Steam Traps
Models 401-SH and 501-SH
Installation and Operation Manual

This bulletin should be used by experienced personnel as a guide to the installation of the Models 401-SH and 501-SH Steam Traps. Selection or installation of equipment should always be accompanied by competent technical assistance. You are encouraged to contact Armstrong International, Inc. or its local sales representative for additional information.

Please read and save these instructions.

IB-19-A-EN

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Installation

Steam trap installation is critical from both a performance and maintenance aspect. Installation of the trap is simplified if you follow these guidelines:

- Before installing the trap, ensure the line is clean. Blowdown any strainers ahead of the trap.
- Installing the trap so that it is **ACCESSIBLE** for inspection and repair, **BELOW** the drip point whenever possible, and **CLOSE** to the vertical drip leg.
- For proper operation, the trap body must be upright in a "vertical to the eye" position. The trap must be installed with the outlet at the top.
- What little condensate there is on superheat and high pressure/low load service usually fom1S in drip legs and in the traps then1Selves. Therefore, proper piping and drip legs of adequate size and diameter are essential for the successful operation of the Armstrong superheat traps, see Chart 1-1 and Figures 1-1 & 1-2.
- Use pipe dope sparingly on male threads only. Leave the end thread exposed to avoid introducing the sealant into the system.
- Install strainers ahead of traps if specified or when dirt conditions warrant their use.
- Shut-Off Valves ahead of traps are needed when traps drain steam mains or where the system cannot be shut down for trap maintenance. When valving a new trap into a hot system, be sure to open the valve slowly. The trap must be filled with water (primed) before operation.
- For typical hook-ups, see Figure 1-2.
- Because insulation reduces the condensate available to the trap for the maintenance of the water seal, leave the trap and 2-3 feet of inlet piping uninsulated. This will help extend trap life. If personnel protection is required, install a wire cage.

Chart 1-1. Recommended Steam Main and Branch Line Drip Leg Sizing

M	D	Drip Leg Length Minimum (in)	
Steam Main Size (in)	Drip Leg Diameter (in)	Supervised Warm-Up	Automatic Warm-Up
½	½	10	28
¾	¾	10	28
1	1	10	28
2	2	10	28
3	3	10	28
4	4	10	28
6	4	10	28
8	4	12	28
10	6	15	28
12	6	18	28
14	8	21	28
16	8	24	28
18	10	27	28
20	10	30	30
24	12	36	36

Figure 1-1. Drip Leg Sizing

The properly sized drip leg will capture condensate. Too small a drip leg can actually cause a "piccolo" effect where pressure drop pulls condensate out of the drip leg and trap.

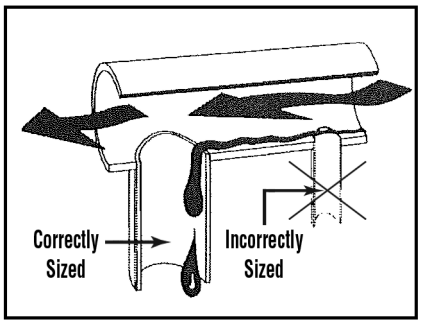
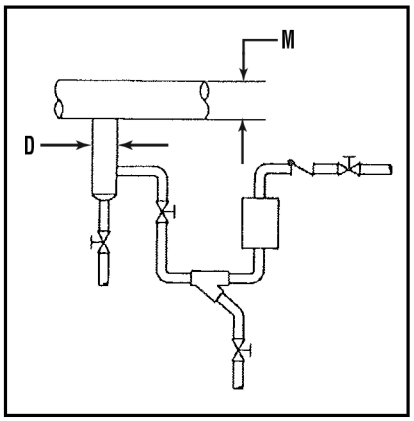


Figure 1-2. Trap Draining Drip Leg on Steam Main



Basic Maintenance

Maintenance Schedule

High pressure drip traps should be tested at least three times per year.

Check Trap

When the steam trap is suspected of malfunctioning, it can be checked by observing the discharge of the trap. Inverted bucket traps discharge intermittently.

If the trap is blowing live steam, close the inlet valve for a few minutes, then gradually open it so that the trap can catch its prime. Do not confuse the discharge of flash steam with live steam loss. If the trap continues to blow live steam, remove the trap from the line, back flush it with compressed air or water, re-install it and check it again for normal operation.

Check Application

If it can not be made to operate normally, verify that the trap is correct for the application (capacity, differential pressure, etc.). If correct, install a new steam trap of the same series and of equal capacity in its place.

NOTE: When performing maintenance on any steam trap, the common practice is to remove the trap in question and immediately install a good trap in its place. Maintenance can then be performed with minimum equipment downtime.

Troubleshooting

Whenever a trap fails to operate and the reason is not readily apparent, the discharge from the trap should be observed. If the trap is installed with a test outlet or discharges to atmosphere, this will be a simple matter - otherwise, it will be necessary to break the discharge connection.

Cold Trap -No Discharge

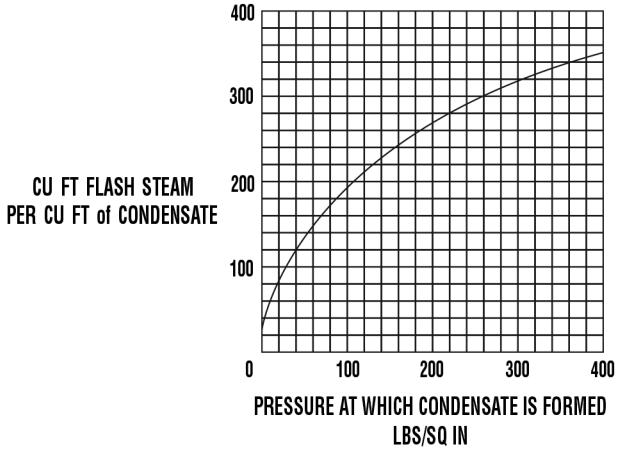
A. If trap fails to discharge condensate.
1. Wrong pressure originally specified.
2. PR V out of order.
3. Pressure gauge on boiler reads low.
4. Orifice enlarged by normal wear.

B. No condensate or steam corning to trap.
1. Stopped by plugged strainer ahead of trap.
2. Broken valve in line to trap.
3. Pipe line or elbows plugged.

Hot Trap -No Discharge

A. No condensate corning to trap.
1. Trap installed above leaky by-pass valve.
2. Bottom chamber not yet full. These special traps will not discharge until enough condensate accumulates. This may take 15 minutes.

Chart 2-1. Volume of flash steam formed when one cubic foot of condensate is discharged to atmospheric pressure.



Steam Loss

If the trap leaks or blows live steam, trouble may be due to any of the following causes:

A. Valve may fail to seat.
1. Piece of scale lodged in orifice.
2. Worn parts.

B. IB trap may lose its prime.
1. If the trap is blowing live steam, close the inlet valve for a few minutes. Then gradually open. If the trap catches its prime, the chances are that the trap is all right.
2. Prime loss is usually due to sudden or frequent drops in steam pressure. If possible locate trap well below drip point.

C. Trap may be venting air and noncondensibles.
To test, take a bucket of cold water and submerge the end of the discharge pipe. If bubbling continues, it is air. If bubbles collapse and disappear, the valve is leaking; see A and B.

D. Imaginary Troubles.
If it appears that steam escapes every time trap discharges, remember: Hot condensate forms flash steam when released to lower pressure, but it usually condenses quickly in the return line. See Chart 2-1.

Continuous Flow

A. Trap too small.
1. A larger trap, or additional traps should be installed in parallel.
2. High pressure traps may have been used for a low pressure job.

B. Abnormal water conditions. Boiler may foam or prime, throwing large quantities of water into steam lines. A separator should be installed or else the feed water conditions remedied.

For additional information on Models 401-SH and 501-SH Steam Traps, contact your Armstrong Representative and request catalog 326.

Designs, materials, weights and performance ratings are approximate and subject to change without notice.
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IB-19-A-EN
Printed in U.S.A. - 11-1-2016