How to Select and Size Armstrong Drain Traps

For Draining Liquids From Gases Under Pressure

Armstrong liquid drain traps are offered in a wide variety of sizes and types to meet the most specific requirements. The most widely used models and sizes utilize bodies, caps and some operating parts that are mass produced for Armstrong steam traps. The proven capabilities of these components, along with volume production economies, enable us to offer you exceptionally high quality at attractive prices. You can choose the smallest and least costly model that will meet your requirements with confidence.

Selection Procedure for Draining Liquid From Gas

1. Multiply the actual peak liquid load (kg/h) by a safety factor of at least 1,5 or 2. See paragraph headed “Safety Factors.”

2. From Orifice Capacity Chart LD-439-1, find the orifice size that will deliver the required cold water capacity at the maximum operating pressure. If a light liquid is to be drained, convert light liquid capacity in kg per hour to water capacity using factors in Table LD-438-1. Then find orifice size from Chart LD-439-1.

3. From the Orifice Size Operating Pressure tables on the product model pages, find the drain trap(s) capable of opening the required orifice size at a specific pressure (and specific gravity if other than cold water – specific gravity 1,0).

Note: If specific gravity falls between those shown in the tables, use next lower. Example: If specific gravity is 0,73, use 0,70 gravity data.

Safety Factors

Safety factor is the ratio between actual continuous discharge capacity of the drain trap and the amount of liquid to be discharged during any given period. Chart LD-439-1 shows the maximum continuous rate of cold water discharge of the drain trap. However, you must provide capacity for peak loads and, possibly, lower-than-normal pressures. A safety factor of 1,5 or 2 is generally adequate if applied to the peak load and the minimum pressure at which it occurs. If the load discharge to the trap is sporadic, a higher safety factor may be required. Contact your Armstrong Representative for details.

Selection Examples

EXAMPLE No. 1: Find a drain trap to drain 500 kg of water per hour from air at 33 bar pressure differential.

Multiply 500 kg/h by 2 (if not already done) to provide a safety factor; thus, a 1 000 kg/h continuous discharge capacity is required. In Capacity Chart LD-439-1, the 1 000 kg/h capacity line intersects the 33 bar pressure line directly below the #38 drill orifice curve. This orifice is available in the Models 1-LD or 11-LD drain trap, but for much lower pressures. Moving to the 32-LD, a #38 orifice is good to 34 bar. This is the trap/orifice combination to use.

Table LD-450-1, page LD-450, shows the Model 32-LD drain trap with #38 orifice will operate at pressures up to 34 bar and, therefore, is suitable for the job. Further checking shows the Model 2313 HLS drain trap with a 7/64" orifice could also handle the job, but it is designed particularly for low gravity liquids and is more costly than the Model 32-LD, so the Model 32-LD is a better choice.

EXAMPLE No. 2: Find a drain trap to drain 2 900 kg/h (safety factor included) of 0,80 specific gravity liquid from gas at 28 bar pressure differential.

Since Capacity Chart LD-439-1 is based on water capacity, the known light liquid capacity requirement must be converted to its equivalent water capacity with the factor given in Table LD-438-1: 2 900 x 1,12 = 3 250 = water capacity required for using Chart LD-439-1.

Chart LD-439-1 shows that 3 250 kg/h and 28 bar calls for a 7/32" orifice. Entering the 0,80 specific gravity column of Table LD-450-1, page LD-450, shows that a Model 36-LD forged steel drain trap will open a 7/32" orifice at pressures up to 49 bar. As a matter of fact, this drain trap will open a 1/4" orifice at 35 bar and would be the one to use.

Note: While drain traps are sized on the basis of pressure differential, steel must be used whenever gauge pressure in the drain trap exceeds 17 bar.

Where Not to Use

Float type drain traps are not recommended where heavy oil, sludge or considerable dirt are encountered in lines. Dirt can prevent the valve from seating tightly, and cold oil can prevent float traps from opening. Where these conditions exist, Armstrong inverted bucket BVSW traps should be used.

How to Order Drain Traps

Specify:

- Drain trap size by number
- Orifice size
- Pipe connections – size and type
- Maximum operating pressure

If the correct drain trap cannot be determined, tell us capacity required, maximum pressure, and SPECIFIC GRAVITY of liquid.

Tabel LD-438-1. Conversion Factors to Find Cold Water Capacity Equivalents for Light Liquids

Specific Gravity	Multiply Light Liquid Capacity in Kilogram Per Hour by:
0,95	1,03
0,90	1,06
0,85	**1,09**
0,80	1,12
0,75	1,16
0,70	**1,20**
0,65	1,24
0,60	1,29
0,55	**1,35**
0,50	1,42

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How to Select and Size Armstrong Drain Traps

For Draining Water From a Light Liquid

Armstrong dual gravity drain traps for draining water from a light liquid are described on pages LD-460 and LD-461. All models shown are identical to corresponding models of traps used to drain liquid from a gas except that float weights are modified to make them suitable for draining water from a light liquid.

Dual gravity drain trap* selection requires that you know the peak heavy liquid load, maximum operating pressure, and specific gravity of the light liquid. With this information you can determine the orifice size required from Chart LD-439-1 and find the specific drain trap that will meet your conditions from the pressure tables on the dual gravity pages.

Selection Procedure for Draining Water from a Light Liquid

1. Assume a required safety factor of 2:1. Multiply the peak load in kg per hour by 2. (See paragraph on "Safety Factors.")

2. From Capacity Chart LD-439-1, find the intersection of actual load times safety factor and the minimum operating pressure differential. Follow the pressure line immediately above this point to intersect the next higher orifice capacity curve. Then follow this curve downward and to the left to get the orifice size.

3. Inspect the tables on pages LD-460 and LD-461 to find the smallest trap that can open the predetermined orifice size at the maximum operating pressure differential. Do not oversize dual gravity drain traps. Oversizing will cause excessive fluctuation of the interface between the two liquids.

Note: While drain traps are sized on the basis of operating pressure differential, forged steel must be used when total pressure in the drain trap exceeds 17 bar.

How to Order Dual Gravity Drain Traps

Specify:

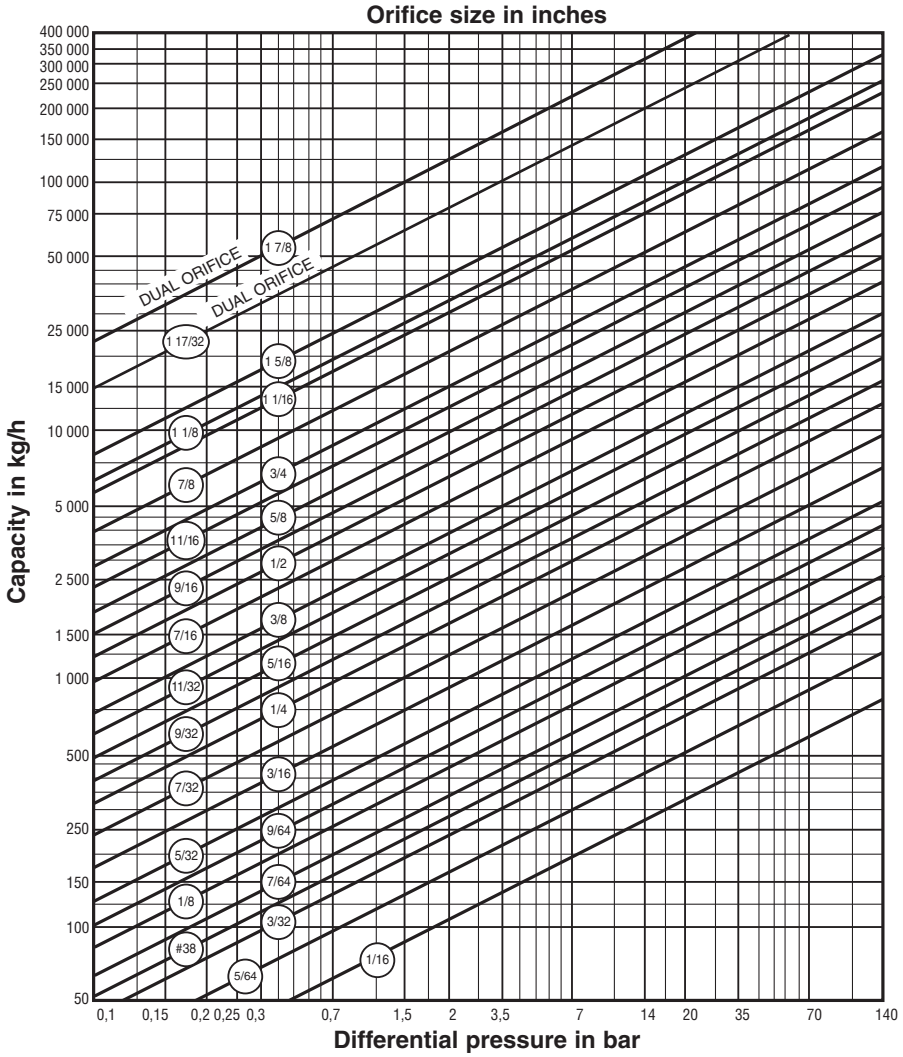
- Drain trap size by number
- Orifice size
- Pipe connections – size and type
- Specific gravity of light liquid
- Weight of water discharge per hour
- Maximum operating pressure

If you are not sure of the drain trap size to use, then specify:

- Specific gravity of light liquid
- Capacity in kg of water per hour with safety factor included
- Working pressure – maximum and minimum

Chart LD-439-1.
Calculated Cold Water Capacity of Armstrong Drain Trap Orifices at Various Pressures

Actual capacity also depends on trap configuration, piping and flow to trap. It is important to allow for safety factors and fluid density variations due to temperature.



* Floats for dual gravity drain traps are weighted with quenching oil which, in the unlikely possibility of float failure, may be dispersed through the system. If this is a hazard, consult the Armstrong Application Engineering Department.