

British Standard Pipe (BSP) Thread Details

British Standard Pipe (BSP) is a family of technical standards for screw threads that has been adopted internationally for interconnecting and sealing pipes and fittings by mating an external (male) thread with an internal (female) thread.

It has been adopted as standard in plumbing and pipe fitting, except in the United States, where NPT and related threads are the standard used.

Thread Types

- ◆ **Parallel (straight) threads**, British Standard Pipe Parallel thread (BSPP) which have a constant diameter; denoted by the letter G.
- ◆ **Taper threads**, British Standard Pipe Taper thread (BSPT), whose diameter increases or decreases along the length of the thread; denoted by the letter R.

These can be combined into two types of joints:

Jointing Threads

These are pipe threads where pressure-tightness is made through the mating of two threads together. They always use a taper male thread, but can have either parallel or taper female threads. (International standards require all female threads to be parallel.)

Long Screw Threads

These are parallel pipe threads used where a pressure-tight joint is achieved by the compression of a soft material (such as an O-Ring seal or a washer) between the end face of the male thread and a socket or nipple face, with the tightening of a back-nut.

Thread form

The thread form follows the British Standard Whitworth standard:

- ◆ Symmetrical V-thread in which the angle between the flanks is 55° (measured in an axial plane)
- ◆ One-sixth of this sharp V is truncated at the top and the bottom
- ◆ The threads are rounded equally at crests and roots by circular arcs ending tangentially with the flanks
- ◆ where $r=0.1373P$
The theoretical depth of the thread is therefore 0.6403 times the nominal pitch

Pipe thread sizes

At least 41 thread sizes have been defined, ranging from 1 to 18, although of these only 15 are included in ISO 7 and 24 in ISO 228. The size number was originally based on the inner diameter (measured in inches) of a steel tube for which the thread was intended, but contemporary pipes tend to use thinner walls to save material, and thus have an inner diameter larger than this nominal size.

In the modern standard metric version, it is simply a size number, where listed diameter size is the major outer diameter of the external thread. For a taper thread, it is the diameter at the "gauge length" (plus/minus one thread pitch) from the small end of the thread. The taper is 1 to 16, meaning that for each 16 units of measurement increase in the distance from the end, the diameter increases by 1 unit of measurement.

G/R size (in)	Thread pitch		Major diameter		Minor diameter		Gauge length		Tapping drill	
	(in-1)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	R 95% (mm)	G 80% (mm)
	1/16	28	0.907	0.3041	7.723	0.2583	6.561	5/32	4	6.6
1/8	28	0.907	0.383	9.728	0.3372	8.566	5/32	4	8.6	8.8
1/4	19	1.337	0.518	13.157	0.4506	11.445	0.2367	6	11.5	11.8
3/8	19	1.337	0.656	16.662	0.5886	14.95	1/4	6.4	15	15.3
1/2	14	1.814	0.825	20.955	0.7335	18.631	0.3214	8.2	18.7	19.1
5/8	14	1.814	0.902	22.911	0.8105	20.587	0.3214	8.2	20.7	21.1
3/4	14	1.814	1.041	26.441	0.9495	24.117	3/8	9.5	24.2	24.6
7/8	14	1.814	1.189	30.201	1.0975	27.877	3/8	9.5	28	28.3
1	11	2.309	1.309	33.249	1.1926	30.291	0.4091	10.4	30.4	30.9
1 1/8	11	2.309	1.492	37.897	1.3756	34.939	0.4091	10.4	35.1	35.5
1 1/4	11	2.309	1.65	41.91	1.5335	38.952	1/2	12.7	39.1	39.5
1 3/8	11	2.309	1.745	44.323	1.6285	41.365	1/2	12.7	41.5	42
1 1/2	11	2.309	1.882	47.803	1.7656	44.845	1/2	12.7	45	45.4
1 5/8	11	2.309	2.082	52.883	1.9656	49.926	5/8	15.9	50.1	50.5
1 3/4	11	2.309	2.116	53.746	1.9995	50.788	5/8	15.9	50.9	51.4
1 7/8	11	2.309	2.244	56.998	2.1276	54.041	5/8	15.9	54.2	54.6
2	11	2.309	2.347	59.614	2.2306	56.656	5/8	15.9	56.8	57.2

Terminology used in British Standard Pipe Threads:

- ◆ G, external and internal parallel (ISO 228)
- ◆ R, external taper (ISO 7)
- ◆ Rp, internal parallel (ISO 7/1)
- ◆ Rc, internal taper (ISO 7)
- ◆ Rs, external parallel
- ◆ The terminology for the use of G and R originated from Germany (G for gas, as it was originally designed for use on gas pipes; R for rohr, meaning pipe.)
- ◆ Threads are normally Right-Hand. For Left-Hand threads, the letters, LH, are appended.