



# 400 Series Inverted Bucket Steam Traps

Forged Chrome-moly Steel for Vertical Installation

For Pressures to 69 bar...Capacities to 9 000 kg/h

## Description

Armstrong offers its 400 Series forged chrome-moly steel traps for vertical installation with a choice of screwed, socketweld or flanged connections.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket. This provides continuous automatic air and CO<sub>2</sub> venting at steam temperature.

Inverted bucket traps drain continuously to prevent condensate backup. They are also resistant to water hammer.

**Operation on Superheat.** A normally operating bucket trap is filled with saturated steam and condensate. Superheated steam can enter only as fast as the steam inside can condense. As a result, the temperature of the trap is at (or slightly below) saturated steam temperature, regardless of the degree of superheat.

**Trap Selection.** The pressure-containing parts of the steam trap should safely withstand the maximum pressure and temperature conditions of the system. For example, a trap is required for a 62 bar main at 482°C. The normal operating temperature of the trap will be about 278°C. A Model 415 trap should be selected, even though several smaller traps are capable of handling the working pressure.

### For Superheat Service:

1. Don't oversize the orifice; a restricted orifice may be advisable.
2. Specify a burnished valve and seat and an extended inlet tube and check valve.
3. Provide a drip leg of adequate diameter and length.
4. Provide a generous length (600-900 mm) of inlet piping, with the trap below the main.
5. Don't insulate the trap or the inlet piping.

## Connections

Screwed BSPT and NPT  
Socketweld  
Flanged DIN or ANSI (welded)

## Materials

Body: ASTM A182 F22 Class 3  
Models 413 and 415 are available with cast 316 stainless steel bodies and all stainless steel internals  
Internals: All stainless steel – 304  
Valve and seat: Stainless Steel 17-4PH (<35 bar)  
Titanium (>35 bar)

## Options

Stainless steel internal check valve

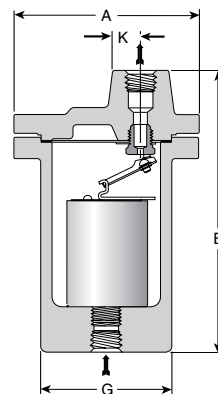
## Specification

Inverted bucket steam trap, type ... in forged chrome-moly steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, with the discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

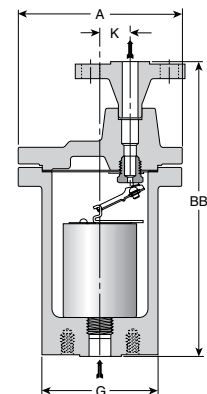
## How to Order

Specify:

- Model number
- Size and type of pipe connection. When flanges are required, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required



Model 400 Trap



Series 400 FW Trap

**Table ST-98-1. 400 Series Bottom Inlet, Top Outlet Trap (dimensions in mm)**

Add suffix "CV" to trap number for internal check valve.

Model No. Screwed or SW Model No. Flanged	413 413-FW	415 415-FW	416 416-FW
Pipe Connections	15 – 20 – 25	25 – 32 – 40	40 – 50
"A" Flange Diameter	219	273	317
"B" Face-to-Face (screwed & SW)	305	379	448
"BB" Face-to-Face (flanged PN100*)	353 – 360 – 366	440 – 444 – 446	513 – 519
"G" Body Outside Diameter	137	175	216
"K" $\varnothing$ Outlet to $\varnothing$ Inlet	36,5	44,4	54
Number of Bolts	8	9	12
Weight in kg (screwed & SW)	29,5	57,2	88,0
Weight in kg (flanged PN100*)	31,5 – 32,5 – 33,0	58,0 – 60,0 – 61,5	92,5 – 94,5

\* Other flange sizes, ratings and face-to-face dimensions are available on request.

All models are CE Marked according to the PED (2014/68/JE).

**All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.**

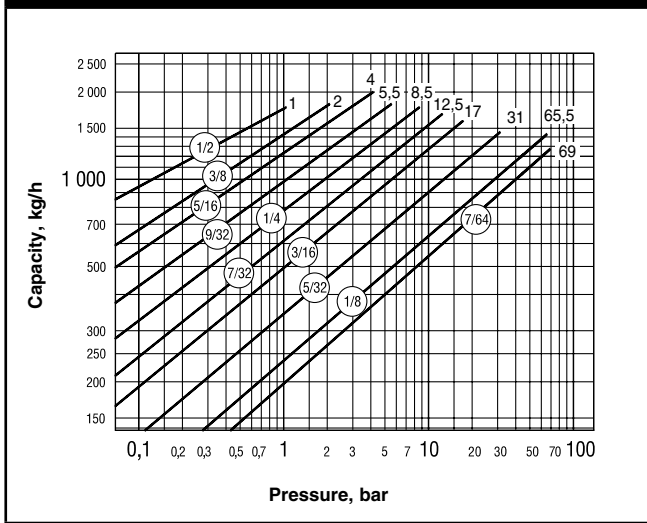
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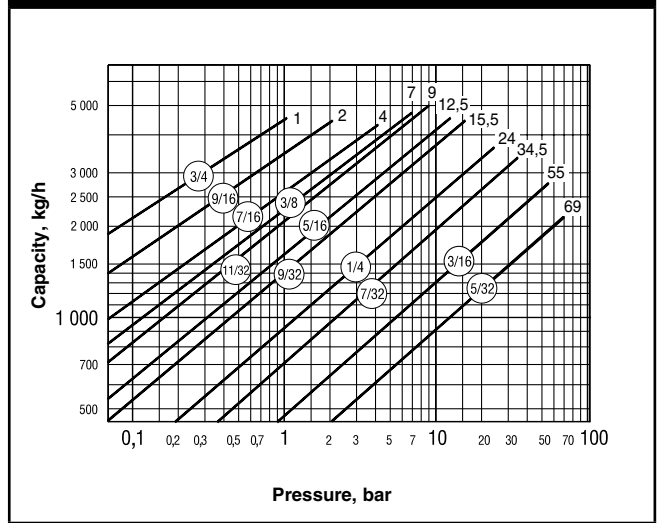
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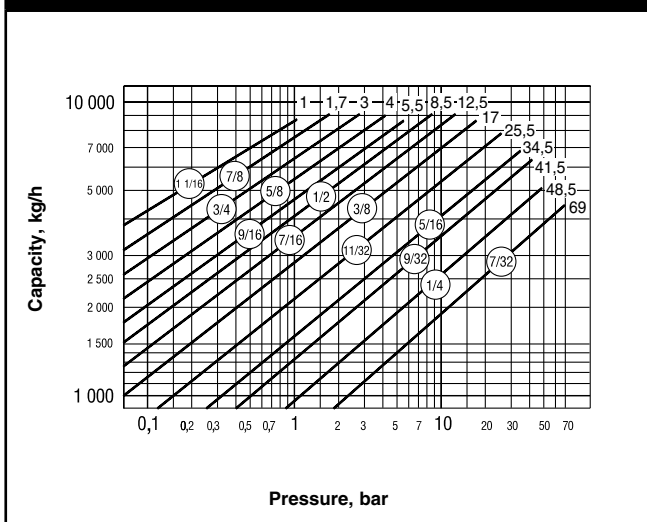
**Table ST-99-1. Model 413 Capacity**



**Table ST-99-2. Model 415 Capacity**



**Table ST-99-3. Model 416 Capacity**



**Table ST-99-4. Pressure-Temperature Rating for Forged Steel Traps**

Model No.	Maximum Operating Pressure, Saturated Steam	Max. Allowable Pressure (Vessel Design)† of Pressure-Containing Parts at Indicated Temp.			
		-28 / +399°C	427°C	454°C	482°C
		bar			
<b>413</b>	69	83	<b>83</b>	72	54
<b>415</b>	69	76	<b>76</b>	74,5	66,5
<b>416</b>	69	<b>117</b>	114	93	68

**Notes:** Maximum operating pressure to be marked on nameplate will be determined by actual orifice used.  
 Maximum allowable pressures shown in boldface will be marked on nameplate, unless otherwise requested.  
 Traps with flanges may have different pressure-temperature ratings.  
 Maximum back pressure is 99% of inlet pressure.

† May be derated depending on flange rating and type.

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