The Heat is on

Think Safety!

A Publication Of The West Virginia Propane Gas Association

Spring 2016

Safely Filling Recreational Cylinders

Spring is here and summer is rapidly approaching which is primetime-grilling season. This, of course, leads to an increase in the demand for filled grill cylinders.

Cylinder exchange racks have become increasingly popular in recent years, but still many customers prefer to have their own tank filled.

These customers expect and deserve to have their tanks safely and correctly filled. As propane professionals, we should strive to meet those expectations. We are going to discuss the responsibilities of propane dispensers and how they can both fill the tanks appropriately and do the best job possible to keep both themselves and the customer safe.

Knowing the Job:

Any employee actively engaged in dispensing propane should meet minimum responsibilities such as:

- Know all regulations concerning the safe dispensing of propane.
- Know how to correctly inspect and identify tanks that should not be filled due to damage to the tank or qualification expiration.

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Knowing the Job:

- How to determine the correct fill amount.
- How to make sure the fill area is safe from potential ignition sources such as static electricity, combustion engines, any open flame. It can't be assumed that everyone understands the potential danger.
- How to react in case of an emergency including shutdown procedures. Any employee filling cylinders should know the location of the emergency shutdown device as well as emergency procedures.

Also, it is important that anyone who fills cylinders have the ability to provide safety information to the customer including the safe transportation of the tank once it is filled.

The amount of propane that can be carried within a closed bodied vehicle is restricted. According to NFPA 58, 90 pounds total of propane can be transported in a closed vehicle. However, no more than 45 pounds of propane can be contained in one cylinder which limits the transportation of propane to two 40-pound cylinders, four 20-pound cylinders, eight 11-pound cylinders or two 33.5-pound cylinders.

Whatever amount of propane is transported inside the vehicle, the filled tanks should be carried in an upright and stationary manner. A filled cylinder should never be left inside the vehicle for a long period of time. Instead it should be transported directly to the customer's destination.

This vehicle was damaged as a woman lit a cigarette and the propane from the cylinder inside the vehicle was ignited.

The rising temperature inside a vehicle can quickly create a dangerous situation as the propane inside the tank begins to boil. Liquid propane expands 270 times as it turns to vapor, which increases the pressure inside the tank. Once it reaches the necessary pressure level to activate the pressure relief valve, propane vapor will be released inside the vehicle. At that point, the only thing it needs to become explosive is an ignition source.

Operating the Dispenser:

A dispenser operator should be familiar with how all of the equipment operates. He or she should also make sure that it is in proper working condition.

First, make sure all hose-end valves are closed before slowly opening the liquid outlet valve and the downstream manual valve.

Inspect all valves, piping, the transfer hose and fittings to make sure they are sound and without leaks. Also, inspect the threads of all connection adapters for excess wear. All gaskets and "O" rings should be in good working condition.

If a leak is found, the dispenser should be shut down.

Once the dispenser has been verified as safe, the cylinder can be filled.

If you open the liquid outlet valve too quickly, the excess flow valve can slam shut as indicated by a snapping noise. If the excess flow valve has closed, proceed as follows:

Close the downstream valve

Wait for the excess flow valve to reopen. (This may be indicated by a clicking sound)

Open it slowly to avoid another closure.

Before Refilling A Cylinder:

According to 49 CFR 173.301 each cylinder must be built according to all DOT qualifications.

Each cylinder must pass a visual inspection. The cylinder should be observed for any crack, leak, bulge, defective valve, a leaking or defective pressure relief device, evidence of physical abuse, fire or heat damage, or detrimental rusting or corrosion.

The cylinder must be equipped with a properly sized and installed pressure relief valve. The valve must also be tested for leaks using proper testing methods.

If the cylinder fails the visual inspection for any of the above reasons, it cannot be filled. It must be repaired, requalified, or condemned.

The cylinder can only be requalified by someone with a valid RIN. When applying for a RIN the training and qualifications of the persons who perform the inspection must be stated in the application.

Cylinders may be requalified by one of three methods:

Visual inspections – must be requalified every five years.

Simple hydrostatic test – must be repeated every seven years after the cylinder has undergone the first 12-year water jacket test.

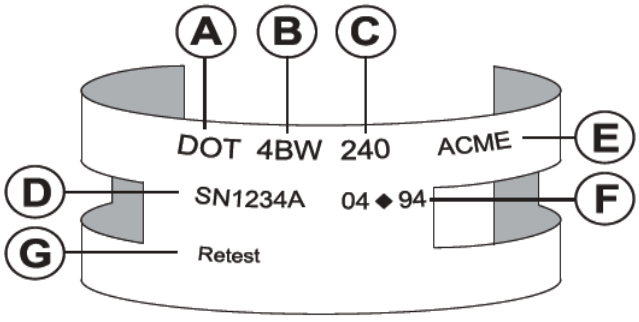
Water jacket hydrostatic test – must be requalified every 12 years.

Most dispenser operators who requalify cylinders use the visual inspection method. It permits requalification of cylinders by a complete external inspection in accordance with Compressed Gas Association Pamphlet C-6 or C-6.3. However, the visual inspection method is permitted only by persons holding a current US DOT requalifer identification number (RIN) and the results must be recorded and maintained in accordance with CFR 49 180.215.

CFR 49 180.215 requires that daily records of visual inspections be kept by the person who performs the inspection until either the expiration of the requalification period or until the cylinder is again requalified, whichever comes first. The records must include the date of inspection, DOT specification number, cylinder identification, type of cylinder protective coating, conditions checked, and disposition of cylinder. Other record-keeping requirements can be found in section 107.803-805.

The requalified cylinder must be marked in accordance with 49 CFR 180.213. The markings must be made by stamping, engraving, scribing, the use of durable pressure adhesive label or any other method that produces a legible, durable mark.

Propane cylinders have identifying marks on the cylinder neckring (collar), or cylinder shoulder depending on the cylinder type. The diagram below depicts examples of several of the required markings.



- (A) Manufactured to U.S. DOT specifications
- (B) Cylinder specification type (e.g. 4B, 4BA, 4BW, and 4E)
- (C) Cylinder service pressure (psig)
- (D) Cylinder serial number
- (E) Manufacturer's name (or registered symbol)
- (F) Original manufacture/test date, month and year, and inspector's mark, as required (i.e., this diagram indicates April 1994 and inspectors's mark ◆)
- (G) Area for date requalified/retested (no date is shown indicating that the 12-year requalification is *overdue*)

* Additional markings may be present as authorized by HMR under the specification

Sample Requalification Marks (49 CFR § 180.213)

01 A3 12 07	01 A3 12 07 "X"	V123456 0107 E
An approved **RIN** holder's marking "A123" certifying a 12-year Volumetric Expansion test conducted in January 2007	The same **RIN** holder's marking where **"X"** represents the symbol of the testing method used for requalification: **"E"**: 5-Year External Visual Method **"S"**: 7-Year Proof-Pressure Method	An External Visual marking for an approved **VIN** holder denoting the 5-Year External Visual method conducted in January 2007 (Ref. VIN Approval Letter)

NOTE! *Requalification Marks may only be applied by valid U.S. DOT RIN (Requalifier Identification Number) or VIN (Visual Identification Number) holders!*

Authorized RIN and VIN holders are listed: http://phmsa.dot.gov/hazmat/regs/sp-a/approvals/cylinders

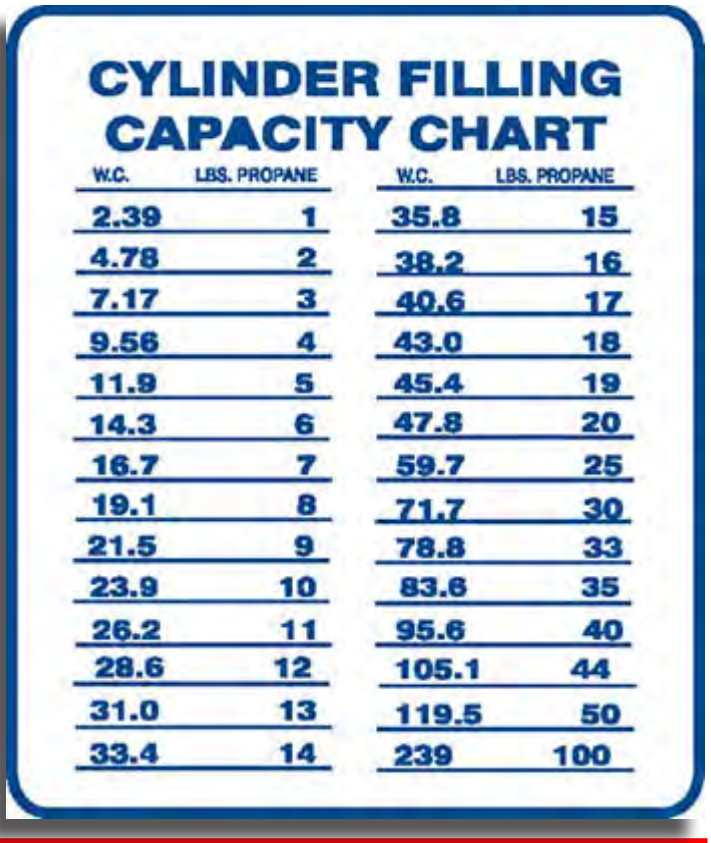
Correctly Filling A Cylinder:

According to NFPA 58, an OPD shall not be the primary means to determine when a cylinder is properly filled. The OPD is intended to be a backup device

OPD valves are machined parts, machined by human beings, and as such are not infallible. Therefore, cylinders should be filled either by weight or volumetric methods to insure that the cylinder is not filled beyond 80 percent capacity. Consult NFPA 58 to determine which method is right for the particular cylinder you are filling.

Most portable recreational cylinders will be filled using the weight method. When using the weight method, the cylinder should be filled to 42 percent of the marked water capacity in pounds. For instance, a "20-pound" cylinder with a water capacity of 47.1 pounds should be filled with about 19.78 pounds of propane.

Overfilling a cylinder can create a dangerous situation!



CYLINDER FILLING CAPACITY CHART

W.C.	LBS. PROPANE	W.C.	LBS. PROPANE
2.39	1	35.8	15
4.78	2	38.2	16
7.17	3	40.6	17
9.56	4	43.0	18
11.9	5	45.4	19
14.3	6	47.8	20
16.7	7	59.7	25
19.1	8	71.7	30
21.5	9	78.8	33
23.9	10	83.6	35
26.2	11	95.6	40
28.6	12	105.1	44
31.0	13	119.5	50
33.4	14	239	100

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Training Quiz

Name_____ Social Security Number_____

1. Any employee filling cylinders must know all regulations pertaining to their filling.
   A. True B. False

2. Any employee filling cylinders must know how to identify cylinders that should not be filled.
   A. True B. False

3. Any employee filling cylinders needs to make sure the fill area is free of ignition sources.
   A. True B. False

4. Any employee filling cylinders must know emergency shutdown procedures including the location of the emergency shutdown device.
   A. True B. False

5. A closed body vehicle is allowed to carry up to ___ pounds of propane total and no more that ____ pounds of propane in one cylinder.
   A. 90, 45 B. 45, 20 C. 100, 60 D. 90, 20

6. Cylinders transported in a vehicle must be kept in an upright and stationary manner.
   A. True B. False

7. Before operating a dispenser, inspect all _____, _____, the _____ to make sure they are sound and without leaks.
   A. Valves B. Piping C. Transfer hose and fittings D. A,B, and C

8. If you open the liquid outlet valve too quickly on a dispenser, the excess flow valve can slam shut.
   A. True B. False

9. Before filling a cylinder, it must be observed for leaks, cracks, dents, bulges, defective relief valve or any other damage that could be a potential danger.
   A. True B. False

10. A cylinder can only be requalified by someone with a valid _____.
   A. PHD B. RIN C. BA D. RN

11. Cylinders can be requalified by _____.
   A. Visual inspection B. Simple ydrostatic test C. Water jacket hydrostatic test D. A, B, and C

12. A simple hydrostatic test must be completed every ____ years after the cylinder has undergone the first 12-year water jacket test.
   A. 5 B. 12 C. 7 D. 9

13. An OPD is the primary means to determined when a cylinder has been properly filled.
   A. True B. False

Training Quiz Answers

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