

SAMPLE COOLERS



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This section contains information on Cleaver-Brooks sample coolers. The Model SC22 and SC42 Sample Coolers are used to cool boiler water samples under pressure so that an accurate sampling can be made. When boiler water samples are taken without being properly cooled (while under boiler pressure), as much as 20% of the sample can flash to steam, causing inaccurate measurement of boiler water quality.

FEATURES AND BENEFITS

Heavy Duty All Stainless Steel Wetted Parts:

- SC-22 cools boiler water samples up to 635 °F and 2000 psig.
- SC-42 cools boiler water samples up to 1000 °F and 5000 psig.

True Counterflow Cooling:

- Effective baffling on the shell side produces full counter flow with high cooling water flow and minimum pressure drop, vibration and scaling.
- Proper temperature achieved.

Compact Design:

- SC-22 3-9/16" square x 5-1/2" long compact size. Easily mounted in cooling water piping without using brackets or special supports.
- SC-42 3-9/16" square x 11-1/4" long mounted in cooling water piping without using brackets or special supports.

Stainless Steel Coil:

- Single continuous tube with no joints assures long, maintenance free operation.

Removable Shell:

- Shell can be easily removed for inspection and/or cleaning without disconnecting sample water lines.

Lowest Cost:

- Largest heat transfer surface per unit of cost of any sample coolers.

PRODUCT OFFERING

The sample cooler is a low-pressure-drop system for monitoring boiler water quality without shutting down the boiler system. A simple, compact design cools samples with minimum disturbance to system pressure. The 316 stainless steel tubing is a continuous, jointless, coil arrangement. Tubing is maintenance-free

The design has baffling on the shell side to achieve high cooling water flow, minimizing pressure drop, vibration and scaling. The shell can be easily removed for inspection and/or cleaning without disconnecting sample or water lines.

SC-22

Rated for 635 °F at 2000 psig. Shell is 304 stainless steel, rated at 450 °F, 250 psig.

SC-42

Rated for 1000 °F at 5000 psig. Shell is 304 stainless steel, rated at 650 °F, 450 psig.

SC-22 Panel

The SC-22 is available in a pre-assembled panel mounted kit including:

- Stainless steel mounting panel
- Cooling water inlet and outlet valves
- Sample inlet metering valve and isolation valve
- Stainless steel sink with drain

DIMENSIONS AND RATINGS

Dimensions for Model SC-22 are shown in Figure H14-1, and for the SC-22 Panel in Figure 2. Figure 4 shows dimensions for Model SC-42. Ratings are shown in Table 1.

ENGINEERING DATA

Refer to Figure 3 (SC-22) and Figure 5 (SC-42) for performance curves. These diagrams show the relationship of outgoing sample temperature to incoming cooling water temperature for various sample temperatures (diagonal lines) and flow rates.

Example: The water sample is 1/4 gpm (946 cc/min) at 400 °F and is to be cooled to less than 100 °F and the cooling water is 95 °F. Follow the dotted line at 0.25 gpm to 400 °F inlet temperature. Read 18 °F temperature approach. Sample pressure drop will be approximately 6.5 psig. Sample will cool to 88 °F, (70 °F coolant + 18 °F approach).

Table 1. Sample Cooler Ratings

MODEL NO.	SHELL DESIGN	TUBE DESIGN	TUBE MATERIAL	SHELL & HEAD MATERIAL	AREA	WEIGHT
SC-22	250 psig @ 450°F	2000 psig @ 635°F	1/4" OD SS ^A	304 SS	1.2 sq-ft	9 lbs
SC-42	450 psig @ 650°F	5000 psig @ 1000°F	1/4" OD 316 SS	304 SS	2.4 sq-ft	12 lbs

A. Tubing is 300 series stainless steel with chemical and physical properties equal to, or better than T304.

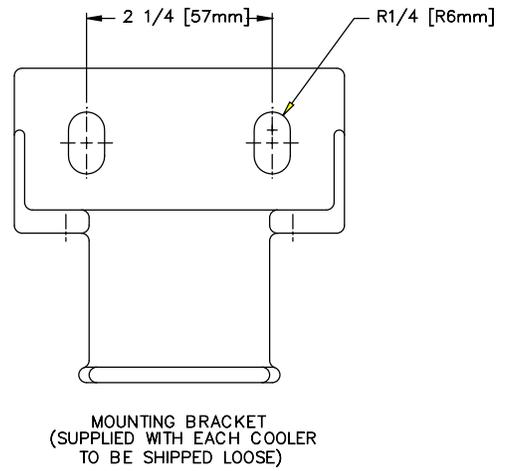
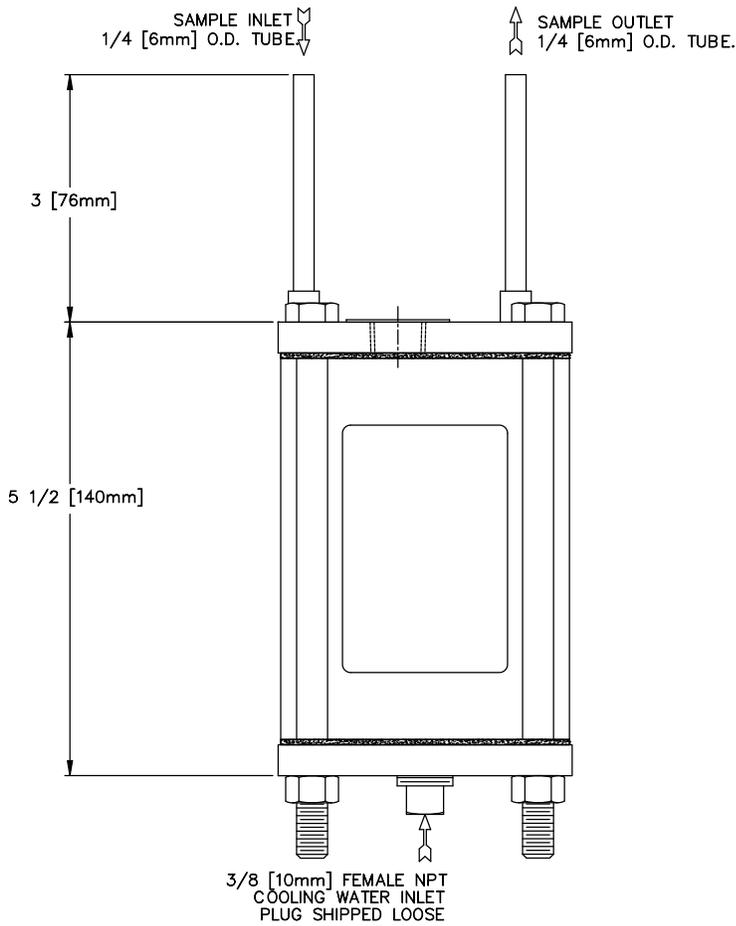
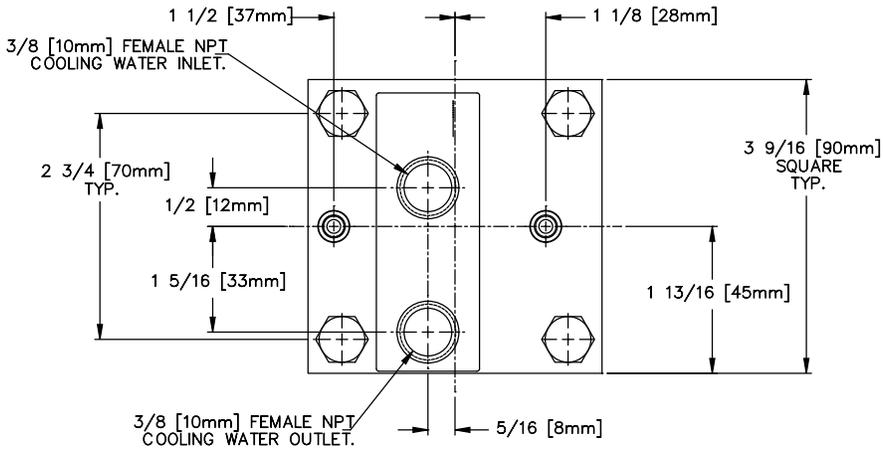
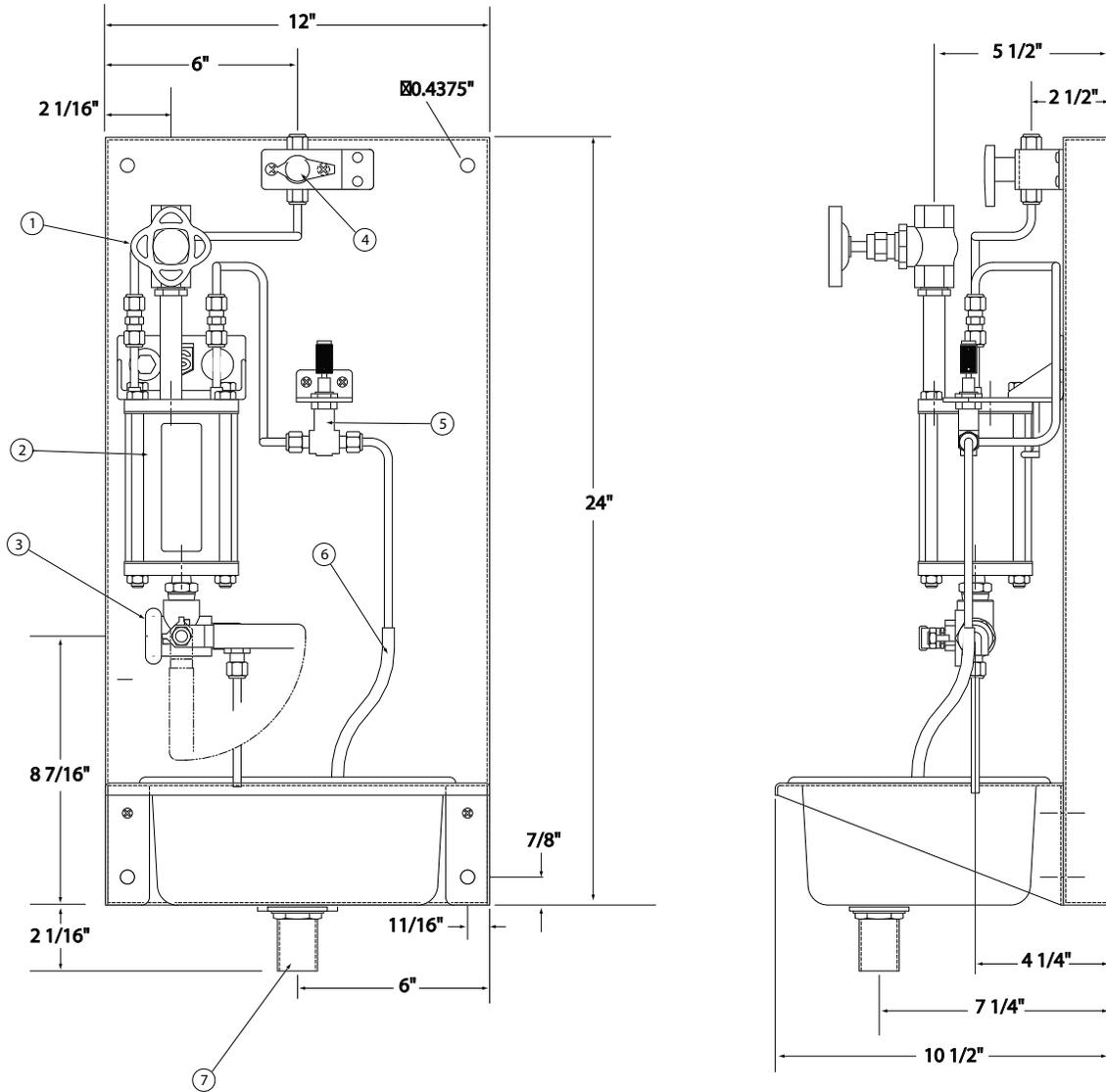


Figure 1. SC-22 Dimensions



ITEM	DESCRIPTION
1	COOLING WATER OUTLET GLOBE VALVE 1/2" NPT
2	SAMPLE COOLER MODEL SC-22
3	COOLING WATER INLET BALL VALVE 1/2" NPT
4	SAMPLE INLET ISOLATION VALVE 1/4" COMP.
5	SAMPLE THROTTLING METERING VALVE
6	TYGON TUBE GRAB SAMPLE
7	SINK DRAIN, 1" NPS

RATINGS:
 PRESSURE.....250 psi
 TEMPERATURE.....405°F

Figure 2. SC-22 Panel

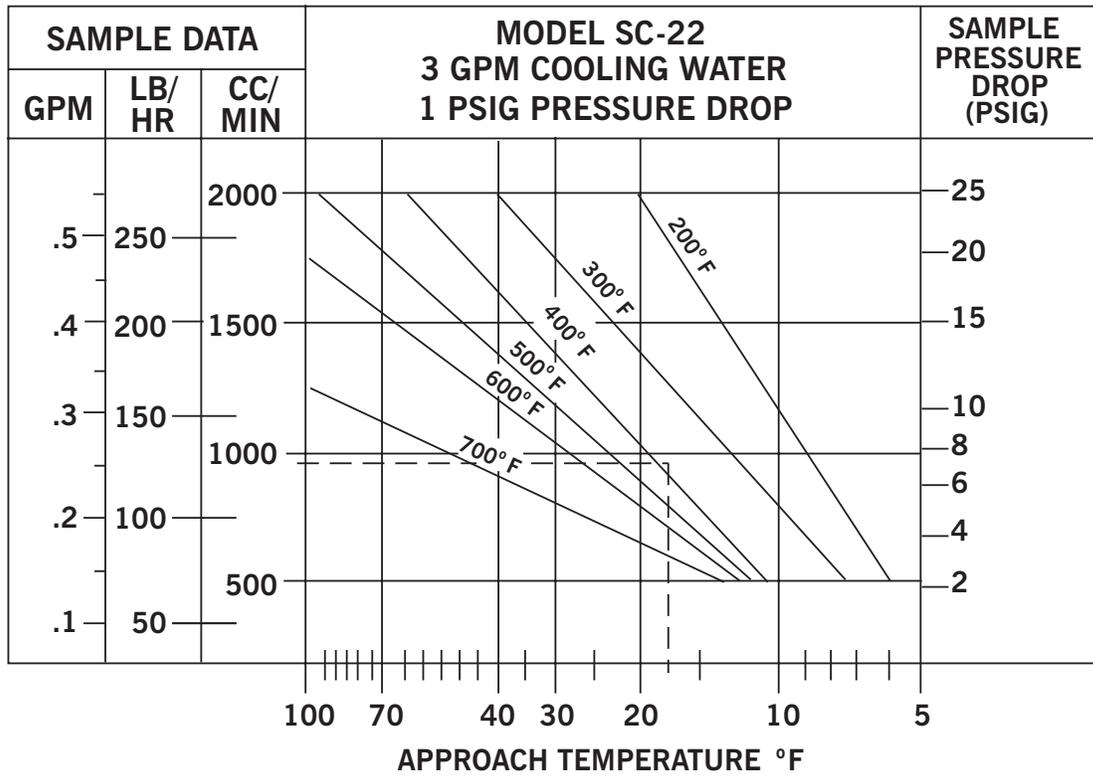


Figure 3. SC-22 Performance Curves

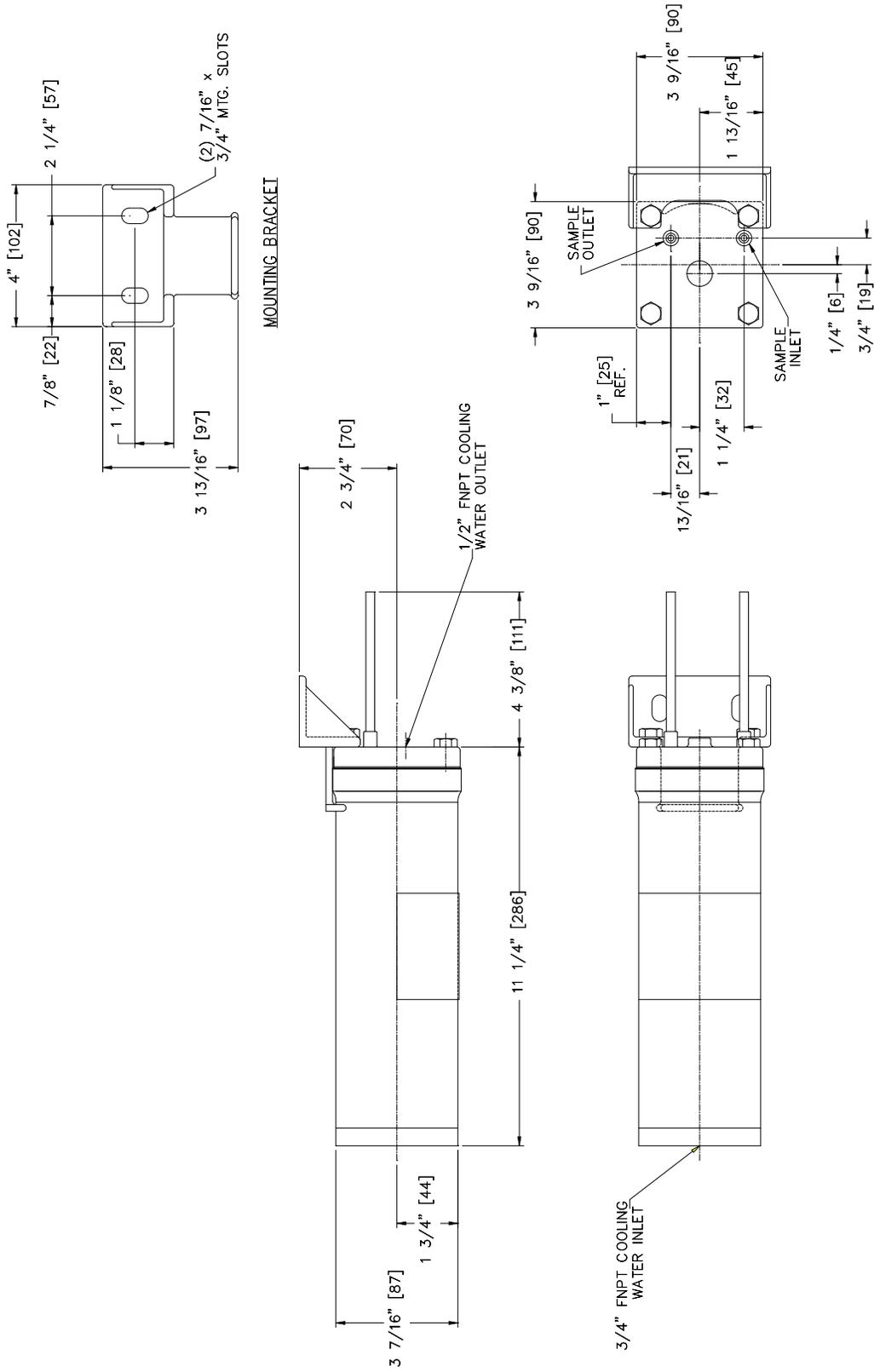


Figure 4. SC-42 Dimensions

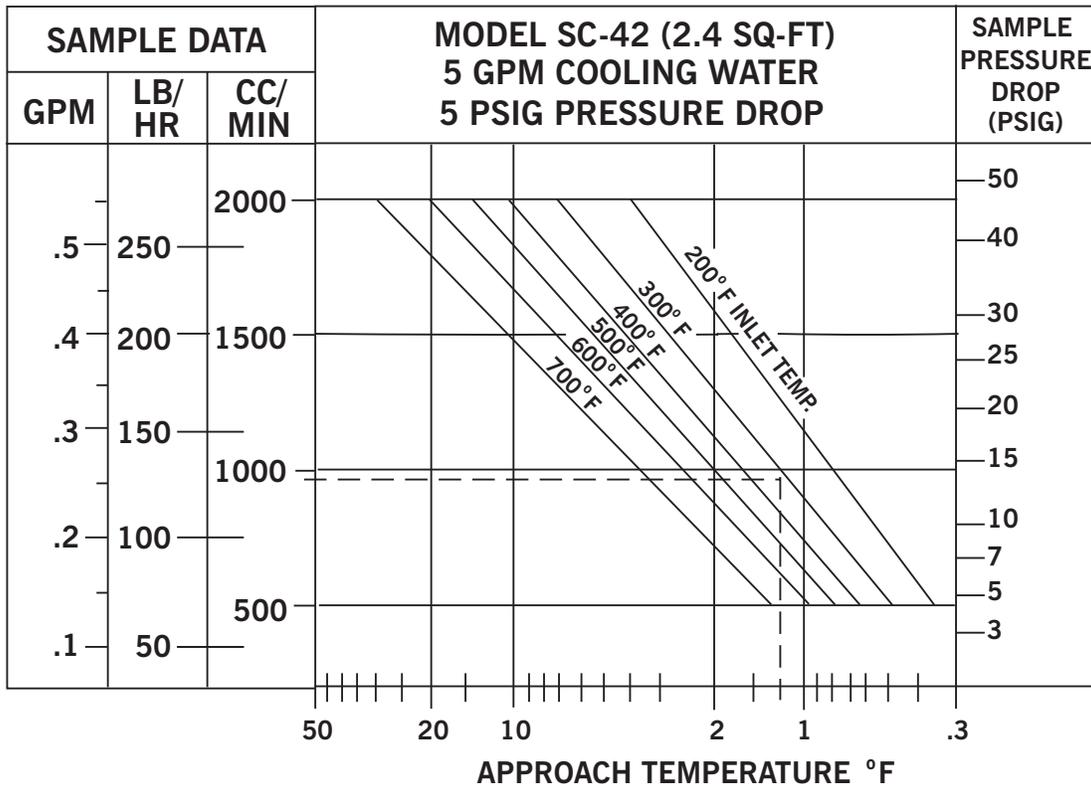


Figure 5. SC-42 Performance Curves

SAMPLE SPECIFICATIONS

1.1 GENERAL

The following sample specifications are provided by Cleaver-Brooks to assist you in specifying your customer's requirements.

A. SC-22

1. Furnish _____ Cleaver-Brooks Model SC-22 sample cooler(s) consisting of 304 stainless steel head and shell, jointless coiled T304 stainless steel tubing, and a carbon steel mounting bracket.
2. The sample cooler shall be of compact bolted design and shall require no larger space than 3-9/16" square x 5-1/2". The tubing and shell shall be removable for cleaning without disturbing connections. The cooling water connections shall be 3/8" FPT and the sample tube connections shall be 1/4" OD.
3. The tubing shall be rated at 2000 psig at 635 °F. The surface area shall be 1.2 sq-ft.

B. SC-22 PANEL

1. Furnish _____ Cleaver-Brooks Model SC-22 Panel pre-assembled kit. Includes Model SC-22 sample cooler as specified in Item A above, and the following additional equipment.
2. 12" x 24" stainless steel mounting panel.
3. Sample throttling metering valve and sample inlet isolation valve.
4. Cooling water outlet globe valve and inlet ball valve.
5. Stainless steel sink with 1" NPS drain fitting.

C. SC-42

1. Furnish _____ Cleaver-Brooks Model SC-42 sample cooler(s) consisting of 304 stainless steel head and shell, jointless coiled T304 stainless steel tubing, and a carbon steel mounting bracket.
2. The sample cooler shall be of compact bolted design and shall require no larger space than 3-9/16" square x 11". The tubing and shell shall be removable for cleaning without disturbing connections. The cooling water inlet connection shall be 3/4" FPT and the cooling water outlet connection shall be 1/2" FPT. The sample tube connections shall be 1/4" OD.
3. The tubing shall be rated at 5000 psig at 1000 °F. The surface area shall be 2.4 sq-ft.