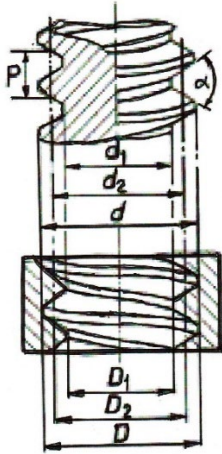


As is stated in several other links there are almost no thread types FMS can't measure. Measuring pitch diameter (d2 on external threads and D2 on internal) is by far the most common but FMS thread inserts can be made to measure both d1 (external minor diameter) and D (internal major diameter).



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

P = pitch
 α = flank angle

Measuring d and D_1 is easy and should always be done as it doesn't require inserts. A caliper is often enough.

Checking pitch is also easy simply by using a pitch gauge.



There are a countless number of thread types but so far FMS has only 2 practical limitations to the types that can be measured.

Pitches finer than 0.5mm/48 TPI and internal threads less than 5mm/0.2".

Using a FMS caliper pressure device ensures uniform measurement accuracy as the same measurement force is used by all.



FMS thread inserts types 21, 22 and 23 can measure all thread types with flank angles between 50° and 80°.

The typical thread types for that flank angle range are :

M, MF & MJ
 UNC, UNF, UNEF & UNJ

Whitworth 55° profile pipe threads ISO G (formerly BSPP)

American 60° profile pipe threads NPS

Pg (80°) Steel conduit

FMS thread inserts nos. 24 and 25 are for measuring pitch diameter on tapered threads type R & Rc (BSPT 55°) plus NPT (60°).

Metric Trapezoidal threads (Tr 30°) and ACME and Stub Acme (29°) require thread inserts for each pitch because of the small flank angle.

A thread type that has become more common with FMS is Buttress and there are several types. 7° 45° is the most common but FMS thread inserts can be made for all variations.

Probably important to add but when measuring pitch diameter of an internal thread a reference item is required. We recommend a FMS calibration plate.

Most FMS calibration plates are made with both d_2 and D_2 references unless otherwise specified by the customer. These calibration plates can be supplied with a calibration certificate from an authorize laboratory.

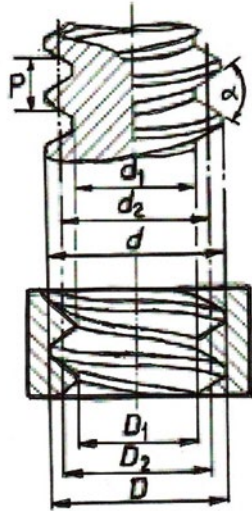
A major advantage with FMS when measuring pitch diameter of external threads is that no calculation is necessary. After zeroing the caliper and measuring, the result is the pitch diameter. With internal only a very simple minor calculation.

If required calibration plates can be supplied with a Calibration Certificate from an authorized laboratory.

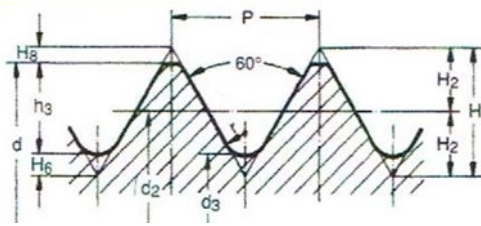
The standard dimension for d_2 on a calibration plate is 20mm and for D_2 50mm. Other dimensions are possible if ordered.

d_2 is not necessary on a calibration plate but is an advantage re caliper calibration. Wear on a calibration plate is virtually non-existent.

FMS has, or can make, thread inserts to measure these external and internal thread types. Pitch diameter (d_2/D_2) and also minor diameter (external) and major diameter (internal) D .



ISO Metric M



$$H = 0,86603 \cdot P$$

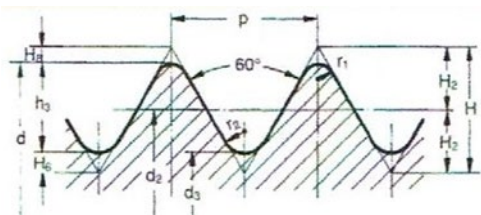
$$h_3 = 0,61343 \cdot P$$

$$d_2 = d - (0,6495 \cdot P)$$

$$d_3 = d - (2 \cdot h_3)$$

$$r = \frac{H}{6} = 0,14434 \cdot P$$

ISO Inch UNC, UNF, UNEF & NPS



$$H = 0,86603 \cdot P$$

$$h_3 = 0,61343 \cdot P$$

$$d_2 = d - (0,6495 \cdot P)$$

$$d_3 = d - (2 \cdot h_3)$$

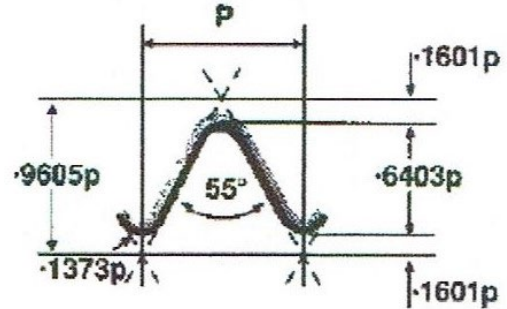
$$r_1 = 0,10825 \cdot P$$

$$r_2 = 0,1443 \cdot P$$

The profile of these two (M & ISO Inch) is almost identical with only minor differences in radii and of course pitch.

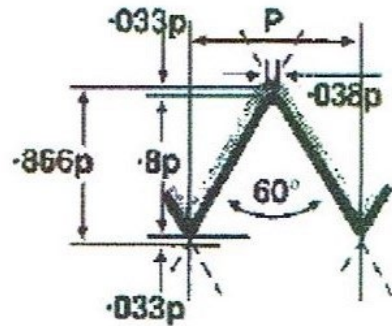
Whitworth

G (ISO denomination for BSP) & BSW
For pipe threads only 4 pitches.
28, 19, 14 & 11 TPI



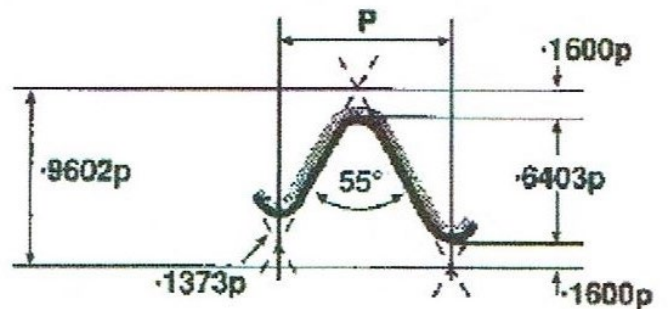
US Pipe Straight NPS

Only 5 pitches
27, 18, 14, 11½ & 8 TPI



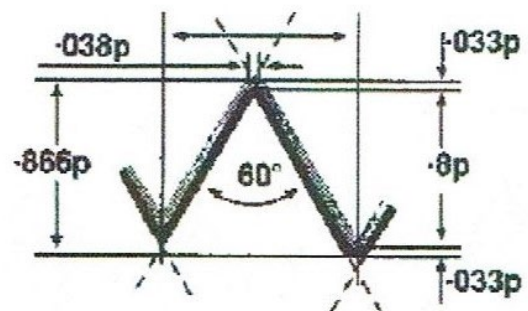
ISO Taper Pipe R & Rc

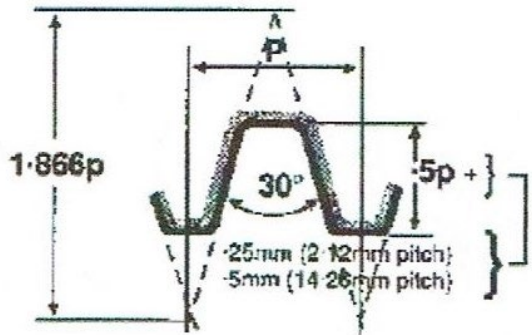
Only 4 pitches. 28, 19, 14 & 11 TPI



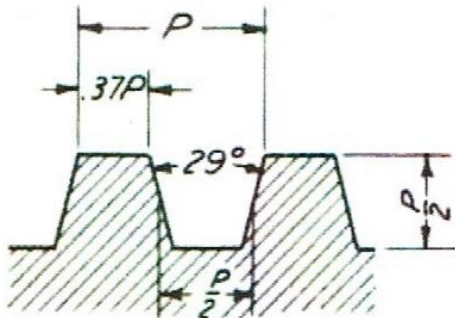
US Pipe Taper NPT

Only 5 pitches 27, 18, 14, 11½ & 8 TPI



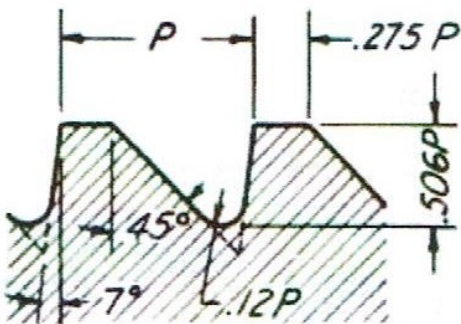


ACME



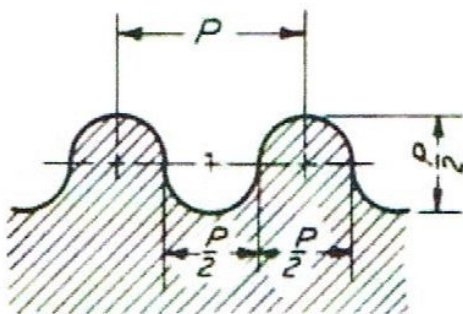
N.B. FMS thread inserts can also be used on Stub Tr & Stub Acme.

Buttress



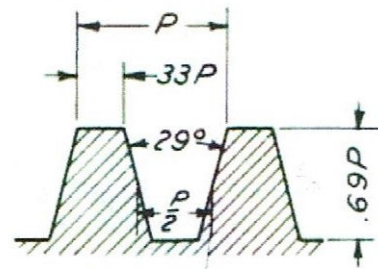
Knuckle (Rd)

Only has 4 pitches 10, 8, 6 & 4 TPI

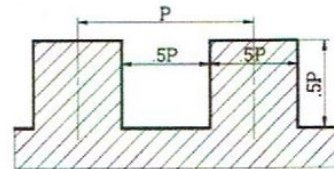


There are 2 versions of this thread type with small variations in diameters and tolerances.

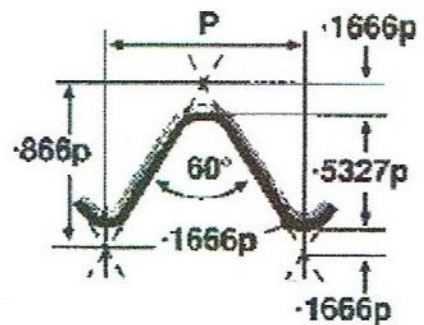
Worm



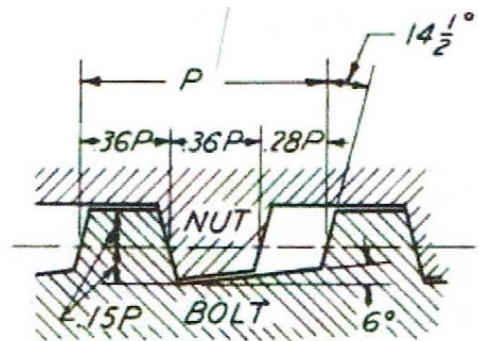
Square



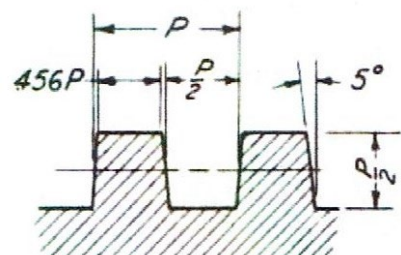
B.S. Cycle



Dardeclet



Modified Square



<https://flexiblemeasuring.com/>

www.F-M-S.dk