

# Shell & Tube Heat Exchangers

CUSTOM - ENGINEERED SERIES: CENTURY®

## **Southgate Process Equipment, Inc.**

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**Standard Xchange**  
a xylem brand

# Shell & Tube Heat Exchangers

As the recognized leader in heat exchanger products, systems and technology, Standard Xchange has been providing state-of-the-art solutions to heat transfer problems for more than 100 years.

Today, the company is devoted exclusively to the design, engineering and manufacture of shell-and-tube, gasketed plate, brazed plate and air-cooled heat exchanger products. Standard Xchange heat exchangers are engineered and manufactured by experienced craftsmen who have been devoted to the science of heat transfer not just for years, but for generations. And because we offer such a wide assortment of different heat exchanger designs, we can assure you of getting the optimum heat transfer solution to your specific application, without bias toward any one particular (or proprietary) product line.

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**Century Series**  
heat exchangers  
are manufactured  
with the highest  
standards of quality.

Some of Standard Xchange's  
code qualification options  
include:

**ISO 9001**

**ASME Code**

**Pressure Equipment  
Directive (97/23EC)**

**China ML**

**Korean KGS**

**Brazilian NR-10**



## DESIGN FLEXIBILITY

### The Century Series – the flexible answer to heat transfer problems.

Flexible in design, Century heat exchangers are capable of handling high pressures and temperatures, as well as a wide variety of fluids and gasses. Based on mechanically straightforward design, they offer a virtually limitless array of choices in terms of performance, materials, options and features. Century heat exchangers combine choice of options and control of custom design with economies of standardization and production, to give you the precise heat exchanger you need at the lowest cost. Century series heat exchangers can be designed and manufactured to the standards and guidelines of the following: TEMA (Tubular Equipment Manufacturers Association), ASME (American Society of Mechanical Engineers), API (American Petroleum Institute), ABS (American Bureau of Shipping), The Pressure Equipment Directive (97/23/EC), USN (U.S. Navy) and others.

At Standard Exchange, we work directly with these organizations, and frequently offer our facilities – particularly our advanced thermal research laboratory – along with our expertise to help set, clarify and implement standards that contribute to the overall strength of the heat transfer industry.

## THE NEW STANDARD IN INNOVATION.



It's true that Standard Xchange has been leading the way in state-of-the-art heat transfer solutions. Our advanced thermal research lab is one of the largest and best equipped facilities in the industry. Staffed with a team of highly qualified engineers, Standard Xchange's research efforts are used

to analyze complex heat transfer solutions and advanced new product development. It is also made available to industry groups, to develop standards and guidelines for product design and testing.

## THE NEW STANDARD IN COST-EFFECTIVE SOLUTIONS.



From water to oil to process fluid and corrosive fluid applications, there's an Standard Exchange heat exchanger that will get the job done. Our comprehensive range of shell & tube heat exchangers are dependable, rugged, and proven – with more than 100 years of research and engineering backing every design. With

state-of-the-art computerized design and configuration integrated with our advanced lean manufacturing cells, hundreds of design options are available through our Quick Ship Program providing unparalleled yet cost-effective lead-times.

## DESIGN EXPERIENCE

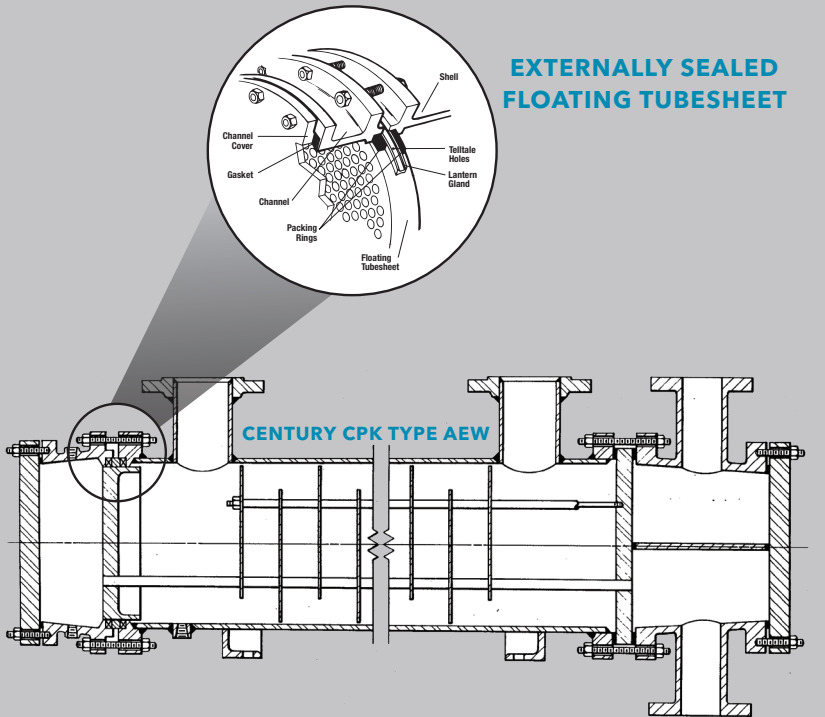
### Custom-design flexibility with off-the-shelf economy.

The continuous flow of design innovations and refinements, the availability of a variety of new construction materials, and an expanding array of “non-traditional” applications have made the task of heat exchanger selection more complex than ever before. Engineers are increasingly finding answers to these challenges in the Century Series heat exchangers from Standard Exchange. This line of products offers a vast range of combinations in design, performance, materials and options for virtually any heat transfer problem.

Whatever the application requires, chances are there's a Century Series heat exchanger that's right for the job:

- Fixed or floating tubesheet, single – or multi-pass, straight or U-tube, fixed tubesheet or removable bundle
- Steel or stainless, copper or bronze, nickel or exotic alloys, Hastelloy®, Monel® or titanium

## CENTURY® CPK SERIES



### CENTURY® CPK STANDARD DESIGN CAPABILITIES

	DESIGN PRESSURE	DESIGN TEMPERATURE
Tube Side	75 - 450 psi 517 - 3,102 kPa	-20 - 650°F -29 - 343°C
Shell Side	75 - 300 psi 517 - 2,068 kPa	-20 - 650°F -29 - 343°C

### DETAILS

- Straight tube, removable bundle, packed floating tubesheet
- Single or two pass tube arrangements for maximum efficiency over a wide variety of tube side flow rates.
- Standard shell sizes from 3 inches through 31 inches in diameter; custom designs up to 60 inches in diameter.
- Available in horizontal and vertical installations as well as stacked assemblies.

### ADVANTAGES:

Floating tubesheet allows differential expansion between the shell and tubes.

Maximum tube count per shell diameter.

Shell side can be steam or mechanically cleaned.

Bundle can be easily replaced or repaired.

Less costly than full internal floating head type construction.

### LIMITATIONS:

Both shell side and tube side exposed to packing. Volatile and/or toxic fluids should be avoided.

Packing limits design pressure and temperature for both shell and tube sides.

TEMA Type AEW or BEW.  
Can meet TEMA "B", "C" and "R",  
ASME Section VIII Div. 1 "U" stamp  
and ASME Section III "N" stamp.

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## DETAILS

- Straight tube, removable bundle, outside-packed floating head.
- Single- or multi-pass tube arrangements for maximum efficiency over a wide variety of tube side flow volumes.
- Standard shell sizes from 8 inches through 42 inches in diameter; custom designs up to 60 inches in diameter.
- Available for horizontal or vertical mounting.

## ADVANTAGES:

Floating tubesheet allows differential expansion between the shell and tubes.

Shell side can be steam or mechanically cleaned.

Bundle can be easily repaired or replaced.

Less costly than full internal floating head-type construction.

Only shell side fluids are exposed to packing.

Volatile or toxic fluids possible on tube side.

Provides large bundle entrance area.

## LIMITATIONS:

Shell side limited to non-volatile and/or non-toxic fluids.

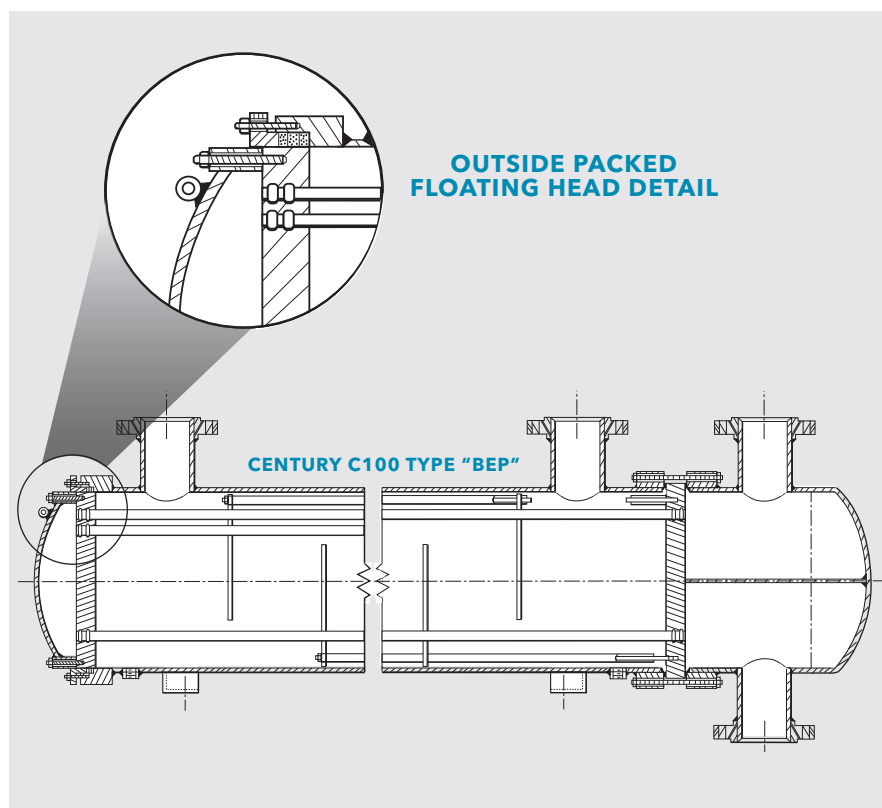
Shell side packing limits design pressure and temperature.

Less surface per given shell and tube size than TEMA type AEW or BEW designs.

TEMA Type AEP or BEP.

Can meet TEMA "B", "C" and "R", ASME Section VIII Div. 1 and ASME Section III "N" stamp.

# CENTURY® C100



## CENTURY® C100 STANDARD DESIGN CAPABILITIES

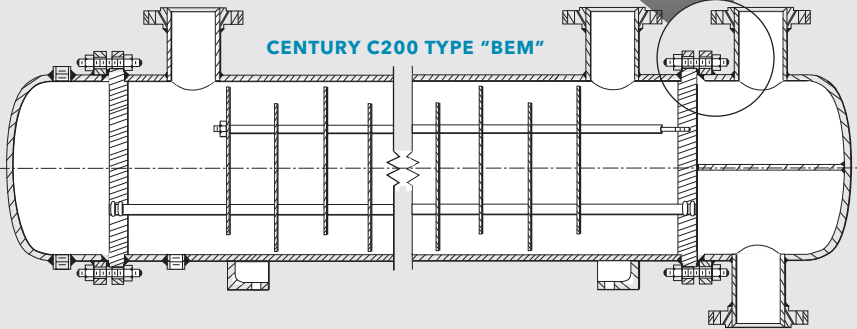
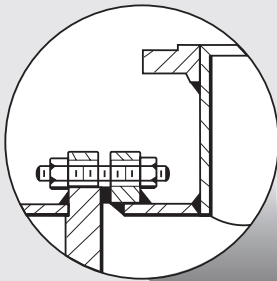
	DESIGN PRESSURE	DESIGN TEMPERATURE
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<b>Shell Side</b>	75 - 300 psi 517 - 2,068 kPa	-20 - 650°F -29 - 343°C

**Note:** Custom designs to 3,600 psi/24,816 kPa and 1000°F/538°C, depending on shell diameter and design temperature.

## CENTURY® C200 | C210

**FIXED TUBESHEET  
DETAIL**

**CENTURY C200 TYPE "BEM"**



### CENTURY® C200 and C210 STANDARD DESIGN CAPABILITIES

	DESIGN PRESSURE	DESIGN TEMPERATURE
<b>Tube Side</b>	75 - 450 psi 517 - 3,102 kPa	-20 - 650°F -29 - 343°C
<b>Shell Side</b>	75 - 300 psi 517 - 2,068 kPa	-20 - 650°F -29 - 343°C

**Note:** Custom designs to 3,600 psi/24,816 kPa and 1000°F/538°C, depending on shell diameter and design temperature.

### DETAILS

- Straight tube, fixed tubesheet, removable channel or bonnet (C200) or integral channel (C210).
- Single - or - multi-pass tube arrangements for maximum efficiency over a wide variety of tube side flow volumes.
- An expansion joint can be added to compensate for severe temperature differentials.
- Standard shell sizes from 5 inches through 42 inches in diameter; custom designs up to 60 inches in diameter.
- Available for horizontal or vertical mounting.

### ADVANTAGES:

Less costly than removable bundle exchangers.

Provides maximum heat transfer surface area per given shell and tube size.

Easily interchangeable with designs of various other manufacturers.

Tube side can be steam or mechanically cleaned.

Only tube side fluids are exposed to gaskets. Volatile or toxic fluids possible on shell side.

Easy accessibility for tube side cleaning and inspection.

No packed joints.

### LIMITATIONS:

No provision for differential expansion of tubes and shell.

Shell side may not be mechanically cleaned.

TEMA Type AEM, BEM or NEN.  
Can meet TEMA "B", "C" and "R",  
ASME Section VIII Div. 1 and  
ASME Section III "N" stamp.

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## DETAILS

- U-tube, removable bundle (C300) or suction-heater (open-end shell) construction (C320).
- Multi-pass tube arrangements for maximum efficiency over a variety of tube side flow volumes.
- The C320 is much like the C300, but has an open-end shell and special tube layout for tank suction heating applications.
- Standard shell sizes from 5 inches through 42 inches in diameter; custom designs up to 60 inches in diameter.
- Available for horizontal or vertical mounting.

## ADVANTAGES:

Allows for differential thermal expansion between shell and tubes as well as between individual tubes.

High heat transfer surface area for given shell and tube size.

Capable of withstanding thermal shock.

The most economical of all shell-and-tube exchangers, and the least expensive of all basic designs.

Shell side can be steam or mechanically cleaned.

Bundle can be removed for shell side cleaning and maintenance.

## LIMITATIONS:

Individual tube replacement is difficult.

Cannot be made single-pass on tube side, so true counter current flow not possible.

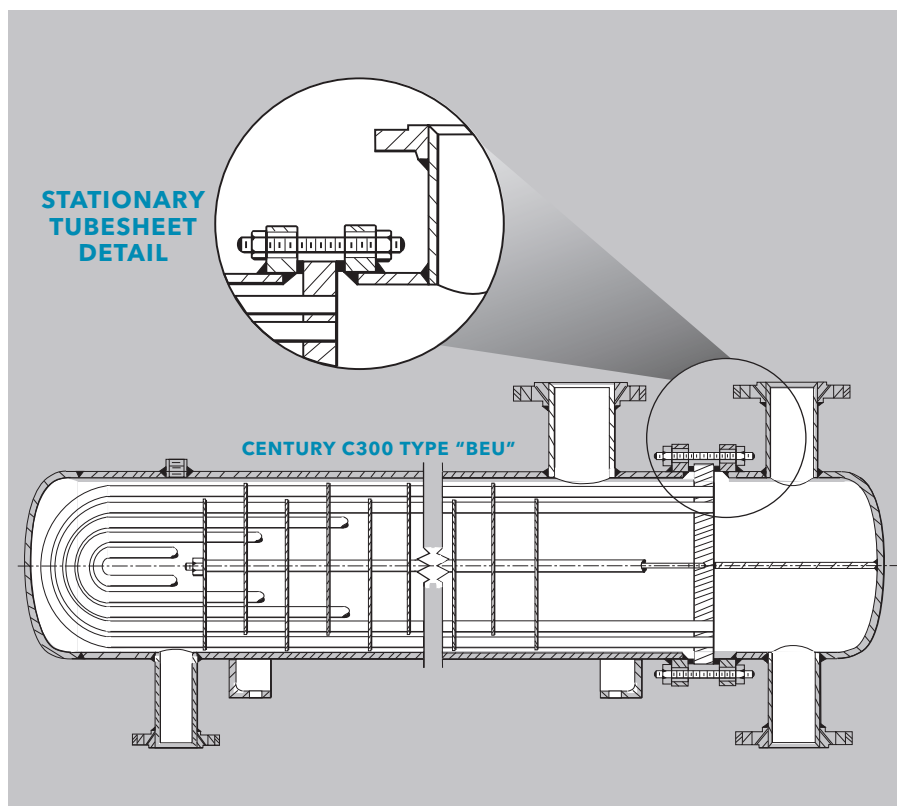
Draining tube side is difficult in vertical (head-up) position.

Tube side can be cleaned by chemical means only.

TEMA Type AEU or BEU.

Can meet TEMA "B", "C" and "R", ASME Section VIII Div. 1 and ASME Section III "N" stamp.

# CENTURY® C300 | C320



## CENTURY® C300 AND C320 STANDARD DESIGN CAPABILITIES

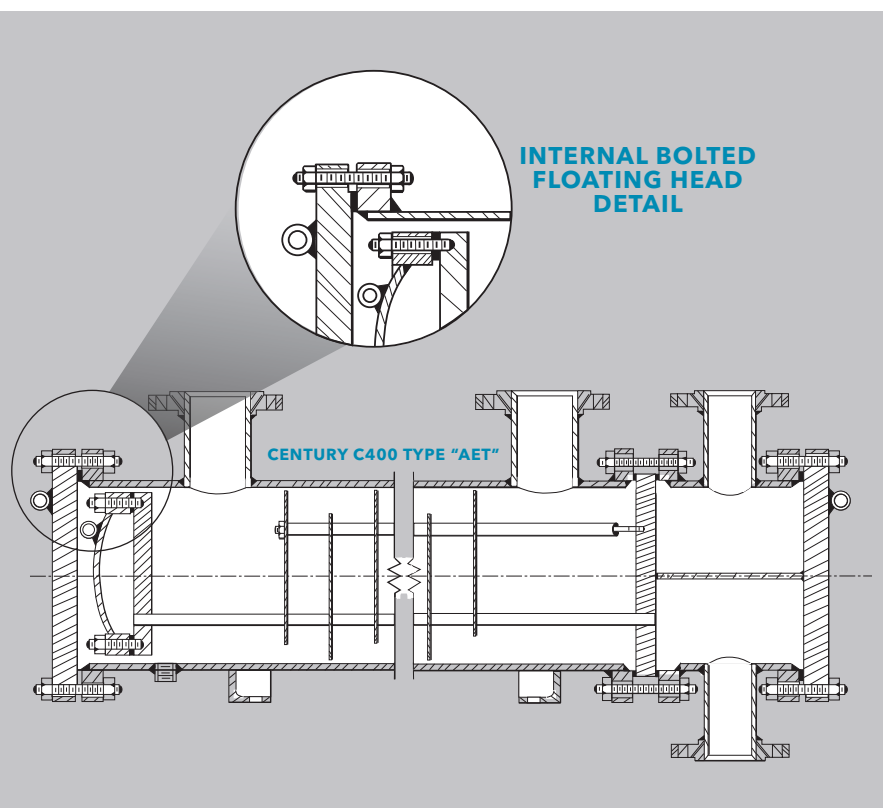
	DESIGN PRESSURE	DESIGN TEMPERATURE
<b>Tube Side</b>	75 - 450 psi 517 - 3,102 kPa	-20 - 650°F -29 - 343°C
<b>Shell Side</b>	75 - 300 psi 517 - 2,068 kPa	-20 - 650°F -29 - 343°C

**Note:** Custom designs to 3,600 psi/24,816 kPa and 1000°F/538°C, depending on shell diameter and design temperature.

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## CENTURY® C400



### CENTURY® C400 STANDARD DESIGN CAPABILITIES

	DESIGN PRESSURE	DESIGN TEMPERATURE
Tube Side	75 - 450 psi 517 - 3,102 kPa	-20 - 650°F -29 - 343°C
Shell Side	75 - 300 psi 517 - 2,068 kPa	-20 - 650°F -29 - 343°C

**Note:** Custom designs to 3,600 psi/24,816 kPa and 1000°F/538°C, depending on shell diameter and design temperature.

### DETAILS

- Straight tube, internally bolted floating head, pull-through construction with removable bundle.
- Multi-pass tube arrangements for maximum efficiency over a wide variety of tube side flow volumes.
- Standard shell sizes from 8 inches through 42 inches in diameter; custom designs up to 60 inches in diameter.

### ADVANTAGES:

Bundle can be removed from shell for cleaning or maintenance.

Lack of packed joints allows for handling volatile or toxic fluids.

Large bundle entrance area.

Allows for differential thermal expansion between shell and tubes.

Bundle can be pulled without removing floating head cover.

### LIMITATIONS:

Less heat transfer surface area given shell and tube size than other removable bundle designs.

The costliest of all basic types of heat exchanger designs.

Gasket leak detection not possible on floating head.

TEMA Type AET or BET.

Can meet TEMA "B", "C" and "R", ASME Section VIII Div. 1 and ASME Section III "N" stamp.

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## DETAILS

- Straight tube, internal clamp split ring, floating head, removable bundle.
- Multi-pass tube arrangements for maximum efficiency over a wide variety of tube flow volumes.
- Standard shell sizes from 6 inches through 42 inches in diameter; custom designs up to 60 inches in diameter.
- Available for horizontal or vertical mounting.

## ADVANTAGES:

Higher heat transfer surface area per given shell and tube size than pull-through designs (AET or BET Types).

Allows for differential thermal expansion between the shell and tubes.

Lack of packed joints allows for handling volatile and/or toxic fluids.

Provides multi-pass tube arrangements.

Bundle can be removed for shell side cleaning and maintenance.

## LIMITATIONS:

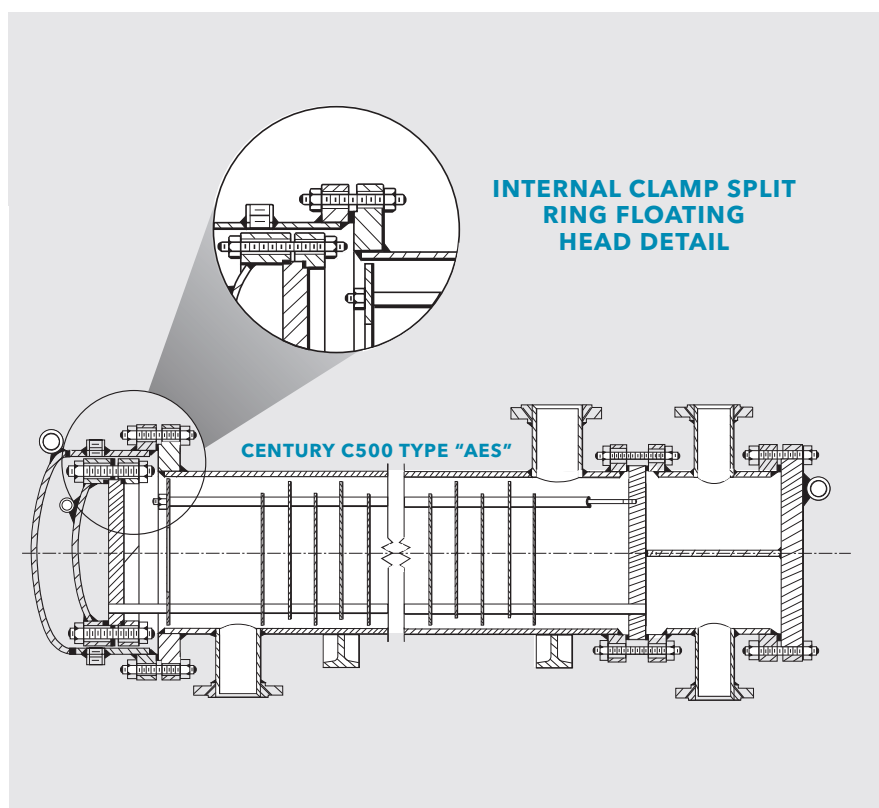
Shell cover, clamp ring and floating head cover must be removed prior to removing bundle. This results in higher maintenance cost compared to "pull-through" designs (AET or BET)

More costly than fixed tubesheet and U-tube designs.

TEMA Type AES or BES.

Can meet TEMA "B", "C" and "R", ASME Section VIII Div. 1 and ASME Section III "N" stamp.

# CENTURY® C500



## CENTURY® C500 STANDARD DESIGN CAPABILITIES

	DESIGN PRESSURE	DESIGN TEMPERATURE
<b>Tube Side</b>	75 - 450 psi 517 - 3,102 kPa	-20 - 650°F -29 - 343°C
<b>Shell Side</b>	75 - 300 psi 517 - 2,068 kPa	-20 - 650°F -29 - 343°C

**Note:** Custom designs to 3,600 psi/24,816 kPa and 1000°F/538°C, depending on shell diameter and design temperature.

## MATERIALS

### Standard Designs

#### Shells

- Shells - Steel, 304SS, 316SS, 304LSS, 316LSS up to 42-inch diameter

#### Bonnets/Channels

- Bonnets/channels - Steel, 304SS, 316SS, 304LSS, 316LSS, Cast Iron, Cast Bronze, Ductile Iron.

#### Tubesheets

- Tubesheets - Aluminum Bronze, 90/10 CuNi, Muntz, RNB, 304SS, 316SS, 304LSS, 316LSS Steel.

#### Tubes

- Tubes - Carbon Steel, Stainless Steel, Nickel and Nickel Alloys, Titanium and other Alloys. Bare and Lo-Fin Tubing.

## CAPABILITIES

- Hydraulic tube expansion
- Seal and strength welding of tubes to tubesheet
- Expansion joints (flanged and flued head as well as bellows type)
- Surface finish analysis
- Heat transfer test laboratory (4,000 ft<sup>2</sup>)
- Helium leak testing
- Radiographic, ultrasonic and magnetic particle testing (sub-contracted)
- API oil flushing

## DESIGN CAPABILITIES

### Custom Designs

#### Materials

- Stainless steel(s) (including Alloy 20, 317SS, AL6XN, 904LSS, etc.)
- Hastelloy • Titanium • Monel
- 90/10 CuNi • 70/30 CuNi • Inconel
- Incoloy® • Avesta 254SMO

(Note: Weld qualifications may have to be developed)

#### Diameter

- Up to 42 inches for standard designs; custom designs up to 60 inches

#### Length

- Up to 30 feet for standard steel designs and 21 feet for standard stainless steel designs; custom designs up to 40 feet.

#### Temperature

- From -20°F (-29°C) up to 655°F (343°C) with standard designs; custom designs from -300°F (-184°C) up to 1000°F (538°C).

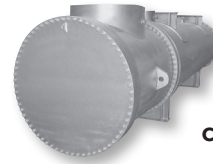
#### Weight

- 50 tons maximum

## SPECIFICATIONS

- ASME Section III "N" stamp
- ASME Section VIII Division 1
- TEMA Classes "B", "C" and "R"
- API
- ABS
- US Navy (Mil C-15730)
- The Pressure Equipment Directive (97/23/EC)

## MODELS OF EFFICIENCY



CENTURY SERIES®



BRAZEPAK®



PLATEFLOW®



AIREX® AND FANEX®



PRE-ENGINEERED SERIES



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