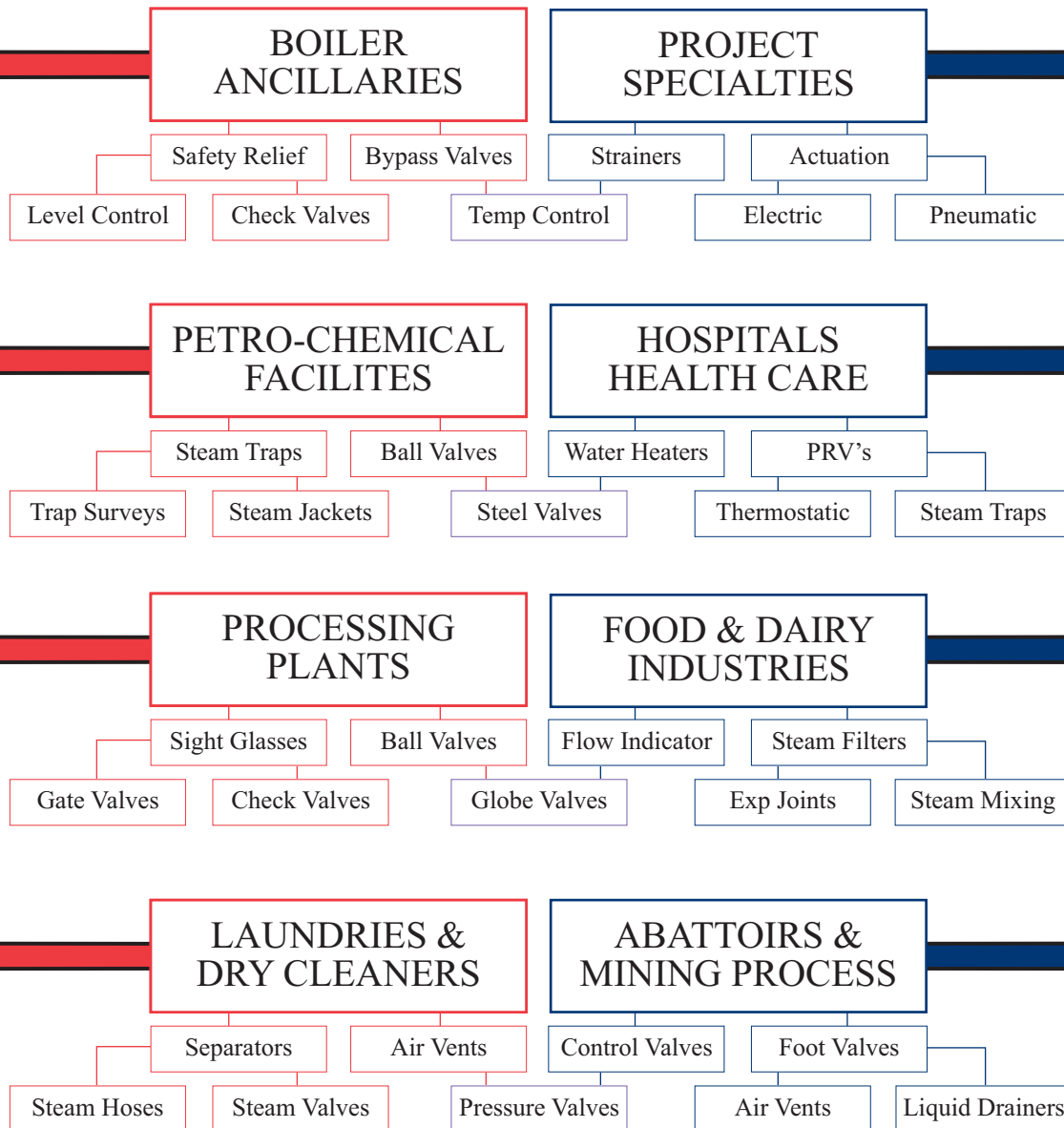


# ARMSTRONG STEAM & ENGINEERING

Pty. Ltd.

## Valves, Actuators & Pipeline Specialties



### From Concept to Conclusion



# 300 Series Inverted Bucket Steam Trap

## Forged Carbon Steel for Vertical Installation

For Pressures to 650 psig (45 bar)...Capacities to 20,000 lb/hr (9,072 kg/hr)

Steam Trapping and Steam Tracing Equipment

### Description

Armstrong offers its 300 Series forged carbon 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, which provides continuous automatic air and CO<sub>2</sub> venting at steam temperature.

Inverted bucket traps drain continuously, allowing no condensate backup. They are also resistant to water hammer.

### 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 (2'-3') of inlet piping, with the trap below the main.
5. Don't insulate the trap or the inlet piping.

### Connections

Screwed NPT and BSPT  
Socketweld  
Flanged

See page ST-100 for dimensional information for flanged and socketweld connections.

### Materials

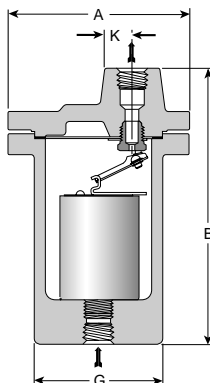
Body: ASTM A105  
Models 312, 313, 316 are also available with cast 316 stainless steel bodies and all stainless steel internals

Internals: All stainless steel—304 (larger sizes have cast iron bucket weights)

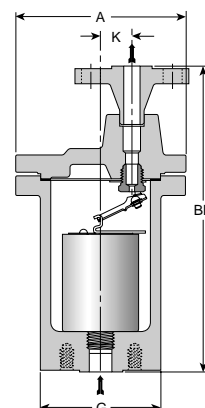
Valve and seat: Hardened chrome steel—440F

### Options

- Stainless steel internal check valve
- Thermic vent bucket 250 psig (17 bar) maximum
- Scrub wire



Series 300 Trap



Series 300-FW Trap

### Specification

Inverted bucket steam trap, type ... in forged carbon steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and discharge orifice at the top of the trap.

### 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

### Pressure-Temperature Rating for Forged Steel Traps

Model No.	Max. Oper. Pressure, Sat. Steam		Maximum Allowable Pressure (Vessel Design) of Pressure-Containing Parts at Indicated Temperature							
			°F		°C		°F		°C	
			-20/+650	-28/+343	700	371	750	399	800	427
	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
310	400	27.5	770	48	<b>770</b>	<b>48</b>	730	50	600	41
312	600	41	600	41	<b>600</b>	<b>41</b>	560	38.5	500	34.5
313	650	45	1,080	74	<b>1,080</b>	<b>74</b>	970	67	780	54
314	650	45	<b>1,130</b>	<b>78</b>	1,120	77	990	68	810	56
315	650	45	<b>1,015</b>	<b>70</b>	965	66.5	860	59	690	47.5
316	650	45	<b>1,100</b>	<b>76</b>	1,050	72	940	65	760	52

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.

300 Series Bottom Inlet, Top Outlet Traps. Add suffix "CV" to trap number for internal check valve.

Model No. Screwed or SW Model No. Flanged	310 310-FW		312 312-FW		313 313-FW		314 314-FW		315 315-FW		316 316-FW					
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm				
Pipe Connections	1/2, 3/4	15, 20	1/2, 3/4, 1	15, 20, 25	1/2, 3/4, 1	15, 20, 25	1, 1-1/4	25, 32	1, 1-1/4, 1-1/2	25, 32, 40	1-1/2, 2	40, 50				
"A" (Diameter)	4-5/8	117	6-3/4	171	8	203	8-5/8	219	9-3/4	248	11-7/8	302				
"B" (Height, Screwed or SW)	7-15/16	202	10-3/16	259	11-1/2	292	13-11/16	348	15	381	17-1/8	435				
"BB"	12-1/16*	306*	12-5/16	313	13-7/8	352	16-1/16	408	17-9/16	446	19-11/16	500				
"G" (Body OD)	3-1/16	78	4-3/4	121	5-1/8	130	5-3/4	146	6-5/8	168	8-3/8	213				
"K" (¢ Outlet to ¢ Inlet)	9/16	14.3	1-1/4	31.7	1-7/16	36.5	1-7/16	36.5	1-3/4	44.4	2-1/8	54.0				
Number of Bolts	6				8				9				10			
Weight Scr. or SW lb (kg)	10 (4.5)		30 (13.6)		50 (22.7)		70 (31.8)		98 (44.5)		179 (81.2)					
Weight, Flanged lb (kg)	12 (5.4)		32 (14.5)		51 (23.1)		73 (33.1)		103 (46.7)		184 (83.5)					

\*"BB" dimensions shown are for 3/4" conn., Class 600 flanged No. 310-FW. Consult factory for dimensions of models with other connection sizes and/or flanges.

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

# 300 Series Inverted Bucket Steam Trap

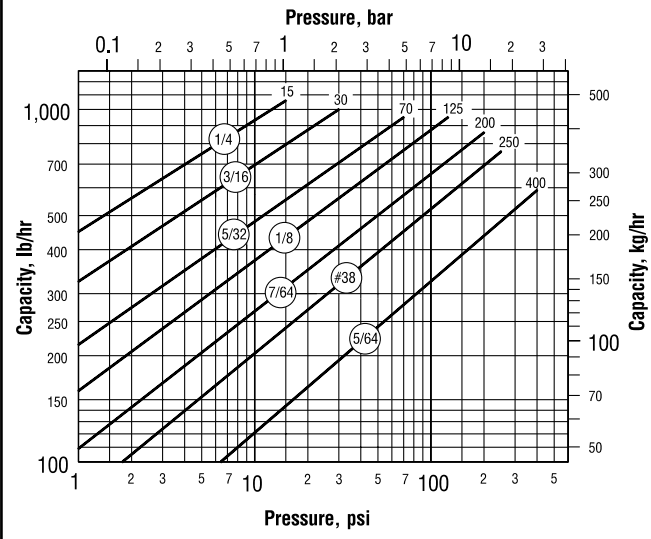
## Forged Carbon Steel for Vertical Installation

For Pressures to 650 psig (45 bar)...Capacities to 20,000 lb/hr (9,072 kg/hr)

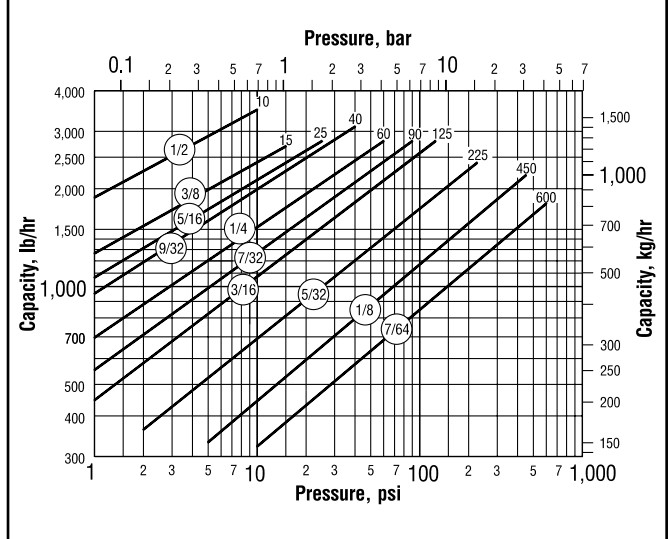


Steam Trapping and Steam Tracing Equipment

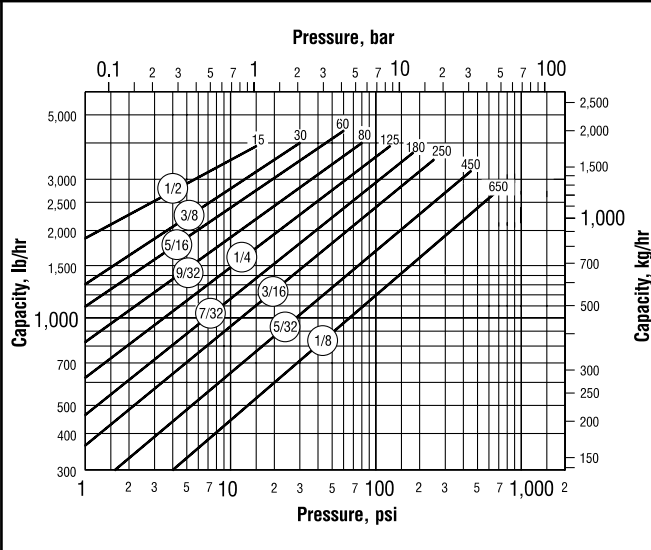
**Model 310 Capacity**



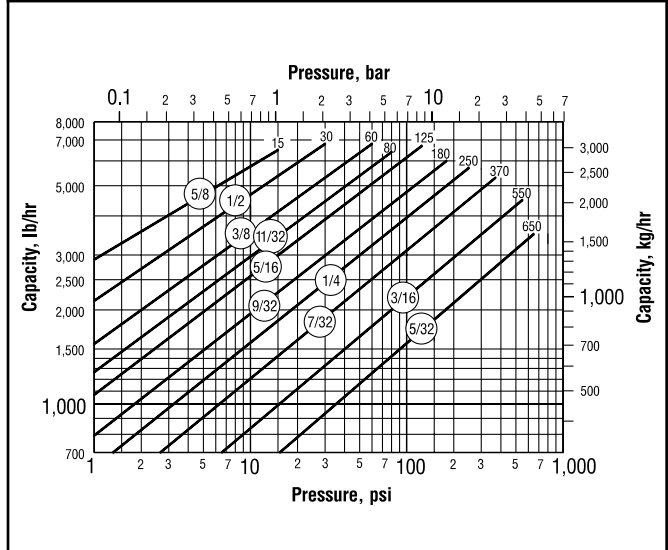
**Model 312 Capacity**



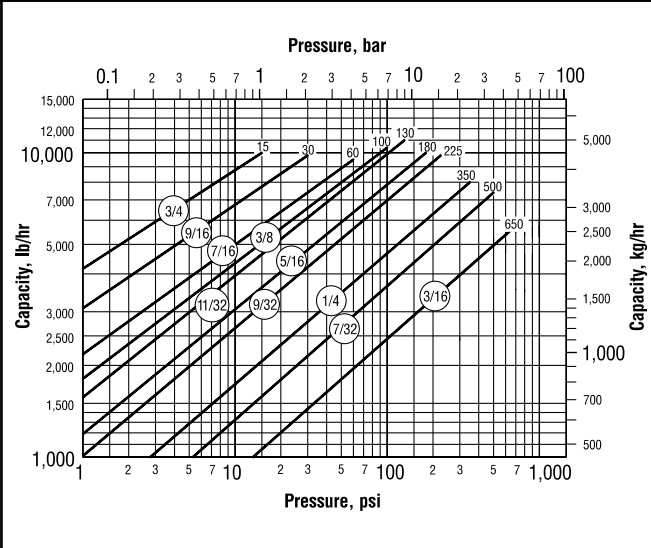
**Model 313 Capacity**



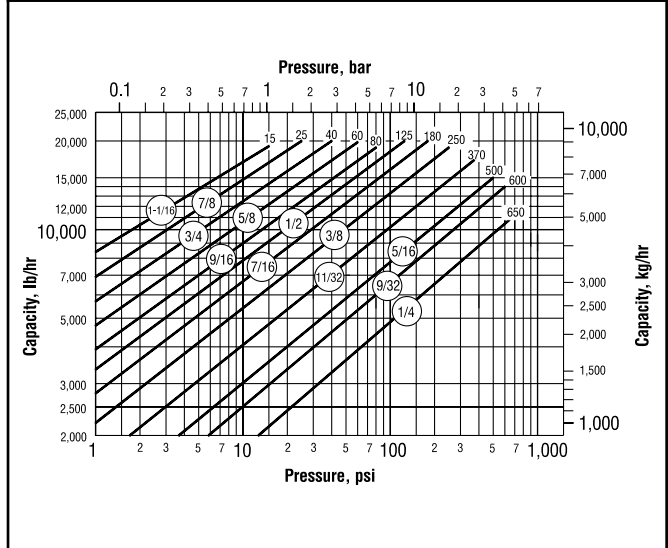
**Model 314 Capacity**



**Model 315 Capacity**



**Model 316 Capacity**





# 400 Series Inverted Bucket Steam Trap

Forged Chrome-moly Steel for Vertical Installation

For Pressures to 1,000 psig (69 bar)...Capacities to 20,000 lb/hr (9,072 kg/hr)

Steam Trapping and Steam Tracing Equipment

## 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 900 psig (62 bar) main at 900°F (482°C). The normal operating temperature of the trap will be about 532°F (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 (2'-3') of inlet piping, with the trap below the main.
5. Don't insulate the trap or the inlet piping.

## Connections

Screwed NPT and BSPT  
Socketweld  
Flanged

See page ST-100 for dimensional information for flanged and socketweld connections.

## 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: 17-4PH or 440F

## Options

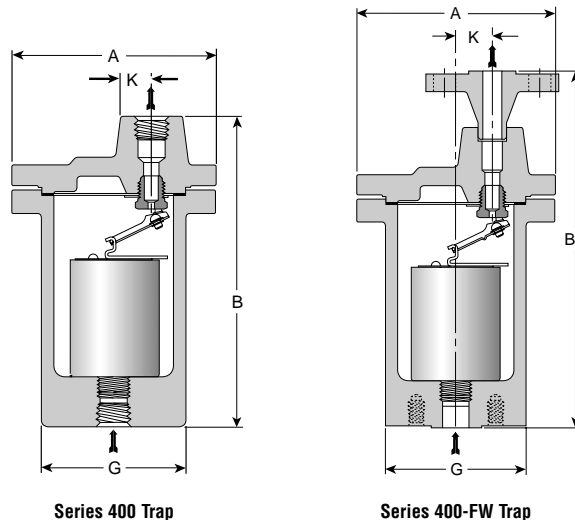
Stainless steel internal check valve

## 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.

## 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



400 Series, Bottom Inlet, Top Outlet Traps. 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	
	in	mm	in	mm	in	mm
Pipe Connections	1/2, 3/4, 1	15, 20, 25	1, 1-1/4, 1-1/2	25, 32, 40	1-1/2, 2	40, 50
"A" (Diameter)	8-5/8	219	10-3/4	273	12-1/2	317
"B" (Height, Screwed or SW)	12-3/16	310	14-15/16	379	17-5/8	448
"BB"	14-7/8	378	18-1/16	459	21-1/2	546
"G" (Body OD)	5-3/8	137	6-7/8	175	8-1/2	216
"K" (Ø Outlet to Ø Inlet)	1-7/16	36.5	1-3/4	44.4	2-1/8	54.0
Number of Bolts	8		9		12	
Weight Scr. or SW lb (kg)	65 (29.5)		126 (57.2)		205 (93.0)	
Weight, Flanged lb (kg)	70 (31.8)		132 (59.9)		211 (95.7)	

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

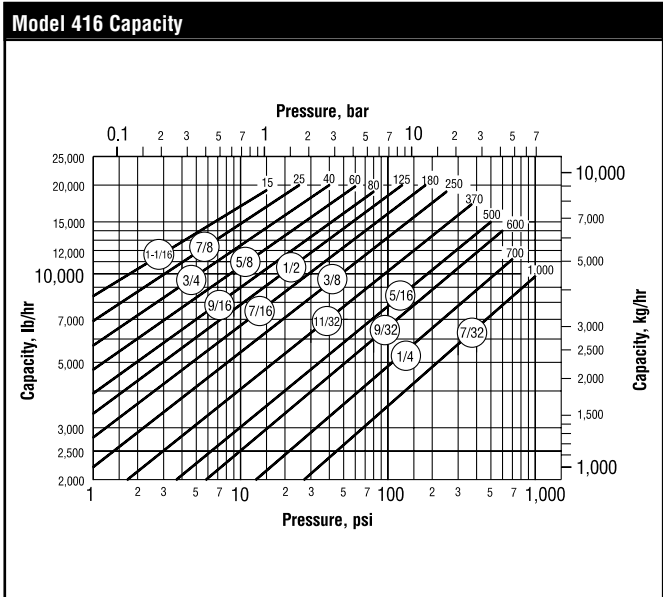
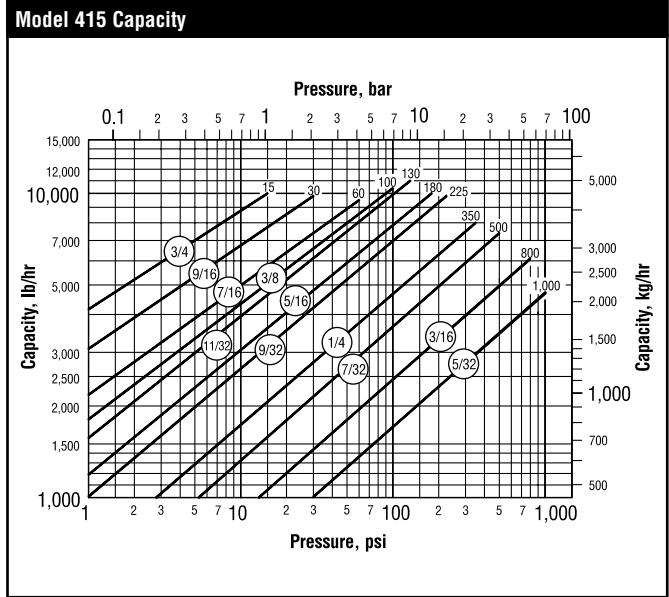
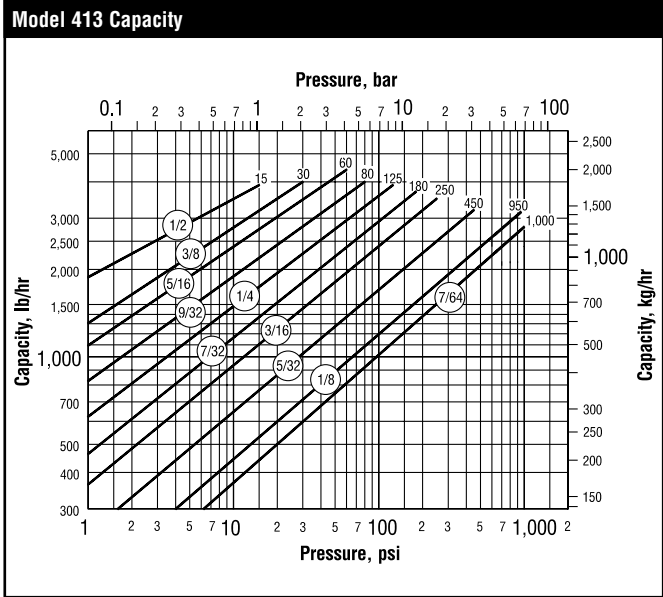
# 400 Series Inverted Bucket Steam Trap

## Forged Chrome-moly Steel for Vertical Installation

For Pressures to 1,000 psig (69 bar)...Capacities to 20,000 lb/hr (9,072 kg/hr)



Steam Trapping and  
Steam Tracing Equipment



Pressure-Temperature Rating for Forged Steel Traps														
Model No.	Max. Oper. Pressure, Sat. Steam		Maximum Allowable Pressure (Vessel Design) of Pressure-Containing Parts at Indicated Temperature											
			°F		°C		°F		°C		°F		°C	
			-20/+650	-28/+343	700	371	750	399	800	427	850	454	900	482
	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
413	1,000	69	1,200	83	1,200	83	1,200	83	<b>1,200</b>	<b>83</b>	1,050	72	780	54
415	1,000	69	1,100	76	1,100	76	1,100	76	<b>1,100</b>	<b>76</b>	1,080	74.5	965	66.5
416	1,000	69	1,700	117	1,700	117	<b>1,700</b>	<b>117</b>	1,660	114	1,350	93	990	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.