

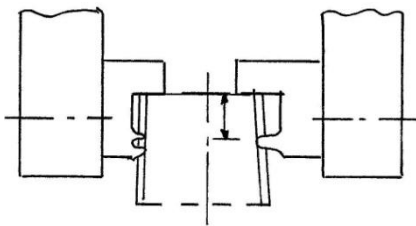
MEASURING TAPER THREADS R, Rc & NPT

Nominal pitch diameter for taper threads is given at a specified distance from the end of the pipe and the larger the taper thread diameter the greater the distance.

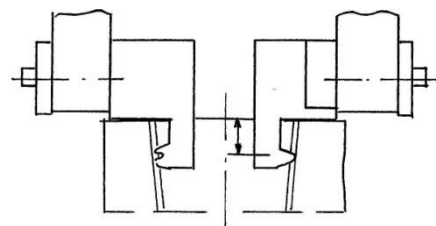
e.g. for R & Rc ½" the distance is 8.2mm, 1" is 10.4mm and 2" is 15.9mm.

for NPT ½" the distance is 8.13mm, 1" is 10.16mm and 2" is 11.07mm.

Taper threads normally have a much larger pitch diameter tolerance than that of straight threads so when using FMS taper thread inserts pitch diameter tolerances have been recalculated from just one distance from the end i.e. 6mm. This means that by using one single FMS thread measuring insert it is possible to measure every taper thread from 1/4" and up.



Sketch showing the principle when measuring external taper thread pitch diameter.



Sketch showing the principle when measuring internal taper thread pitch diameter.

Page 2 - 2 shows the correct distances and nominal pitch diameters at those distances as well as showing the nominal pitch diameters at a single distance from the pipe end.

Inspecting taper threads with thread plug and ring gauges requires one for each thread diameter and thus can be expensive if making several sizes. Using FMS taper thread inserts requires only one pair of inserts for either external or internal taper threads.

Pitch diameter measurement with FMS also has the advantage of having the correct pitch diameter if the thread is to be galvanized or similar afterwards as this will change the pitch diameter by 4 times the plating/coating.

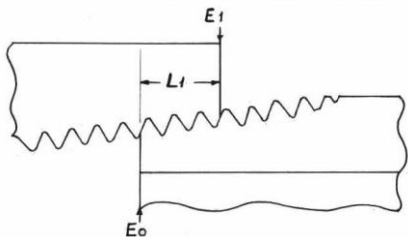
FMS taper thread inserts will also require a calibration plate (type 30A) for correct calibration and measurement.



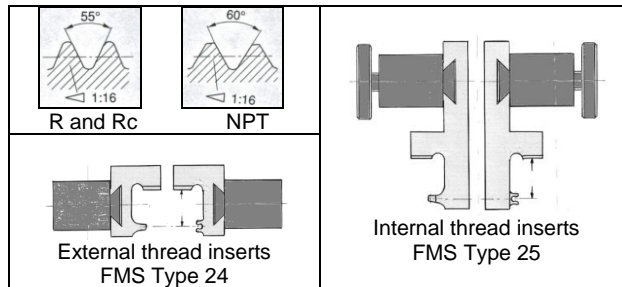
There are many other taper thread types than the three mentioned and FMS thread inserts can be made for all.

TAPERED PIPE THREADS R, Rc & NPT – PITCH DIAMETER

Ref. *DS/ISO 7-1 PIPE THREADS WHERE PRESSURE-TIGHT JOINTS ARE NOT MADE ON THE THREADS (WHITWORTH)*
& *ANSI/ASME B1.20.1 Pipe Threads, General Purpose*



E₀ is the internal measuring point and E₁ is the external measuring point



FMS thread inserts type 24A and 25A can measure pitches from 19 to 8 T.P.I.

| R & Rc (WHITWORTH PIPE THREAD) BSPT | | | | | |
|-------------------------------------|--------|-------|----------------------------|----------------------------|----------------------------------|
| Nominal pipe diam. | T.P.I. | P mm | Pitch diam. E ₀ | Pitch diam. E ₁ | Measurement point L ₁ |
| 1/4 | 19 | 1.337 | 11.93 | 12.30 | 6.0 |
| 3/8 | 19 | 1.337 | 15.41 | 15.81 | 6.4 |
| 1/2 | 14 | 1.814 | 19.28 | 19.79 | 8.2 |
| 3/4 | 14 | 1.814 | 24.69 | 25.28 | 9.5 |
| 1 | 11 | 2.309 | 31.12 | 31.77 | 10.4 |
| 1 1/4 | 11 | 2.309 | 39.64 | 40.43 | 12.7 |
| 1 1/2 | 11 | 2.309 | 45.53 | 46.32 | 12.7 |
| 2 | 11 | 2.309 | 57.15 | 58.14 | 15.9 |
| 2 1/2 | 11 | 2.309 | 72.62 | 73.71 | 17.5 |
| 3 | 11 | 2.309 | 85.12 | 86.41 | 20.5 |
| 4 | 11 | 2.309 | 109.96 | 111.55 | 25.4 |
| 5 | 11 | 2.309 | 135.16 | 136.95 | 28.6 |
| 6 | 11 | 2.309 | 160.56 | 162.35 | 28.6 |

| NPT (AMERICAN PIPE THREAD) | | | | | |
|----------------------------|--------|-------|----------------------------|----------------------------|----------------------------------|
| Nominal pipe diam. | T.P.I. | P mm | Pitch diam. E ₀ | Pitch diam. E ₁ | Measurement point L ₁ |
| 1/4 | 18 | 1.411 | 12.13 | 12.49 | 5.79 |
| 3/8 | 18 | 1.411 | 15.55 | 15.93 | 6.10 |
| 1/2 | 14 | 1.814 | 19.26 | 19.77 | 8.13 |
| 3/4 | 14 | 1.814 | 24.58 | 25.12 | 8.61 |
| 1 | 11 1/2 | 2.209 | 30.83 | 31.46 | 10.16 |
| 1 1/4 | 11 1/2 | 2.209 | 39.55 | 40.22 | 10.67 |
| 1 1/2 | 11 1/2 | 2.209 | 45.62 | 46.29 | 10.67 |
| 2 | 11 1/2 | 2.209 | 57.63 | 58.33 | 11.07 |
| 2 1/2 | 8 | 3.175 | 69.08 | 70.16 | 17.32 |
| 3 | 8 | 3.175 | 84.85 | 86.07 | 19.46 |
| 3 1/2 | 8 | 3.175 | 97.47 | 98.78 | 20.85 |
| 4 | 8 | 3.175 | 110.09 | 111.43 | 21.44 |
| 5 | 8 | 3.175 | 136.92 | 138.41 | 23.80 |
| 6 | 8 | 3.175 | 163.73 | 165.25 | 24.33 |

| Nominal pipe diameter | T.P.I. | P | Pitch ediameter at 6 mm depth | |
|-----------------------|--------|-------|-------------------------------|----------|
| | | | External | Internal |
| 1/4 | 19 | 1.337 | 12.30 | 11.93 |
| 3/8 | 19 | 1.337 | 15.78 | 15.44 |
| 1/2 | 14 | 1.814 | 19.65 | 19.42 |
| 3/4 | 14 | 1.814 | 25.06 | 24.91 |
| 1 | 11 | 2.309 | 31.49 | 31.40 |
| 1 1/4 | 11 | 2.309 | 40.01 | 40.06 |
| 1 1/2 | 11 | 2.309 | 45.90 | 45.95 |
| 2 | 11 | 2.309 | 57.52 | 57.77 |
| 2 1/2 | 11 | 2.309 | 72.99 | 73.34 |
| 3 | 11 | 2.309 | 85.49 | 86.10 |
| 4 | 11 | 2.309 | 110.33 | 111.18 |
| 5 | 11 | 2.309 | 135.53 | 136.58 |
| 6 | 11 | 2.309 | 160.93 | 161.98 |

| Nominal pipe diameter | T.P.I. | P | Pitch ediameter at 6 mm depth | |
|-----------------------|--------|-------|-------------------------------|----------|
| | | | External | Internal |
| 1/4 | 18 | 1.411 | 12.50 | 12.12 |
| 3/8 | 18 | 1.411 | 15.92 | 15.56 |
| 1/2 | 14 | 1.814 | 19.63 | 19.40 |
| 3/4 | 14 | 1.814 | 24.95 | 24.75 |
| 1 | 11 1/2 | 2.209 | 31.20 | 31.09 |
| 1 1/4 | 11 1/2 | 2.209 | 39.92 | 39.85 |
| 1 1/2 | 11 1/2 | 2.209 | 45.99 | 45.92 |
| 2 | 11 1/2 | 2.209 | 58.00 | 57.96 |
| 2 1/2 | 8 | 3.175 | 69.45 | 69.79 |
| 3 | 8 | 3.175 | 85.22 | 85.70 |
| 3 1/2 | 8 | 3.175 | 97.84 | 98.41 |
| 4 | 8 | 3.175 | 110.46 | 111.06 |
| 5 | 8 | 3.175 | 137.29 | 138.04 |
| 6 | 8 | 3.175 | 164.10 | 164.88 |

Pitch diameter tolerances on external threads

- 19 T.P.I. ± 0.08
- 14 T.P.I. ± 0.11
- 1) 11T.P.I. ± 0.14
- 2) 11T.P.I. ± 0.21

Pitch diameter tolerances on internal threads

- 19 T.P.I. ± 0.10
- 14 T.P.I. ± 0.14
- 1) 11 T.P.I. ± 0.18
- 2) 11 T.P.I. ± 0.21

Pitch diameter tolerances on external threads

- 18 T.P.I. ± 0.09
- 14 T.P.I. ± 0.11
- 11 1/2 T.P.I. ± 0.14
- 8 T.P.I. ± 0.20

Pitch diameter tolerances on internal threads

- 18 T.P.I. ± 0.09
- 14 T.P.I. ± 0.11
- 11 1/2 T.P.I. ± 0.14
- 8 T.P.I. ± 0.20

1) up to and including R 2 and Rc 2
2) above R 2 and Rc 2