How to Use the IB Trap Summary 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.

The summary capacity chart plots actual trap capacity vs. inlet pressure on a log-log grid. The trap capacities become **straight lines** on this grid. The **small numbers** along the pressure axis identify the subdivisions; for example, between the large 10 and 100, the numbers 2, 3, 5, and 7 represent 20, 30, 50 and 70 psig.

The summary chart combines many trap families into one chart by presenting only a portion of the capacity line for each orifice size. For charts that give capacity over a wide range of pressures, see the specific trap model pages.

Individual capacity charts for various traps are given throughout this catalog. Those charts show capacity lines for each orifice, with pressures usually from 1 psig up to the maximum rated pressure of that orifice.

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

Example 1. Constant pressure, condensing rate.
Given:
Maximum inlet pressure . . . . . .70 psig
Normal operating differential pressure . . . . . 60 psig
Required capacity = 300 lb/hr condensate load
times 3:1 safety factor, or . . . . . 900 lb/hr

Enter the chart at the 60 psig line and go up to 900 lb/hr capacity. This is directly on the 5/32" orifice line for models 211, 811 and 881 (and other traps). Now follow this line to the right, to the vertical drop at 70 psig. This means the orifice will work, in these traps, up to a maximum differential of 70 psig. Assuming a cast iron trap is suitable, the 5/32" orifice in a Model 211, 811 or 881 trap will meet all the operating requirements.

Example 2. Constant condensing rate but with possible reduced inlet pressure.
Given:
Maximum inlet pressure . . . . . .100 psig
Minimum inlet pressure. . . . . .40 psig
Required capacity = 400 lb/hr condensate load
times 3:1 safety factor, or . . . . . .1 200 lb/hr

Consider the maximum operating pressure first. Enter the chart at the 100 psig line and find the first capacity line above 1 200 lb/hr. This is the 5/32" orifice in a Model 212, 812 or 882, and it has a capacity of 1 800 lb/hr at 100 psig. Now extend this straight line to the left until it intersects the 40 psig pressure line. At 40 psig, read a capacity of 1 300 lb/hr. (You could also refer to the individual capacity charts for Models 212, 812 or 882.) Assuming cast iron is suitable, this is the desired trap selection to meet the requirements of opening at the maximum pressure, and also having the needed capacity at the minimum pressure.

This example points out how the capacity is influenced by the trap size. Example 1 also used the same orifice size, but in a physically smaller trap. In the larger trap the same diameter orifice not only has a higher capacity, it will work at higher pressures.

Example 3. Constant condensing rate but high back pressure.
Given:
Inlet pressure . . . . . .100 psig
Normal outlet (back) pressure . . . . . 50 psig
Required capacity = 1 800 lb/hr condensate load
times 3:1 safety factor, or . . . . . 5 400 lb/hr

Traditional method:
Since the differential pressure is only 50 psig, enter the chart at 50 psig and go up to a capacity of 5 400 lb/hr. This is just under the capacity lines for Models 214 and 814. However, the 5/16" orifice is the largest orifice that will operate at 100 psig inlet pressure. (Remember that the back pressure may not always be there!) Extend the capacity line for the 5/16" orifice to the left, and read a capacity of 4 800 lb/hr at 50 psig. Since this is too low, go up to the 215/815 capacity lines and repeat the process. The selection will end up being a Model 215 or 815 with a 3/8" orifice.*

About this chart ...
The Armstrong capacity chart shows continuous discharge capacities of Armstrong traps under actual operating conditions, as determined by many hundreds of tests made over the years. In these tests, **hot condensate** was used, at or near the steam temperature corresponding to the test pressure. The choking effect of flash steam in the orifice and the back pressure created by this flash steam were therefore automatically taken into account. The test setups were similar to an actual installation hookup, so that pipe friction in both inlet and discharge lines was reflected in the results.

* This method is conservative. While it will always select a workable trap, it may select a larger trap than necessary. Consult Armstrong Application Engineering for further information about the effects of back pressure.

Summary Capacity Chart