

Liquid Drain Traps

for effective draining of
liquids from gases



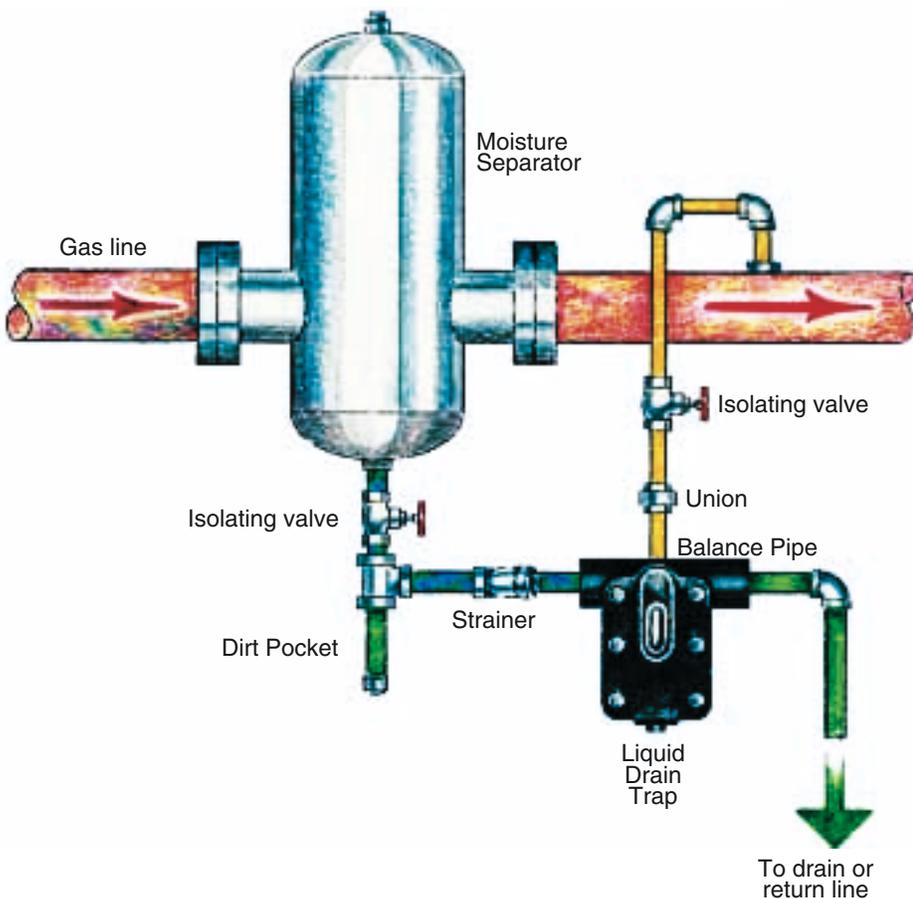
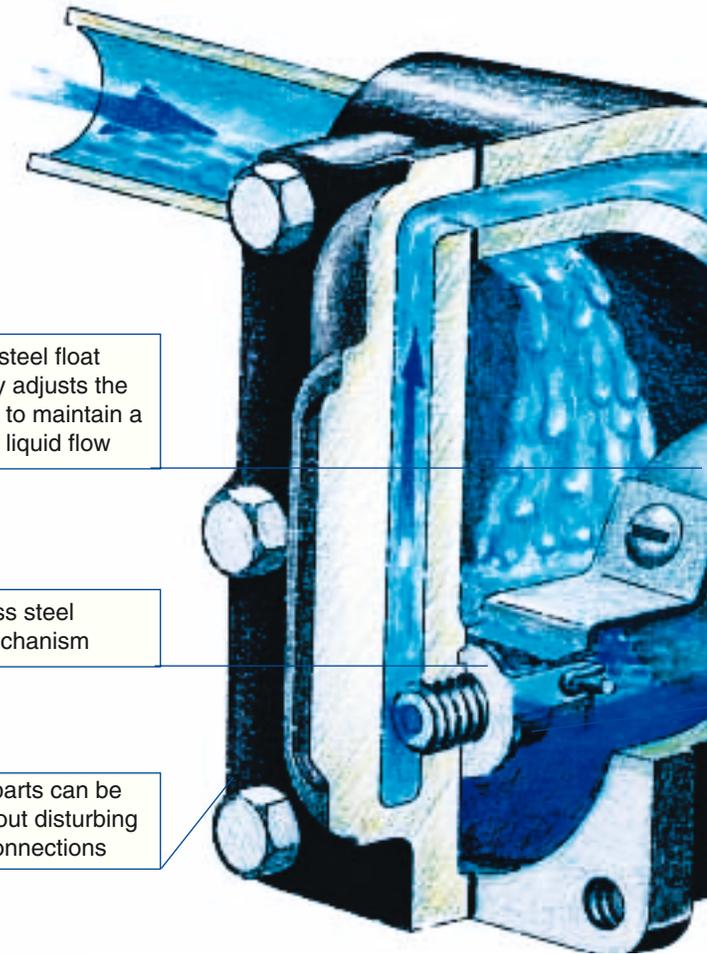
spirax
/sarco

Automatic and continuous drain trap o

Many industrial processes involve the removal of a liquid from a pressurized gas. The most common example is compressed air. Atmospheric air always contains some water vapor. When the air is compressed and cooled, it can hold less moisture. The excess water vapor condenses to form liquid water. This water is harmful to the distribution system and the pneumatic equipment. A liquid drain trap is used to drain off the water while preventing the escape of compressed air.

Although the majority of small Liquid Drain Traps are used on compressed air systems, there are many other industrial applications which require the drainage of a liquid from either its own vapor phase or some other gas.

Spirax Sarco automatic float-operated liquid drain traps are ideally suited for this purpose. The traps can handle liquids with a specific gravity as low as 0.5, and they are available in a wide variety of sizes, end connections and construction materials.



Drain Traps automatically pass liquid, but the liquid must first be collected and fed to the trap. In the system illustrated to the left, a Spirax Sarco moisture separator is used to “knock out” small liquid droplets in the gas flow. The liquid collects in the bottom of the separator, and from there is piped to the drain trap. A Spirax Sarco strainer protects the trap from dirt and pipe scale.

Because liquid which backs up in the separator may be re-entrained in the gas flow, continuous drainage is important. The Spirax Sarco float drain trap is ideal for this system because it adjusts instantly and automatically to load and pressure variations. The continuous, modulated flow means that liquid never backs up ahead of the trap.

operation increases system efficiency



An NPT balance pipe tapping is provided in the top of the body

Liquid seals the valve at all times, preventing gas leakage

Dirt and sludge which may accumulate in the bottom of the trap may be blown down by removing the drain plug or by installing a manual blow down valve.

User benefits

✓	Instantly and automatically adjusts to variations in liquid load and pressure.
✓	Efficiently handles any load or pressure within its rating.
✓	Handles liquids with specific gravity as low as 0.5
✓	Wide variety of materials and operating pressures.
✓	Stainless steel valve trim and floats.
✓	Sizes from 1/4" to 4" and capacities up to 900,000 lb/h.
✓	Liquid seal above the valve prevents gas leakage.
✓	Dirt and sludge can be "blown down" periodically through the drain tapping.
✓	No priming required.
✓	Can be serviced without disturbing piping connections.

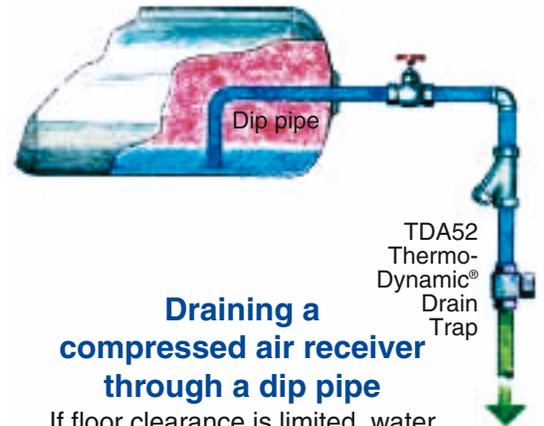
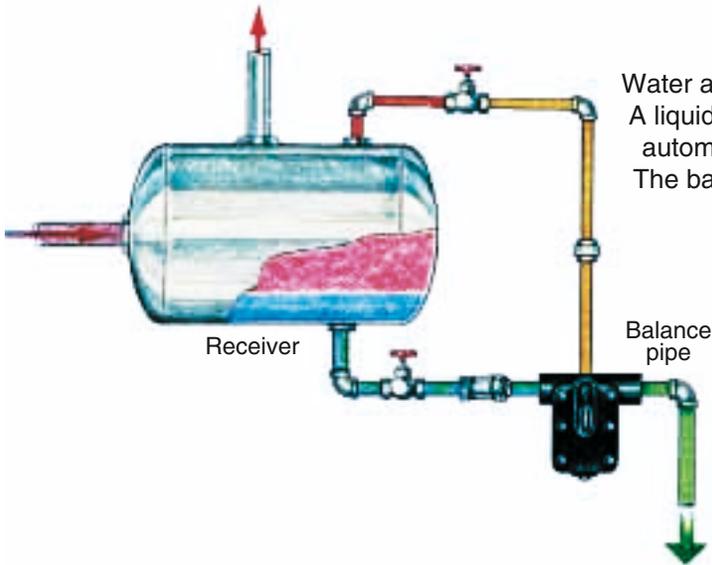
Liquid Drain Trap overview

Model	Size(s)	PMO	Piping Connection	Piping Configuration	Body Material	T.I.S. Reference	
FA-30	3/4", 1", 1-1/2" 2"	30	NPT	Parallel 	Iron	7.306	
FA-75		75					7.309
FA-150		150					
FA-200	200	7.312					
FAB-10	10						
FAB-75	75						
FAB-175	175	7.317					
CA-14	1/2", 3/4"				200	Top in Side out 	
FAI	1/2", 3/4", 1"				200	7.316	
CA10S	1", 1-1/2", 2"				200		
FA450	3/4", 1", 1-1/2", 2"	465	NPT, SW, Flanged	In-line horizontal 	Steel	7.315	
	3", 4"	450				7.3151	
CA46S	1/2", 3/4", 1", 1-1/2", 2"	300	Flanged	Vertical 	Stainless Steel	7.3023	
FA-150	1/4"	150	NPT			7.307	
TDA52	1/2"	250	NPT			7.314	
CAS14/CAS14S	1/2", 3/4", 1"	200	NPT, SW	Vertical 	Steel/ Stainless Steel	7.3022	
F-150V	1/2"	150	NPT, SW			7.310	
F-300V		300					

Typical applications for liquid drain traps

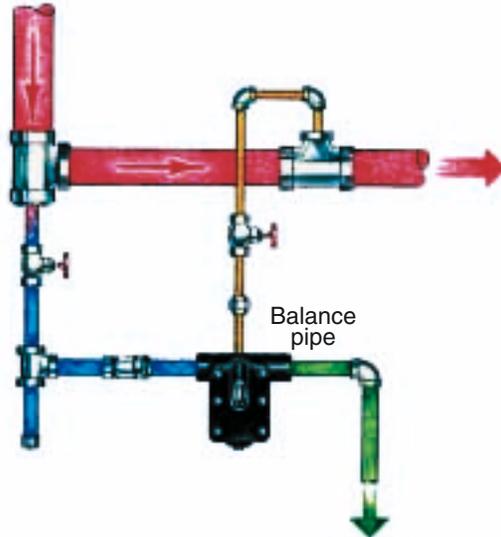
Draining a compressed air receiver

Water always collects in the bottom of a compressed air receiver. A liquid drain trap is used to remove this water continuously and automatically, while preventing the escape of compressed air. The balance pipe allows air which may enter the trap to escape back to the receiver. Air binding can occur without a balance pipe installed.



Draining an air or gas supply main downfeed

Liquid can collect at points where pipes carrying air or other gases change elevation or direction. If this liquid is allowed to accumulate, the result could be waterhammer or equipment damage. A Drain Trap should be installed at the bottom of every downfeed. The balance pipe must be connected to the top of the supply main downstream of the drainage point.

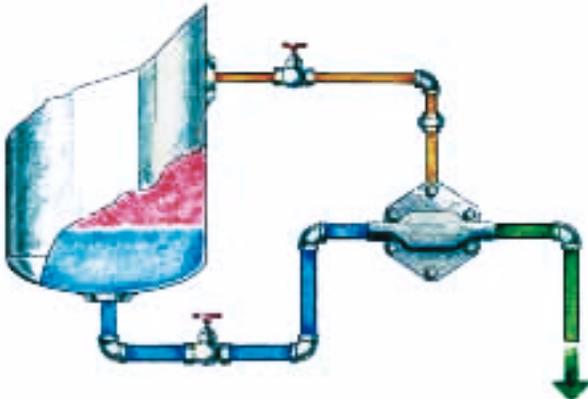


Draining a compressed air receiver through a dip pipe

If floor clearance is limited, water may be removed from the receiver through a dip pipe. In this case, a TDA52 Thermo-Dynamic® Drain Trap is the best choice. A balance pipe is not required because the TDA52's cyclic operation prevents air binding.

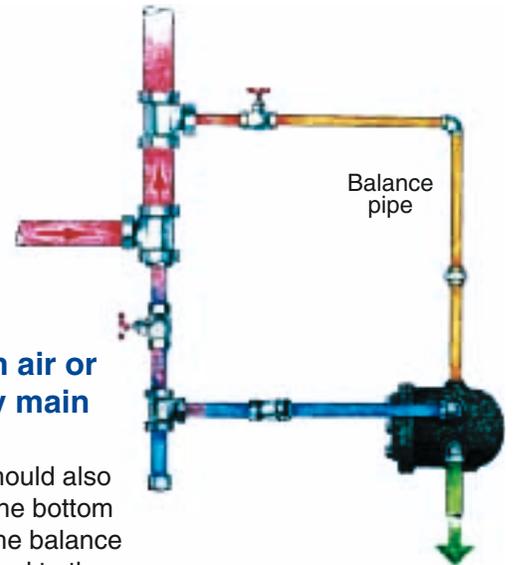
Using a Drain Trap to maintain a liquid level

A Float Drain Trap can be used to maintain a liquid level in a tank. In effect, the trap acts as a controlled overflow. The balance pipe must be connected to the tank above the maximum liquid level.



Draining an air or gas supply main riser

A Drain Trap should also be installed at the bottom of every riser. The balance pipe is connected to the riser so that it will be downstream of the drainage point.



Although the traps can be used to drain most liquids from most gases, some applications, particularly those involving hazardous or unusual fluids, may be subject to regulation or may otherwise require special consideration. Spirax Sarco will endeavor to provide whatever data is necessary to assist in product selection.

Liquid Drain Trap capacities selection and sizing

The discharge rate depends on the differential pressure across the trap (that is, the pressure at the trap inlet minus the pressure at the outlet). The capacity charts show the maximum cold water discharge rate versus the differential pressure. **Note:** Although the differential pressure is used for sizing, the trap body must be designed for the full maximum system pressure.

Operation against return

Line back-pressure

If the pressure in the return line (the "back-pressure") is above atmospheric at all times, the maximum operating pressure (PMO) of the trap is increased by the amount of the back-pressure. (But the increased PMO must never be higher than the PMA — the maximum allowable pressure.)

Example:

If the nameplate PMO is 100 psig, and the back-pressure is always at least 25 psig, the drain trap may be used at a working pressure of up to 125 psig, provided that the nameplate PMA is at least 125 psig at the operating temperature. The excess pressure will not hold the valve closed because the differential pressure is not greater than the nameplate PMO.

Safety factors

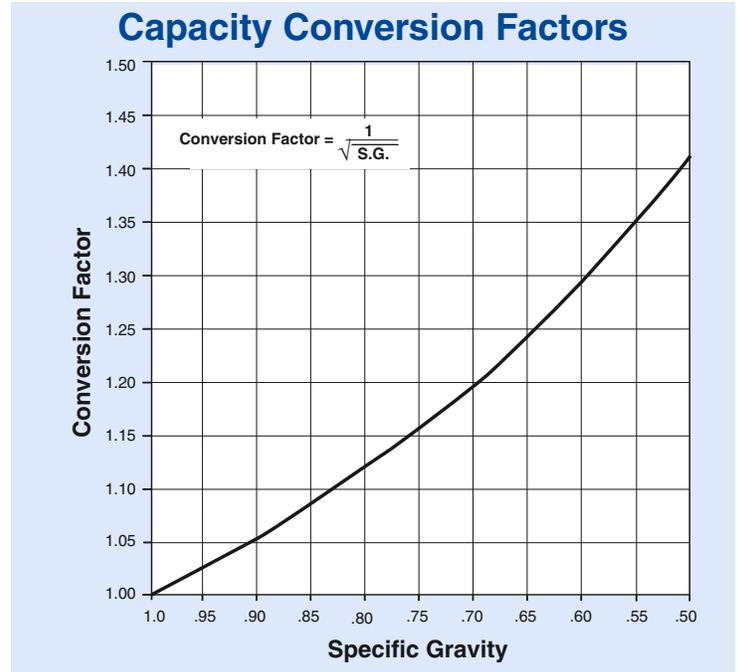
Both the amount of liquid to be discharged and the differential pressure may fluctuate. To ensure continuous drainage during periods of high load and/or low pressure, the liquid drain trap should be selected to handle the estimated load times a safety factor of 1.5 at the lowest expected differential pressure. If the capacity requirements or operating conditions cannot be predicted accurately, the safety factor should be increased accordingly. If the maximum peak load and minimum differential pressure are accurately known, the safety factor may be reduced or eliminated.

Liquids other than cold water

For liquids higher than cold water (that is, liquids with a specific gravity less than 1.0), both the discharge capacity and the maximum operating pressure will be reduced. The required capacity of the light liquid (including the safety factor) must be multiplied by the appropriate conversion factor from figure 1. The resulting equivalent cold water capacity is used to select a trap using the cold water capacity charts. Table 1 must be consulted to ensure that the reduced PMO of the selected trap is higher than the expected maximum system pressure. If there is a back-pressure in the return line, the PMO of the trap may be increased (see above).

Flashing liquids

The capacity charts are based on single-phase (liquid only) flow. If the pressure/temperature conditions upstream and downstream of the trap are such that a portion of the liquid will re-evaporate, or "flash" as it passes through the valve, the resulting two-phase (liquid and gas) flow will reduce the capacity of the trap. If two-phase flow is expected, the safety factor should be increased by 1-1/2 to 2 times.



Maximum operating pressure with light liquids

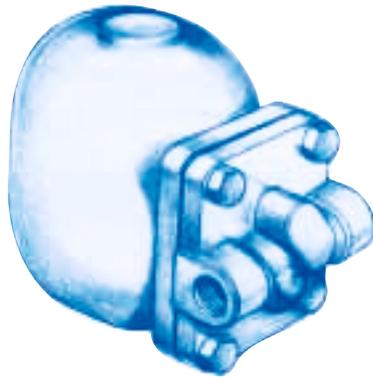
Model(s)*	Size(s) s.g.	Maximum Operating Pressure, psig											
		1.00	.99 to .95	.94 to .90	.89 to .85	.84 to .80	.79 to .75	.74 to .70	.69 to .65	.64 to .60	.59 to .55	.54 to .50	
FA/FAI-30	1/2", 3/4", 1"	35	31	28	24	21	17	14	10	7	3	—	
	1-1/2", 2"	34	31	28	25	22	20	17	14	11	8	6	
FA/FAI-75	1/2", 3/4", 1"	90	81	73	65	57	49	41	33	25	16	8	
	1-1/2"	88	81	73	66	58	51	43	36	28	21	13	
	2"	75	60	54	49	44	38	33	28	23	17	12	
FA/FAI-150	1/2", 3/4", 1"	150	142	128	114	100	86	71	57	43	29	15	
	1-1/2"	150	140	127	115	103	78	65	53	40	28	—	
	2"	150	139	127	115	103	91	79	67	55	43	31	
FAI-200	1/2", 3/4", 1"	200	184	168	152	135	119	103	87	71	54	38	
FA-200	1"	200	200	200	190	164	139	113	88	62	37	11	
	1-1/2"	200	200	200	191	168	145	122	99	76	53	30	
FAB-10	2"	10	9	8	7.5	7	6	5.5	5	4	3.5	3	
FAB-75	1-1/2"	75	69	63	57	50	44	37	31	25	19	13	
	2-1/2"	75	69	63	57	50	44	37	31	25	19	13	
FAB-175	2"	175	163	150	137	124	111	98	85	72	59	46	
CA-14	1/2", 3/4"	200	198	195	173	152	130	110	87	65	45	26	
FA450	-4.5	1/2", 3/4"	65	65	65	65	65	55	50	38	26	16	7
		1"	65	65	65	65	65	57	50	39	29	20	11
		1-1/2", 2"	65	59	53	47	42	36	30	24	18	12	6
FA450	-10	1/2", 3/4"	145	145	145	125	108	94	80	60	43	30	19
		1"	145	145	145	125	107	93	80	65	50	35	21
		1-1/2", 2"	145	132	119	105	92	79	66	53	40	26	13
CA10S	-14	1/2", 3/4"	203	198	195	173	152	130	110	87	65	45	26
		1"	203	203	203	180	160	135	113	92	72	50	29
CA46S	-14	1-1/2", 2"	203	203	203	203	203	203	203	165	99	54	27
		1/2", 3/4"	304	304	304	280	261	225	165	155	116	75	36
FA450	-21	1"	304	290	275	245	217	187	159	130	100	66	36
		1-1/2", 2"	304	304	304	304	295	253	211	165	99	54	27
		3/4"	465	464	464	440	420	350	300	240	185	125	65
FA450	-32	1"	465	450	435	385	340	290	246	195	145	100	55
		1-1/2", 2"	465	422	380	337	295	253	211	165	99	54	27
		1/2", 3/4", 1"	203	203	203	203	203	162	130	97	72	—	—
CAS14/CAS14S	1/2", 3/4", 1"	203	203	203	203	203	162	130	97	72	—	—	
FA450	3", 4"	450	450	450	450	450	450	390	275	158	40	—	
FA-150	1/4"	150	135	119	104	89	73	58	43	25	12	—	
F-150V	1/2"	150	150	150	150	138	119	100	80	61	42	23	
F-300V	1/2"	300	300	300	300	282	243	203	164	125	86	46	

*Some models are not available in all of the listed sizes. For liquids with a specific gravity less than 0.5, please consult factory.

Liquid Drain Tra

CA10S

The CA10S features rugged cast iron (1") or ductile iron (1-1/2" and 2") construction for pressures up to 200 psig. The convenient in-line connections allow for servicing of all drain trap internals without removal from the pipeline. The stainless steel float and valve resist corrosion and allow for continuous drainage.

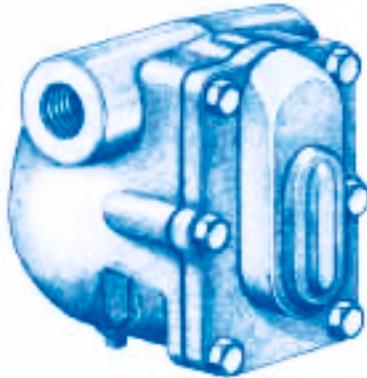


CA10S

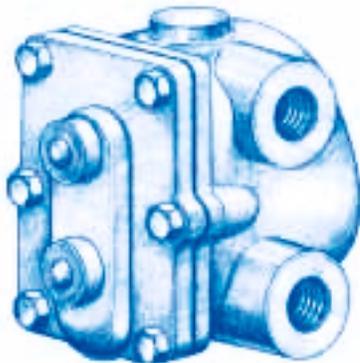
Sizes	1", 1 1/2", 2"		
Body Material	1" Ductile Iron, 1 1/2" & 2" Cast Iron		
Connections	NPT		
Piping Configuration	In-Line Horizontal		
TIS#	7.3021		
Model	CA10S-4.5	CA10S-10	CA10S-14
Maximum Operating Pressure (PMO)	65 psig	145 psig	200 psig
Load @ PMO (lb/hr)	72,000	45,000	35,000
	2" Trap	2" Trap	2" Trap

FA/FAI

The FA and FAI Liquid Drain Traps are traditional cast iron products available with either parallel (FA) or in-line (FAI) connections. These traps are offered for system pressures up to 200 psig. The stainless steel float and valve resist corrosion and allow for continuous drainage.



FAI



FA

FA-150 (not pictured)

The FA-150 is a compact, vertical top in/bottom out Liquid Drain Trap. This all stainless steel drainer is available with 1/4" threaded connections.

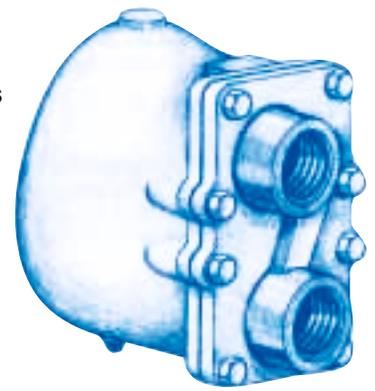
F-150V/F-300V (not pictured)

The F-150V and F-300V Liquid Drain Traps are compact units with vertical top in/bottom out flow pattern. The in-line design allows for simple servicing of the internal parts without removal from the pipeline.

Sizes	1/2"	1/4"
Body Material	Stainless/Carbon	Stainless Steel
Connections	NPT	NPT
Piping Configuration	In-Line Vertical	Vertical
TIS#	7.310	7.307
Model	F-150V	F-300V
Maximum Operating Pressure (PMO)	150 psig	300 psig
Load @ PMO (lb/hr)	1,250	920

FAB

The FAB range of Super Capacity Liquid Drain Traps are rugged cast iron products designed to handle large liquid loads at pressures to 175 psig. The stainless steel float and valve resist corrosion and allow for continuous drainage.



FAB

Sizes	2"	1 1/2", 2 1/2"	2"
Body Material	Cast Iron		
Connections	NPT		
Piping Configuration	Parallel		
TIS#	7.312		
Model	FAB-10	FAB-75	FAB-175
Maximum Operating Pressure (PMO)	10 psig	75 psig	175 psig
Load @ PMO (lb/hr)	25,000	240,000	68,000
	2" Trap	2" Trap	2" Trap

FAI

Sizes	1/2", 3/4", 1			
Body Material	Cast Iron			
Connections	NPT			
Piping Configuration	In-Line Horizontal			
TIS#	7.316			
Model	FAI-30	FAI-75	FAI-150	FAI-200
Maximum Operating Pressure (PMO)	30 psig	75 psig	150 psig	200 psig
Load @ PMO (lb/hr)	3,100	2,700	2,700	1,500

FA

Sizes	3/4", 1, 1 1/2", 2" (FA200: 1, 1 1/2" only)			
Body Material	Cast Iron			
Connections	NPT			
Piping Configuration	Parallel			
TIS#	7.306 & 7.309			
Model	FA-30	FA-75	FA-150	FA-200
Maximum Operating Pressure (PMO)	30 psig	75 psig	150 psig	200 psig
Load @ PMO (lb/hr)	13,000	8,500	11,000	6,000
	2" Trap	2" Trap	2" Trap	1-1/2" Trap

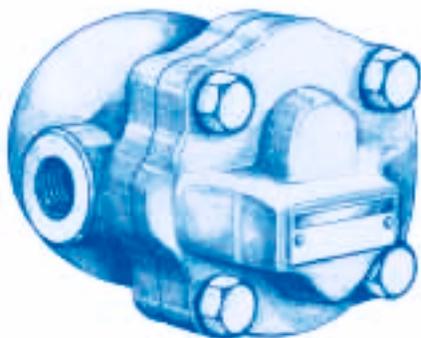
F-150V/F-300V

FA-150

product range

CA14

The CA14 offers a compact Liquid Drain Trap with in-line flow designed for horizontal or vertical piping. The rugged ductile iron construction is suitable for pressures up to 200 psig. The stainless steel float and valve resist corrosion and allow for continuous drainage of condensate.



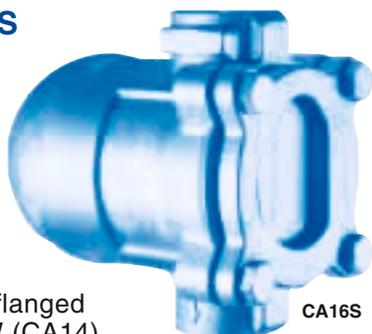
CA14

Sizes	1/2", 3/4"
Body Material	Ductile Iron
Connections	NPT
Piping Configuration	In-Line Horizontal, Vertical
TIS#	7.317
Maximum Operating Pressure (PMO)	200 psig
Load @ PMO (lb/hr)	900

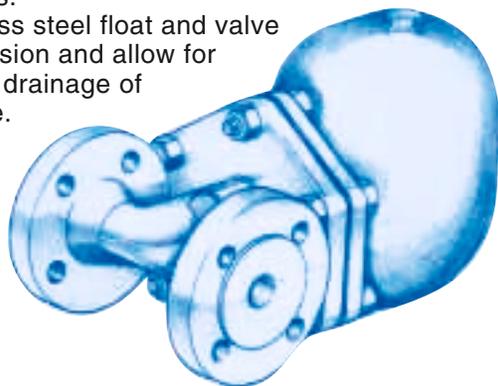
CA14, CA14S, CA46S

The CA16S and CA46S Liquid Drain Traps are designed for systems requiring stainless steel construction. These traps are available with convenient in-line connections for ease of maintenance and either flanged (CA46S) or threaded/SW (CA14) connections.

The stainless steel float and valve resist corrosion and allow for continuous drainage of condensate.



CA16S



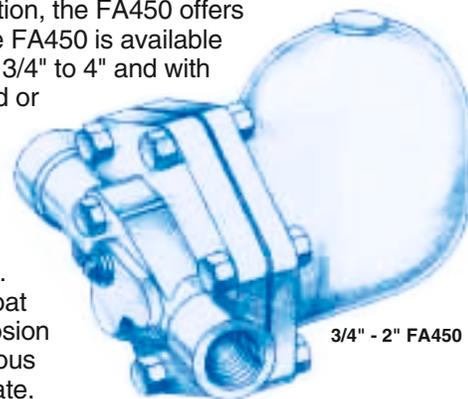
CA46S

TDA52

Sizes	1/2"
Body Material	Stainless Steel
Connections	NPT
Piping Configuration	In-Line
TIS#	7.314
Maximum Operating Pressure (PMO)	250 psig
Load @ PMO (lb/hr)	2,800

FA450

For processes that require pressures to 465 psig and/or steel construction, the FA450 offers the best solution. The FA450 is available in sizes ranging from 3/4" to 4" and with threaded, socket weld or flanged connections. The in-line design allows all internal parts to be serviced without removing the trap from the pipeline. The stainless steel float and valve resist corrosion and allow for continuous drainage of condensate.



3/4" - 2" FA450

FA450

Sizes	3/4", 1, 1 1/2, 2"					3" & 4"
Body Material	Cast Steel					
Connections	NPT, SW, Flanged					
Piping Configuration	In-Line Horizontal					
TIS#	7.315					7.3151
Model: FA450	-4.5	-10	-14	-21	-32	FA450
Maximum Operating Pressure (PMO)	65 psig	145 psig	200 psig	300 psig	465 psig	465 psig
Load @ PMO (lb/hr)	71,000	45,000	35,000	40,000	50,000	900,000
	2" Trap	2" Trap	2" Trap	2" Trap	2" Trap	3" & 4" Trap

CAS14/CAS14S

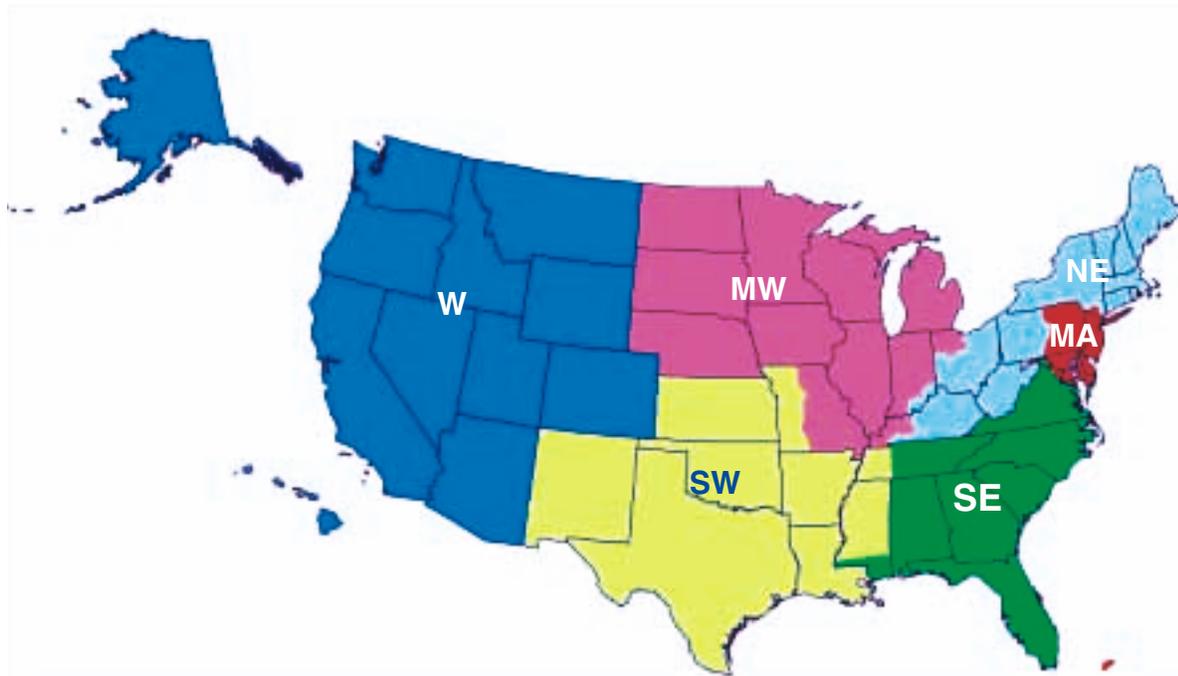
Sizes	1/2", 3/4", 1"	
Body Material	Stainless Steel	
Connections	NPT	
Piping Configuration	In-Line Horizontal	
TIS#	TI-P148-38 US	
Model: CAS14 / CAS14S	1/2", 3/8"	1"
Maximum Operating Pressure (PMO)	145 psig	200 psig
Load @ PMO (lb/hr)	904	2640

CA46S

Sizes	1/2", 3/4", 1, 1 1/2", 2"			
Body Material	Stainless Steel			
Connections	Flanged			
Piping Configuration	In-Line Horizontal			
TIS#	7.3023			
Model	CA46S-4.5	CA46S-10	CA46S-14	CA46S-21
Maximum Operating Pressure (PMO)	65 psig	145 psig	200 psig	300 psig
Load @ PMO (lb/hr)	72,000	45,000	35,000	40,000
	2" Trap	2" Trap	2" Trap	2" Trap

TDA52 (not pictured)

The only Thermo-Dynamic Drain Trap currently offered, the TDA52 is a compact product that is very popular for drainage of compressed air lines. This 1/2" unit can accommodate pressures up to 250 psig and is constructed of stainless steel to resist corrosion.



For more information on Spirax Sarco, contact your Regional Hub Office below, or call 1-800-883-4411 and you will be connected to the location nearest you.

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