



eSteamG Venturi Condensate Removal Assembly User's Manual

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1. INTRODUCTION / SUMMARY

eSteamG Venturi Condensate Removal Assembly (Venturi) is a device consisting of a venturi unit combined with a Y-strainer and drain valve installed in a steam system to eliminate condensate and hold back supply steam. This is accomplished by proper sizing the orifice of the venturi unit to match the pressure and load specs of the application. This orifice is sized to handle the maximum condensate load for that application in the system. eSteamG is available for support and to address your questions.

Venturis work on the basis of turbulent flow. Steam traveling the speed of sound continuously forces much slower condensate (about 30 mph) through a precisely sized hole. Venturis are sized to handle 100% of the condensate produced by an application. At 100% load, an accurately sized orifice is fully and continuously occupied with condensate. Condensate is continuously being purged, while steam is blocked completely from escaping.

When the load drops below 100%, the solid condensate stream that completely blocks steam loss becomes a violently turbulent mixture of equivalent volumes of steam and water, a phenomenon called two-phase flow. Since condensate is several times denser than steam, steam loss is negligible. With no moving parts, Venturis should retain their initial efficiency indefinitely.

eSteamG technical and installation support:

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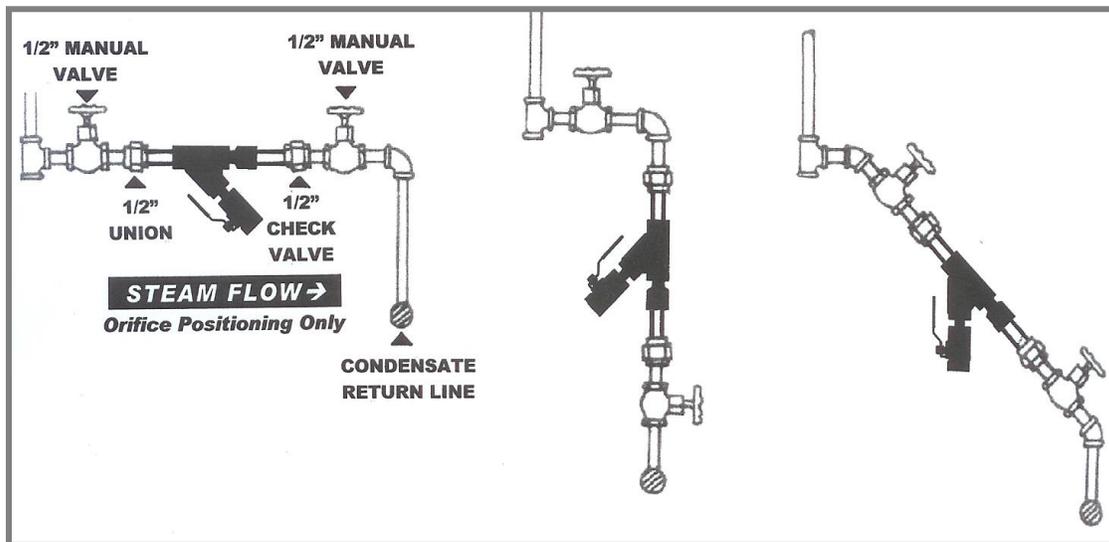
2. INSTALLATION

Receiving, Handling and Inspection

- Inspect the steam trap assembly for damage incurred during transit. Report damage to eSteamG immediately.
- Check to be sure the rated pressure and temperature for the Venturi is not less than the maximum pressure and temperature of the installation. Contact eSteamG if there is a question about the rating.
- If the orifice trap assembly is not installed immediately, store indoors in a clean dry cool environment.
- Do not stack anything on the steam trap assemblies.

Venturi General Installation Instructions

- a) Each location of a Venturi in the system has been sized for a specific orifice. Please make sure that the orifice size matches the condensate load for the specific location being installed.
- b) Position the Venturi in the line so that the fluid enters the inlet end of the assembly. The Venturi design is such that it is not necessary that the assembly be perfectly vertical or horizontal.



- c) Be sure sufficient headroom is provided for easy access for servicing the Y-strainer.
- d) Connect the steam trap assembly to the line.
- e) It is recommended that the drain plug be removed and drain valve be installed at the bottom of the Y-strainer screen chamber. Such strainer drain valve is recommended for all Venturis under 600 Class and is needed for preventive maintenance and troubleshooting.
- f) Pressure gauges near the Venturi inlet and outlet are recommended.
- g) Check valves should be installed wherever there is the possibility of reverse flow.

3. OPERATION

Operation Start-Up

To start up the system the gate valves on the strainers should be opened up to drain any condensate left in the lines at shut down. After the system starts to build pressure, close the drain valves. This will also serve as the blow-down procedure for annual blow-down.

Caution

Start system gradually. This eliminates sudden shock to strainer and other equipment in the line.

Shut-Down

Tightly close isolation valves on inlet and outlet connection of the Venturi.
Open drain valve to relieve liquid pressure in the Venturi.

4. MAINTENANCE

For the Y-strainer, it is recommended that they be blown down two or three times following initial installation due to the possibility of pre-existing contaminants in the system or flaking as the system starts up. After blow down, heat check the hot and cold side of the Venturi. If the temperatures are in the range indicated by a saturated steam tables the Venturi is performing properly (adjust for superheat if present).

Thereafter, for general maintenance it is recommended that an annual blow down be performed on all drip leg units size 6 (.047") and smaller followed by the above referenced heat test.

Periodical Heat Checks

eSteamG recommends that a quarterly heat check be done of the strainer to insure condensate flow through the orifice. The temperature on the strainer should be in the range of the steam temperature. If the strainer is cold, follow the instructions in Section 5. Fault Finding / Correction / Troubleshooting to check the screen and orifice for blockage, and if necessary replace the screen.

eSteamG recommends that an annual check of the venturi unit be done, and that an annual blowdown be done for line maintenance. The temperature differential across the Venturi should be measured, with a wide differential indicating high efficiency. If the temperature is below initial or target temperature, it is likely that water is backing up. Check strainer first to see if the strainer basket is full. If not, the Venturi should be removed following the instructions in Section 5. Fault Finding / Correction / Troubleshooting to check for blockage. Although it is unlikely that there will be many instances requiring steam trap assembly replacement, it is recommended that a spare venturi unit be kept in stock for each size orifice as well as sufficient spare Y-strainers.

If the temperature differential is below initial or target temperature and there is no blockage in the strainer or orifice, contact eSteamG for technical support.

It is essential that the proper Venturi be used in the designated location. If changes are made to the condensate loads, pressures or temperatures, or changes are made to the equipment, a resized Venturi may be required.

Screen Removal

- a) Follow shut-down procedure.
- b) When pressure is relieved, loosen bolts on the strainer. Drain fluid through bottom drain to a level below the screen seat.
- c) Remove cover on strainer.
- d) Remove dirty screen

Screen Replacement

- a) Check to see that the screen mesh is correct for the orifice size (generally 40 mesh)
- b) Place new screen squarely on basket seat. Inspect cover gasket and seal surface; clean seat or replace cover gasket as necessary. A gasket should be replaced if it is warped, has lost elasticity or is overly worn.
- c) Always keep spare Flexitallic gaskets in stock
- d) Replace strainer cover; tighten strainer bolts
- e) Follow start-up procedure.

Screen Cleaning

It will probably be easier most of the time to replace the screen rather than cleaning it, but if screens are cleaned, use the following procedure.

How to Clean Screen

- a) Invert screen and wash out debris by directing a stream of air or water against the screen exterior.
- b) Note: Do not allow screen contents to dry, as this will make cleaning most difficult.
- c) Inspect screen at each cleaning for holes or tears; repair or replace as required.
- d) Always keep spare screens in stock.

Shut-down Periods

During shut-down periods

- a) Drain the fluid
- b) Clean the Screen

Venturi Unit

The 316 stainless steel venturi unit is permanent and warranted for 15 years. Properly sized Venturis will have a large temperature differential across the trap, a measure of efficiency.

Because the venturi unit has no moving parts to fail, no maintenance is required except in case of blockage. In case of blockage, replace the whole assembly with a spare, unplug the plugged assembly offline, and then store the assembly for use as a spare, checking the condition of the strainer and cleaning as necessary.

To replace the assembly, locate a proper spare assembly, follow the procedures for shut-down, Venturi removal, and Venturi installation. Once the plugged assembly has been cleared it should be reusable as a spare.

For checking and cleaning the strainer follow the procedures for screen removal, screen cleaning and screen replacement.

Venturi Removal

- a) Follow shut-down procedure.
- b) When pressure is relieved, loosen unions or bolts, depending on how venturi is isolated. Drain fluid through bottom drain to a level below the screen seat.
- c) Remove Venturi.

Safety

It is important to follow the plant's proper shutdown and start up procedures when doing maintenance or Venturi replacement, and to follow piping best practices.

5. FAULT FINDING / CORRECTION / TROUBLESHOOTING

The venturi unit has no moving parts. It can be either sized incorrectly for the actual condensate load or become clogged. If an operational issue occurs at the location of a Venturi, eSteamG recommends the following procedure to determine whether the Venturi has clogged or if the operational issue is related to something else. eSteamG is available for steam system problem solving.

1. Check to insure that the Venturi has been installed in the proper direction as noted by the arrows on the Y-strainer of the assembly. For general reference, the Y-Strainer side of the Venturi assembly should be on the upstream side of the piping and the venturi unit of the Venturi assembly should be on the condensate expulsion side of the piping. Refer to drawing above.
2. While the steam system is in operation, heat check the upstream (hot) and downstream (cold) side of the Venturi and note the temperatures.
3. Next open the drain valve on the Y-strainer and blow down the screen to clear any debris that may have accumulated for 30 seconds or so.
4. Close the drain valve and repeat the heat test to see if the hot side temperature has returned to the normal range. Monitor the temperature over the next several minutes to ensure the application has stabilized.
5. If the temperatures are in the range indicated by a standard, superheated, or saturated steam tables, the Venturi is performing properly and the issue lies elsewhere. You can contact eSteamG for technical assistance in the analysis of the problem.
6. If the temperatures return below the range indicated by the steam tables, the venturi unit may be plugged, requiring maintenance to isolate the Venturi. First remove the screen in the Y-strainer to ensure it is clear. The screen may need to be replaced. Next remove the venturi unit and check for plugging. The venturi unit may be physically unplugged or replaced with a unit with the same size orifice. Contact eSteamG for technical assistance.