

Why use Tigerloop® in fuel heating systems?



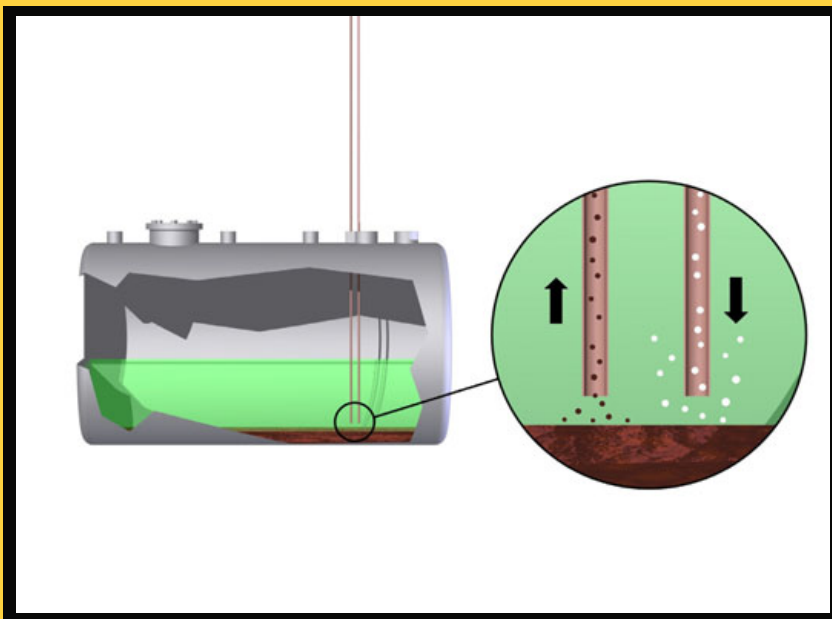
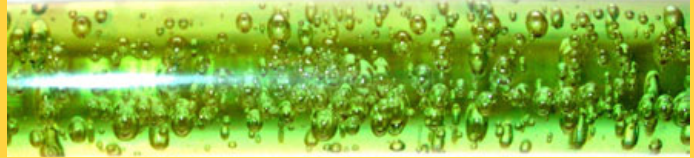
Reliability

New products are continually being developed in the modern oil heating industry in order to satisfy new laws and regulations for environmentally safe and energy efficient oil heating installations. Recent development has led to low-sulphur heating oil, highly efficient burners using blue-flame technology and condensing oil boilers. This new technology helps ensure optimal combustion making oil heating a reliable, cost effective and environmentally friendly alternative. However, these technological developments have created an even higher demand for clean, air-free oil to ensure reliability in oil heating. **The Tigerloop® automatically and continuously removes air from the oil, creating the best possible operating conditions for the heating installation.**

Tigerloop® eliminates common oil heating problems.

Gas/air bubbles in oil

When oil is drawn up from the oil tank to the burner, large amounts of gas bubbles can be released from the oil. These gas bubbles are released when there is a negative pressure (vacuum) in the suction line. The quality, temperature and viscosity of the oil will also play a determining role in the amount of gas released. This occurs in almost every installation, but above all when oil must be lifted to a higher level and/or drawn through long suction lines. The gas/air bubbles flow with the oil into the oil pump and are the leading cause of breakdowns. Gas/air bubbles also lead to an increased build up of soot, reduced efficiency, increased emission of harmful particles, unnecessary wear and tear on the oil pump and higher oil consumption.

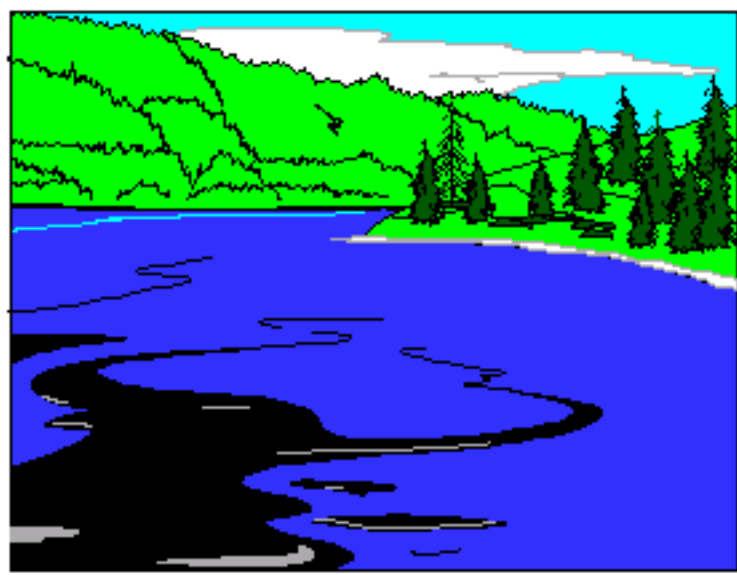


Problems with two-pipe systems

The two-pipe system was developed to try and get rid of the gas/air bubbles from the oil pump. A return line pumps the separated gas/air bubbles together with the unburned oil from the oil pump back to the oil tank. This, however, does not reduce the amount of gas/air bubbles that flow to the nozzle for combustion, which results in nozzle problems (see page 4). The high flow of oil in the two-pipe system (up to 20 times more than what is actually used for combustion) leads to increased dirt/sludge being released from the oil tank leading to clogged oil filters and nozzles.

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Risk for leakage

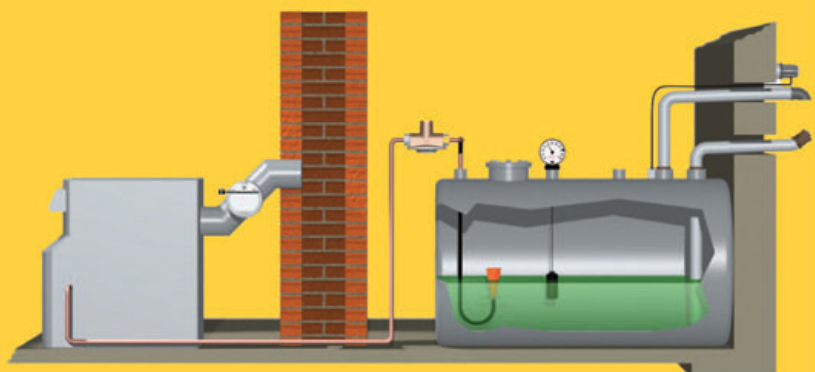


The pressurized return line in a two-pipe system is the number one cause of damages due to leaks in heating oil installations. Even the smallest leak in the return line can lead to terrible environmental damages and expensive clean up. To avoid problems with leaky return lines, countries such as Denmark and Switzerland have already established laws prohibiting use of the two-pipe system. In these countries, the one-pipe system with a de-aeration device like the Tigerloop® is standard. Other

countries, such as Belgium and Germany are also in the process of establishing similar laws. For example, the one-pipe system with a de-aerator is standard in most German states and even required by law on new heating installations.

One-pipe system without Tigerloop®

The one-pipe system **without** a Tigerloop® is not to be recommended. This is due to the increased risk of breakdowns, as gas/air bubbles cannot be removed from the oil pump during operation. Such a system will only work as long as the oil is continuously 100% free of gas/air bubbles. Moreover, it is

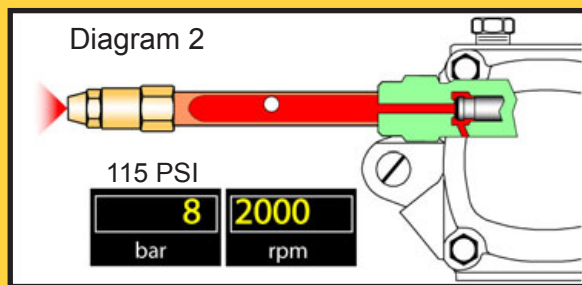
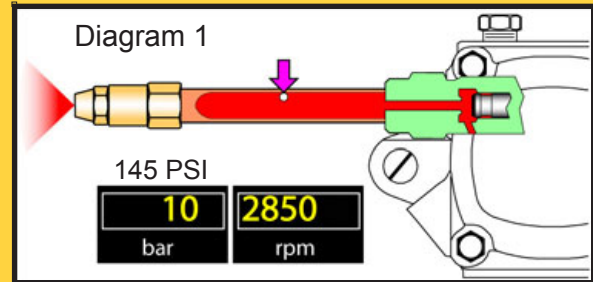


impossible to automatically de-aerate the system during start up or after running the tank empty since a tool is necessary to purge the system. By using a Tigerloop® the system will be primed automatically by pressing the reset button on the burner. When converting from a two-pipe system to a one-pipe system it is important to consider the dimension of the suction pipe (feed line). Too large a diameter of pipe in a one-pipe system with a de-aerator may lead to air pockets as the siphon effect is lost in the descending sections of the suction pipe.

Tigerloop® eliminates common oil heating problems.

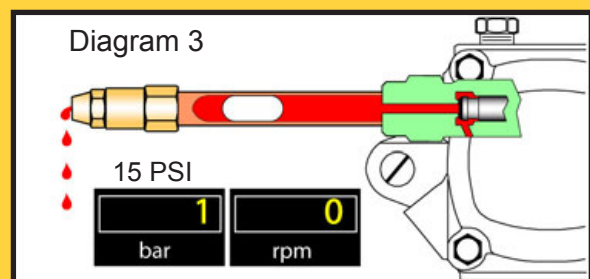
Burner Nozzle Problems

Diagram 1 shows a cut-away of a pump/nozzle operating normally, except for the air bubble lodged in the nozzle line. The bubble is deceptively small, since its size has been compressed by the pressure in the nozzle line. As long as the oil pump operates, the bubble will remain small and compressed, having no effect on burner operation.



However, when the pump shuts down, it is a different story. As the pump's rpm decreases, the piston will close against the nozzle seat, cutting off the flow of oil from the pump, but not the flow of oil from the nozzle. The expanding bubble has taken over for the pump in supplying the pressure, pushing oil out of the nozzle. (diagram 2).

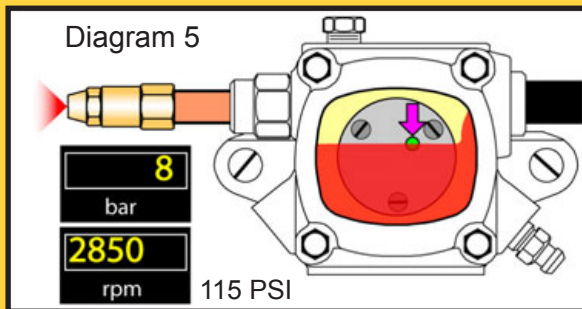
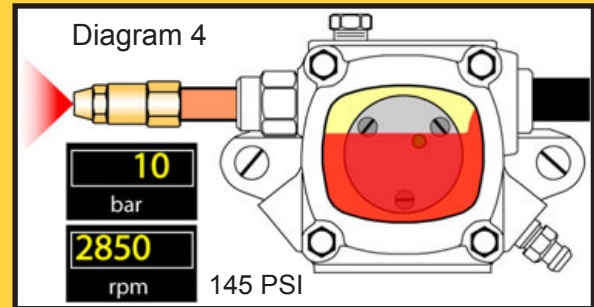
Oil flow does not cease until the bubble has expanded back to its original size and nozzle line pressure has dropped to zero (diagram 3). The result is virtually no cut-off, with sooty, smoky shutdowns. And, a solenoid valve will not help this problem. It is strictly a problem caused by air bubbles.



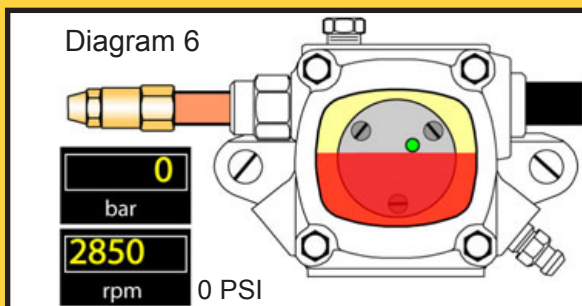
Tigerloop® eliminates common oil heating problems.

Burner Pump Problems

Moreover, the presence of air bubbles in the fuel has some consequences on the operation of the pump. Diagram 4 is a cut-away of a pump's strainer chamber, with the pump operating normally. The level of oil does not fill the entire chamber. This is normal because during bleeding the oil level only rises high enough to just cover the inlet to the gear set, about two-thirds of the way up the strainer chamber. This air cushion formed at the top quiets the hydraulic whine of the gear set and does not affect pump operation. As long as the inlet to the gear set stays covered, all is well.

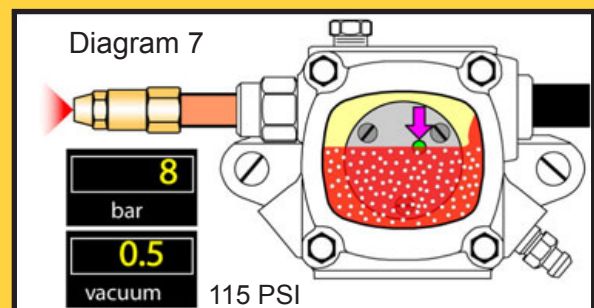


But, if air enters the pump, it will immediately rise to the top, pushing down the oil level in the strainer chamber and partially uncovering the inlet to the gear set. (diagram 5). The gear set starts gulping air and oil and the pressure becomes unstable, resulting in poor combustion, noise, rumbling, pulsation...



If enough air enters, the oil level drops completely below the inlet to the gear set, the pressure is lost and the burner eventually locks-out. (diagram 6).

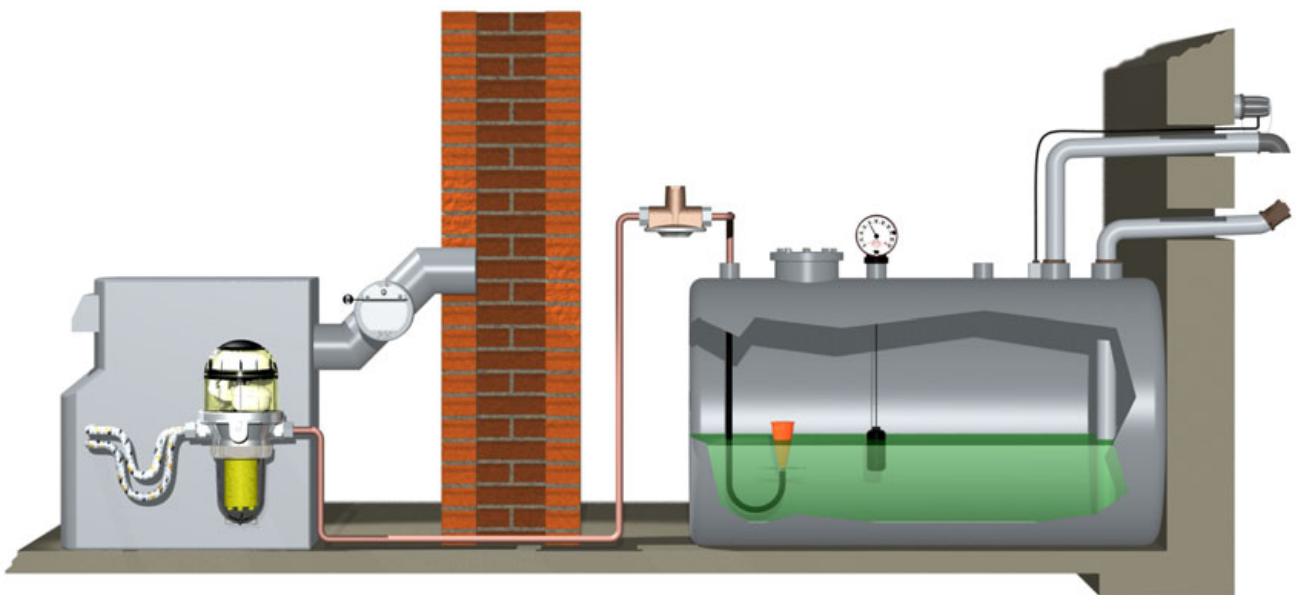
The second kind of bubbles are gases which come from dissolved vapors and volatiles that are drawn out of the oil when it is exposed to vacuum. The higher the vacuum, the more bubbles produced. Diagram 7 shows what is going on in the strainer chamber of the oil pump. The bubbles drawn out of the oil rise to the top of the strainer chamber, the oil level falls, the gear set gulps foamy oil, pressure becomes unstable and the burner eventually locks out.



The Tigerloop® prevents such air/gas problems by automatically and continuously de-aerating the oil before it enters the oil pump.

Creating the optimal solution

New laws and regulations for environmentally safe oil heating installations are leading to the demise of the two-pipe system. Tigerloop® makes a one-pipe system possible for every type of oil heating installation. The one-pipe system is the most environmentally safe method for transporting oil from the oil tank to the oil burner. The advantages of this system will also increase burner efficiency and reduce fuel consumption.



One-pipe advantages from the oil tank Two-pipe reliability for the oil pump



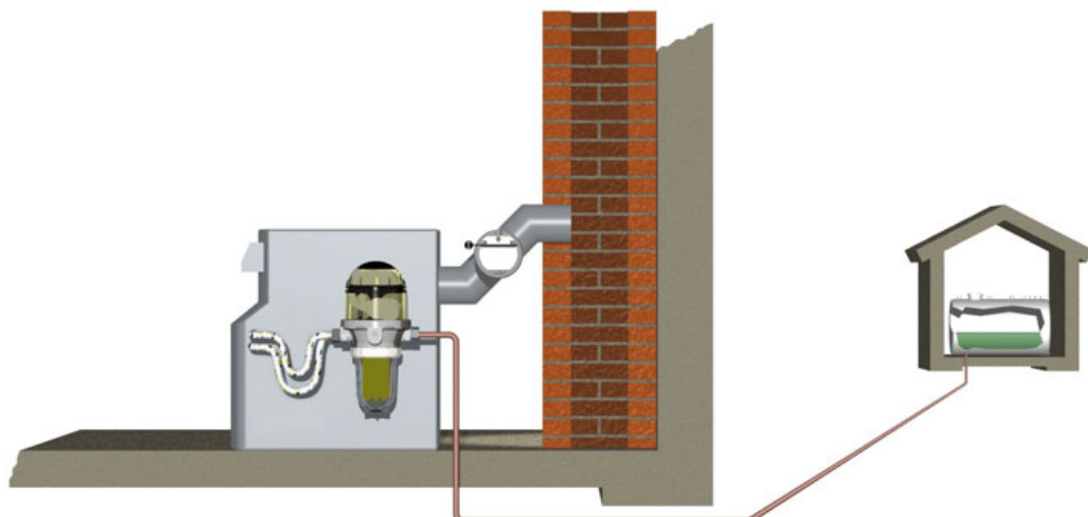
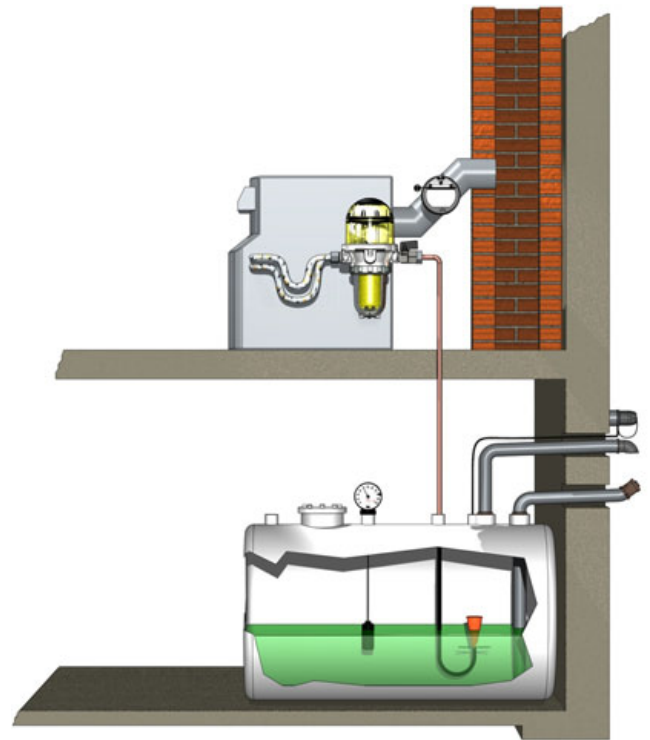
Between the oil tank and Tigerloop®, the heating installation functions as a one-pipe system. However, between the Tigerloop® and the oil pump, it is a two-pipe system. Be sure that the by-pass screw is installed in the pump for two-pipe operation. The Tigerloop® will automatically and continuously remove air from the oil helping the burner to run more efficiently. The Start/Stop function of the burner is improved as no air pocket builds up before the nozzle. Oil is also preheated by the friction in the pump to approximately room temperature, thus eliminating problems associated with cold oil.

Tigerloop® - for environmentally safe and highly efficient oil heating installations

The Tigerloop® allows you to place the oil tank below the level of the burner. Air bubbles that are released in the oil due to the vacuum in the system are automatically and continuously removed thanks to the Tigerloop®. By using the Tigerloop® system, only the amount of oil burned in combustion is actually drawn from the tank. This reduces the flow of oil, which saves filter life and preserves oil quality. Also, with no return line to the tank you will reduce installation costs and eliminate the risk for return-line leakage.

An oil pump delivers the same amount of oil irrespective of what is actually needed for combustion. In the case of a normal domestic burner, only approx. 5 % of the delivered oil is actually burned in combustion. In the case of the traditional two-pipe system, the remaining 95% is transported back to the oil tank. With a Tigerloop® automatic oil de-aerator no oil needs to be transported back to the tank. The oil that is not burned in combustion is lead back to the Tigerloop® where it is de-aerated again and again automatically. For this reason only the amount of oil to be burned in combustion is sucked from the oil tank.

Gas/air bubbles are also released when friction in long oil lines causes a vacuum (negative pressure) to build in the oil line. The more friction, the more bubbles that will be released, causing problems for the oil pump. The result is poor combustion and increased fuel consumption. The Tigerloop® even solves this problem by continually de-aerating the oil.



Applications:

The benefits of Tigerloop® are applicable anywhere you use a light oil burner. For example:
Boilers (Steam Boilers, Thermal Fluid Heaters, Hot Air Generators and Hot Water Boilers)
Furnaces
Ovens (like bakery ovens)
Portable heaters
Driers (like Agricultural Dryers, Food Processing Dryers, Textile Dryers)
Incinerators (Non-Ferrous Melting, Heat Treatment and Ceramic Kilns)
Paint Shops (like Automobile Paint Shop)
Road Construction (like Bitumen Tank Heating and Hot Mix Plant)

Approvals & Conformity

Tigerloop® is TÜV approved, UL & ULC listed, TSSA approved and conforms to EN 12514-2, BS 5410 , OFTEC T32 and CSA B 139-04.

Summary of Tigerloop advantages:

- Eliminate the risk of leakage in the return line.
- Reduce the flow of fuel, preserve quality of oil.
- Less dirt/sludge transported in the system.
- Better combustion, reduces oil consumption.
- Solve the problem of nozzle dripping causing soot build up.
- Provides the best possible operating conditions for pump.
- Satisfied customers / reduces call backs.
- The installers save time and money (easier installation).



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