Pipe Thread Chart — BSP (G/R), NPT and Metric: Dimensions, TPI and Identification

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Dimension table for BSPP (G), BSPT (R), NPT and metric fine threads used on fittings, glands and sensors: major diameter, threads per inch or pitch, tap drill, how to tell them apart with calipers, and which pairs seal together.

The three families

BSPP / G (ISO 228-1) is a parallel British pipe thread that seals on a gasket, O-ring or bonded washer under the fitting shoulder — never in the thread itself. BSPT / R (ISO 7-1) is the tapered version that seals in the thread with sealant or PTFE tape; Rc is the tapered female, Rp the parallel female that mates with R male. NPT (ASME B1.20.1) is the American tapered thread with a 60° flank angle against the 55° of the British forms — the two taper families are not interchangeable even where diameters look close. Metric fine threads (M12 × 1.5, M20 × 1.5 …) are parallel and dominate cable glands and sensor bosses.

Dimension table

Nominal | G/R major Ø (mm) | BSP TPI | NPT major Ø (mm) | NPT TPI | G tap drill (mm) |

1/8" | 9.73 | 28 | 10.24 | 27 | 8.8 |

1/4" | 13.16 | 19 | 13.62 | 18 | 11.8 |

3/8" | 16.66 | 19 | 17.05 | 18 | 15.25 |

1/2" | 20.96 | 14 | 21.22 | 14 | 19.0 |

3/4" | 26.44 | 14 | 26.57 | 14 | 24.5 |

1" | 33.25 | 11 | 33.23 | 11.5 | 30.75 |

1 1/4" | 41.91 | 11 | 41.98 | 11.5 | 39.5 |

1 1/2" | 47.80 | 11 | 48.05 | 11.5 | 45.25 |

2" | 59.61 | 11 | 60.09 | 11.5 | 57.0 |

Note the classic trap at 1/2" and 3/4": G and NPT major diameters differ by well under a millimetre but the flank angles differ (55° vs 60°), so a forced assembly leaks under vibration. At 1" the TPI differ (11 vs 11.5) — a thread gauge settles it instantly.

Identification in four steps

Parallel or tapered? Lay a straight edge on the crests — a taper is visible over 3–4 threads.

Measure the major diameter with calipers on a male thread and find the closest row above; pipe threads are named for the bore of the original steel pipe, not the thread OD.

Count TPI with a pitch gauge: 19 or 14 says British; 18 says NPT; a metric pitch (1.5 mm) says gland thread.

Check the seat. A flat face, O-ring groove or 30° cone means the joint seals on the face and the thread is parallel G; bare tapered threads mean R or NPT with sealant.

Catalogue examples: JIC-to-NPT adapters, M20 × 1.5 Ex e cable glands and 1/2" NPT gauge valves. Flange-face dimensions live in the PN16 flange chart; refrigeration flare threads (7/16"-20 UNF …) are covered in the SAE flare guide.

Frequently asked questions
What diameter is a 1/2 inch BSP thread?A 1/2" BSP (G 1/2) male thread measures 20.96 mm across the crests with 14 threads per inch.Are BSP and NPT threads interchangeable?No. BSP uses a 55° flank angle and NPT 60°, and the TPI differs at several sizes; a mixed joint may screw together but will not seal reliably.How does a G (BSPP) thread seal?On the face: a bonded washer, gasket or O-ring under the fitting shoulder carries the seal, while the parallel thread only provides clamping.What thread is on a standard cable gland?European glands use metric fine threads — most commonly M16 × 1.5, M20 × 1.5, M25 × 1.5 — parallel, sealed by a washer or O-ring at the entry face.How do I tell NPT from BSPT quickly?Count threads per inch: 18 TPI at 1/4"–3/8" or 11.5 TPI at 1" and above means NPT; 19 or 11 TPI means the British taper. Both are tapered, so only the pitch and flank angle separate them.

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