



## TAR vs. TUR

### TAR

- **TAR** = Test Accuracy Ratio, defined as the ratio of the accuracy required of the UUT and the accuracy tolerance of the calibrator (NCSL, page 2). Example a calibrator might have 4 to 10 times the manufacturer's published accuracy of the DUT.
- A TAR is an expression of the *qualitative potential* of the adequacy of a calibrator and not based on measurement data.

### TUR

- **TUR** = Test Uncertainty Ratio is the ratio between the accuracy tolerance of the UUT and the uncertainty of the calibrator either as a source or measuring instrument.
- A MU is a result of combining a lab's Calibration Measurement Capabilities (k=2, 95% probability) *and* Measurement Uncertainty (MU).
- A MU takes into consideration other contributors of measurement inaccuracy primarily the resolution of the DUT. The calibrator's CMC isn't diminished but the DUT's ability to resolve an input diminishes the lab's CMC.
- TUR *quantitatively*, based on data, qualifies a calibrator's adequacy for the task.



### How is TUR determined:

Labs with ISO17025:2017 accreditation are required to determine and publish their CMC's (Calibration Measurement Capability) for their testing equipment. The CMC's represent a 95% probability a measurement is valid.

A MU is larger than a CMC. MU, or Measurement Uncertainty, is the uncertainty of measurement at the time of calibration. The MU reported on a certificate is a combination of the CMC and the DUT's resolution, stability, performance and/or other contributors of error.

The TUR is then the ratio of the MU vs. the DUT's published accuracies.



## Statements of Compliance on Certificates (Pass/Fail, In or Out of Tolerance)

Under protest DGI Metrology is required by ILAC and our registrar to issue statements of compliance based on measurements that are out of specification while taking into account MU's.

We provide the MU's to the user and therefore for several reasons we believe that a simple statement of acceptance (not taking MU's into consideration) on the certificate leaves the responsibility and privilege of the user to decide, based on the MU's provided, if the DUT is fit for use.

It is also our belief that when we provide measurements, and the user is aware of our MU's, then our responsibility as a calibration lab has been fulfilled. It should not be within our domain to say to a user the DUT is not fit for the user's particular application that likely is unknown to us.

This Lab's TUR always exceeds 4:1 but MU's and subsequent TUR's sometimes cannot meet the old TAR minimum 4:1. In the rare event this lab's TUR is less than 3:1 we indicate that on the certificate issued.

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