

## How to Determine the Size of 1/4" and 1/8" National Pipe Thread tapered (NPT) Fittings

There is a bewildering assortment of fitting types and sizes on the web site.

One of the things frequently asked about is National Pipe Thread tapered (NPT) fittings.

Many people have difficulty identifying the correct size NPT fitting for their needs.

The confusion comes from the fact that the outside diameter (OD) of an NPT fitting does not match the "name" of the fitting.

For an example let's look at a fitting shown below, which is a 1/4" to 1/8" NPT Male Connector.

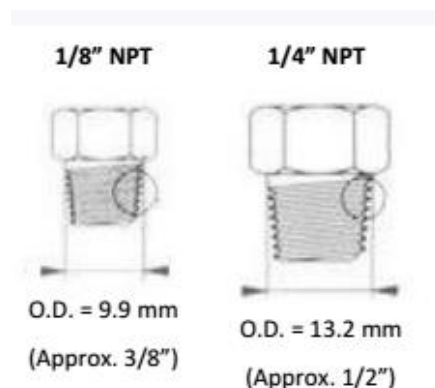


The 1/4" designation in the name refers to the compression fitting side of the fitting (on the left in the picture above) which has a nut and ferrules to accept and connect to 1/4" OD tubing.

Makes sense, right? However, the threads on the right side of the fitting in the picture above are called 1/8" Male NPT, but if you measure the OD of the 1/8" NPT side you will find it is about 0.4" diameter... certainly not very close to 1/8" (0.125").

As a general "rule of thumb" an NPT thread is approximately 1/4" (0.25") larger than its "name." For a 1/4" NPT fitting the "nominal" OD is 0.533".

NPT fittings are slightly tapered so the "nominal" diameter is the diameter in the middle of the threaded portion, as measured by the top (crest) of the threads. This is a bit confusing, but NPT threads are made to the ANSI B1.20.1, SAE AS71051 standard and anything complying with a standard with a name like that is bound to be bewildering. Hopefully the image below will help.



The charts below are from the Swagelok Thread and End Connection Identification Guide with the first chart showing dimensions for male NPT threads and the second chart containing the dimensions for female NPT threads.

## Thread Identification Reference Tables

### T Tapered—Male

Note: Measured thread diameters may not match table measurements exactly. All threads have tolerances regarding many parts of the threads. The information in this table is not intended to be used as inspection criteria for threaded fittings. It is intended to be used as a guide to help identify various threads.

Nominal Thread Size, in.	Designation	Nominal Male Thread Diameter		Pitch <sup>①</sup>	Page
		in.	mm		
1/16	ISO 7/1	0.304	7.72	28W	25
	NPT	0.308	7.84	27U	23 to 24
1/8	ISO 7/1	0.383	9.73	28W	25
	NPT	0.401	10.18	27U	23 to 24
1/4	ISO 7/1	0.518	13.16	19W	25
	NPT	0.533	13.54	18U	23 to 24
3/8	ISO 7/1	0.656	16.86	19W	25
	NPT	0.668	16.98	18U	23 to 24
1/2	ISO 7/1	0.825	20.96	14W	25
	NPT	0.832	21.14	14U	23 to 24
3/4	ISO 7/1	1.041	26.44	14W	25
	NPT	1.043	26.49	14U	23 to 24
1	NPT	1.305	33.14	11.5U	23 to 24
	ISO 7/1	1.309	33.25	11W	25
1 1/4	NPT	1.649	41.90	11.5U	23 to 24
	ISO 7/1	1.650	41.91	11W	25
1 1/2	ISO 7/1	1.882	47.80	11W	25
	NPT	1.888	47.97	11.5U	23 to 24
2	ISO 7/1	2.347	59.61	11W	25
	NPT	2.362	60.00	11.5U	23 to 24

① U = Unified      W = Whitworth      M = Metric  
 Labeling on each Swagelok pitch gauge form

Note: 1/2 and 3/4 in. ISO 7/1 and NPT threads can be difficult to identify because they are very close in design. Positive identification may not be possible without the use of an optical comparator. Contact your authorized Swagelok representative for additional information.

## T Tapered—Female

Note: Measured thread diameters may not match table measurements exactly. All threads have tolerances regarding many parts of the threads. The information in this table is not intended to be used as inspection criteria for threaded fittings. It is intended to be used as a guide to help identify various threads.

Nominal Thread Size, in.	Designation	Nominal Female Thread Diameter		Pitch <sup>①</sup>	Page
		in.	mm		
1/16	NPT	0.244	6.22	27U	23 to 24
	ISO 7/1	0.258	6.56	28W	25
1/8	NPT	0.336	8.54	27U	23 to 24
	ISO 7/1	0.337	8.57	28W	25
1/4	NPT	0.436	11.07	18U	23 to 24
	ISO 7/1	0.451	11.45	19W	25
3/8	NPT	0.571	14.49	18U	23 to 24
	ISO 7/1	0.589	14.95	19W	25
1/2	NPT	0.705	17.90	14U	23 to 24
	ISO 7/1	0.734	18.63	14W	25
3/4	NPT	0.914	23.21	14U	23 to 24
	ISO 7/1	0.949	24.12	14W	25
1	NPT	1.148	29.15	11.5U	25
	ISO 7/1	1.193	30.29	11W	23 to 24
1 1/4	NPT	1.491	37.87	11.5U	23 to 24
	ISO 7/1	1.534	38.95	11W	25
1 1/2	NPT	1.730	43.49	11.5U	23 to 24
	ISO 7/1	1.766	44.85	11W	25
2 1/4	NPT	2.203	55.95	11.5U	23 to 24
	ISO 7/1	2.231	56.66	11W	25

TABLES

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Note: 1/2 and 3/4 in. ISO 7/1 and NPT threads can be difficult to identify because they are very close in design. Positive identification may not be possible without the use of an optical comparator. Contact your authorized Swagelok representative for additional information.

Finally, you should always use PTFE tape when making a connection with an NPT fitting.