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HYDRAULIC ELEVATOR OIL LEAKAGE

The vast majority of elevators now in service, including those manufactured by Elevator Concepts LTD, use pressurized hydraulic oil to move and hold the elevator car. Leakage in the hydraulic system can result in unintended operation and car movement.

The typical hydraulic system consists of an open system and a closed system. The open system consists of a reservoir, a pump, and a control valve. The closed system consists of a check valve, the hydraulic piping, and the hydraulic jack assembly. which extends the ram in the hydraulic jack. Hydraulic oil is stored in the reservoir. To raise the elevator, the control valve connects the closed system to the pump, pressurizing the oil and consequently raising the car. To lower the elevator, the control valve connects the closed system to the reservoir, releasing the pressure, and allowing the car to descend.

Oil leakage can occur in either the open or closed systems. Leakage in the open system will not cause the elevator to descend. In some designs, it will cause a loss of oil from the reservoir. The only concerns in this case are the possibility that the elevator will run out of oil before it reaches its extent of travel, and of course the mess made by an oil leak. However, most open systems are now designed so that a leak in the pump or valve will cause the oil to simply return to the reservoir.

Leakage in the closed system, however, is a more serious matter. Leakage here means unintended and uncontrolled elevator descent in addition to oil loss from the system. If the car has unintended descent that cannot be explained by controller problems, or loss of oil that cannot be visually observed, the entire closed system must be checked to determine the cause.

One way of checking the closed system is to run the car to its full extent of up travel, so the ram is on its stop ring. Take an accurate measurement of the oil in the reservoir. Then run the pump for a couple minutes to pressurize the system at by-pass pressure. While the pump is running, check for signs of leaks along the entire system. After you stop the pump, measure the oil in the reservoir. If the level has gone down and there are no visually observable leaks, there is probably a leak in the in-ground portion of the hydraulic cylinder, or in some concealed piping. Carefully observe the packing; it is not unusual for a packing to leak and have the oil wick down the cylinder right into the ground with very little sign of leakage. Also note if the elevator is descending on its own. If it is, close the line valve. If the descent stops, there is most likely a problem with the down section of the control valve. If not, there is probably a leak in the in-ground portion of the hydraulic cylinder, or in some concealed piping. If an in-ground leak is suspected, a complete settling test should be performed. Any elevator suspected of concealed leakage should be removed from service immediately.

You should know that there is another cause for unintended descent, which is hydraulic oil cool-down. The oil heats up when it moves the car. As the oil heats it expands. When the oil cools down, it shrinks, resulting in the descent of the car. If the elevator has an unexplained descent of a small amount (1/2" to 3") which is very consistent, you should suspect oil cool-down. All hydraulic elevators are subject to this phenomenon; the amount varies on a job by job basis. This is the reason that all hydraulic elevators are required to be equipped with an automatic "anti-creep" device.

If you have any questions regarding this or any other aspect of our elevators, please contact us.