Measurement

Introduction

Measurement is the comparison of an unknown dimension to a known standard. Good measuring instruments were a key to high volume production. Without them, parts could not be built accurately enough to be interchangeable. Each assembly had to be hand fitted together. Today, measuring tools are essential for most machining operations from initial part layout to final inspection.

Calipers

A typical caliper might measure lengths from 0 to 7.5 inches to a precision of one thousandth of an inch. One can measure the outside of a part with the jaws, the inside of a hole or slot with the nibs, or the depth of a hole or shoulder with the extension bar.

It takes a little practice to read a vernier scale properly. Calipers often have a dial or digital readouts instead.

To read a vernier caliper:

- Read the large number division first.
- Read the small number division.
- Read the number of smaller subdivisions. Each represents 0.025 inches to be added to the measurement.
- Read which line on the vernier lines up with a line on the main beam. For each line a thousandth must be added to the measurement.

Micrometer

A micrometer generally provides greater precision than a caliper, but can measure a smaller range of lengths.

To use a micrometer, place the part in the opening. Next, turn the thimble until the spindle contacts the work. To apply a consistent pressure to the part, use the ratchet stop. Use the clamp ring to hold the thimble in place while you read the micrometer. To read the micrometer:

- Read the exposed number on the barrel.
- Read the number of divisions past the number. Each division represents 0.025 inches.
- Read the division on the spindle. These usually read to less than thousandths of an inch.