertise, our source of energy*

**A worldwide specialist  
 in anticorrosion  
 and process equipment**

Worldwide presence  
 with several manufacturing  
 sites and workshops close  
 to our customers

**Mersen France Pagny-sur-Moselle**

- > 36,000 m<sup>2</sup>
- > Heat exchangers, pressure vessels, columns, piping, bellows and compensators, mixers, systems, bursting discs

**Mersen USA Salem**

- > 6,700 m<sup>2</sup>
- > Graphite heat exchangers, systems, welded plate heat exchangers, piping, bellows and compensators, bursting discs

**Mersen France Brignais**

- > 8,000 m<sup>2</sup>
- > Welded and gasketed plate heat exchangers, metallic shell and tubes heat exchangers, mixers

**Mersen France Grézy**

- > 8,000 m<sup>2</sup>
- > Specialist in equipment for the nuclear industry
- > Pressure vessels, columns, mixers, heat exchangers

**Nippon Carbon Mersen**

- > Distribution and repair shop

**Mersen UK Teesside**

- > 5,600 m<sup>2</sup>
- > Graphite heat exchangers, bursting discs

**Mersen Deutschland  
 Linsengericht**

- > 3,000 m<sup>2</sup>
- > Tantalum equipment : heat exchangers, bayonets, heating coils, columns, accessories

**Mersen USA Oxnard**

- > 6,600 m<sup>2</sup>
- > Pressure vessels, columns, heat exchangers (tantalum, zirconium, titanium, nickel alloys, stainless steel)

**Mersen India Chennai**

- > 2,600 m<sup>2</sup>
- > Graphite heat exchangers, systems

**Mersen Maroc El Jadida**

- > 2,500 m<sup>2</sup>
- > Graphite and metallic heat exchangers
- > After-sales service, assembling

**Mersen Xianda Shanghai-Fengxian**

- > 150,000 m<sup>2</sup>
- > Heat exchangers, pressure vessels, columns, piping, mixers, systems

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