



Indian Institute of Science

# Office of Laboratory Safety & Environmental Health

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## HYDROSTATIC TESTING OF GAS CYLINDERS

This document outlines OLSEH guidelines to ensure for Hydrostatic Test Gas Cylinders safety while working in the laboratories and research facilities. **Hydrostatic Requalification** (also known as a **Hydrostatic Test**) is the most common way to check a cylinder for leaks or flaws. During a hydrostatic requalification test, the cylinder is examined to ensure it can safely hold its rated pressure. Cylinder hydrostatic requalification is crucial as such containers can rupture if they lose structural integrity when containing compressed gas.

Note: For guidelines on safe practices, please refer to the OLSEH safety manual. Please note that, it is the responsibility of the Lab In charges to ensure safety in their labs. It is the responsibility of all users to follow safety directives.

### 1 When to test?

1. **Steel cylinders** should be tested **every five years** and have an indefinite service life until they fail a hydro test and visual inspection.
2. **Aluminum cylinders** (not including hoop-wrapped composite cylinders i.e. FRP-2) should be **tested every five years** and have an indefinite service life until they fail a hydro test and visual inspection.
3. **Hoop-wrapped cylinders** should be **tested every three years** and have a **15-year service life**.
4. Cylinders containing hydrogen are susceptible to embrittlement.
  - a) At the very least we require permanent tanks for hydrogen is made of SS 316, as per ASME Section VIII Div.1.
  - b) The safety test must qualify the cylinder especially for H<sub>2</sub> storage. Else, replace the cylinder after every 7 years.
5. If there is any doubt about the suitability of the cylinder for filling, it should be returned to a certified hydrostatic test facility for examination and retesting.
  - a) The cylinder must be **removed from service** and **retested** if there is any evidence of a leak, crack, defect or damage.
  - b) Cylinders which show **evidence of exposure to high heat or flames** (paint turned to a brown or black color, decals missing, or gauge lens melted) need to be removed from service and requalified prior to filling.
  - c) Cylinder that show **significant corrosion**.
  - d) Old cylinders that have not been used, not been **pressurized or not been tested** in last 5 years.

## 2 Vendors for Hydrostatic Testing:

Following vendors can be contacted for hydrostatic testing. The list is incomplete, you are welcome to use any vendor that is qualified as per Karnataka State and has the requisite credentials. The vendor should have a Government license and should be certified vendor for certifying the procedure which was followed.

1. Bhuruka Gases Limited, 28524239/240, [cal.sales2@bhuruka.gases.com](mailto:cal.sales2@bhuruka.gases.com)
2. Sri Vinayaka Gas Agencies, 7760666444/23103113, [svgases@gmail.com](mailto:svgases@gmail.com)

## 3 Procedure of hydrostatic test:

A hydrostatic test involves pressurizing the cylinder to its test pressure (usually 5/3 or 3/2 of the working pressure) and measuring its volume before and after the test. A permanent increase in volume above the tolerated level means the cylinder fails the test and must be permanently removed from service.

The hydrostatic test parameters must be clearly defined during the design phase and stated in the project specifications. Guidelines set forth in the AWWA M41 Manual and the ANSI/AWWA C600 Standard is as follows: "Test Pressure shall be **1.25 times** the operating pressure. Duration of the test is **two hours**."

## 4 How to prepare the gas cylinders for testing?

Preliminary test that users that can do themselves *before* contacting vendor.

1. Toxic and non-toxic gas cylinders must be segregated.
2. All the cylinders must be tagged and chained properly to avoid fall. All the details on the tag should be filled.
3. It is important that cylinder be completely empty. Usually even empty cylinders have some gas left in them. For testing, even this residue is not allowed.
4. Even if, no gas is coming out of the valve outlet, confirmatory test for valve blockage if any should be carried out before treating or labeling the cylinders as EMPTY.
5. If the cylinder is fitted with residual pressure valves (RPV), Adaptors should be used to empty out the Cylinder. De-valving should be done with due care and with precautions.
6. The cylinder should be thoroughly cleaned. Cleaning can be done by brushing, sand blasting or suitable solvent cleaning. While Cleaning, care should be taken to not to damage the surface of Cylinder, Valve, threading.
7. The cylinders undergoing for hydrostatic test should be leak free.

## 5 Instructions for Vendor doing the test:

The Cylinder is safe for use, if it passes the periodic test criteria, as mentioned in IS-5844-2014 (Hydrostatic stretch testing of Compressed Gas Cylinders) and also have no defects as mentioned in Annex C of IS standard 8451-2009, (Periodic inspection and testing of high pressure gas cylinders).