Blowdown Separator
& Aftercoolers
Installation, Operation, and Maintenance

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INSTALLATION — BLOWDOWN SEPARATOR

Installation of the CB Blowdown Separator is not complicated. However, proper installation is necessary and the following may suggest some possible system configurations. In the examples that follow, the boiler, blowdown valves, and piping to and from the separator would be provided by others. Installations may vary from the examples shown.

The inlet should be piped from the boiler blowdown valves using Sch. 80 min. code rated materials. The piping pressure to the inlet should be rated to the design pressure of the boiler. A ‘dead- boiler’ drain should be provided off the inlet piping as shown.

The CB separator is an instantaneous separator - therefore sufficient drainage must be provided to allow the unit to drain as quickly as the blowdown flow is separated. The floor drain should be steel, cast iron, or concrete of the same size or larger than the separator drain and aftercooler. Drains should be sloped a minimum of 1’ per 100’. More slope or larger size should be used on obstructed or angled drains.

The vent should also be as direct as possible to atmosphere to limit pressure drop. The same size pipe as the separator vent should be used. The vent should be extended above buildings, work areas, and personnel to a safe point of discharge. Flashing should be used when vent is through a composition roof.
**Figure 1** shows the simplest and most practical installation. This arrangement will provide ready drainage for most heating or process boilers. A dead-boiler drain is also included (boiler, piping, and blowdown valves provided by others).

Optional angle iron legs can be provided to support the separator off the floor. These legs vary in length depending on the size of drain and type of after cooler used.

As an option, water tempering may be added to the separator as shown. Our water tempering aftercooler package includes aftercooler fitting, temperature regulator valve, strainer and bimetal thermometer. A check valve and pressure reducing valve (not shown) could also be provided as an option. Cooling water pressure to the valve should be limited to 60 psig. See additional instructions below for the aftercooler fitting installation.

**Figure 1**

Elevated or outdoor installations (**Figure 2**) may be used where boiler room floor space is at a premium.

Outdoor installations are popular because “underroof” space is not consumed. The installation can be off the ground as in Figure 1 or elevated as in Figure 2. Because the separator is self-draining, there is no risk of freezing. The temperature regulator valve should be located indoors and the bulb and capillary protected from freezing. Wall mounting brackets can be supplied as an option for wall mounted installations.
Localities requiring storage tempering may use a blowdown separator only if discharged to a holding device such as an open, closed but vented, slotted or grid top receiver. The receiver should be capable of holding the accumulation of two blowdowns. A manual drain or a siphon drain may be used on the receiver. The siphon drain turn should be located at the top of the first blowdown level. The separator should be located at a sufficient height so that additional blowdown mixes well with the cooled blowdown being held in the receiver. A manual drain should always be provided on the receiver for periodic cleaning.

Local regulations should prevail at all times. Consult your insurance agency for additional requirements regarding the use and installation of blowdown separators. Welding on an ASME code pressure vessel requires a certified welder who carries the appropriate stamp for the procedure.

These separators handle hot steam and condensate. Caution should be used when working on or around the pressure vessel.

**OPERATION and MAINTENANCE**

The separator is an integrally welded unit with no removable or replaceable parts. The only maintenance required on the separator is to keep the vessel exterior clean and free of rust.

Normal boiler blowdown procedures as recommended by the boiler manufacturer should be used as the operating procedure for the separator.

To minimize shock and water hammer, the blowdown valve should be opened slowly to allow the blowdown line and separator to warm. This can also help cooling water mixing to start.

Refer to aftercooler instructions below for separators with drain water cooling accessories.

Since the separator is self-draining and self-drying, there are no other instructions. Simply follow the normal boiler blowdown procedure.
BLOWDOWN TANK OPERATION AND MAINTENANCE
Operation of the blowdown tank will be determined by the normal blowdown procedures of the boiler to which it is attached.

Since blowdowns are for the purpose of removing concentrations and sediment on the boiler bottom, quick short blowdowns are more effective than one long blowdown of the same water quantity. The first blow should be slow opening to minimize shock on blowdown piping.

No boiler should be blown down into a blowdown tank which contains water at a temperature exceeding the room temperature unless the tank is fitted with a water cooling device. When the temperature of the water in the tank exceeds room temperature, the temperature should be reduced to room temperature before blowing down a boiler.

If a blowdown tank is used in connection with multiple boilers, it may be desired to blow down the boilers consecutively without replacing the water in the tank after each blowdown. In this case a water cooling or mixing device with automatic temperature control should be attached to the tank or to the water discharge line so that cold water will be mixed with the blowdown water. The resulting mix should be at or below 150 deg F. For proper cooling of the water leaving the blowdown tank, the rate of cooling water should be at least equal to the rate of water leaving the tank.

If the tank is less than one-half full after a boiler is blown down, it should be brought to the proper level by adding water before the next blowdown.

If during a blowdown the water seal level cannot be maintained, the water outlet line should be reduced one pipe size. Operators are cautioned that a reduction of water outlet pipe size may cause an increase in pressure in the tank. As a general rule, an outlet-to-inlet size ratio of 2:1 should be sufficient to compensate for any resistance in the piping upstream of the drain. A 1:1 outlet-to-inlet ratio would assume minimal resistance and pipe length. If the tank pressure at any time exceeds 5 psi, the vent pipe size should be increased and if necessary, additional vent area to the tank provided.

All scale and sediment that is blown from the boiler that does not remain in solution with the water will deposit in the bottom of the tank. Therefore, the tank should be blown down and cleaned internally at sufficient intervals to prevent sediment accumulation to a point that would close off the outlet.
INSTALLATION AND OPERATION — AFTERCOOLERS

The selected aftercooler is screwed into the drain line after the separator. The cold water inlet coupling should then be piped to the cooling water through the valve and accessories as illustrated below. The bottom of the aftercooler is then piped to a service drain. The drain should be steel, cast iron, or concrete of the same size or larger than the aftercooler. Drains should be sloped a minimum of 1' per 100'. More slope or larger size should be used on obstructed or angled drains.

Figure 4 shows the 5D manual aftercooler with recommended piping including manual valve and accessories.

The 5D is a manual aftercooler. Cooling water is added to the hot condensate stream by opening the manual valve. The check valve and strainer protect the manual valve.

Figure 5 shows the 18DF automatic aftercooler with recommended piping for the temperature regulator valve and accessories.

The 18DF is an automatic aftercooler. The self-actuating valve senses the drain temperature and adds cooling water until the set temperature is met. A mixing tongue is provided on 4” units and larger. The drain temperature can be continuously monitored on the bi-metal thermometer. The middle flanges permit rotation for various pipe fitting requirements and also serve as a dismantling point.

The self actuating temperature regulating valve bulb or the solenoid valve sensing element and the bi-metal thermometer stem are inserted into the bulb connections on the aftercooler in that order. If a bulb does not fit correctly into the aftercooler, a nipple could be added to lengthen the connection. The bulbs should project into at least the center of the aftercooler. Instructions also accompany the temperature regulator valve or solenoid valve.

Not shown are the 16DS automatic aftercooler and the 20AO spray-type aftercooler. The 16DS aftercooler is the same as the 18DF model without the center flanges. The 20AO aftercooler is a jacketed type aftercooler required in some areas. This unit uses several cold water sprayholes. It can also be used to knock down steam.

For models 16DS and 20AO follow the same installation procedure as the 18DF.
CB aftercoolers are non-clogging. The short nozzles and high velocities prohibit deposit buildup and clogging which can typically occur at high temperatures.

⚠️ **CAUTION** The surface of the aftercooler may be hot. Use caution when working around the vessel.