



# Dispensing Propane Safely Filling Cylinders by Weight & Volume



# Filling Portable Cylinders



# Filling Cylinders

Method determined at the local level

Federal + NFPA 58:

Less than 200 lb. water capacity, transported in commerce = WEIGHT

200 lb. or more water capacity = VOLUME

Less than 200 lb. water capacity, used at fill site = VOLUME



# Filling by Weight



# Filling by Weight



Qualify



Prepare



Fill



Shutdown

# Filling by Weight



Qualify



Prepare



Fill



Shutdown

- Confirm cylinder is in good physical shape.
- Confirm qualification date.

# Filling by Weight



Qualify



Prepare



Fill



Shutdown

- Clear Scale.
- Calculate fill weight.
- Set scale.
- Select adapter if required.
- Attach adapter to cylinder
- Connect hose.
- Set meter register to 0 if applicable.





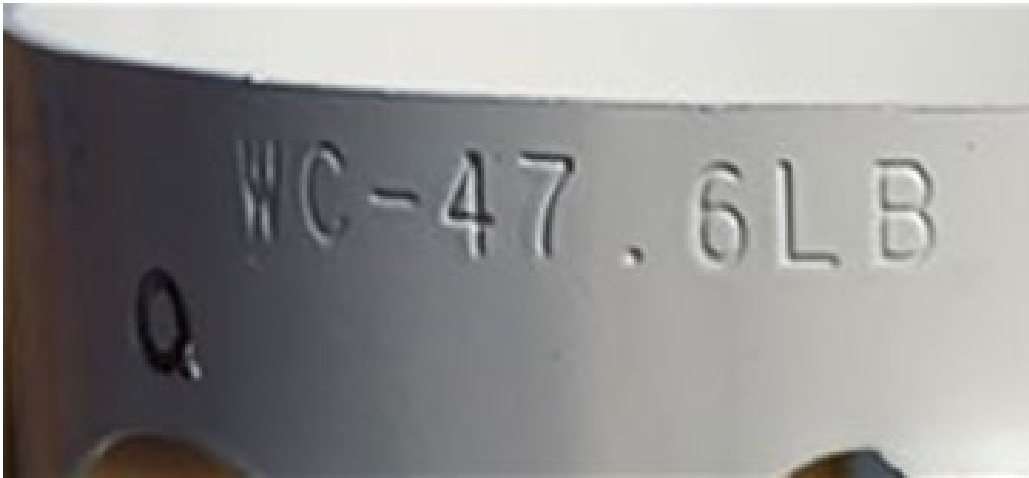


# Cylinder Filled Weight

To determine the total filled weight of a cylinder, you will need to identify the water capacity and tare weight of the cylinder being filled.



# Cylinder Filled Weight



This is the “Water Capacity” –  
47.6 LB

# Cylinder Filled Weight

This is the "Tare Weight" –  
47.6 LB





# Propane Capacity

$$\text{Propane Capacity (lb.)} = \text{Water Capacity (lb.)} \times .42$$

# Exercise 1

Water Capacity: 23.9 lbs.

Constant: 0.42

$$23.9 \times 0.42$$

Propane Capacity: 10.0 lbs.

# Exercise 2

Water Capacity: 95.3 lbs.

Constant: 0.42

$$95.3 \times 0.42$$

Propane Capacity: 40.0 lbs.



# Exercise 3

Water Capacity: 72.4 lbs.

Constant: 0.42

$$72.4 \times 0.42$$

Propane Capacity: 30.4 lbs.

# Total Filled Weight

$$\text{Total Filled Weight} = \text{Propane Capacity} + \text{Tare Weight}$$

Water Capacity: 80 lbs.

Tare Weight: 34.5 lbs.

$$\text{Propane Capacity} = 80 \times 0.42 = 33.6$$

$$\text{Total Filled Weight} = 33.6 + 34.5 = 68.1$$

# Exercise 4

Water Capacity: 12 lbs.

Tare Weight: 11 lbs.

Constant: 0.42

$$\text{Propane Capacity} = 12 \times 0.42 = 5.0$$

$$\text{Total Filled Weight} = 5.0 + 11$$

$$\text{Total Filled Weight} = 16$$



# Exercise 5

Water Capacity: 238 lbs.

Tare Weight: 69.4 lbs.

Constant: 0.42

$$\text{Propane Capacity} = 238 \times 0.42 = 100.0$$

$$\text{Total Filled Weight} = 100.0 + 69.4$$

$$\text{Total Filled Weight} = 169.4$$

# Exercise 6

Water Capacity: 103 lbs.

Tare Weight: 33.9 lbs.

Constant: 0.42

$$\text{Propane Capacity} = 103 \times 0.42 = 43.3$$

$$\text{Total Filled Weight} = 43.3 + 33.9$$

$$\text{Total Filled Weight} = 77.2$$



FAIRBANKS

neptune TOTAL

GALLONS  
0003

RESET TO ZERO BEFORE DELIVERY

ATTENTION OPERATOR!  
PROCEED WITH CAUTION  
WEIGHING HOOKS  
ARE TO BE USED  
FOR ALL WEIGHING  
OPERATIONS. DO NOT  
WEIGH WITH HOOKS  
ON OTHER EQUIPMENT  
OR VESSELS.

26

34

Danger! Flammable propane gas under pressure.  
Do not use if you see or smell propane gas. Do not use if you see or smell propane gas. Do not use if you see or smell propane gas.

CORNER



# Scale Set Point

## Scale Set Point

Propane + Tare Weight + Hose & Fitting Weight

80 lbs. WC      34.5 lbs. TW      4.5 lbs. HW

Propane Capacity:  $80 \text{ lb. WC} \times .42 = 33.6$

$33.6 + \text{TW } 34.5 \text{ lbs.} + \text{HW } 4.5 \text{ lbs.}$

Scale Set Point = 72.6

Round Down

Scale Set Point = 72

# Exercise 7

Water Capacity: 71.4 lbs. Tare Weight: 25 lbs. Hose Weight: 4.5 lbs.

$$\text{Propane Capacity} = 71.4 \times 0.42 = 30.0$$

$$\text{Total Filled Weight} = 30.0 + 25 = 55$$

$$\begin{aligned} \text{Scale Set Point} &= 55 + 4.5 \\ &= 59.5 \end{aligned}$$

$$\text{Scale Set Point} = 59$$



# Fill



Qualify



Prepare



Fill



Shutdown

- Turn on pump.
- Open hose end valve if needed.
- Watch scale.





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ELECTRIC COMPANY

CL I OR LOWER

AMP

ON

VOLTS

HP

VOLTS

TO PREVENT  
AIR COVER MUST  
WHILE CIRCUITS ARE  
SEE INSTRUCTIONS

CAT  
NO

CONTROL ASSEMBLY COVER

HAZARDOUS LOCATION

CL I CL II

GRP CD GRP FFD

CL III

# Shutdown



Qualify



Prepare



Fill



Shutdown

- Scale tips: immediately close the hose end valve.
- Turn off pump.
- Close service valve.
- Disconnect hose.
- Store hose.
- Disconnect adapter (if applicable).





RECOMMENDED PROCEDURES FOR FILLING CRYO-COL AND -KSEME LIQ-GAS CONTAINERS

STEP 1: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 2: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 3: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 4: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 5: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 6: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 7: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

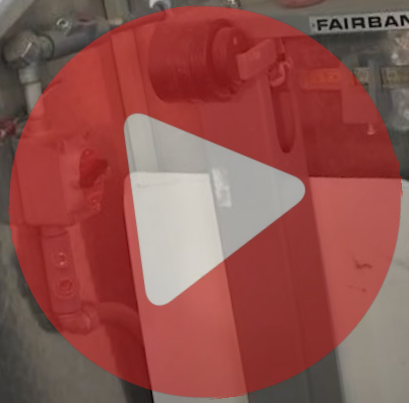
STEP 8: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 9: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

STEP 10: VERIFY THE MATERIAL IS SAFE TO FILL AND THE CONTAINER IS FULLY CHARGED.

FAIRBANKS

neptune  
GALLONS  
0002  
3 7/8





# Filling by Volume



Qualify



Prepare



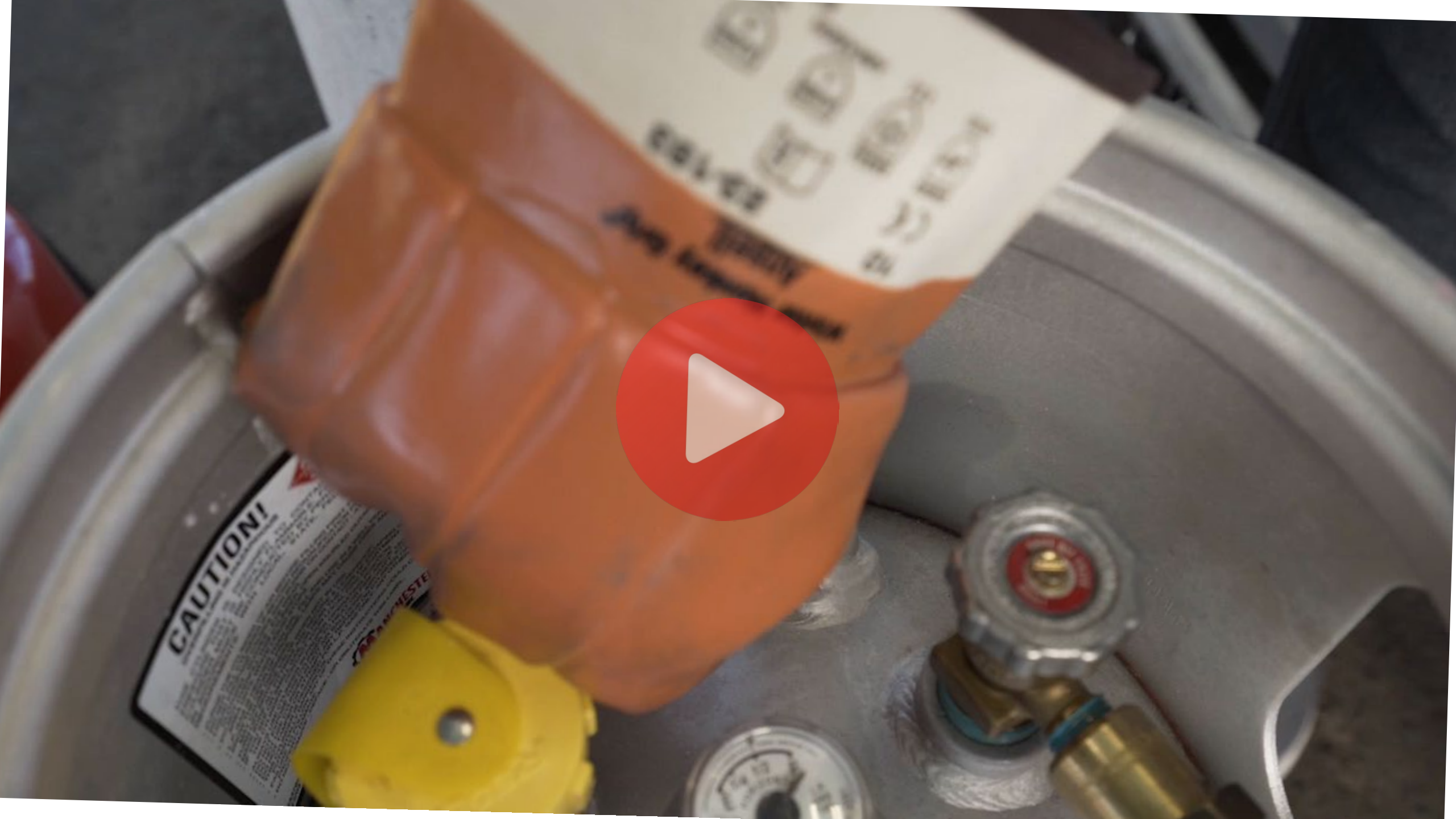
Fill



Shutdown

- Confirm cylinder is in good physical shape.
- Confirm qualification date.

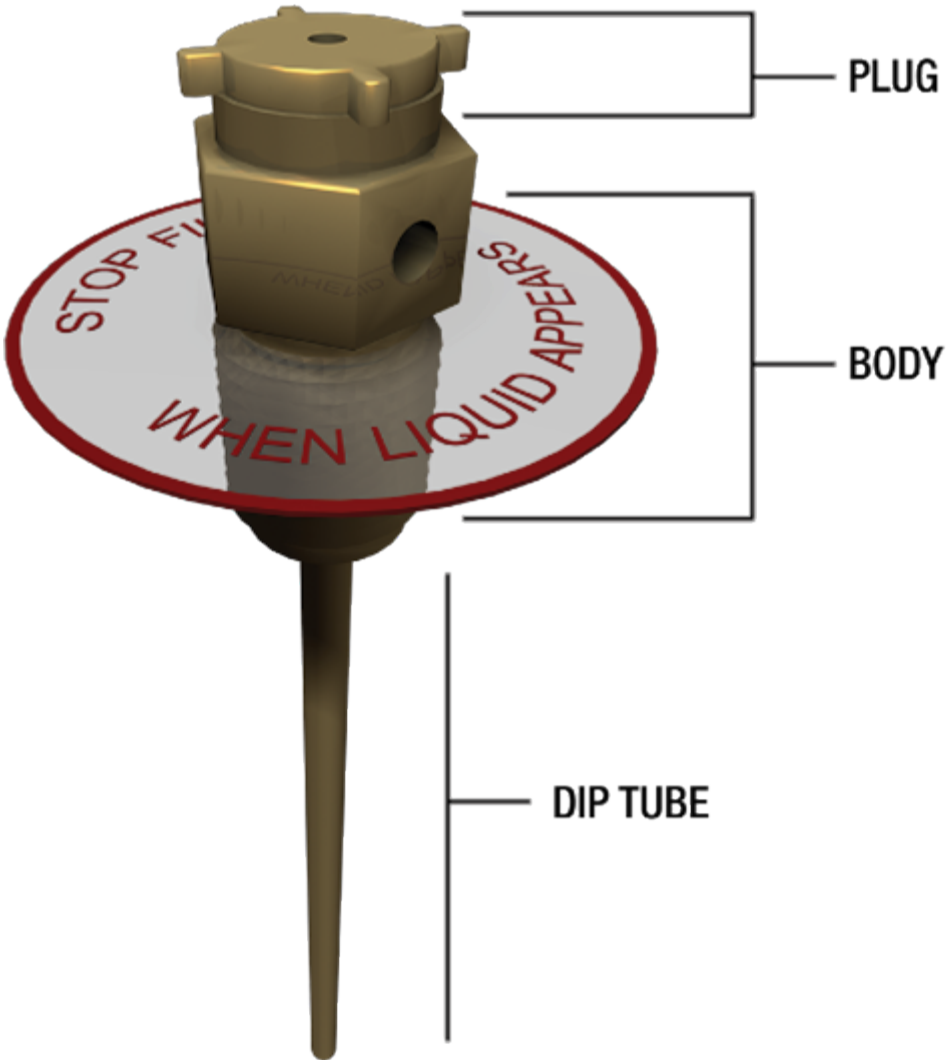
- Verify the Fixed Maximum Liquid Level Gauge (FMLLG) is operational.
- Select adapter if required.
- Attach adapter to cylinder.
- Connect hose.
- Set meter register to 0 if applicable.



**CAUTION!**

REPLACEMENT WATER FILTER  
1000000

# Fixed Maximum Liquid Level Gauge (FMLLG)





**CAUTION!**  
OVERFILLING IS HAZARDOUS!  
THIS CYLINDER IS DESIGNED TO CONTAIN A LIQUID. IF PROLEUM GAS UNDER PRESSURE IS RELEASED FROM THIS CYLINDER, IT MAY BE FLAMMABLE. ONLY QUALIFIED PERSONNEL SHOULD OPERATE THIS CYLINDER. FEDERAL, STATE, AND LOCAL REGULATIONS MAY APPLY. FEDERAL, STATE, AND LOCAL REGULATIONS MAY APPLY. FEDERAL, STATE, AND LOCAL REGULATIONS MAY APPLY.

**DANGER!**  
FLAMMABLE GAS & LIQUID  
IF PROLEUM GAS UNDER PRESSURE IS RELEASED FROM THIS CYLINDER, IT MAY BE FLAMMABLE. ONLY QUALIFIED PERSONNEL SHOULD OPERATE THIS CYLINDER.



# Filling by Volume



Qualify



Prepare



Fill



Shutdown

- Confirm cylinder is in good physical shape.
- Confirm qualification date.

- Verify the Fixed Maximum Liquid Level Gauge (FMLLG) is operational.
- Select adapter if required.
- Attach adapter to cylinder.
- Connect hose.
- Set meter register to 0 if applicable.

- Turn on pump.
- Open service valve if needed.
- Open FMLLG - If liquid appears, the cylinder is full.
- Open hose end valve.
- Watch FMLLG.





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UL LISTED  
AMP VOLTS

HP VOLTS

TO PREVENT  
ARM COVER MUST  
WHILE CIRCUITS ARE  
SEE INSTRUCTIONS  
CAT  
NO  
CONTROL ASSEMBLY COVER  
HAZARDOUS LOCATIONS  
CL I CL II  
GRP. CD GRP. ITC  
CL III

# Filling by Volume



Qualify



Prepare



Fill



Shutdown

- Confirm cylinder is in good physical shape.
- Confirm qualification date.

- Verify the Fixed Maximum Liquid Level Gauge (FMLLG) is operational.
- Select adapter if required.
- Attach adapter to cylinder.
- Connect hose.
- Set meter register to 0 if applicable.

- Turn on pump.
- Open service valve if needed.
- Open FMLLG - If liquid appears, the cylinder is full.
- Open hose end valve
- Watch FMLLG.

- Liquid (white mist) escapes – immediately close the hose end valve.
- Turn off pump.
- Close service valve.
- Disconnect hose.
- Store hose.
- Disconnect adapter (if applicable).





**Review: Take the Quiz**

# Multiple Choice

**What is the first step in filling a cylinder by weight?**

- Inspect the cylinder.
- Set the register to 0.
- Identify the needed adapters.
- Calculate the scale set point.

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# Multiple Choice

**Whether you can fill by weight or volume is determined by:**

- Federal Regulations.
- regulations at the local level.
- NFPA 58.
- the availability of trained staff.

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# Multiple Choice

**What is the first step in filling a cylinder by volume?**

- Inspect the cylinder.
- Set the register to 0.
- Identify needed adapters.
- Confirm that the FMLLG is operating properly.



# Multiple Choice

**What is the first step in filling a cylinder by volume?**

- Inspect the cylinder.
- Set the register to 0.
- Identify needed adapters.
- Confirm that the FMLLG is operating properly.

# Multiple Choice

**When filling by the volume you can confirm that the FMLLG is working by opening it and \_\_\_\_\_.**

- see liquid coming out.
- listening for a hissing sound.

# Multiple Choice

**When filling by the volume you can confirm that the FMLLG is working by opening it and \_\_\_\_\_.**

see liquid coming out.

listening for a hissing sound.

# True/False

**When filling by volume the meter register is used to determine when the cylinder is full of liquid propane.**

True

False

# True/False

**When filling by volume the meter register is used to determine when the cylinder is full of liquid propane.**

True

False

# Multiple Choice

**To calculate the propane capacity:**

- Add water capacity plus the tare weight, then multiply by .42
- Add the tare weight to the water capacity
- Multiply the water capacity

# Multiple Choice

**To calculate the propane capacity:**

- Add water capacity plus the tare weight then multiply by .42
- Add the tare weight to the water capacity
- Multiply the water capacity



# True/False

**The fixed maximum liquid level gauge is used to determine that the cylinder is full when filling by volume.**

True

False

# True/False

**The fixed multiple liquid level gauge is used to determine that the cylinder is full when filling by volume.**

True

False

# Multiple Choice

**Calculate the scale set point of a 20 lb. Cylinder**

Water capacity: 47.6 lb.

Tare Weight: 16.6 lb. Hose Weight: 4 lb.

40 lb.

41 lb.

58 lb.

59 lb.

# Multiple Choice

**Calculate the scale set point of a 20 lb. Cylinder**

**Water capacity: 47.6 lb.**

**Tare Weight: 16.6 LB**

**Hose Weight: 4 LB**

40 lb.

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