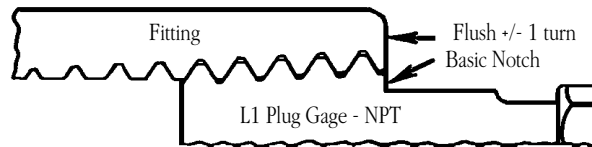


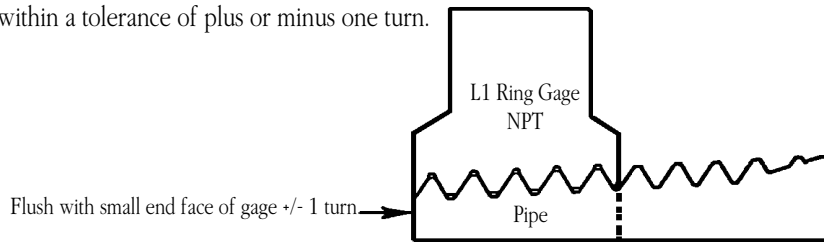
# NPT Thread Gages



Gaging of NPT threads is quite easy and differs from straight threads in that only one gage, an L1 plug or L1 ring is used to determine acceptability. The taper pipe thread plug has a step at the L1 distance from its small end. When turned hand tight into the product's internal pipe thread, (do not force the gage), the step is required to be flush with the large end of the product thread within a tolerance of plus or minus one turn. Many times the product thread is chamfered, countersunk or recessed, exceeding the major diameter of the thread. In these instances, the gaging point of the product thread becomes where the first visible sign of a scratch mark at the major diameter occurs on the chamfer cone.



The taper pipe thread ring gage has a thickness equal to the L1 length. The ring's large end (marked face) is turned hand tight onto the external pipe thread until it stops (do not force the gage). The small end of the ring gage is required to be flush with the small end of the pipe within a tolerance of plus or minus one turn.

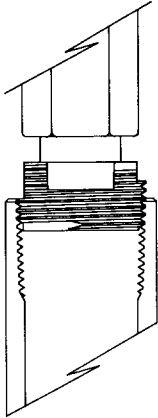
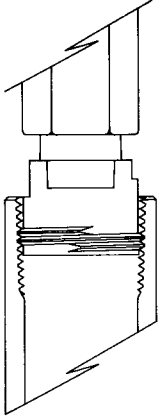
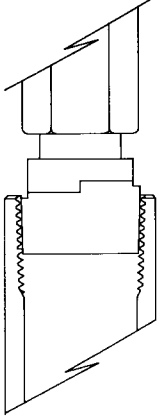


Nominal Size of Pipe	Threads Per Inch	Basic L1 Length	Major Diameters			Pitch Diameters			Minor Diameters	
			At Small End	At Gaging Notch	At Large End	At Small End	At Gaging Notch	At Large End	At Small End	At Gaging Notch
1/16	27	.160	.29289	.30289	.30921	.27118	.28118	.28750	.24947	.25947
1/8	27	.1615	.38522	.39531	.40171	.36351	.37360	.38000	.34180	.35189
1/4	18	.2278	.51339	.52763	.53850	.47739	.49163	.50250	.44139	.45563
3/8	18	.240	.64801	.66301	.67350	.61201	.62701	.63750	.57601	.59101
1/2	14	.320	.80600	.82600	.83936	.75843	.77843	.79179	.71086	.73086
3/4	14	.339	1.01525	1.03644	1.04936	.96768	.98887	1.00179	.92011	.94129
1	11 1/2	.400	1.27154	1.29654	1.31422	1.21363	1.23863	1.25630	1.15572	1.18072
1 1/4	11 1/2	.420	1.61504	1.64129	1.65922	1.55713	1.58338	1.60130	1.49922	1.52547
1 1/2	11 1/2	.420	1.85400	1.88025	1.89922	1.79609	1.82234	1.84130	1.73817	1.76442
2	11 1/2	.436	2.32693	2.35418	2.37422	2.26902	2.29627	2.31630	2.21111	2.23836
2 1/2	8	.682	2.80278	2.84541	2.87388	2.71953	2.76216	2.79062	2.63628	2.67891
3	8	.766	3.42388	3.47175	3.49888	3.34062	3.38850	3.41562	3.25737	3.30525
3 1/2	8	.821	3.92075	3.97207	3.99888	3.83750	3.88881	3.91562	3.75425	3.80556
4	8	.844	4.41762	4.47038	4.49888	4.33438	4.38712	4.41562	4.25112	4.30387
5	8	.937	5.47398	5.53255	5.56188	5.39073	5.44929	5.47862	5.30748	5.36604
6	8	.958	6.52935	6.58922	6.62388	6.44609	6.50597	6.54062	6.36284	6.42272
8	8	1.063	8.51685	8.58328	8.62388	8.43359	8.50003	8.54062	8.35034	8.41678
10	8	1.210	10.62857	10.70419	10.74888	10.54531	10.62094	10.66562	10.46206	10.53768
12	8	1.360	12.61607	12.70107	12.74888	12.53281	12.61781	12.66562	12.44956	12.53456

## When Ordering Pipe Gages Please Specify:

1. Quantity
2. Nominal Size & Threads Per Inch.
3. Short or Long Form Certification if required.

## *Basic Use of NPTF 3-Step & 6-Step Gages*

L1 Plug	L3 Plug	Crest Check Plug
<p>Screw the L1 plug into the fitting (hand tighten). This classifies the thread as to “Maximum”, “Basic”, or “Minimum”.</p>	<p>Screw the L3 plug into the fitting (hand tighten). The gage must match the classification of the L1 plug within +/- 1/2 turns.</p>	<p>Insert 6-step Crest Check plug into the fitting. When the L1 plug is at the maximum notch, the 6-step gage must go between “MX” and “MXT” notch. When the L1 plug is at the Basic Notch, the 6-Step gage must go between “B” and “BT” notch. When the L1 plug is at minimum notch, the 6-Step gage must go between the “MN” and “MNT” notch.</p>
		

### *Gages Required to check other Pipe Threads*

<u>Type of Thread</u>	<u>Internal Product Threads</u>	<u>External Product Threads</u>
PTF SAE Short	PTF SAE Short L1 & L3 Plug Gages	PTF SAE Short L1 & L2 Ring Gages
ANPT	ANPT L1, L3 & Plain 6-Step Plug Gages	ANPT L1, L2 & Plain 6-Step Ring Gages
NPSF	NPTF L1 Plug Gage	Mates with NPTF External Threads
NPSM	Go & Not Go Plug Gages	Go & Not Go Ring Gages
NPSL	Go & Not Go Plug Gages	Go & Not Go Ring Gages
NH	Go & Not Go Plug Gages	Go & Not Go Ring Gages
NPSH	Go & Not Go Plug Gages	Go & Not Go Ring Gages
NPSC	NPT L1 Plug Gage	Mates with NPT External Threads
BSPT System A	BSPT Thread Plug	BSPT Thread Ring
BSPT System B	BSPT Thread Plug & Plain Plug	BSPT Thread Ring & Plain Ring
BSPP	Go & Not Go Thread Plug	Go & Not Go Thread Rings

JIS (Japanese) & DIN (German) Parallel and Tapered Pipe Thread Gages are also available.

# NPTF Thread Gages



## Class 1 Threads

Gaging of NPTF class 1 threads is identical to that of NPT threads with the use of the  $L_1$  plug or  $L_1$  ring. In addition, the use of an  $L_3$  plug or  $L_2$  ring is necessary for a functional check of taper deviations and continuation of thread beyond the  $L_1$  length of engagement.

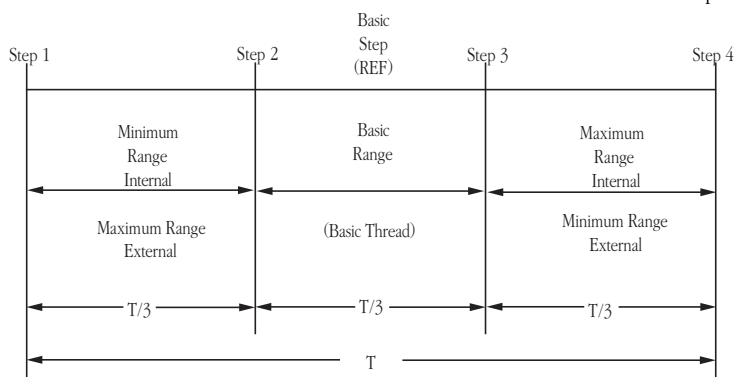
The  $L_3$  plug or  $L_2$  ring may not vary from the relative position established by the  $L_1$  plug or ring by more than  $\pm 1/2$  turn. Crest and root truncations are generally considered adequately controlled by the tooling used to produce the product threads in NPTF class 1 threads.



## Class 2 Threads

Gaging of NPTF class 2 threads is identical to that of NPTF class 1 threads with the use of  $L_1$  and  $L_3$  plugs or  $L_1$  and  $L_2$  rings. The  $L_1$  plug or  $L_1$  ring is also used to classify the thread as being "maximum", "basic" or "minimum". (see diagram) Note: Basic range is  $\pm 1/3$  turn from basic step. The use of 4-Step  $L_1$  gages facilitates classification of product threads. They offer 2 steps for each classification range rather than estimating the range by turning the gage from the basic step and are highly recommended.

NPTF class 2 threads also require the measurement or gaging of the crests and roots of the threads. While direct measurements or optical projection is more accurate and should be considered the final method in the event of a dispute, 6-Step crest and root truncation gages offer fast, simplified and acceptable method of checking crests and roots. The 6-Step gages consist of 3 pairs of steps, each pair corresponding to the classification of the thread established by the  $L_1$  plug or ring as "maximum", "basic", or "minimum." Specifications for all Class 2 NPTF threads are shown for the recommended 4-Step Gage design on the following page.



Note: For NPTF threads:  $T=2$  Turns  
For PTF-SAE Short, NPSF and NPSI threads:  $T=1.5$  Turns  
Classification of Product Thread Size Using 4-Step Gages.

The Steps of the crest check or root check are marked and correspond to the following:  
MN Minimal Size with minimum truncation. MNT Minimal thread with maximum truncation.  
B Basic thread with minimum truncation. BT Basic thread with maximum truncation.  
MX Maximum thread with minimum truncation. MXT Maximum thread with maximum truncation.

## When Ordering Please Specify:

1. Quantity
2. Nominal Size & Threads Per Inch.
3. Basic, 3-Step, or 4-Step design on  $L_1$ ,  $L_3$  plugs &  $L_1$ ,  $L_2$  Rings. (Basic unless otherwise specified.)
4. Single or Double Ended plug gages.
5. Short or Long Form Certification if required.

# NPTF Class 2 Specifications

Nominal Size & T.P.I.	Basic Dimensions for L1 Plug Gages, NPTF											Basic Dimensions for L3 Plug Gages										
	Basic Length L1	Small End		Basic Dim. at L1 Plane		Min. Range		Basic Range		Max. Range		Basic Length L1+L3	Small End		Four Threads L3+p	Min. Range		Basic Range		Max. Range		
		Pitch Dia.	Major Dia	Pitch Dia.	Major Dia.	Min.	Max	Min.	Max.	Min.	Max.		Pitch Dia.	Major Dia.		Min.	Max	Min.	Max.	Min.	Max.	
						Step 1	Step 2	Step 2	Step 3	Step 3	Step 4					Step 1	Step 2	Step 2	Step 3	Step 3	Step 4	
						L1-p	L1-1/3p	L1-1/3p	L1+1/3p	L1+1/3p	L1+p					L1+L3-p	L1+L3-1/3p	L1+L3-1/3p	L1+L3+1/3p	L1+L3+1/3p	L1+L3+p	
1/16-27	.1600	.27118	.29289	.28118	.30289	.12296	.14766	.14766	.17234	.17234	.19704	.2711	.2642	.2815	.1482	.23406	.25876	.25876	.28344	.28344	.30814	
1/8-27	.1615	.36351	.38522	.37360	.39531	.12446	.14916	.14916	.17384	.17384	.19854	.2726	.3566	.3738	.1482	.23556	.26026	.26026	.28494	.28494	.30964	
1/4-18	.2278	.47739	.51339	.49163	.52763	.17224	.20928	.20928	.24632	.24632	.28336	.3945	.4670	.4928	.2222	.33894	.37598	.37598	.41302	.41302	.45006	
3/8-18	.2400	.61201	.64801	.62701	.66301	.18444	.22148	.22148	.25852	.25852	.29556	.4067	.6016	.6275	.2222	.35114	.38818	.38818	.42522	.42522	.46226	
1/2-14	.3200	.75843	.80815	.77843	.82815	.24857	.29619	.29619	.34381	.34381	.39143	.5343	.7451	.7783	.2857	.46287	.51049	.51049	.55811	.55811	.60573	
3/4-14	.3390	.96768	1.01740	.98887	1.03859	.26757	.31519	.31519	.36281	.36281	.41043	.5533	.9543	.9876	.2857	.48187	.52949	.52949	.57711	.57711	.62473	
1-11-1/2	.4000	1.21363	1.27329	1.23863	1.29829	.31304	.37102	.37102	.42898	.42898	.48696	.6609	1.1973	1.2379	.3478	.57394	.63192	.63192	.68988	.68988	.74786	
1-1/4-11-1/2	.4200	1.55713	1.61679	1.58338	1.64304	.33304	.39102	.39102	.44898	.44898	.50696	.6809	1.5408	1.5814	.3478	.59394	.65192	.65192	.70988	.70988	.76786	
1-1/2-11-1/2	.4200	1.79609	1.85575	1.82234	1.88200	.33304	.39102	.39102	.44898	.44898	.50696	.6809	1.7798	1.8203	.3478	.59394	.65192	.65192	.70988	.70988	.76786	
2-11-1/2	.4360	2.26902	2.32868	2.29627	2.35593	.34904	.40702	.40702	.46498	.46498	.52296	.6969	2.2527	2.2932	.3478	.60994	.66792	.66792	.72588	.72588	.78386	

Nominal Size & T.P.I.	Basic Dimensions for Crest Check Plug Gages							Basic Dimensions for Root Check Plug Gages							
	Max. Dia at L3 Basic Thread with Max. Truncation.	Basic Pipe Thread		Min. Thread		Max. Thread		Max. Dia. at L1 + L3 length from end of fitting. Basic Thread with Min. Truncation.	Max. width of crest at Major Diameter.	Basic Pipe Thread		Min. Thread		Max. Thread	
		Min. Truncation	Max. Truncation	Min. Truncation	Max. Truncation	Min. Truncation	Max. Truncation			Min. Truncation	Max. Truncation	Min. Truncation	Max. Truncation	Min. Truncation	Max. Truncation
+ .00015	+ .000					+ .0002									
- .00000	+/- .001	- .002	+/- .001	- .002	+/- .001	- .002	- .0000								
1/16-27	.2391	.2154	.2711	.1907	.2464	.2401	.2958	.2893	.003	+/- .001	- .000	+/- .001	- .000	+/- .001	- .000
1/8-27	.3315	.2169	.2726	.1922	.2479	.2416	.2973	.3817	.003	.2726	.2181	.2479	.1934	.2973	.2428
1/4-18	.4276	.3394	.3945	.3024	.3575	.3764	.4315	.5064	.004	.3945	.3394	.3575	.3024	.4315	.3764
3/8-18	.5622	.3516	.4067	.3146	.3697	.3886	.4437	.6410	.004	.4067	.3516	.3697	.3146	.4437	.3886
1/2-14	.6918	.4794	.5343	.4318	.4867	.5270	.5819	.7984	.004	.5343	.4772	.4867	.4296	.5819	.5248
3/4-14	.9010	.4984	.5533	.4508	.5057	.5460	.6009	1.0076	.004	.5533	.4962	.5057	.4486	.6009	.5438
1-11-1/2	1.1324	.6052	.6609	.5472	.6029	.6632	.7189	1.2622	.005	.6609	.5774	.6029	.5194	.7189	.6354
1-1/4-11-1/2	1.4759	.6252	.6809	.5672	.6229	.6832	.7389	1.6057	.005	.6809	.5974	.6229	.5394	.7389	.6554
1-1/2-11-1/2	1.7149	.6252	.6809	.5672	.6229	.6832	.7389	1.8447	.005	.6809	.5974	.6229	.5394	.7389	.6554
2-11-1/2	2.1878	.6412	.6969	.5832	.6389	.6992	.7549	2.3176	.005	.6969	.6134	.6389	.5554	.7549	.6714

Basic Dimensions for L1 Ring Gages										Basic Dimensions for L2 Ring Gages									
Nominal Size & T.P.I.	Basic Length L1	Large End		Maximum Range		Basic Range		Minimum Range		Basic Length L2	Large End		Maximum Range		Basic Range		Minimum Range		
		Pitch Dia.	Minor Dia.	Max.	Min.	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.	Max.	Min.			
				Step 1	Step 2	Step 2	Step 3	Step 3	Step 4		Step 1	Step 2	Step 2	Step 3	Step 3	Step 4			
				(L1 - p)	(L1 - 1/3p)	(L1 - 1/3p)	(L1 + 1/3p)	(L1 + 1/3p)	(L1 + p)										
1/16-27	.1600	.28118	.25947	.12296	.14766	.14766	.17234	.17234	.19704	.26113	.28750	.27024	.22409	.24879	.24879	.27347	.27347	.29817	
1/8-27	.1615	.37360	.35189	.12446	.14916	.14916	.17384	.17384	.19854	.26385	.38000	.36274	.22681	.25151	.25151	.27619	.27619	.30089	
1/4-18	.2278	.49163	.45563	.17224	.20928	.20928	.24632	.24632	.28336	.40178	.50250	.47661	.34622	.38326	.38326	.42030	.42030	.45734	
3/8-18	.2400	.62701	.59101	.18444	.22148	.22148	.25852	.25852	.29556	.40778	.63750	.61161	.35222	.38926	.38926	.42630	.42630	.46334	
1/2-14	.3200	.77843	.72871	.24857	.29619	.29619	.34381	.34381	.39143	.53371	.79179	.75850	.46228	.50990	.50990	.55752	.55752	.60514	
3/4-14	.3390	.98887	.93915	.26757	.31519	.31519	.36281	.36281	.41043	.54571	1.00179	.96850	.47428	.52190	.52190	.56952	.56952	.61714	
1-11-1/2	.4000	1.23853	1.17897	.31304	.37102	.37102	.42898	.42898	.48696	.68278	1.25630	1.21577	.59582	.65379	.65379	.71176	.71176	.76974	
1-1/4-11-1/2	.4200	1.58338	1.52372	.33304	.39102	.39102	.44898	.44898	.50696	.70678	1.60130	1.56077	.61982	.67780	.67780	.73576	.73576	.79374	
1-1/2-11-1/2	.4200	1.82234	1.76268	.33304	.39102	.39102	.44898	.44898	.50696	.72348	1.84130	1.80077	.63652	.69450	.69450	.75246	.75246	.81044	
2-11-1/2	.4360	2.29627	2.23661	.34904	.40702	.40702	.46498	.46498	.52296	.75652	2.31630	2.27577	.66956	.72754	.72754	.78550	.78550	.84348	

Basic Dimensions for Crest Check Ring Gages								Basic Dimensions for Root Check Ring Gages								
Nominal Size & T.P.I.	Major Diam at L2 Basic Thread with Max. Truncation D	Basic Pipe Thread		Minimum Thread		Maximum Thread		Ring Dia.	Minor Dia. at L2 length from end of pipe. Basic thread with min. truncation D	Max. width of Crest at Minor Dia. F	Basic Pipe Thread		Min. Thread		Max. Thread	
		Min Trunc. B	Max. Trunc. Bt	Min. Trunc. MN	Max. Trunc. MNt	Min. Trunc. MX	Max. Trunc. MXt				Min. Trunc. B	Max. Trunc. Bt	Min. Trunc. MN	Max. Trunc. MNt.	Min. Trunc. Mx	Max. Trunc. MXt
	- .00015	+ .000	+ .000	+ .000	+ .000	+ .000	+ .0002	+ .002	+ .002	+ .002	+ .002					
+ .0000	+/- .001	-.002	+/- .001	-.002	+/- .001	-.002	+/- .03	-.0000	+/- .001	-.000	+/- .001	-.000	+/- .001	-.000		
1/16-27	.3126	.2054	.2611	.2301	.2858	.1807	.2364	1-1/4	.2624	.003	.2611	.2066	.2858	.2313	.2364	.1819
1/8-27	.4051	.2082	.2639	.2329	.2886	.1835	.2392	1-1/4	.3549	.003	.2639	.2094	.2886	.2341	.2392	.1847
1/4-18	.5419	.3467	.4018	.3837	.4388	.3097	.3648	1-1/2	.4631	.004	.4018	.3467	.4388	.3837	.3648	.3097
3/8-18	.6769	.3527	.4078	.3897	.4448	.3157	.3708	1-3/4	.5981	.004	.4078	.3527	.4448	.3897	.3708	.3157
1/2-14	.8451	.4788	.5337	.5264	.5813	.4312	.4861	2	.7385	.004	.5337	.4766	.5813	.5242	.4861	.4290
3/4-14	1.0551	.4908	.5457	.5384	.5933	.4432	.4981	2-1/4	.9485	.004	.5457	.4886	.5933	.5362	.4981	.4410
1-11-1/2	1.3212	.6272	.6828	.6852	.7408	.5692	.6248	2-5/8	1.1914	.005	.6828	.5993	.7408	.6573	.6248	.5413
1-1/4-11-1/2	1.6662	.6512	.7068	.7092	.7648	.5932	.6488	3-1/8	1.5364	.005	.7068	.6233	.7648	.6813	.6488	.5653
1-1/2-11-1/2	1.9062	.6678	.7235	.7258	.7815	.6098	.6655	3-3/8	1.7764	.005	.7235	.6400	.7815	.6980	.6655	.5820
2-11-1/2	2.3812	.7008	.7565	.7588	.8145	.6428	.6985	4.00	2.2514	.005	.7565	.6730	.8145	.7310	.6985	.6150