

The ASME/ANSI A17.1-2000 elevator safety code provides that you upgrade your single-bottom cylinder with increased protection against potential catastrophic failures and environmental contamination. Replacement with a double-bottom cylinder with PVC protection minimizes serious safety and environmental risks. Although the Canadian CSA/B44 Safety Code for elevators does not presently contain this requirement, the national committees are involved in an ongoing process of harmonizing the two codes.

WARNING

OIL LEAKS AND CORROSION TO A SINGLE-BOTTOM HYDRAULIC CYLINDER COULD LEAD TO CATASTROPHIC FAILURE, CAUSING SERIOUS PERSONAL INJURY, DEATH OR ENVIRONMENTAL CONTAMINATION.

WE RECOMMEND THAT YOU REPLACE THIS CYLINDER WITH A DOUBLE-BOTTOM CYLINDER WITH SEALED PVC PROTECTION TO AVOID THESE RISKS. PROPER MAINTENANCE BY WELL-TRAINED, SKILLED ELEVATOR MECHANICS IS NECESSARY UNTIL YOU REPLACE THE CYLINDER. EVEN WITH THE MOST DILIGENT MAINTENANCE PROGRAMS, CYLINDERS ARE SUBJECT TO CORROSION AND LEAKS.

Cylinder Replacement

Even the most rigorous and diligent maintenance is no substitute for replacing your cylinder with a double-bottom cylinder with sealed PVC protection. Prior to replacement, however, an ongoing maintenance program is essential to the safe and consistent performance of your hydraulic elevator system.

A comprehensive maintenance program, which is designed to protect the durability of your in-ground cylinder, must include the following procedures, which strictly adhere to code requirements.

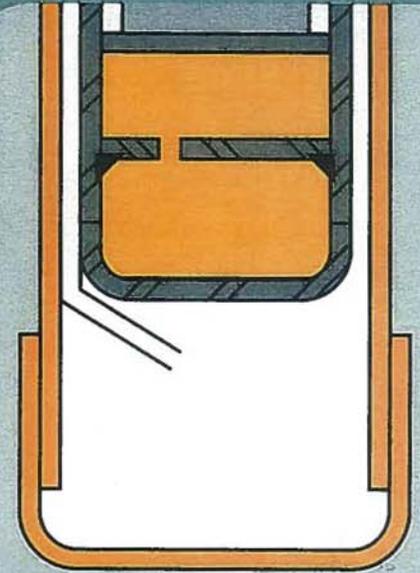
- 1 Perform monthly inspections for possible leaks; monitor oil levels.
- 2 Never add oil without determining that the source of oil loss is above-ground; ensure proper corrective action.
- 3 Perform annual pressure-relief valve tests.
- 4 Perform annual static pressure tests of the entire system including the cylinder piping.
- 5 Never disconnect any safety devices such as low oil timer, motor overload protection device, etc., as such are an early-warning system for cylinder leaks.
- 6 Perform a two-hour, full-load static pressure test of the total hydraulic system and of the pressure relief valve (if a leak is suspected).*
- 7 Perform tests of the sealed PVC protection.

Be sure your maintenance program provides at least these seven elements. All leaks must be detected early. If the leak is below ground, the elevator must be taken out of service immediately and the cylinder replaced.

* These tests alone are not a fail-safe method for determining the safety of your system. The tests must be followed by close monitoring of the oil level at least every month to ensure the cylinder is not leaking.

AMTECH

Elevator Services



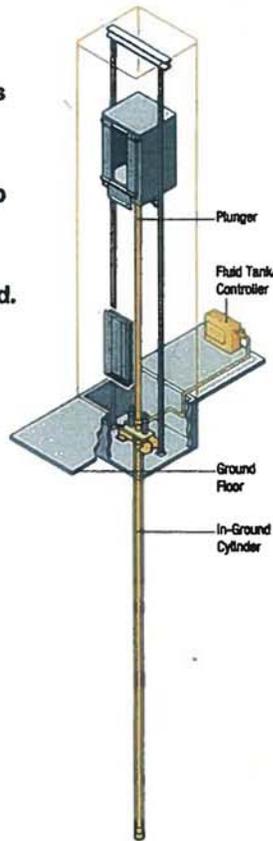
Hydraulic Cylinder Information



WARNING
READ IMPORTANT ELEVATOR
SAFETY INFORMATION AND
WARNINGS ENCLOSED

In-Ground Hydraulic Cylinders

In most hydraulic elevator systems, pressurized oil is pumped from a tank to an in-ground cylinder. The cylinder's in-ground length equals the distance from the building's ground floor to the top floor. The oil pushes a plunger, or piston, which causes the elevator car to ascend. The car descends when oil returns to the tank.



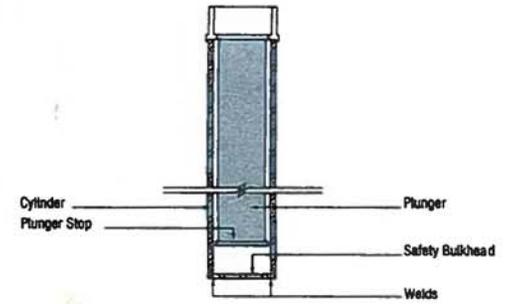
There are three common types of in-ground cylinders:

- **Single-bottom cylinders**
- **Double-bottom (safety-bulkhead) cylinders**
- **Double-bottom cylinders with sealed polyvinyl chloride (PVC) protection**

In-ground cylinders without state-of-the-art corrosion protection can leak and possibly fail. Leaks can contaminate soil and water. Even worse, failure poses serious risks to passengers' personal safety. Sealed PVC cylinder protection substantially reduces the risk of corrosion, leaks and failure.

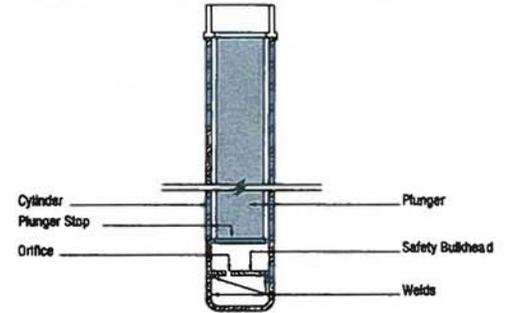
Single-Bottom Cylinder

Pre-1970s elevator codes permitted single-welded cylinder bottoms, and many are still in use today. These cylinders are susceptible to corrosion and leaks. If a catastrophic failure occurs, oil will escape rapidly, causing the elevator to descend out of control. This could result in serious passenger injury or death, as well as environmental and property damage.



Double-Bottom Cylinder

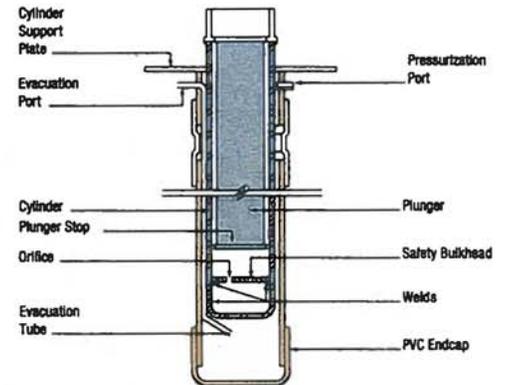
The 1971 United States code and the 1977 Canadian code required double-bottom cylinders for new installations. The design featured a safety bulkhead plus a dished cap at the bottom. An orifice in the safety bulkhead would limit the speed of a car's descent to 15 feet (4.5 meters) per minute if the cylinder bottom failed. The double-bottom minimizes passenger safety risks from a bottom failure, but corrosion and cylinder leaks are still possible.



PVC Protection

U.S. and Canadian codes in 1989 and 1992, respectively, required corrosion protection for new installations. Durable and non-corrosible PVC protection meets or exceeds all code requirements. PVC protection surrounds the wall and bottom of the in-ground cylinder. It is sealed at the top of the cylinder and permits monitoring of the space between the cylinder and the PVC lining. A tube enables the removal of water or other liquid that might seep into the space between the cylinder and the PVC lining. Without these design benefits, unwanted elements may come into contact with the cylinder and cause corrosion.

A properly maintained double-bottom cylinder with sealed PVC lining provides maximum protection against risks to passenger safety and the environment.



An Ounce of Prevention

Although the public may take it for granted, passenger safety is the result of countless details in the equipment's design, manufacture and preventive maintenance.

This Safety Guide was created to help you prevent situations that can pose safety risks.