

REPRODUCIBILITY AND ACCURACY OF MEASUREMENT

Reproducibility: ASTM standard 4417-93 cites levels of reproducibility for both “X-Coarse” and “Coarse” grade replica tape.

For X-Coarse grade replica tape:

“Two results, each the mean of four replicates, obtained by operators in different laboratories should be considered suspect if they differ by more than 37%.”

For Coarse grade replica tape, the equivalent level of reproducibility is cited as 28%.

According to these ASTM criteria, the following errors are the maximum that should be expected:

| PROFILE (mils) (microns) | ERROR ("COARSE") (mils) (microns) | ERROR ("X-COARSE") (mils) (microns) |
|-----------------------------|--------------------------------------|--|
| 1.0 25 | 0.3 8 | not applicable |
| 2.0 50 | not applicable | 0.8 18 |
| 3.0 75 | not applicable | 1.1 27 |
| 4.0 100 | not applicable | 1.5 37 |

Accuracy: NACE Standard RP0287-95 addresses the issue of accuracy of measurement, reporting the results of round robin tests in which 14 blasted panels were measured by 7 laboratories. Replica tape and focusing microscope measurements agreed within their 95% confidence limits in 11 of 14 cases. The average difference between the two types of measurement was 0.2 mils (5 microns).

Reproducibility and Accuracy (Testex): By using a series of surfaces machined to known roughness, it is possible to test the accuracy and reproducibility of profile measurements made with replica tape and a micrometer gage. The surfaces used in Testex' internal testing were produced by making casts of grooves of known depth. The casts then consist of sharp-topped parallel "V-shaped" ridges of known height.

A blasted surface is highly irregular, unlike the regular grooved structure used in our tests. For this reason, the proper way to assess the accuracy of replica tape for evaluation of blasted surfaces is via the techniques used by the standards organizations concerned with such surfaces.

Nevertheless, tests using casts of machined surfaces show micrometer gage measurements of Press-O-Film to have an accuracy and reproducibility of 0.3 mil (8 microns), or better, across the ranges of Coarse and X-Coarse material. The casts of machined surfaces were measured with a light section microscope.

The accuracy and reproducibility suggested by these tests could differ from results obtained for an arbitrary blasted surface. For example, laboratory tests suggest that when Coarse material is used to measure actual blasted surfaces having profiles greater than 2.0 mil (50 microns), it is less accurate than is X-Coarse material, though this is not clear from tests on casts of machined surfaces.

Coarse and X-Coarse material should be used within their respective recommended ranges. In the region where their ranges overlap, between 1.5 and 2.0 mils (38 to 50 microns), Coarse grade material is more accurate.