



TECHNICAL BULLETIN

SUBJECT: CALIBRATION CYLINDERS

In accordance with DOT regulations, hydrostatic test systems must be checked daily to ensure the accuracy of cylinder test results. The calibrated cylinder is a special cylinder, which is used for daily test system expansion reading calibration.

In accordance with 49 CFR 173.34 (e) (4), the calibrated cylinder is used on a daily basis to ensure that the Hydrostatic Test System being used is operating properly and to check system calibration. To check-out the test system, the calibrated cylinder is pressurised to the Cylinder Calibration Certificate pressure values. The resulting test system expansion values are then compared to the Cylinder Calibration Certificate expansion values. If the test system expansion values do not match within 1.0 %, the test system must be inspected to determine if adjustments and/or measuring device calibrations are required.

NOTE:

In some cases, calibrated cylinder eccentricity may cause expansion reading problems. Prior to performing any test system adjustments, the calibrated cylinder should be pressurised to its maximum calibration pressure at least three times to eliminate any cylinder eccentricity effects. After pressurising and relieving the cylinder three times, re-run the expansion value checks. Note also that temperature variations may affect cylinder expansion results

System Verification - 49 CFR 173.34(e)(4)(iii)(B)

The Test System must be verified in all Test Jackets that will be used that day. Pressures can be split up between jackets to verify system functionality. For example, it is acceptable to pressurise the calibrated cylinder in one jacket to 3,000 psi, and the calibrated cylinder in another jacket to 4,000 psi, thereby verifying the Pressure Indicating Device, and the Test System for both jackets through the range of test pressures from 3,000 to 4,000 psi.

This procedure will result in the complete system being verified throughout the range of test pressures. It should be noted that not every pressure nor every expansion level will be verified in every test jacket. However, since the Pressure Transducer (Pressure Indicating Device) is common to the entire system, once verified for a given pressure in one jacket, it is thereby verified for the entire system. Likewise, since the Load Cell (Expansion Indicating Device) is common to the entire system, the expansion verification of the device is accomplished in any of the common jackets. The reason for pressurising the Calibrated Cylinder in every jacket is to verify the **functionality** of the individual jacket, not to verify the calibration of the Pressure / Expansion Indicating Devices for every jacket.

It is recommended (although NOT mandatory) that the cylinder be checked against either another calibration cylinder or a dead-weight tester every 10 years. ½% accuracy required.

Cylinder Calibration Procedure.

For information only. This procedure must NEVER be carried out by the re-tester. The calibration cylinder is set-up during manufacture by Galiso as described briefly below.

1. Pressurise cylinder to 1 1/8 times maximum test pressure three times. Ensure it returns to zero permanent expansion each time.
2. Using an accurate and verified system, and with a dead-weight tester, pressurise to set points 4 times for each point. Each point must be within 0.2 cc
3. Plot curve of points and check deviations. Linearity must be to 99.99%. No point can deviate by more than ½%.
See also Galiso instruction manual 21-11-1133

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