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Successfully Locating Suction Line Leaks

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Many oil heat service technicians encounter problems with air in the oil supply system. Most are caused by the use of COMPRESSION FITTINGS, but leaks can be found elsewhere. You may recognize the following air related symptoms:

1. Loss of flame retention (flame pulsates on end cone).
2. Loss of oil prime causing lock-out on safety.
3. Rough or noisy starts and stops.
4. Pump whine and pressure fluctuation.
5. Nozzle afterdrip.

NOTE: *This can cause afterburn in the combustion chamber, which may cause a smoky condition. Oil accumulation in the air tube has also been noted.*

Now let's see how to repair these leaks. There are several different methods available today to locate suction line leaks. Some of the most commonly used are:

- Pressure Test Method
- Vacuum Test Method
- Visual Test and Sight Glass Methods

Pressure Test Method

1. Disconnect supply line as close to the tank as possible.
2. (Two-pipe) If system is two-pipe, disconnect return line and plug return port at fuel unit.
(Single-pipe) If single-pipe, proceed to step #3.
3. Install pressure gauge into gauge port of the fuel unit.
4. Begin to pressurize line to a reading of 8-10 PSIG. Do not exceed 10 PSIG or you may cause seal separation from the pump shaft, damaging the fuel unit.
5. Monitor your pressure reading. This reading should hold on the pressure gauge for 10 to 15 minutes. A sudden or gradual drop in this reading will indicate a leak.
6. To assist you in finding the leak, use a leak detector fluid or solution on the fittings and connections. This will allow you to visually locate the leak.
7. Repair the leak and retest system by redoing steps 1-6.

REMINDER: If you are testing a two-pipe system, make sure you remove the return plug and reinstall the return

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2. (Two-pipe) If system is two-pipe, disconnect return line and place an open container below return port of fuel unit.

(Single-pipe) If system is single-pipe, connect a bleed hose to the bleeder port and place opposite end of the hose into an open container.

3. Fill the fuel pump of either system with oil and install a vacuum gauge into the inlet port.

4. Start and run the burner until a vacuum of 10-15 in. Hg is reached. On a single-pipe system, you must open the bleed port while the burner is running to raise the vacuum. Once the vacuum is reached, close the bleed port.

NOTE: On either system you may need to jumper the F-F terminals after burner start-up to allow sufficient time to reach the vacuum reading.

5. While the burner is running and you have reached the required vacuum, perform the following:

Two-pipe: Plug return port and turn power to burner OFF.

Single-pipe: Close bleed port and turn power to burner OFF.

6. On either system, check the vacuum reading after shutdown. This reading should hold for a 5 minute period. If the vacuum does not hold steady, recheck all connections to assure they are tight and rerun test.

7. If vacuum reading continues to leak down, repair or replace fuel unit. Once determining fuel unit is air tight, check the supply lines for air leaks.

The Vacuum Method (*Suction Line Test*)

This test will be most effective when you have a shut-off valve near the oil tank.

1. Install a vacuum gauge in the optional inlet port of the pump. (Single or two-pipe). Leave suction line connected.

2. Close shut-off valve nearest to the oil tank.

3. Start burner and allow your vacuum to stabilize.

NOTE: On either system you may need to jumper the F-F terminals after burner start-up to allow sufficient time to stabilize vacuum reading.

4. Turn power to the burner off after vacuum reading has stabilized. The vacuum reading should hold steady for 5 minutes.

5. If the vacuum reading does not hold and your fuel unit is leak tight, we must then assume that the leak is between our fuel unit and shut-off valve.

6. Proceed with the leak detection method of your choice to locate the fitting or connection point which is at fault.

7. On a system which does not have a shut-off valve near the tank, you will need to test with an alternate method. Please note Pressure, Visual and Sight Glass Methods.

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The flared tubing is an 8-to-10 inch piece of clear plastic tubing, 3/8" or 1/2", depending upon line size. Flared fittings at both ends, one male and the opposite female, will suffice.

The sight glass method is a crossover from the air conditioning and refrigeration industry. It requires the use of an in-line sight glass made of a brass body and Pyrex viewing window. They are available with 3/8" or 1/2" flare connections.

To test:

1. Install your choice of tester into the suction line at the fuel unit inlet making sure all connections are tight.
2. Start the burner and watch the oil flow through the tester.
3. On a two-pipe system allow approximately 3 minutes of run time to remove the air that entered while installing the tester.
4. On a single-pipe unit, you must purge this air pocket through the bleed port.
5. Following our 3 minute period, or after venting of the air, continue watching oil flow quality at the tester.
6. If signs of air bubbles reappear or continue to appear in the tester, no matter how small, you have an air leak.

To locate the leaks, you must install the clear tester tube at all connections, working your way towards the tank. If at any time, the air bubbles disappear, the leak should be found at your previous connection.

Should your tests be conducted on an underground tank and at the last available connection you are still encountering air, you may have located a leak in the buried lines. The leak may be in the indoor or outdoor portion of these lines. Exposing these lines for further testing may be your easiest solution. Once isolating the leak(s), make repairs and retest the system to ensure that it is leak free.

Electrode Sight Glass

Available to the industry today is the electronic sight glass. The instrument resembles a hand held meter and has two transducers that you can easily mount at any point in your suction line. They are located a slight distance apart from one another. When operating, one unit transmits and the other receives ultrasonic signals. The varying rate of pulse of the signal received is an indication of the locations and quantity of air flowing through the system. This unit is becoming more widely used because it is very quick and effective.

Conclusion

The previous information has covered a number of techniques to successfully locate suction line leaks. It is up

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