

Greetings from Galiso Incorporated

This letter pertains to the recent changes to the calibration values for your calibrated cylinders. Galiso technicians have found this to be necessary on many Recortest 4 installations and upgrades. The reasons that the cylinder values are no longer correct are thinning of the cylinder walls due to corrosion and or incorrect previous calibration.

Calibrating a cylinder on site with the installed / upgraded machine requires a check of each of the 4 calibration accuracy issues to establish that the cylinder calibration values that are done on site are accurate. When there is a discrepancy in prior calibration values to present ones, a check of each of these four calibration accuracy issues is important to prove the new calibration data is correct.

These issues are:

1. Accuracy of pressure measuring device . . . verified with master gauge.
2. Accuracy of expansion measuring device . . . verified with test weights
3. Temperature . . . measured to determine the weight of water during calibration
4. Buoyancy . . . checked with the a pour test and adjusted for temperature.

Regarding issue 1, the Recortest 4 uses a digital pressure transducer that is a high accuracy, traceable pressure standard suitable for calibration of cylinders. Because the .02% accuracy of this transducer is better than the .25% accuracy of the master gauge the master gauge is used to confirm that the transducer is functioning properly but we do not calibrate the digital transducer to the gauge. This we believe is a major factor in the need for us to re calibrate cylinders during Recortest 4 installations and upgrades. Prior to the installation / upgrade it was possible to adjust the pressure transducer to match the expansion values. We also verify that the pressure circuit comprised of the high pressure pump, valves and tubing, hoses, test head, and cylinder are not leaking.

Regarding issue 2, in most cases the load cell weigh bowl assembly is replaced by the digital Recortest 4 weigh bowl scale. The accuracy of this digital scale has proven to be very stable over time and eliminates the need for frequent calibration.

Regarding issue 3, When the ambient temperature is 4 degrees c / 39 degrees f, one cc of water weighs 1 gram but at 40c/104f room temperature, one cc of water weighs .992 grams which is a accuracy loss of negative .8%. By determining the ambient temperature we can correct its effect on the weight of water when we perform a pour test to verify the accuracy and leak integrity of the complete expansion circuit comprised of the weigh bowl, siphon tube, plumbing and valves, test jacket, test head and cylinder.

Regarding issue 4, We determine the effect of siphon tube buoyancy on the system that will be used to create calibration cylinder values. To do this we open the expansion circuit to the weigh bowl with the cylinder to be calibrated in the test jacket. Then we pour 100cc of water into a cup on a separate scale by using the weight of water at ambient temperature. For example if the ambient temperature is 20 degrees c / 68 degrees f, then we would pour 99.8 grams of water into the cup. Next we pour the water out of the cup into the weighbowl of the Recortest 4 that is connected to the test jacket with the calibrated cylinder. This test is performed several times to verify that the complete expansion circuit is accurate and stable.

We then run repeated tests at each calibration pressure to gather the expansion data for each pressure point. Finally we check the linearity of all calibration points and then create a certificate of expansion values for the calibrated cylinder. If you have any further questions about this work please feel free to contact our service team anytime.

Thankfully yours – The Galiso team