

Strain Cylinders



Reference Strain Cylinder Set up in 3MN Strain Cylinder Reference Machine

The verification of concrete cube testing machines using strain cylinders is central to maintaining uniformity of measurement throughout the construction industry. NPL provides a UKAS-accredited strain cylinder certification service.

Concrete cube testing

The construction industry, when pouring concrete, needs to ensure that the strength and conformity of the mixture is suitable for the purpose it is being used for.

The strength and conformity of the concrete is measured by testing samples of the concrete mixture which have been, moulded into standard size cube moulds and allowed to fully set. Once set, the moulded concrete cube is placed centrally in a compression testing machine in which the force required to crush is measured.

When testing highlights non-conformity, this allows the user to take remedial action prior to further construction work.

Measurement of the correct concrete strength requires the force to be evenly applied to the cube. The ability of the machine to apply an evenly distributed force is certified using a strain cylinder.

Strain cylinders

A strain cylinder is a vertical metal cylinder with four strain gauge bridges evenly spaced around the circumference half way along its length. The strain cylinder is placed (either centrally or offset by a specific distance) in the compression testing machine, specific forces are applied, and the output readings from the four strain gauge bridges are monitored. The differences between these readings show how uniformly the load was applied to the ends of the strain cylinder.

NPL holds the UK's two master reference strain cylinders. To ensure conformity of these two strain cylinders and check that they are still functioning correctly, the two cylinders are regularly cross-checked against each other.

Strain cylinder calibration

UKAS-accredited concrete testing laboratories must have their strain cylinders certified every two years. Their strain cylinder is compared with a reference strain cylinder in NPL's 3 MN reference compression machine-this has a long history of stability, both for the accuracy of the applied forces and the behaviour of the machine frame.

The certification of the strain cylinders includes the measurement of the flatness and parallelism of the end faces. NPL has the facilities to refurbish the end faces of a strain cylinder if necessary.

For further information or to discuss your requirements, please contact us.

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