Inverted Bucket Trap Capacity Chart

20,000 18,000 16,000 14,000 12,000 10,000 9,000 8,000 7,000 6,000 5,000 4,500 4,000 3,500 3,000 2,000 2,500 1,800 1,600 1,400 1,200 1,000 900 800 700 600 500 400 240

POUNDS OF CONDENSATE PER HOUR—ACTUAL CAPACITY OF TRAP, CONTINUOUS DISCHARGE

PRESSURE DIFFERENCE BETWEEN STEAM LINE AND RETURN LINE

NOTE: Above capacity chart does not include all models available. Refer to specific page of trap required for capacities not covered above.
How to Use the Inverted Bucket Trap Capacity Chart

This catalog should be utilized as a guide for the installation and operation of steam trapping equipment by experienced personnel. Selection or installation should always be accompanied by competent technical assistance or advice. Armstrong and its local representatives are available for consultation and technical assistance. We encourage you to contact your Armstrong representative for complete details.

To select an inverted bucket steam trap using the Armstrong capacity chart, you must know the condensate load, safety factor and pressure differential. Remember, the objective is always to select a trap that can 1) operate at the maximum differential pressure and 2) handle the capacity at the minimum differential pressure. Consider the following typical problems.

EXAMPLE 1. Constant Pressure and Condensing Rate
Given:
Maximum pressure differential __________ 70 psi
Operating differential __________ 60 psi
Condensate load 300 lbs/hr
times 3:1 safety factor or __________ 900 lbs/hr

Enter chart at 60 psi line and go up to 900 lbs/hr capacity. This is directly on the \( \frac{5}{32} \) " orifice line as shown in Fig.13-1. The capacity of this \( \frac{5}{32} \) " orifice at pressures less than 30 psi is indicated by the thin blue line. Follow the line to the right to the vertical drop at 70 psi. This means this orifice will operate to a maximum of 70 psi differential—the other requirement for this application. Follow the heavy line back to the left and note that it's attached to the arrow indicating that the 211, 811 or 881 traps with the \( \frac{5}{32} \) " orifice will yield this capacity. This is the trap to use.

EXAMPLE 2. Constant Pressure and Condensing Rate but with Possible High Back Pressure
Assume for example:
Maximum pressure differential __________ 90 psi
Operating differential minimum __________ 40 psi
Operating differential normally __________ 60 psi
Condensate load 300 lbs/hr
times 3:1 safety factor or __________ 900 lbs/hr

Note in Fig.13-1 that the \( \frac{5}{32} \) " orifice will handle the 900 lbs/hr load at a differential pressure of 60 psi. When the operating differential drops to the minimum level (40 psi), however, the capacity is only 900 lbs/hr.

To solve the problem, refer to the sawtooth chart. Enter at the minimum differential pressure (40 psi) and move up until you intersect a line that is above 900 lbs/hr capacity, which is the first thin blue line above the heavy blue "sawtooth" for the 211, 811 and 881 traps. Note that this is the continuation of the capacity line for the \( \frac{5}{32} \) " orifice for the 212, 812 and 882 traps. Now follow the line to the right until the vertical drop at 125 psi differential. This is within our requirement of 90 psi. Therefore a \( \frac{5}{32} \) " orifice can handle the 900 lbs/hr condensate load when fitted into a 212, 812 or 882 trap and that it will not lock shut at the 90 psi maximum differential. This is the trap to use since it will handle the load at both the minimum and maximum operating differentials, even though it has a maximum operating pressure differential of 125 psi.

How the Capacity Chart Was Made
The Armstrong capacity chart shows continuous discharge capacities of Armstrong traps under actual operating conditions as determined by literally hundreds of tests. In these tests condensate at the steam temperature corresponding to the test pressure was used. The choking effect of flash steam through the orifice, as well as the back pressure created by flash steam, were automatically taken into account. Actual installation hookups were used so that pipe friction in both inlet and discharge lines also were reflected in the results.

Trap capacity ratings based on cold water tests which produce no flash steam would be much too high. Orifice tests also are too high because they ignore pipe friction. Theoretical calculations of trap capacities have never been conservative. You can depend on Armstrong capacity ratings because they show actual capacities of hot condensate.

Heavy blue “sawtooth” curves show capacities for traps using maximum possible diameter orifices for the pressures shown.

Thin line curves extending down to the left of the heavy curves show the capacities of Armstrong traps at pressures below their maximum ratings. For example: A No. 216 trap, with \( \frac{1}{2} \) " orifice good for a maximum working pressure of 125 psi, will have a continuous discharge capacity of a little less than 12,000 lbs/hr at 40 psi.

Close study of this chart reveals that steam trap capacity is governed by more than just the orifice diameter. A 2" No. 216 trap with \( \frac{1}{2} \) " discharge orifice, working at 15 psi pressure, has a continuous discharge capacity of some 7,200 lbs/hr, but a \( \frac{3}{4} \) " No. 213, also with \( \frac{1}{2} \) " orifice and also working at 15 psi pressure, has a continuous discharge capacity of only 3,900 lbs/hr. In the case of the No. 213, friction in the \( \frac{3}{4} \) " pipe is greatly restricting capacity, whereas there is little capacity loss due to pipe friction when a \( \frac{1}{2} \) " orifice is used in a 2" pipe at 15 psi.