

Information Bulletin

1 May 2006

Fiberglass Composite materials now being used for 20 Pound Propane Cylinders

Recently, the Nassau County Fire Service Academy conducted live fire tests on the new lightweight fiberglass composite LPG (Propane) Cylinders that are currently being sold in the New York City area. (See Figure 1 & 1A).



Figure 1



Figure 1a

The Nassau County Fire Service Academy conducted 2 separate tests and both tests involved a 20 pound cylinder that was filled to its normal capacity of 80% with liquid propane. Test #1 involved placing the cylinder over a pool of burning fuel oil. (See Figure 2). Test #2 involved placing the cylinder next to a propane torch pressure fire.



Figure 2

In both situations, the relief valve operated as expected and the outer protective casing burned away. (See Figure 3).(See Figure 4).



Figure 3



Figure 4

However, there was a venting of the cylinder at the neck area in both tests. The cylinder valve and relief valve are the same as on a steel LPG cylinder. The valve on the composite cylinder is threaded through the composite and held in place by a steel flange on the inside of the cylinder. When sufficient heat / fire is applied to the neck the composite opens and fire will vent from around this attachment point. The valve remains in place and is not blown out. (See Figures 5 & 6).



Figure 5



Figure 6

In the first test where the cylinder was placed over a pool of burning fuel oil, there was breach of the cylinder shell. There was no BLEVE and the cylinder remained upright throughout the test. (See Figures 7 & 8).



Figure 7



Figure 8

In the second test where the cylinder was exposed to a propane pressure fire, there was no breach of the cylinder shell. There was no BLEVE and the cylinder remained upright throughout the test. (See Figure 9).



Figure 9

The following time line provides information regarding the results of the tests as documented by the Nassau County Fire Service Academy.

	Test #1 - Pool Fire	Test #2 - Flame Impingement
Outer Protective Casing Burned away	3 minutes	less than 1 minute
Relief Valve activated	3 minutes, 25 seconds	2 minutes
Venting at the neck of the cylinder	4 minutes	3 minutes
Breach of the cylinder shell	4 minutes, 25 seconds	No breach
Complete burn off	16 minutes	14 minutes

Those present during the test concluded that the potential for BLEVE on these composite cylinders is remote. However, the cylinder wall can be breached by fire resulting in a large plume of fire.

The Nassau County Fire Service Academy has issued the following recommendations for response to these type of cylinders involved in fire:

- Fire Department members need to be aware of these type of cylinders.
- Standard LPG response guidelines should be followed.
- Cylinder construction needs to be identified or confirmed.
- When dealing with a composite cylinder, DO NOT APPROACH cylinder. Fire can vent out from any point on the cylinder.
- With the decreased risk of BLEVE, exposure protection can be performed first instead of cooling the cylinder.
- Steel cylinders still require immediate water application!
- Composite cylinder is lighter and can be disrupted by hose stream applications. During the test fires, both cylinders remained in place until hit by a hose stream.

The Office of Fire Prevention and Control wishes to thank the Nassau County Fire Service Academy for sharing this information and allowing us to forward this information on to others. Special thanks to Asst. Chief Denis Murphy & Deputy Chief Gene Pietzak who compiled the information.



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