

SuperScale

Locomotive Company
367-A Beckett Pl.
Grover Beach, Ca 93433

Dear Customer,

Some information concerning the safety valves you have purchased from SUPERSCALE LOCOMOTIVE COMPANY is presented below.

SAFETY VALVE INSTALLATION

1. Install the boiler fitting in the boiler, first, using a 3/4" hex socket so as not to damage the fitting. Do not use an open-end wrench because, even when carefully used, it could upset the metal of the boiler fitting with possible damage to the surface upon which the bottom of the safety valve tightens for a seal. Do not use teflon tape on either the pipe thread of the fitting or the safety valve itself. Pieces could break off in service and lodge in the valve causing it to malfunction.
2. Next, screw the safety valve onto the boiler fitting and tighten (**lightly**) using a close fitting 3/4" open-end wrench.

CAUTION: It is strongly advised that a new boiler be steamed and blown down several times before these safety valves are installed. New boilers contain some residual dirt from the manufacturing process which general washing does not remove. Steam and boiling water tend to remove these particles of dirt which may go out of the safety valve when it pops off. The poppet inside the safety valve only lifts .018" and decreases as it approaches reseal. Dirt particles which are larger than the opening in the valve could become lodged between the seat and the poppet and prevent the valve from closing, causing probable damage to the seat.

OTHER IMPORTANT INFORMATION

1. All safety valves are fully tested and set on steam using a precision laboratory test gauge which is accurate to plus or minus 1/4 psi. These valves pop off within 1 psi of set pressure-consistently. **PLEASE NOTE:** If your steam gauge registers a pop off pressure other than the indicated setting on the valve, have your gauge checked. Some of the small steam gauges used by Live Steamers have been found to be as much as 30 psi in error when checked against a laboratory gauge. Don't assume that your gauge is reading accurately-it may not be. Indicated pressure readings on the small commercial gauges are commonly plus or minus 3%. (That's about 4 psi at 125 psi pressure.)
2. The blowdown differential is set to function in the range of 4 psi to 8 psi, and doesn't vary by more than 1/2 psi from the factory setting. The reseal is sharp and tight. If the valve leaks after reseal, the valve either has dirt in it and needs cleaning, or it is worn enough to need a reseating operation. (NOTE: a valve can be lodged open by a piece of dirt after popping the very first time, regardless of its being a new valve.)
3. When removing the safety valve for any reason, put some penetrating oil on the joint between the valve and the fitting to help with loosening. Over a short period of time, the valve will tend to seize up on the boiler fitting making separation with a wrench difficult. **Do not**, under any circumstances apply a wrench or pliers to the top case of the safety valve.
4. After the boiler has been blown down for storage, spray a small amount of WD-40 in each safety valve to stop any top-side corrosion.

SUPERSCALE provides a cleaning procedure with each safety valve. Read it and become familiar with it. The customer can service his own safety valve by following the directions.

SUPERSCALE will perform service on any of its safety valves on a "time and material" basis at the current shop rate. A custom repair of a safety valve could approach or exceed the original cost of the valve. In the past, the few occasions that safety valves have been returned for service, all of the valves had suffered damage due to dirt from a dirty boiler. So, again, be sure your boiler is free of dirt before installing the valves.

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SETTING SAFETY VALVES

THESE INSTRUCTIONS APPLY ONLY TO SUPERSCALE LOCOMOTIVE CO. SAFETY VALVES.

The pop-off pressure setting is established by the 3/16 hex screw on the top of the valve. To change the pressure, loosen the lock nut on this screw and rotate the screw clockwise to increase the pressure. One full turn of the screw is equal to approximately 30 psi. Fine tuning can be done during a test on your boiler after rough adjustments have been made.

The blowdown differential (the difference between pop-off pressure and reseal pressure) is set by the serrated blowdown adjusting ring inside the valve body. You can see it by looking down into the valve through the steam discharge slots. The small screw in the side of the valve body locks the ring in place. If the safety valve is the muffled type, the muffler must be unscrewed from the valve body before any adjustment of the ring can be made. (Take care when reinstalling the muffler because the muffler threads are 90 pitch and very easily cross-threaded.) Set the blowdown differential in the range of 5 to 8 psi. For example, if the valve pops at 120 psi, then it should reseal at 115 to 112 psi. If the blowdown differential is set to low, then the valve will not pop at the set pop-off pressure, but will slowly start to release steam, like a leak, and will gradually increase the steam flow as the pressure increases past the pop-off setting. The valve will not function well and will not release steam pressure like it is designed to do if the blowdown adjusting ring is not set properly. By the same token, if the blowdown differential is set to high, the valve will release steam in excess of the 8 psi range and drop the boiler pressure beyond a desirable low limit. The valve will definitely pop in this mode and release steam as it should, but will not reseal at the desired reseal pressure.

To change the blowdown differential from the factory setting, loosen the side screw until it is backed out beyond the serrations of the blowdown adjusting ring so that the ring can be turned. Rotate the ring counter-clockwise to increase the blowdown differential. One notch is equal to approximately 2 to 3 psi. For a 10 psi change of the pop-off pressure, the ring must be rotated about one notch.

As an example, suppose you receive a safety valve which is factory set at 120 psi pop-off pressure and you want to lower the pop-off pressure to 100 psi. First, set the blowdown adjusting ring. Loosen the side screw, and with a toothpick or a small jewelers screwdriver, rotate the ring counter-clockwise 2 notches and tighten the screw. Make sure the screw seats itself between the serrations on the ring. Now set the pop-off pressure by adjusting the top screw. Loosen the lock nut and rotate the screw counter-clockwise approximately 2/3 turn. Tighten the lock nut. Do all of this on the bench or on a cold boiler. You are ready for a sample test on your boiler. If the valve performs well after your "rough" settings, then you have set it right the first time. If, however, you would like to make a small change from your "rough" settings, then you may reset the pop-off pressure at this time using your steam gauge as a guide. **Put on some gloves and suitable eye protection.** Lower the boiler pressure to 0 psi before attempting to do any resetting of the pop-off pressure or the blowdown differential. As an extra precaution, **don't work with your face directly over the valve**, just in case there is pressure in the boiler when you don't expect it. Keep in mind that to adjust the blowdown adjusting ring you must look straight down into the valve to see the ring. You don't want the valve popping off while you have your face in the way of the discharge. **For your total safety, it is recommended that you do not make any final adjustments on the valves until the boiler has cooled down completely.**

Some people are not familiar with pop-type safety valves so that they can recognize when a valve is working properly. It is recommended that before you make any changes, use the valves as factory set for a short time to familiarize yourself with their performance.

SAFETY VALVE CLEANING PROCEDURE

by

Superscale Locomotive Company

1. Remove the safety valve from the boiler fitting. Use a penetrating oil like "Kroil" on the screwed together joint.
2. Carefully remove the tiny hex headed screw from the side of the body. This screw tightens into one of the slots of the adjusting ring (blowdown ring) to keep it in place.
3. Now unscrew the body from the base. It will be under spring pressure. Do not tamper with the screw in the top of the body. This adjusts the pressure and does not need to be removed to clean the valve. Use "Kroil" here, too.
4. Observe the position of the blowdown ring and remove the spring assembly and the feather valve (or poppet). Don't move the adjusting ring-mark it's position with a felt marker and make sure it remains in the same place during cleaning and reassembly. If it is accidentally moved and not replaced into the exact previous position, the blowdown will be off, and it will have to be reset on the boiler, under steam, by trial and error. Raising the ring increases the blowdown differential. (counter-clockwise rotation)
5. Place the base, the poppet and the body in warm vinegar for about 15 minutes, then rinse off with water, thoroughly.
6. Inspect the guides and the seat of the poppet for foreign matter, and also the seat and bore in the base. If necessary, clean further with a no-metallic article (toothpick) capable of fitting into the seat area of both base and poppet.
7. Now reassemble taking care to get the spindle to enter the hole in the top adjusting screw. Screw the body on tight (finger tight).
8. Replace the small hex screw in the side and screw it in until it seats against the body, taking care that it enters the same slot it had been in before disassembly. Replace the safety valve on the boiler fitting and tighten snugly.

Because of the corrosive and scaling conditions which occur in a boiler, I feel it necessary to make some recommendations concerning the safe use of safety valves.

Although this is written concerning the safety valves sold by Superscale Locomotive Company, it applies to other makes as well.

1. First and foremost - before leaving the steaming bay, pop both safety valves to insure that both are working properly. This can be easily done with the Superscale valves by inserting a 1/16" dia. rod into the hole of the adjusting screw and holding down the spindle until the #2 safety valve blows, then release the #1. This method allows testing both valves without the need for hard firing with the resultant heavy water loss. Some boilers do not have the steaming capacity to fire against the #1 safety valve to the point where the #2 valve opens; therefore, this method, when employed, may be the only way to exercise the #2 valve.
2. Be especially suspicious of the safety valves if the locomotive has been laid-up for several weeks or longer. Corrosion can occur in a boiler which the operator has blown down and "properly" prepared for storage.
3. Since the contents of the water we use in our boilers varies widely with location, safety valves may require more frequent maintenance in some areas than in others. At the first sign of a valve malfunction (not popping at the set pressure, failure to reseal cleanly, leakage, stuck open or closed, etc.) it is time to inspect and clean it as outlined by the maintenance sheet which Superscale provides with each safety valve.

REMEMBER - A safety valve which is corroded shut is nothing more than a plug.