



Food & Beverage

Heat transfer solutions and evaporation systems for the food and beverage industry.





When it comes to **Sanitary Markets**, you need someone who understands your unique heat transfer needs - from fluid properties to fouling tendencies, a partner who can take that knowledge, and transform it into the **optimum heat transfer system**.

A partner who is committed to you before, during, and after the sale.

A partner like **API Heat Transfer**.

For more than 140 years, we've created heat transfer solutions for some of the most challenging food and beverage applications, and we're ready to help take the performance of your application to the next level!

A well established understanding.



Our expertise in the food and beverage industry dates back to 1879, when we patented a spray cooler for wort in the brewing process. Today, we supply some of the world's best-performing heat transfer solutions to food and beverage businesses of all types.



BEVERAGE

APPLICATIONS

Cooling, heating, and short-term heating of clear and cloudy fruit juices, vegetable juices, soft drinks, mixed drinks, isotonic beverages, carbonized beverages, and syrups

Cooling and heating of purees

Hot water boiler

CIP heater



BREWING

APPLICATIONS

Cooling and heating of wort

Cooling of yeast

Deep-cooling and pasteurizing of beer

Condensing of exhaust vapor

Cooling of condensate

Hot water boiler

CIP heater

Flash cooler

Evaporation systems for yeast, malt extract, and wort



DAIRY

APPLICATIONS

Cooling, heating, and pasteurizing of milk, yogurt, desserts, cream, and ice cream mix, cheese, whey, pudding, buttermilk, kefir, and sour milk

Super-heating of cream

Cooling of brine

Hot water boiler

CIP heater

Oils, Sugars, we have it covered.

Whether its edible oils, food ingredients or sugars, we have your solution.



EDIBLE OILS

APPLICATIONS

Cooling and heating of edible oil
Cooling of fatty acids
Heat recovery in the refining process
Winterizing of edible oil



FOOD INGREDIENTS

APPLICATIONS

Short-term heating of gelatin and basic materials
Cooling of yeast wort and liquid sponge
Cooling, heating, and pasteurizing of ketchup, mayonnaise, mustard, margarine, margarine emulsion, and soy milk
Hot water boiler
CIP heater
Flash cooler
Evaporation systems for gelatin, pectin, herb extracts, tea, coffee, protein hydrolysate, soja sauce, tuna sauce, and orange peel extract
Desulphurization of beverages (juices, wine)



SUGARS AND STARCHES

SUGAR APPLICATIONS

Heating, concentration, and cooling of sugar juice and sugar derivatives
Pre-heating and pasteurizing of diluted juices
Heating and cooling of syrup and molasses
Heat recovery of molasses and mash
Multistage concentration systems for cane and beet sugar, invert sugar, palatinite, and oligo-fruit sugars and insulin solutions

STARCH APPLICATIONS

Heating and cooling of starch solutions, corn spring water, and wheat starch wastewater
Super-heating of saccharified starch solutions for the inactivation of enzymes
Multistage vaporizing systems for glucose, dextrose, maltose, and sorbitol
High concentration of fructose, starch, washing, and cooking waters for potatoes, rice, and wheat
Pre-cooling and deep-cooling of syrups and concentrates
Condensation of flash steam



Quality and capabilities.

API has world class manufacturing facilities strategically located around the world with the highest quality standards and certifications to support the needs of our customers.

WORLD CLASS:

- Global sourcing
- Strategically located
- Product specific technical centers
- FEA, CFD and other modeling
- Cleaning and regasketing services
- Installation and Commissioning engineers

CERTIFICATIONS:

- 3A Sanitary
- ISO 9001:2015
- TUV

CODES & STANDARDS:

- ASME , PED, GOST, CML
- ANSI, TEMA, CRN, API
- And many more



Our solutions.

GASKETED PLATE HEAT EXCHANGERS

With a variety of plate and gasket options, we cover a wide range of food and beverage applications, especially the cooling and heating of beer, wine, and liqueurs.



ALL-WELDED PLATE HEAT EXCHANGERS

With operating temperatures as high as 750° F and as low as -320° F, and operating pressures as high as 360 PSI, this can be used for many traditional shell and tube applications.



EVAPORATION SYSTEMS

Our PLC-equipped systems are used for fruit and vegetable juice and puree, aroma recovery, sugar solutions, extracts, gelatin, coffee, tea, whey, nutraceuticals, and wastewater.



SHELL & TUBE

Full range of standard and custom TEMA designed heat exchangers covering a wide range of materials, designs and codes



PASTEURIZATION SYSTEMS

Our HTST pasteurization systems can deliver as much as 95 percent regeneration when heating and cooling various liquids.



GASKETED PLATE HEAT EXCHANGERS

Our long-standing experience in demanding applications provide our customers with custom-tailored, cost effective solutions. Our plate heat exchangers offer industry leading solutions for a variety of thermal process applications in the F&B industry.

APPLICATION RANGE	
Operating pressure	up to 25 bar for standard units
Operating temperature	up to 170 °C for standard units

higher values on request

PRESSURE FRAMES	
Materials	Carbon steel, painted Carbon steel, stainless steel-clad Stainless steel, solid
Codes (PED)	AD 2000-Merkblatt, ASME Sec. VIII Div. 1, GL, ABS, DNV and others
Connections	Studded bolts acc. to DIN 2501, EN 1092-1, ANSI Flanges acc. to DIN, EN 1092-1, ANSI Threaded connections Aseptic and foodstuff connections

PLATES	
Materials	AISI 304, AISI 316L, AISI 316Ti, alloy 926, AISI 904L, SMO 254®, nickel, nickel alloys, titanium grade 1, titanium grade 11

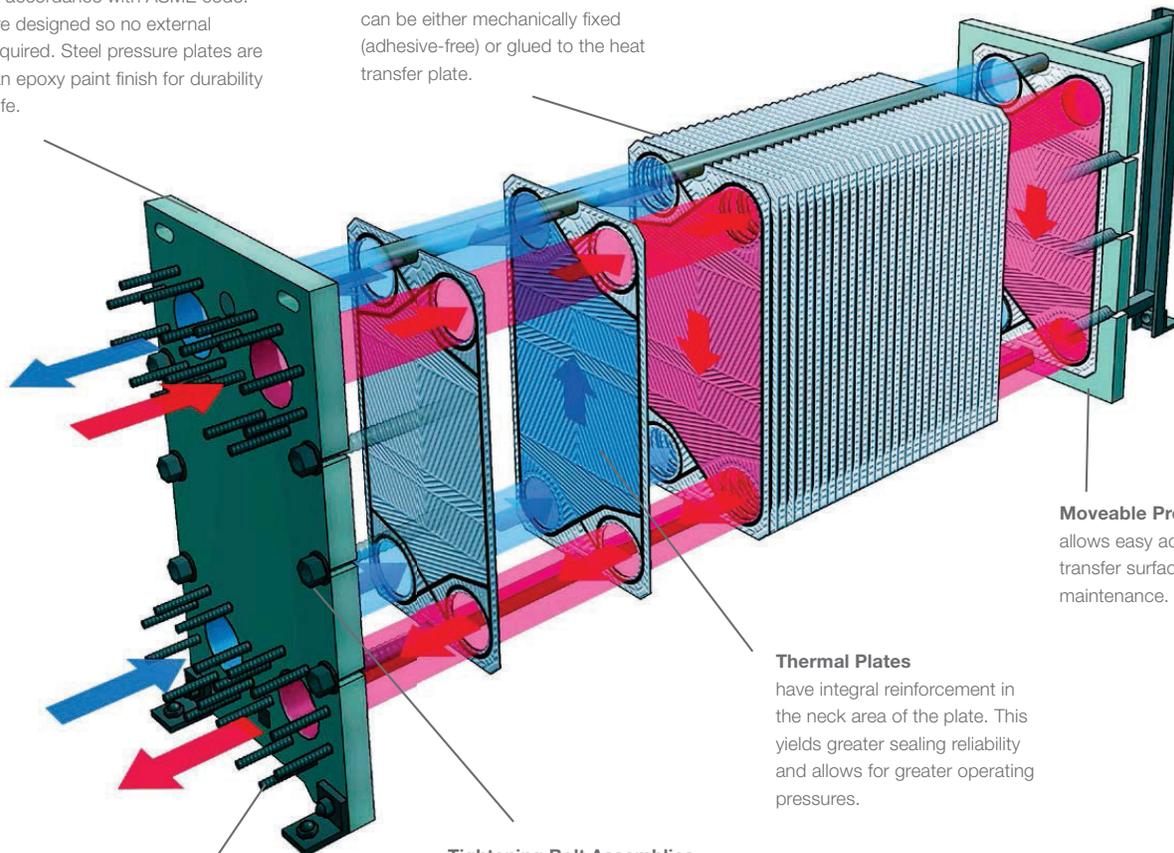
GASKETS	
Materials	Elastomers (nitrile, EPDM, FKM / Viton® and others) PTFE-enveloped elastomers (SIGMACOAT), Aramid fibers, materials for industrial and foodstuff applications.
Fixing	Gasketed plates: - with mechanically fixed gaskets (SIGMAFIX) - with glued gaskets Semi-welded modules (SIGMADUAL): - with mechanically fixed gaskets (SIGMAFIX) - with glued gaskets

Pressure Retaining Covers

are designed in accordance with ASME code. These plates are designed so no external reinforcing is required. Steel pressure plates are provided with an epoxy paint finish for durability and extended life.

Elastomer Gaskets

can be either mechanically fixed (adhesive-free) or glued to the heat transfer plate.



Piping Connections

are available as studded, threaded, flanged, or sanitary clamp.

Tightening Bolt Assemblies

are made of zinc-coated alloy steel or stainless steel for corrosion resistance and ease of opening. All tightening is easily done from the fixed pressure plate end of the unit.

Moveable Pressure Plate

allows easy access to heat transfer surfaces for simplified maintenance.

Thermal Plates

have integral reinforcement in the neck area of the plate. This yields greater sealing reliability and allows for greater operating pressures.

ALL-WELDED PLATE HEAT EXCHANGERS

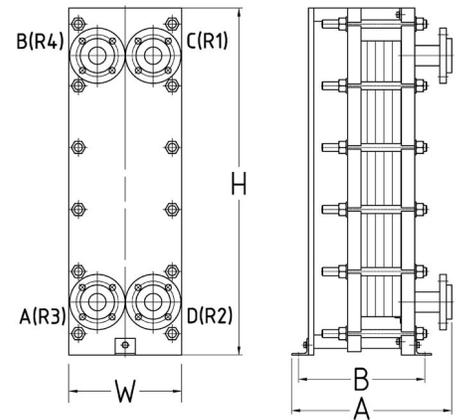
Our line of Schmidt® SIGMAWIG all-welded plate heat exchangers represents the most compact, rugged and cost-effective means of transferring heat in critical applications.

TECHNICAL DETAILS

SIGMAWIG all welded plate heat exchangers are similar to gasketed plate heat exchangers because of the number of corrugated plates and do not include gaskets. The plates are sealed hermetically by TIG welded seams. The loading capacity of these connection exceeds the strength of gaskets.



ADVANTAGES	BY COMPETENCE
Weldings replace gaskets	Higher security level at critical process conditions
Temperatures ≥ 250 °c	e.g., Steam, thermal oil edible oil
Operating pressures ≥ 25 bar	e.g., Condensation of refrigerants high pressure heating or low temperature networks
Compact design	Minimum space required, minimum installation, minimum piping
Efficient heat transfer	Homogeneous countercurrent flow
Small liquid content	Optimized control of process, higher level of security, when handling dangerous products
10,000 Times proven	Proven design, long-term experience in practice in a wide field of applications



Main dimensions SIGMAWIG

	Nozzle Size	Max. Operating Pressure *)	Min. Operating Temperature *)	Min. Operating Temperature *)	Max. Flow Rate (Liquid)	Max. Exchange Surface	Max. Length A	Max. Length B	Width W	Height H
Units	[DN]	[bar]	[°C]	[°C]	[m³/h]	[m²]	[mm]	[mm]	[mm]	[mm]
ST 3	25	25	250	-120	8,5	2,7	600	325	108	303
ST 12	50	25	250	-120	35	16,5	686	576	335	790
ST 18	50	25	250	-120	35	25	686	576	335	1035
ST 30	100/150	25	250	-120	450	60	1385	935	550	1180
ST 40	100/150	25	250	-120	450	90	1385	935	550	1480

* variations on request

EVAPORATION SYSTEMS

Evaporation is an energy intensive and costly process. API's solution with SIGMASTAR® rising film plate evaporators paired with our technical expertise provide an optimized bespoke solution with the lowest total ownership cost with outstanding performance.

APPLICATIONS:

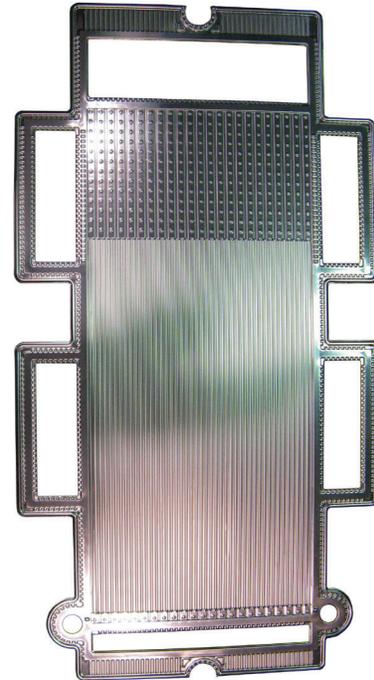
- **Beverages:** Juices, Tea, Coffee, Plant Drinks
- **Foods:** Fruit Puree, Dairy, Candy, Meat Broth
- **Protein:** Collagen Peptide, Gelatin, Meats, Fertilizer
- **Sugars & Starches:** Corn Mash, Potatoes, Sweeteners, Syrups
- **Extracts:** Cannabis, Nutraceuticals, Plant, Herbal

ADVANTAGES:

- **Cost:** Lowest total ownership cost design
- **Product:** Superior product distribution regardless of feed rate which offers turndown flexibility
- **Quality:** Short residence time through high velocities and short distance to protect quality of product
- **Applications:** no other system produces a higher concentration or can handle a higher viscosity
- **Dual Purpose:** Simultaneous product processing capability providing lower cost solution through fewer effects
- **Expertise:** 60+ years supplying evaporation systems

BESPOKE SOLUTION:

- **Effects:** Single or multiple effect systems based on size, energy consumption, installation costs, and operational costs
- **Heating Systems:** Direct steam, thermal vapor recompression (TVR) or Mechanical vapor recompression (MVR)
- **Options:** Aroma recovery, CIP, etc available



SHELL & TUBE

If you're looking for the industry leader in value and long-term reliability, look no further than the API Basco® shell and tube heat exchanger. Our Shell & Tube is cost-effective, versatile, and can be customized for your specific needs.

PERFORMANCE NOTES:

- Cost-effective, standard and custom designs
- Readily available with short lead times
- Uses precision-punched baffles to minimize fluid bypass and maximize heat transfer
- Manufactured for a wide range of duties in state-of-the-art ISO-certified facilities

FEATURES AND SPECIFICATIONS:

- Removable and non-removable straight tube or U-tube bundles
- One-, two-, and four-pass designs
- High-strength shells in carbon steel or stainless steel
- Tubesheets are welded to the shell; holes are precision drilled for proper fit and sealing
- Baffles are hot-rolled punched steel for enhanced strength and reliability – engineered for correct fit to reduce tube wall damage from high-velocity liquids or gases
- Tubes are available in a range of materials, depending on the application, and are roller expanded using controlled pressure to ensure proper bond
- Heavy-duty mounting brackets can be reversed or rotated; slotted holes allow for quick install
- Fabricated end bonnet heads are standard on TEMA-C and some ASME units; zinc anodes available for added protection
- Connections available, threaded or flanged, in 3 in., 4 in., 5 in., 6 in., and 8 in. diameters – additional connections can be added



APPLICATIONS:

- Condensate Cooling
- Refrigerant Evaporating
- Refrigerant Condensing
- Air Dryers
- Heat Pumps
- Cooling Tower
- Domestic Water
- Oil Heaters

MATERIALS OF CONSTRUCTION:

SHELL

Carbon steel, stainless steel

TUBES

Copper, admiralty, 90/10 CuNi, stainless steel, carbon steel, titanium

TUBESHEETS

Carbon steel, stainless steel, 90/10 CuNi

BONNETS

Cast iron, cast bronze, 304/316 stainless steel, carbon steel

BAFFLES

Carbon steel, brass, 304/316 stainless steel

STANDARD RATINGS:

DESIGN PRESSURE

Shell side: 300 PSI (TEMA-C/ASME: 150 PSI)

Tube side: 150 PSI (TEMA-C/ASME: 150 PSI)

DESIGN TEMPERATURE

300°F (stainless higher)

TEST PRESSURE

All units tested pneumatically or hydrostatically



PASTEURIZATION SYSTEMS

Our SIGMATHERM Pasteurization System is the trusted choice for beverage and liquid food customers. Our extensive experience in pasteurization ensures the quality of product at low operating costs.

APPLICATIONS:

- **Beverages:** Juices, Beer, Milk, Wine, Plant Based Beverages
- **Foods:** Fruit & Vegetable Puree, Dairy, Sauces, Pastes
- **Protein:** Collagen Peptide, Gelatin, Liquid Egg
- **Sugars & Starches:** Jam, Jelly, Syrups, Honey

ADVANTAGES:

- Low thermal load on the products
- Long life expectancy of the plant
- Low heating costs
- Compact construction
- Fully automated control available
- Heat recovery up to 96%
- Wide range of standard and custom-built pasteurizer capacity:
27gph – 13,200gph or 100l/h – 50,000l/h

BESPOKE SOLUTION:

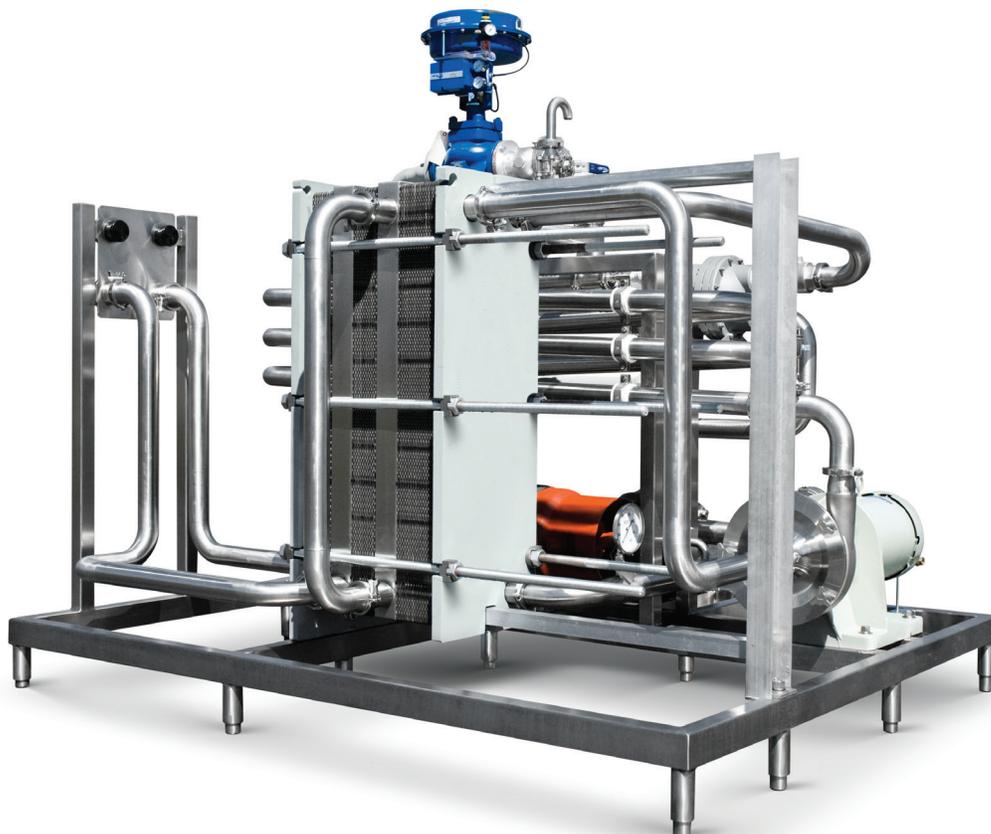
- **Controls:** Manual or fully automated control capability
- **Heating Source:** Direct steam, hot water sets, etc based on plant utility capability
- **Options:** High viscous material, CIP systems, etc available

PROCESS DESCRIPTIONS:

HTST Pasteurization

Product passes through a high temperature short time heating system is pre-heated in the heat recovery section, it is then brought to pasteurization temperature in the heating section, held for prescribed time in the holding tube before the temperature is lowered in the heat recovery section, and finally cooled to the packaging or storing temperature.

Process plants can be entirely based on the SIGMATHERM plate heat exchanger which is capable of up to 96% heat recovery. SIGMAFLOW tubular heat exchangers and direct steam injection systems provide an alternative design for viscous, pasty, pulpy and particulate liquid foods.



Food and Beverage Heat Transfer Solutions.



Since 1879, API has been solving the most complex sanitary processes for a wide range of food and beverage applications, including brewing, dairy, edible oils, food ingredients, and sugars and starches.

When it comes to Sanitary markets, you expect industry expertise from your vender who understands your unique application needs and who understands heat transfer from – fluid properties to fouling tendencies. API is your partner with 140+ years experience who can take that knowledge and transform it into the optimum heat transfer system.



API Heat Transfer is 3A Certified to deliver Sanitary quality level product to meet the stringent requirements within the food or dairy applications.



Beverage



Brewing



Dairy



Edible oils



Food ingredients



Sugars and starches



API Heat Transfer, a family of high-performance brands 

High-performance heat transfer.

It's who we are and what we do. It's part of our 140-year heritage designing and delivering world-class heat transfer products for nearly every industry. It's bolstered by our worldwide network of manufacturing facilities that provide sales, service, and support. And it's ingrained in a process that has helped customers around the world for nearly a century and a half.

When you work with us, you'll find the performance of our technologies sets the bar for heat transfer products, and our relentless drive to find and create custom heat transfer solutions to meet any industry challenge sets us apart.

See how our performance can improve yours.

Contact your API Heat Transfer sales rep or visit apiheattransfer.com today.

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