ELEVATOR HYDRAULIC FLUID MONITORING LOG

Post this log in the elevator machine room.

Elevator ID: _____

Date Checked Year: _____	Starting Fluid Level[1] in Tank (in.)	Amount Car Settled During Test (in.)	Ending Fluid Level in Tank (in.)	Difference Between Start & End Lvl. (gals.)	Person or Firm Performing Test
JAN :					
FEB:					
MAR:					
APR:					
MAY:					
JUN:					
JUL:					
AUG:					
SEP:					
OCT:					
NOV:					
DEC:					

1) Establishing a starting level for the hydraulic fluid.
   a) Make the necessary calculations as indicated on the back of this form. This needs to be done only once.
   b) **BEFORE** the initial fluid check, ensure that there is sufficient fluid in the reservoir (tank) to enable the elevator to reach the top landing. If fluid is needed, park the car at the bottom landing before filling the tank. **DO NOT OVERFILL OR FILL THE TANK TO THE TOP.** There should still be some fluid left in the tank when the car is at the top landing; the amount will vary depending on equipment. If you are not sure of the correct amount of oil in the tank, consult with your elevator maintenance contractor.
2) Park the car at the bottom landing at floor level.
   a) Measure the fluid level in the tank from the top edge of the tank to the top of the fluid level.
3) Move the car to the top landing at floor level.
   a) Ideally, the elevator should be provided with a rated load in the car and the hydraulic fluid should be at room temperature. However, an empty car is acceptable.
   b) Ensure the car sill is level with the top landing sill.
   c) With the car at the top landing turn off the main power to the elevator.
   d) Allow the car to sit at the top landing for a minimum of 4-hours (overnight is preferable).
   e) Measure the distance from the landing sill to the car sill.
   f) Return to the machine room and measure the liquid level in the tank.
   g) If the car has settled, there should be a corresponding increase in the liquid level in the tank. Indicate the measurement of the liquid level in the tank on the table above. If the car did not settle, enter “0”.
   h) If the car settles and there is no corresponding increase in the tank, an unaccountable loss of fluid has occurred.
      i) Return the elevator to the bottom landing and remove from operation.
      ii) Further investigation by a licensed elevator contractor is required.

CAUTION: DO NOT OPERATE THE ELEVATOR IF THERE IS A UNACCOUNTABLE LOSS OF HYDRAULIC FLUID! LOWER THE CAR ONTO THE BUFFERS AND SECURE MAIN POWER!

See reverse side for necessary calculations!

Required Calculations

[1] Tank Levels need to be checked with the car at the lowest landing. Measure the distance from the top of the tank to the top of the fluid level and record. Place a permanent mark on the outside of the tank to indicate the maximum fluid level.

Note: The volume of oil in the tank for hydraulic elevators with submersible pumps cannot be accurately determined by this method. Consult with the original equipment manufacturer for this information.

The volume of the tank needs to be determined.

$$v = w \times d \times l$$

Where,
w = width in inches (in.)
d = depth (height) in inches (in.)
l = length in inches (in.)
v = total volume in cubic inches (in^3)

Determine the total volume of the tank in cubic feet:

$$ft^3 = v / 1728$$

Where,
ft^3 = volume in cubic feet

Determine the total volume of the tank in gallons of the tank:
Note: no tank should be filled to its maximum capacity.

$$gal = ft^3 \times 7.48$$

Where,
gal = tank volume in gallons

Amount of fluid in gallons per 1-inch of fluid in the tank level:

$$gl = gal / d$$

Therefore, if the fluid level raises or lowers by 1-inch a total of "*gl*" will be gained or lost.

Determine the area of the plunger:

$$A = pd$$

p = 3.14
d = plunger diameter

Example:
The area of the plunger is 12-in^2 and the area of the tank is 12-ft^2. If the car settles 12-inches, there should be an increase in the liquid level in the tank of 1-inch. If not, there is an unaccountable loss of hydraulic fluid which could be caused by an underground leak.
Further testing will be required to determine if the leak is in the buried cylinder or associated buried piping.

HYDRAULIC ELEVATOR FLUID LEVEL CALCULATION WORKSHEET

Step 1

Reservoir Size			
Width (*w*) ***x***	Height (*h*) ***x***	Length (*l*) **=**	Total Cubic Inches
in.	in.	in.	in^3

Step 2

Total Cubic Inches ¸	Cubic Inches / Cubic Ft.	Total Cubic Feet
in^3	1728 =	ft^3

Step 3

Total Cubic Feet ***x***	Gallons per Cubic Ft.	Total Tank Capacity
ft^3	7.48	gal.

Step 4

Total Tank Capacity ¸	Height	Gallons/inch of Tank Level
gal.	in	gl

Step 5

Area of Hydraulic Plunger		
Diameter ***x***	p	Area of Plunger
in.	3.14	in^2

If the tank is round, the total area is determined by:

$$A = pr^2h$$

Where,
r = radius in inches
h = height of the tank in inches
$\pi = 3.14$
A = volume in cubic in.
Substitute this formula for Step 1.
Use the calculations in Steps 2 and 3 to find the total cubic feet and volume in gallons respectively.
Substitute the length (*l*) and width (*w*) in Step 4 with the same formula in Step 5 (area of a circle) and divide the result into the Total Tank Capacity.