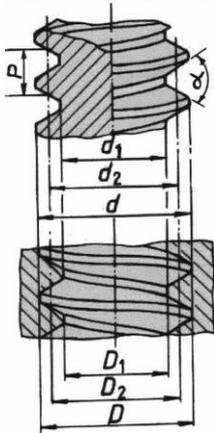


## MEASURING SCREW THREAD DIAMETERS



### EXTERNAL THREAD

$d$  = Major diameter  
 **$d_2$  = Pitch diameter**  
 $d_1$  = Minor diameter

### INTERNAL THREAD

$D$  = Major diameter  
 **$D_2$  = Pitch diameter**  
 $D_1$  = minor diameter

The two easiest diameters to measure are  $d$  (using either a caliper or a micrometer) and  $d_1$  (using a caliper would normally be easiest).

FMS thread inserts are an easy and relatively inexpensive way to measure  $d_2$  and  $D_2$  (pitch diameters for external and internal) and  $d_1$  (external minor diameter) and  $D$  (internal major diameter).

FMS thread measurement inserts are available in 3 types.

1. For external threads and for diameters  $d_2$  and  $d_1$ .
2. For smaller internal threads (from  $\varnothing 6\text{mm}/1/4''$ ) and diameters  $d_2$  and  $d_1$ .
3. For larger internal threads (typically from  $\varnothing 35\text{mm}/1.375''$ ) and diameters  $d_2$  and  $d_1$ .

### MEASURING PITCH DIAMETER ( $d_2$ and $D_2$ ) ON THREADS WITH A FLANK ANGLE FROM $50^\circ$ TO $80^\circ$

Due to the unique design of the FMS thread inserts the scope of flank angle and pitch range are probably unsurpassed by any other method.

The pitch diameter measurement range of threads with flank angles between  $50^\circ$  and  $80^\circ$  are typically:

**0,5 - 1 mm / 48 - 24 TPI**  
**1 - 2 mm / 24 - 13 TPI**  
**2 - 4 mm / 13 - 6 TPI**  
**4 - 8 mm / 6 - 3 TPI**

Among the threads that fall into this category are:

**M, MF, UNC, UNF, UNEF, UNS, Whitworth,  
G, BSP, R, Rc, and Pg.**

### MEASURING PITCH DIAMETER ( $d_2$ and $D_2$ ) ON THREADS WITH FLANK ANGLES OTHER THAN $50^\circ$ TO $80^\circ$

These types of threads with normally require FMS thread inserts for each individual pitch.

These threads (among others) are:

**Tr, ACME, Stub Acme and Buttress**

### MEASURING PITCH DIAMETER ( $d_2$ and $D_2$ ) ON TAPER THREADS

Again, due to the unique design of FMS thread inserts, only 1 pair of FMS thread inserts are required to measure either the pitch diameter of the following external or internal taper threads from  $1/4''$  and up:

### G (BSPT) and NPT

There are of course many other types of tapered threads, (not least API threads) and FMS thread inserts can be manufactured specifically for the thread in question.

### MEASURING INTERNAL THREADS

As with most internal measuring FMS requires a reference for calibration purposes.

For the **FLANK ANGLE FROM  $50^\circ$  TO  $80^\circ$**  category there are two standard calibration plates. One covers the range of

**1mm to 4mm / 24 TPI to 6 TPI**

and the other from

**0.5mm to 8mm / 48 TPI to 3 TPI**

For threads with other flank angles a calibration plate will often be required for each pitch.

N.B. FMS calibration plates can be supplied with a calibration certificate from an accredited calibration facility if required.

### SUMMARY

Thread pitch diameter can be regarded as the most critical thread diameter re fit and if this diameter is measured and monitored then most potential problems will be greatly reduced.

If you have questions and/or require a quote contact Gordon Clarke at:

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