ADVANTAGES AND DISADVANTAGES OF VARIOUS THREAD INSPECTION AND MEASUREMENT METHODS

THREAD PLUG, RING AND CALIPER GAUGES

ADVANTAGES
- Inspects full thread profile and pitch
- Can be used with a minimum of training
- Assuming correct use of both GO and NO-GO gauges the component can be judged “good” or “bad”

DISADVANTAGES
- Only reveals if the component is “good” or “bad” – not the relationship to the tolerance
- Time consuming when setting up the machine and performing process control
- Difficult/expensive to calibrate
- Manufacturing tolerances and wear on the gauges usually give less tolerance on the actual components to be inspected
- Can only be used for the specific thread and tolerance stated on the gauge

MEASURING WIRES FOR A MICROMETER

ADVANTAGES
- Very accurate, assuming correct flank angle
- Can be used on all external threads
- Suitable for machine set-up and process control

DISADVANTAGES
- Only suitable for external threads
- Requires a calculation to find the correct measurement result
- Measuring wires must be bought to suit the relevant micrometer spindle diameter
  N.B. there are 3 standard micrometer spindle diameters – Ø8mm (5/16”), Ø6,5 and Ø6,35 mm (1/4”)
  “Only” measures thread pitch diameter

THREAD INSERTS FOR SPECIAL MICROMETER

ADVANTAGES
- Accurate, assuming correct flank angle
- Can be used on all threads with the same flank angle
- Suitable for machine set-up and process control

DISADVANTAGES
- Only suitable for external threads
- Requires special (and thus expensive) micrometer
- Requires set-up/reference master when used with a micrometer larger than 0 – 25mm
  “Only” measures thread pitch diameter

N.B. One advantage can outweigh several disadvantages, just as one disadvantage can outweigh several advantages.
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THREAD GEOMETRY MEASURING FIXTURES

ADVANTAGES
Measures the total thread geometry (diameters and pitch).
When set up easy to use.
Fixtures for both external and internal threads.
Suitable for machine set-up and process control.

DISADVANTAGES
Relatively expensive as it can only be used for the designated thread.
Requires a reference component for correct set up.
One wrong dimension on the threaded component can give a false indication i.e. an incorrect pitch will give a false reading as will an incorrect flank angle.

THREAD INSERTS FOR USE WITH A DIGITAL CALIPER

PRINCIPLE

ADVANTAGES
Measures pitch diameter on both external and internal threads.
Available for all thread types (Standard inserts can measure all threads with a flank angle between 50°-80°)
4 pairs of inserts cover the pitch range of 0.5 – 8mm/48-3 TPI.
Suitable for machine set-up and process control
SPC possibilities with a digital caliper

DISADVANTAGES
"Only" measures thread pitch diameter
As the basic concept is use with a digital caliper, the pitch diameter tolerance should be at least 0.1 mm/0.004 ins. This is the case with most threads from 6mm/1/4 ins. and over.

There are many other thread measurement possibilities but most of these are either expensive or not suitable for workshop use. Probably the best (inexpensive) method is a combination of using a "GO" thread plug or ring gauge (giving correct thread profile and pitch), and measurement of the thread pitch diameter (giving correct positioning within the tolerance).