

Submitted for recognition as an American National Standard

DRYSEAL PIPE THREADS

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

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SAE J476a Revised JUN61

1. **Scope**—The Dryseal American Standard Taper Pipe Thread, the Dryseal American Fuel Internal Straight Pipe Thread and the Dryseal American Intermediate Internal Straight Pipe Thread covered by this standard conform with the American Standard ASA-B2.2. The Dryseal SAE-Short Taper Pipe Thread in this standard conforms with the Dryseal American Standard Taper Pipe Thread except for the length of thread, which is shortened for increased clearance and economy of material.

The significant feature of the Dryseal thread is controlled truncation at the crest and root to assure metal to metal contact coincident with or prior to flank contact. Contact at the crest and root prevents spiral leakage and insures pressure-tight joints without the use of a lubricant or sealer.

Lubricants, if not functionally objectionable, may be used to minimize the possibility of galling in assembly.

2. References

- 2.1 **Applicable Publications**—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

- 2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

ASA B2.2—Dryseal Pipe Threads
SAE Standards Screw Threads

3. Truncation—Dryseal American Standard External And Internal Pipe Threads For Pressure-Tight Joints Without Lubricant Or Sealer

- 3.1 **Thread Form**—The angle between the flanks of the thread is 60 deg when measured on an axial plane and the line bisecting this angle is perpendicular to the axis of both the taper and straight threads.

Diametral taper of tapered threads is 0.75 in. \pm 0.06 in. per 12.00 in. of length.

Although the crests and roots of the Dryseal threads are theoretically flat, they may be rounded provided their contour is within the limits specified in Table 1.

- 3.2 **Thread Series Symbols**—The identification symbols which have been adopted for designating the various Dryseal Pipe Thread Series are as follows:

NPTF for Dryseal American Standard Taper Pipe Thread.
PTF—SAE for Dryseal SAE Short Taper Pipe Thread.
NPSF for Dryseal American Fuel Internal Straight Pipe Thread.
NPSI for Dryseal American Intermediate Internal Straight Pipe Thread.

Where: N stands for American Standard [formerly American (National) Standard].

P stands for Pipe
T stands for Taper
F stands for Fuel
S stands for Straight
I stands for Intermediate

- 3.3 **Thread Designation**—Dryseal pipe threads are designated by specifying in sequence the nominal size, number of threads per inch, form (Dryseal), and symbol of the thread series.

EXAMPLE—1/8—27 DRYSEAL NPTF

1/8—27 DRYSEAL PTF—SAE SHORT

1/8—27 DRYSEAL NPSF

1/8—27 DRYSEAL NPSI

3.4 Straight Pipe Threads—An assembly with straight internal pipe threads and taper external pipe threads is frequently more advantageous than an all taper thread assembly, particularly in automotive and other allied industries where economy and rapid production are paramount considerations. Dryseal threads are not used on assemblies in which both components have straight pipe threads.

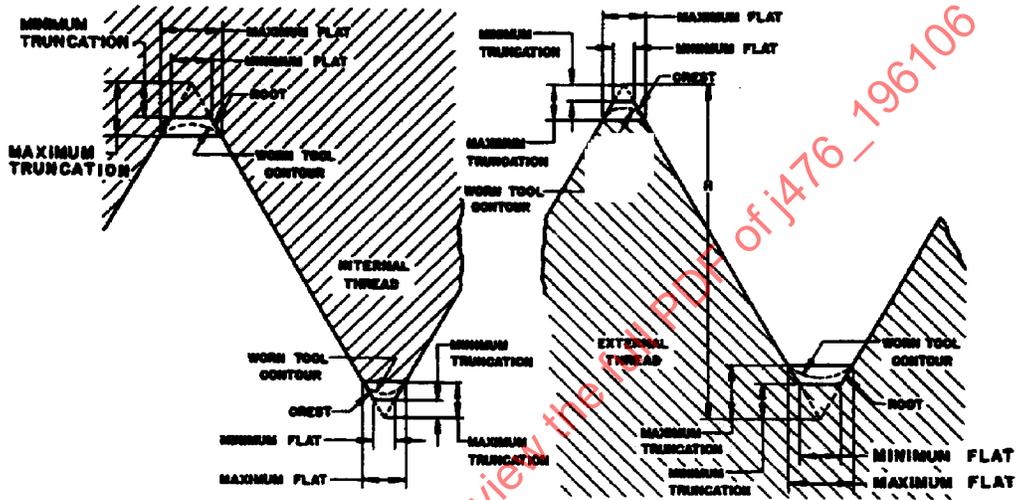


FIGURE 1—

TABLE 1—LIMITS ON CREST AND ROOT TRUNCATION

Threads per in.		Depth of Sharp-V Thread, H in.	Truncation Min Formula	Truncation Min in.	Truncation Max Formula	Truncation Max in.	Equivalent	Equivalent	Equivalent	Equivalent
							Width of Flat ⁽¹⁾ Min Formula	Width of Flat ⁽¹⁾ Min in.	Width of Flat ⁽¹⁾ Max Formula	Width of Flat ⁽¹⁾ Max in.
27	Crest	0.03208	0.047p	0.0017	0.094p	0.0035	0.054p	0.0020	0.108p	0.0040
	Root		0.094p	0.0035	0.140p	0.0052	0.108p	0.0040	0.162p	0.0060
18	Crest	0.04811	0.047p	0.0026	0.078p	0.0043	0.054p	0.0030	0.090p	0.0050
	Root		0.078p	0.0043	0.109p	0.0061	0.090p	0.0050	0.126p	0.0070
14	Crest	0.06186	0.036p	0.0026	0.060p	0.0043	0.042p	0.0030	0.070p	0.0050
	Root		0.060p	0.0043	0.085p	0.0061	0.070p	0.0050	0.098p	0.0070
11-1/2	Crest	0.07531	0.040p	0.0035	0.060p	0.0052	0.046p	0.0040	0.069p	0.0060
	Root		0.060p	0.0052	0.090p	0.0078	0.069p	0.0060	0.103p	0.0090
8	Crest	0.10825	0.042p	0.0052	0.055p	0.0069	0.048p	0.0060	0.064p	0.0080 ⁽²⁾
	Root		0.055p	0.0069	0.076p	0.0095	0.064p	0.0080	0.088p	0.0110

1. The major diameter of plug gages and minor diameter of ring gages used for gaging dryseal threads shall be truncated an amount sufficient to produce a flat width as shown in Appendix C, Tables C1-1 to C12-1 inclusive.
2. There is reason to doubt the correctness of the 8 threads per in. flat widths on account of the volume of metal to be displaced.

4. **Dryseal American Standard Taper Pipe Thread (NPTF)**—This series applies to both the external and internal threads of all full length and is suitable for pipe joints in practically every type of service. These threads are generally conceded to be superior for strength and seal. Use of the tapered internal thread in hard or brittle materials having thin sections will minimize trouble from fracture. Dimensional data for (NPTF) threads is given in Table 2. See Appendix D for limitations of assembly of NPTF threads with other series Dryseal pipe threads.

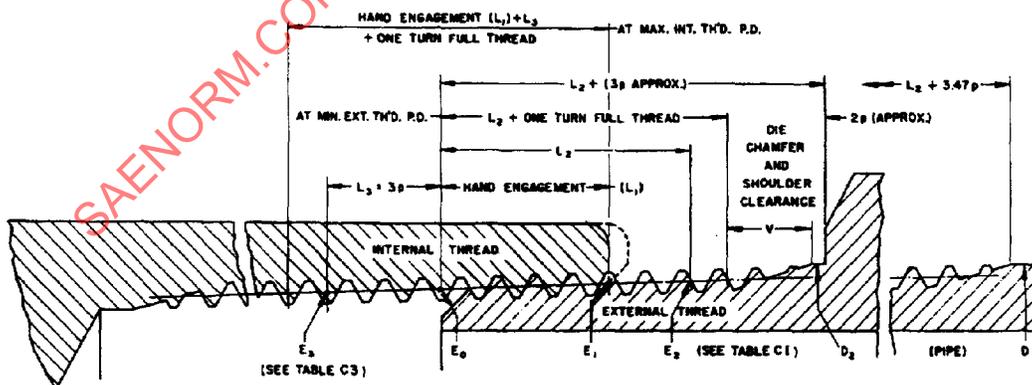


FIGURE 2—

TABLE 2—BASIC DIMENSIONS OF DRYSEAL AMERICAN STANDARD TAPER PIPE THREAD⁽¹⁾

NPTF Size 1	Pitch, P in. 2	Pitch Diameter at End of External Thread, E_0 in. 3	Pitch Diameter at End of Internal Thread, E_1 in. 4	Hand Engagement, L_1 in. 5	Hand Engagement, L_1 Thread 6	Length of Full Thread, L_2 in. 7	Length of Full Thread, L_2 Thread 8	Vanish Threads V Plus Full Thread Tolerance Plus Shoulder Clearance ($V + 1p + 1/2 p$) in. 9	Vanish Threads V Plus Full Thread Tolerance Plus Shoulder Clearance ($V + 1p + 1/2 p$) Thread 10	Shoulder Length $L_2 + (3p \text{ Approx})$ in. 11	External Thread for Draw ($L_2 - L_1$) in. 12	External Thread for Draw ($L_2 - L_1$) Thread 13	Length of Internal Full Thread, $(L_1 + L_3)$ in. 14	Length of Internal Full Thread ⁽³⁾ $(L_1 + L_3)$ Thread 15	OD of Fitting, D_2 in. 16	OD of Pipe, D
1/16-27	0.03704	0.27118	0.28118	0.160	4.32	0.2611	7.05	0.1139	3.075	0.3750	0.1011	2.73	0.2711	7.32	0.315	0.3125
1/8 -27	0.03704	0.36351	0.37360	0.1615	4.36	0.2639	7.12	0.1112	3.072	0.3750	0.1024	2.76	0.2726	7.36	0.407	0.405
1/4 -18	0.05556	0.47739	0.49163	0.2278	4.10	0.4018	7.23	0.1607	2.892	0.5625	0.1740	3.13	0.3945	7.10	0.546	0.540
3/8 -18	0.05556	0.61201	0.62701	0.240	4.32	0.4078	7.34	0.1547	2.791	0.5625	0.1678	3.02	0.4067	7.32	0.681	0.675
1/2 -14	0.07143	0.75843	0.77843	0.320	4.48	0.5337	7.47	0.2163	3.028	0.7500	0.2137	2.99	0.5343	7.48	0.850	0.840
3/4 -14	0.07143	0.96768	0.98887	0.339	4.75	0.5457	7.64	0.2043	2.860	0.7500	0.2067	2.89	0.5533	7.75	1.060	1.050
1 -11-1/2	0.08696	1.21363	1.23863	0.400	4.60	0.6828	7.85	0.2547	2.929	0.9375	0.2828	3.25	0.6609	7.60	1.327	1.315
1-1/4 -11-1/2	0.08696	1.55713	1.58338	0.420	4.83	0.7068	8.13	0.2620	3.013	0.9688	0.2868	3.30	0.6809	7.83	1.672	1.660
1-1/2 -11-1/2	0.08696	1.79609	1.82234	0.420	4.83	0.7235	8.32	0.2765	3.180	1.0000	0.3035	3.49	0.6809	7.83	1.912	1.900
-11-1/2	0.08696	2.26902	2.29627	0.436	5.01	0.7565	8.70	0.2747	3.159	1.0312	0.3205	3.69	0.6969	8.01	2.387	2.375
2-1/2 -8	0.12500	2.71953	2.76216	0.682	5.46	1.1375	9.10	0.3781	3.025	1.5156	0.4555	3.64	1.0570	8.46	2.893	2.875
3 -8	0.12500	3.34062	3.38850	0.766	6.13	1.2000	9.60	0.3781	3.025	1.5761	0.4340	3.47	1.1410	9.13	3.518	3.500

- See general specifications preceding tables.
For gaging methods, gages, cut thread blanks, taps, drilled hole sizes, hole depths, and full thread lengths, see Appendixes A, B, and C.
- External thread tabulated full thread lengths include chamfers not exceeding one and one-half pitches (threads) length.
- Internal thread tabulated full thread lengths do not include countersink beyond the intersection of the pitch line and the chamfer cone (gaging reference point).

5. **Dryseal SAE Short External Taper Pipe Thread (PTF—SAE Short External) For Assembly With Dryseal American Intermediate Internal Straight (Table 6) or Dryseal American Standard Taper (Table 2) Pipe Threads**—External threads of this series conform in all respects with the NPTF threads except that the full thread length has been shortened by eliminating one thread from the small end. These threads are primarily intended for assembly with NPSI internal threads but may also be used with NPTF internal threads. They are not designed for and at extreme tolerance limits may not assemble with PTF—SAE Short or NPSF internal threads. Dimensional data for PTF—SAE Short External Threads is given in Table 3. See Appendix D for limitations of assembly of PTF—SAE Short external threads with other series Dryseal pipe threads.

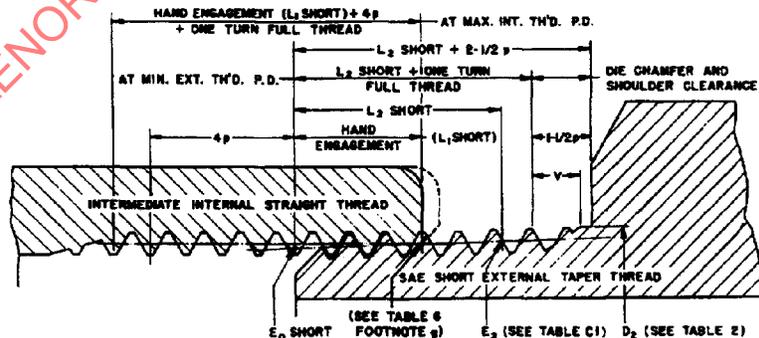


FIGURE 3—

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TABLE 3—BASIC DIMENSIONS OF DRYSEAL SAE SHORT EXTERNAL TAPER PIPE THREAD⁽¹⁾

PTF—SAE Short Size 1	Pitch, P in. 2	Pitch Diameter at End of External Thread, E ₀ Short in. 3	L ₁ in. 4	L ₁ Thread in. 5	Hand Engagement, L ₁ Short in. 6	Hand Engagement, L ₁ Short Thread in. 7	Length of Full Thread, ⁽²⁾ L ₂ Short in. 8	Length of Full Thread, ⁽²⁾ L ₂ Short Thread in. 9	Vanish Threads V Plus Full Thread Tolerance Plus Shoulder Clearance (V + 1p + 1/2 p) in. 10	Vanish Threads V Plus Full Thread Tolerance Plus Shoulder Clearance (V + 1p + 1/2 p) in. 11	Min Shoulder Length (L ₂ Short + 2-1/2 p) in. 12	External Thread for Draw (L ₂ Short—L ₁ Short) in. 13	External Thread for Draw (L ₂ Short—L ₁ Short) in. 14	Length of Internal Full Thread, ⁽³⁾ (L ₁ Short + 4p) in. 15	Length of Internal Full Thread, ⁽³⁾ (L ₁ Short + 4p) in. 16
1/16-27	0.03704	0.27349	0.160	4.32	0.1230	3.32	0.2241	6.05	0.0926	2.50	0.3167	0.1011	2.73	0.2711	7.32
1/8 -27	0.03704	0.36582	0.1615	4.36	0.1244	3.36	0.2268	6.12	0.0926	2.50	0.3194	0.1024	2.76	0.2726	7.36
1/4 -18	0.05556	0.48086	0.2278	4.10	0.1722	3.10	0.3462	6.23	0.1389	2.50	0.4851	0.1740	3.13	0.3945	7.10
3/8 -18	0.05556	0.61548	0.240	4.32	0.1844	3.32	0.3522	6.34	0.1389	2.50	0.4911	0.1678	3.02	0.4067	7.32
1/2 -14	0.07143	0.76289	0.320	4.48	0.2486	3.48	0.4623	6.47	0.1786	2.50	0.6409	0.2137	2.99	0.5343	7.48
3/4 -14	0.07143	0.97214	0.339	4.75	0.2676	3.75	0.4743	6.64	0.1786	2.50	0.6528	0.2067	2.89	0.5533	7.75
1 -11-1/2	0.08696	1.21906	0.400	4.60	0.3130	3.60	0.5958	6.85	0.2174	2.50	0.8132	0.2828	3.25	0.6609	7.60
1-1/4 -11-1/2	0.08696	1.56256	0.420	4.83	0.3330	3.83	0.6198	7.13	0.2174	2.50	0.8372	0.2868	3.30	0.6809	7.83
1-1/2 -11-1/2	0.08696	1.80152	0.420	4.83	0.3330	3.83	0.6365	7.32	0.2174	2.50	0.8539	0.3035	3.49	0.6809	7.83
2 -11-1/2	0.08696	2.27445	0.436	5.01	0.3490	4.01	0.6695	7.70	0.2174	2.50	0.8869	0.3205	3.69	0.6969	8.01
2-1/2 -8	0.12500	2.72734	0.682	5.46	0.5570	4.46	1.0125	8.10	0.3125	2.50	1.3250	0.4555	3.64	1.0570	8.46
-8	0.12500	3.34844	0.766	6.13	0.6410	5.13	1.0750	8.60	0.3125	2.50	1.3875	0.4340	3.47	1.1410	9.13

- See general specifications preceding tables.
For gaging methods, gages, cut thread blanks, taps, drilled hole sizes, hole depths, and full thread lengths, see Appendixes A, B, and C.
- External thread tabulated full thread lengths include camfers not exceeding one and one-half pitches (threads) lengths.
- Internal thread tabulated full thread lengths do not include countersink beyond the intersection of the pitch line and the camfer cone (gaging reference point).

6. **Dryseal SAE Short Internal Taper Pipe Thread (PTF—SAE Short Internal) For Assembly With American Standard External Taper Pipe Thread (Table 2)**—Internal Threads of this series conform in all respects with the NPTF threads except that the full thread length has been shortened by eliminating one thread from the large end. These threads are primarily intended for assembly with NPTF external threads. They are not designed for and at extreme tolerance limits may not assemble with PTF—SAE Short external threads. Dimensional data for PTF—SAE Short Internal Threads is given in Table 4. See Appendix D for limitations of assembly of PTF—SAE Short internal threads with other series Dryseal pipe threads.

Trouble-free assemblies and pressure-tight joints without the use of lubricant or sealer can best be assured where both components are threaded with NPTF (full length) threads. This should be considered before specifying PTF—SAE Short External or Internal Thread.

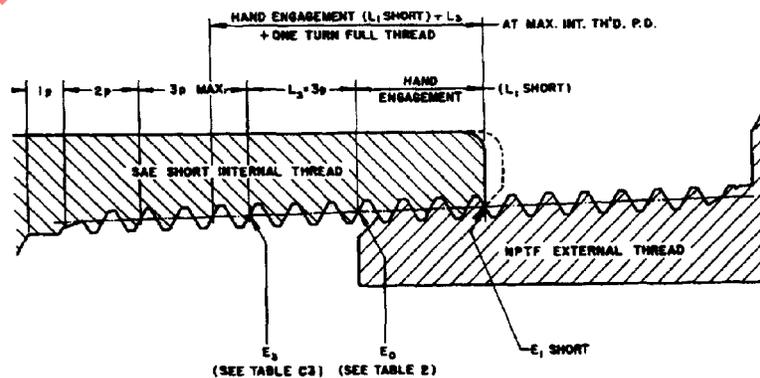


FIGURE 4—

TABLE 4—BASIC DIMENSIONS OF DRYSEAL SAE SHORT INTERNAL TAPER PIPE THREAD⁽¹⁾

PTF—SAE Short Size 1	Pitch P in. 2	Pitch Diameter at End of Internal Thread E ₁ Short in. 3	L ₁ in. 4	L ₁ Thread 5	Hand Engagement, ⁽²⁾ L ₁ Short 6	Hand Engagement, ⁽²⁾ L ₁ Short Thread 7	Length of Internal Full Thread ⁽²⁾ (L ₁ Short + L ₃) in. 8	Length of Internal Full Thread ⁽²⁾ (L ₁ Short + L ₃) Thread 9	Hole Depth for SAE Short Tap (Table B3) in. 10
1/16-27	0.03704	0.27887	0.160	4.32	0.1230	3.32	0.2341	6.32	0.4564
1/8 -27	0.03704	0.37129	0.1615	4.36	0.1244	3.36	0.2356	6.36	0.4578
1/4 -18	0.05556	0.48815	0.2278	4.10	0.1722	3.10	0.3389	6.10	0.6722
3/8 -18	0.05556	0.62354	0.240	4.32	0.1844	3.32	0.3511	6.32	0.6844
1/2 -14	0.07143	0.77397	0.320	4.48	0.2486	3.48	0.4629	6.48	0.8915
3/4 -14	0.07143	0.98441	0.339	4.75	0.2676	3.75	0.4819	6.75	0.9105
1 -11-1/2	0.08696	1.23320	0.400	4.60	0.3130	3.60	0.5739	6.60	1.0956
1-1/4 -11-1/2	0.08696	1.57795	0.420	4.83	0.3330	3.83	0.5939	6.83	1.1156
1-1/2 -11-1/2	0.08696	1.81691	0.420	4.83	0.3330	3.83	0.5939	6.83	1.1156
2 -11-1/2	0.08696	2.29084	0.436	5.01	0.3490	4.01	0.6099	7.01	1.1316
2-1/2 -8	0.12500	2.75435	0.682	5.46	0.5570	4.46	0.9320	7.46	1.6820
3 -8	0.12500	3.38069	0.766	6.13	0.6410	5.13	1.0160	8.13	1.7660

1. See general specification preceding table.

For gaging methods, gages, taps, drilled hole sizes, hole depths, and full thread lengths, see Appendixes A, B, and C.

2. Internal thread tabulated full thread lengths do not include countersink beyond the intersection of the pitch line and the chamfer cone (gaging reference point).

7. **Dryseal American Standard Fuel Internal Straight Pipe Thread (NPSF) For Assembly With Dryseal American Standard External Taper Pipe Thread (Table 2)**—Threads of this series are straight (cylindrical) instead of tapered. They are generally used in soft or ductile materials which will adjust at assembly to the taper of external threads but may also be used in hard or brittle materials where the section is heavy. These threads are primarily intended for assembly with full length NPTF external taper threads. Dimensional data for NPSF threads is given in Table 5. See Appendix D for limitations of assembly of NPSF internal threads with other series Dryseal pipe threads.

**TABLE 5—DRYSEAL AMERICAN STANDARD FUEL
INTERNAL STRAIGHT PIPE THREAD LIMITS⁽¹⁾**

NPSF Size 1	Pitch Diameter ⁽²⁾ Max ^{(3),(4)} 2	Pitch Diameter ⁽²⁾ Min ^{(4),(5)} 3	Minor Diameter ⁽⁶⁾ Min 4	Desired Min	Desired Min
				Length of Full Thread ⁽⁷⁾ in. 5	Length of Full Thread ⁽⁷⁾ Thread 6
1/16-27	0.2803	0.2768	0.2482	0.31	8.44
1/8 -27	0.3727	0.3692	0.3406	0.31	8.44
1/4 -18	0.4904	0.4852	0.4422	0.47	8.44
3/8 -18	0.6257	0.6205	0.5776	0.50	9.00
1/2 -14	0.7767	0.7700	0.7133	0.66	9.19
3/4 -14	0.9872	0.9805	0.9238	0.66	9.19
1 -11-1/2	1.2365	1.2284	1.1600	0.78	8.98

- See general specifications preceding tables.
For gaging methods, gages, taps, drilled hole sizes, hole depths, and full thread lengths, see Appendixes A, B, and C.
- The pitch diameter of the tapped hole as indicated by the taper plug gage is slightly larger than the values given due to the gage having to enter approximately 3/8 turn to engage first full thread.
- Column 2 is the E₁ pitch diameter of thread at large end of internal thread (Table 2) plus (large) 5/8 thread taper.
- Taps specified in Table B4 produce tapped holes to the above limits in cast iron, steel, and brass. In zinc and similar soft metals, they produce tapped holes approximately 0.001 smaller. Plug-gage turns engagement should be reduced accordingly.
- Column 3 is Column 2 reduced by 1-1/2 turns.
- As the Dryseal American Standard pipe thread form is maintained, the major and minor diameters of the internal thread vary with the pitch diameter.
- Internal thread tabulated full thread lengths do not include countersink beyond the intersection of the pitch line and the chamfer cone (gaging reference point).

8. **Dryseal American Intermediate Internal Straight Pipe Thread (NPSI) For Assembly With Dryseal SAE Short External Taper (Table 3) Or American Standard Taper Pipe Thread (Table 2)**—Threads of this series are straight (cylindrical) instead of tapered. They are generally used in hard or brittle materials where the section is heavy and where there is little expansion at assembly with the external taper threads. These threads are primarily intended for assembly with PTF—SAE Short External Taper Threads, but will also assemble with full length NPTF External Taper Threads. Dimensional data for NPSI threads is given in Table 6. See Appendix D for limitations of assembly of NPSI internal threads with other series Dryseal pipe threads.

**TABLE 6—DRYSEAL AMERICAN INTERMEDIATE
INTERNAL STRAIGHT PIPE THREAD LIMITS⁽¹⁾**

NPSF Size 1	Pitch Diameter ⁽²⁾ Max ^{(3),(4)} 2	Pitch Diameter ⁽²⁾ Min ^{(3),(5)} 3	Minor Diameter ⁽⁶⁾ Min 4	Desired Min Length of Full Thread ⁽⁷⁾ in. 5	Desired Min Length of Full Thread ⁽⁷⁾ Thread 7
	1/16-27	0.2826	0.2791	0.2505	0.31
1/8 -27	0.3750	0.3715	0.3429	0.31	8.44
1/4 -18	0.4938	0.4886	0.4457	0.47	8.44
3/8 -18	0.6292	0.6240	0.5811	0.50	9.00
1/2 -14	0.7812	0.7745	0.7180	0.66	9.19
3/4 -14	0.9917	0.9850	0.9283	0.66	9.19
1 -11-1/2	1.2420	1.2338	1.1655	0.78	8.98

- See general specifications preceding tables.
For gaging methods, gages, taps, drilled hole sizes, hole depths, and full thread lengths, see Appendixes A, B, and C.
- The pitch diameter of the tapped hole as indicated by the taper plug gage is slightly larger than the values given due to the gage having to enter approximately 3/8 turn to engage first full thread.
- Column 2 is the same as the E₁ pitch diameter of thread at large end of internal thread (Table 2) minus (small) 3/8 thread taper.
- Taps specified in Table B5 produce tapped holes to the above limits in cast iron, steel, and brass. In zinc and similar soft metals, they produce tapped holes approximately 0.001 smaller. Plug-gage turns engagement should be reduced accordingly.
- Column 3 is Column 2 reduced by 1-1/2 turns.
- As the Dryseal American Standard pipe thread form is maintained, the major and minor diameters of the internal thread vary with the pitch diameter.
- Internal thread tabulated full thread lengths do not include countersink beyond the intersection of the pitch line and the chamfer cone (gaging reference point).

9. Notes

- 9.1 Marginal Indicia**—The change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE SCREW THREADS COMMITTEE

APPENDIX A

SUPPLEMENTARY THREAD INFORMATION

A.1 Terminology—For definitions of terms relating to size of parts, geometrical elements, or dimensions of threads see SAE Standards Screw Threads, Appendix A—Terminology.

A.2 Dryseal American Standard And SAE Short External Taper Pipe Thread Blanks, Cut Threads

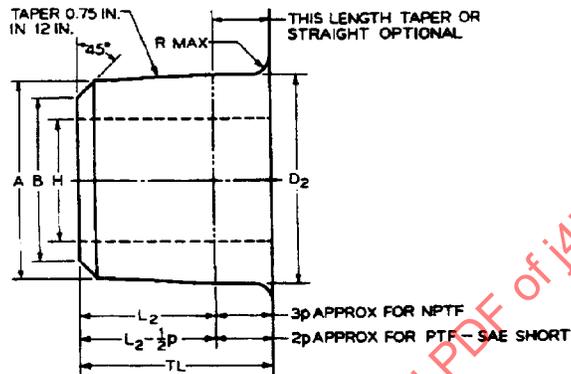


FIGURE A1—

A.2.1 Formulas for Diameter and Length of Thread—Basic diameter and length of thread for different sizes given in Tables 2, 3, and 4, are based on the following formulas:

Basic pitch diameter of thread at small end of NPTF External Thread.

$$E_0 = D - (0.05D + 1.1)p \quad (\text{Eq. A1})$$

Basic pitch diameter of thread at small end of PTF—SAE Short External Thread.

$$E_{0\text{Short}} = D - (0.05D + 1.037)p \quad (\text{Eq. A2})$$

Basic pitch diameter of thread at large end of NPTF Internal Thread.

$$E_1 = E_0 + (0.0625XL_1 \text{ Basic}) \quad (\text{Eq. A3})$$

Basic pitch diameter of thread at large end of PTF—SAE Short Internal Thread.

$$E_{1\text{Short}} = E_0 + (0.0625XL_1 \text{ Short}) \quad (\text{Eq. A4})$$

Basic length of NPTF external full and effective length thread.

$$L_2 = (0.8D + 6.8)p \quad (\text{Eq. A5})$$

Basic length of PTF—SAE Short external full and effective length thread.

$$L_{2\text{Short}} = (0.8D + 5.8)p \quad (\text{Eq. A6})$$

Basic length of NPTF internal full and effective length thread = $L_1 \text{ Basic} + L_3$

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Basic length of PTF—SAE Short internal full and effective length thread = L_1 Short + L_3

Where

D = outside of diameter of pipe

P = pitch of thread in inches

NPSG (for oil and grease cup) is Dryseal American Standard Pipe Thread Form—use NPSF tap drill sizes.

The drilled hole sizes given above for Dryseal straight and taper internal pipe threads are the diameters produced by drills which are closest to the minimum minor diameters as shown in Table A2.

They represent the diameters of the holes which would be cut with a twist drill correctly ground when drilling a material without tearing or flow of metal. This is approximately the condition obtained when a correctly sharpened twist drill is cutting a hole in SAE 1112 or 1113 steel, or SAE 72 brass. When Dryseal taps are used, these holes produce an acceptable pipe thread with the required thread height.

When flat drills are used, the width of the cutting edge may have to be adjusted to produce a hole of the required diameter.

When hard metals and other similar materials are to be drilled and tapped, it may be found necessary to use a drill of slightly smaller diameter to produce a hole of a size that will make it possible for the tap to cut an acceptable pipe thread with the required thread height.

When soft metals and other similar materials are to be drilled and tapped, it may be found necessary to use a drill of slightly larger diameter to produce a hole of a size that will allow for a flow of the metal or material without loading the tap or tearing the material and make it possible for the tap to produce an acceptable pipe thread with the required thread height.

TABLE A1—DIMENSIONS OF DRYSEAL AMERICAN STANDARD EXTERNAL TAPER PIPE THREAD BLANKS (CUT THREADS)

Size	OD at Large End NPTF at L_2 Length D_2 PTF—SAE Short at $L_2 - 1/2p$ Length (Basic Thread One Turn Large with Max Truncation) +0.003 - 0.000	OD at Small End, A NPTF (Basic Thread Two Turns Large with Max Truncation) +0.003 - 0.000	OD at Small End, A PTF—SAE Short (Basic Thread 2-1/2 Turns Large with Max Truncation) +0.003 - 0.000	Chamfer Dia ⁽¹⁾ , B (Minor Dia ⁽¹⁾ at Small End)	Min Length from Small End to Shoulder, TL NPTF $L_2 + (3p \text{ Approx})$	Min Length from Small End to Shoulder, TL PTF—SAE Short $L_2 \text{ Short} + (2-1/2p$ Approx)	Corner Radius, R Max	Recommended Hole Size ⁽²⁾ , H
1/16-27	0.315	0.301	0.302	0.23	0.38	0.3167	0.03	0.12
1/8 -27	0.407	0.393	0.394	0.32	0.38	0.3194	0.03	0.19
1/4 -18	0.546	0.523	0.525	0.42 +0.00	0.56	0.4851	0.06	0.28
3/8 -18	0.681	0.658	0.660	0.55	0.56	0.4911	0.06	0.41
1/2 -14	0.850	0.820	0.822	0.68 -0.02	0.75	0.6409	0.08	0.56
3/4 -14	1.060	1.029	1.031	0.89	0.75	0.6528	0.08	0.72
1 -11-1/2	1.327	1.289	1.292	1.12	0.94	0.8132	0.09	0.94
1-1/4 -11-1/2	1.672	1.633	1.636	1.46 +0.00	0.97	0.8372	0.09	1.25
1-1/2 -11-1/2	1.912	1.872	1.875	1.70	1.00	0.8539	0.09	1.47
2 -11-1/2	2.387	2.345	2.348	2.17 -0.03	1.03	0.8869	0.09	1.94
2-1/2 -8	2.893	2.829	2.833	2.59	1.52	1.3250	0.12	2.31
3 -8	3.518	3.450	3.454	3.21	1.58	1.3875	0.12	2.91

- External pipe threads shall be chamfered from a diameter (rounded to a two-place decimal) obtained by subtracting 0, .016 in. for sizes below 1 in. and 0.025 in. for larger sizes from the minimum minor diameter at small end to produce a length of chamfered or partial thread equivalent to 1 to 1-1.2 times the pitch (rounded to a three-place decimal).
- The hole sizes recommended represent a desirable maximum, strength of wall being considered. However, as considerations other than wall strength frequently control the hole size in specific applications, the recommendations should not be construed as a requirement of this SAE Standard.

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A.3 Pipe-Thread Drilled Hole Sizes For Dryseal American Standard Internal Pipe Thread—It should be understood that this table of drilled hole sizes is intended to help only the occasional user of drills in the application of this SAE Standard. When internal pipe threads are produced in larger quantities in a particular type of material and with specially designed machinery, it may be found to be more advantageous to use a drilled hole size not given in the table, even one requiring a nonstandard diameter drill size.

TABLE A2—PIPE-THREAD DRILLED HOLE SIZES

Size	Straight Pipe Thread Fuel (NPSF) Minor Dia ⁽¹⁾ Min	Straight Pipe Thread Fuel (NPSF) Hole Size +0.003 -0.001	Straight Pipe Thread Intermediate (NPSI) Minor Dia ⁽²⁾ Min	Straight Pipe Thread Intermediate (NPSI) Drilled Hole Size +0.003 -0.001	Straight Pipe Thread Desired Length of Full Thread Min	Straight Pipe Thread Hole Depth for Plug End Tap, Tables B4 and B5	Taper Pipe Thread NPTF (Not Reamed) 2 FF Thread ⁽³⁾ Minor Dia Small from Large End Min	Taper Pipe Thread NPTF (Not Reamed) 2 FF Thread ⁽²⁾ Drilled Hole Size +0.003 -0.001	Taper Pipe Thread NPTF (Not Reamed) 4 FF Thread ⁽²⁾ Minor Dia from Large End Min	Taper Pipe Thread NPTF (Not Reamed) 4 FF Thread ⁽²⁾ Drilled Hole Size +0.003 -0.001	Taper Pipe Thread NPTF ⁽⁴⁾ (Taper Reamed) Minor Dia at Small End Min	Taper Pipe Thread NPTF ⁽⁴⁾ (Taper Reamed) Drilled Hole Size +0.003 -0.001	Taper Pipe Thread Desired Length of Full Thread Min	Taper Pipe Thread Hole Depth for Standard Tap, Table B2	Countersink 90 Deg x dia ⁽⁴⁾
1/16-27	0.2482	0.2500	0.2505	0.2500	0.31	0.47	0.2480	0.2460	0.2434	0.2420	0.2356	0.2344	0.31	0.56	0.33
1/8 -27	0.3406	0.3437	0.3429	0.3437	0.31	0.47	0.3403	0.3390	0.3357	0.3320	0.3279	0.3281	0.31	0.56	0.42
1/4 -18	0.4422	0.4440	0.4457	0.4440	0.47	0.72	0.4417	0.4375	0.4348	0.4300	0.4241	0.4219	0.47	0.81	0.55
3/8 -18	0.5776	0.5781	0.5811	0.5781	0.50	0.72	0.5771	0.5781	0.5702	0.5700	0.5587	0.5625	0.50	0.81	0.69 +0.02
1/2 -14	0.7133	0.7187	0.7180	0.7187	0.66	0.94	0.7127	0.7031	0.7038	0.6960	0.6873	0.6875	0.66	1.06	0.85 -0.00
3/4 -14	0.9238	—	0.9283	—	0.66	0.94	0.9232	0.9219	0.9143	0.9062	0.8976	0.8906	0.66	1.06	1.06
1 -11-1/2	1.1600	—	1.1655	—	0.78	1.16	1.1593	1.1562	1.1484	1.1406	1.1290	1.1250	0.78	1.25	1.34
1-1/4 -11-1/2	—	—	—	—	—	—	1.5041	1.5000	1.4932	1.4844	1.4725	1.4687	0.81	1.31	1.68 +0.03
1-1/2 -11-1/2	—	—	—	—	—	—	1.7430	1.7344	1.7321	1.7188	1.7115	1.7031	0.81	1.31	1.92
2 -11-1/2	—	—	—	—	—	—	2.2170	2.2187	2.2061	2.2031	2.1844	2.1875	0.81	1.31	2.39 -0.00
2-1/2 -8	—	—	—	—	—	—	2.6488	2.6406	2.6336	2.6250	2.5983	2.5937	1.25	1.84	2.89
3 -8	—	—	—	—	—	—	3.2751	3.2656	3.2595	3.2500	3.2194	3.2187	1.34	1.91	3.52

1. Minimum minor diameter for internal straight pipe threads is based upon minimum pitch diameter and minimum truncation and will vary with the pitch diameter.
2. NPTF (taper reamed) drilled hole sizes are recommended for taper reaming before tapping. They also are used without taper reaming by taper drilling or allowing the tap to act as a reamer. Thread lengths so produced are designated "Full or Complete Thread" on drawings.
3. NPTF (not reamed) drilled hole sizes are recommended for taper tapping without reaming. [NPTF (2 FF thread)] minimum minor diameter two threads small from large end and closest drilled hole sizes are recommended only for low pressure use. [NPTF (4 FF thread)] minimum minor diameter four threads small from large end and closest drilled hole sizes are recommended for all pressures. Thread lengths so produced are designated "Effective Thread" on drawings.
4. Internal pipe threads shall be countersunk 90 deg included angle to a diameter (rounded to a two-place decimal) obtained by adding 0.016 in. for sizes below 1 in. and 0.025 in. for larger sizes to the maximum major diameter at large end.

APPENDIX B

DRYSEAL PIPE THREAD TAPS AND CHASERS

B.1 General Information—While production taps will usually be purchased to specification, occasions may arise requiring adaptations of taps, dies, or chasers at hand.

American Standard Taper Taps, Dies, or Chasers (NPT) may be adapted for producing the Dryseal American Standard Taper Pipe Threads (NPTF) by truncating the outside diameter of taps and the inside diameter of dies or chasers the amount necessary to obtain flats shown in Table B1 for producing the limits on the product specified in Table 1. The pitch diameter of taps and dies or chasers so modified will remain standard. American Standard Coupling Straight Pipe Taps (NPSC) used for tapping the American Standard Coupling Straight Pipe Thread (NPSC), with the exception of one size only, may be adapted for tapping the Dryseal American Intermediate Straight Pipe Thread (NPSI) by truncating the outside diameter the amount necessary to obtain flats shown in Table B3 for producing the limits on the product shown in Table 1. The exception is the 1/4-18 size which has a minimum pitch diameter under that required. With the exception of one size only, taps designed to other standards cannot be adapted for tapping the Dryseal American Fuel Straight Pipe Thread (NPSF). The exception is the 1/8-27 American Standard Grease Fitting Tap (NPSG) which, if made in conformity with Tap Manufacturers' Standards of 1939 to 1941 issue, may be used without change for tapping of the 1/8-27 Dryseal American Fuel Straight Pipe Thread (NPSF).

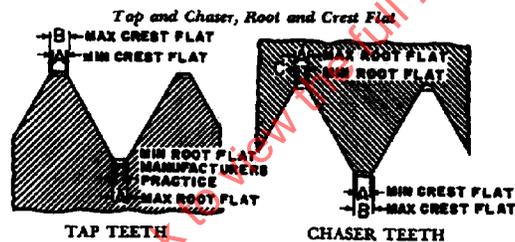


FIGURE B1—

TABLE B1—WIDTH OF FLATS

Threads per in.	A	B	C
27	0.004	0.005	0.002
18	0.005	0.006	0.003
14	0.005	0.006	0.003
11-1/2	0.006	0.008	0.004
8	0.008	0.010	0.006 ⁽¹⁾

1. There is reason to doubt the correctness of the 8 threads per in. flat widths because of the volume of metal to be displaced.

B.2 Chamfer—2 to 3 threads.

B.3 Lead Tolerance—A maximum lead error of ± 0.0005 in. in 1-in. of thread is permitted.

B.4 Angle Tolerance—Error in half angle of ± 30 min is permitted.

B.5 Taper Tolerance—A maximum taper error of $\pm 1/32$ in. per ft is permitted.

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B.6 Marking—In addition to regular markings, Dryseal American Standard Taper Taps will be marked NPTF.

TABLE B2—DRYSEAL TAPER PIPE TAPS FOR DRYSEAL AMERICAN STANDARD INTERNAL TAPER PIPE THREAD, GROUND THREAD LIMITS

PTF Size	Gage ⁽¹⁾ Measure Min	Gage ⁽¹⁾ Measure Max	Major Dia Flat Min	Major Dia Flat Max	Minor Dia Flat ⁽²⁾ Max
1/16-27	0.250	0.375	0.004	0.005	0.004
1/8 -27	0.250	0.375	0.004	0.005	0.004
1/4 -18	0.397	0.521	0.005	0.006	0.005
3/8 -18	0.392	0.516	0.005	0.006	0.005
1/2 -14	0.517	0.641	0.005	0.006	0.005
3/4 -14	0.503	0.627	0.005	0.006	0.005
1 -11-1/2	0.584	0.772	0.006	0.008	0.006
1-1/4 -11-1/2	0.592	0.780	0.006	0.008	0.006
1-1/2 -11-1/2	0.605	0.793	0.006	0.008	0.006
2 -11-1/2	0.573	0.761	0.006	0.008	0.006
2-1/2 -8 ⁽³⁾	0.831	1.019	0.008	0.010	0.008
3 -8 ⁽³⁾	0.831	1.019	0.008	0.010	0.008

1. Distance small end of tap projects beyond face of American Standard Thin-Ring Gage.
2. Minor diameter as specified or sharper.
3. There is reason to doubt the correctness of the 8 threads per in. flat widths because of volume of metal to be displaced.

TABLE B3—DRYSEAL TAPER PIPE TAPS FRO DRYSEAL SAE SHORT INTERNAL TAPER PIPE THREAD, GROUND THREAD LIMITS

PTF—SAE Short Size	Gage ⁽¹⁾ Measure Min (6p)	Gage Measure Max (7p)	Major Dia Flat Min	Major Dia Flat Max	Minor Dia Flat ⁽²⁾ Max
1/16-27	0.222	0.259	0.004	0.005	0.004
1/8 -27	0.222	0.259	0.004	0.005	0.004
1/4 -18	0.333	0.389	0.005	0.006	0.005
3/8 -18	0.333	0.389	0.005	0.006	0.005
1/2 -14	0.429	0.500	0.005	0.006	0.005
3/4 -14	0.429	0.500	0.005	0.006	0.005

1. Distance small end of tap projects beyond face of American Standard Thin-Ring Gage.
2. Minor diameter as specified or sharper.

B.7 Chamfer—1-1/2 to 2 threads.

B.8 Marking—In addition to regular markings, Dryseal SAE Short Taper Taps will be marked PTF—SAE Short.

B.9 Tolerances—Same as for Dryseal American Standard Taper Taps.

TABLE B4—DRYSEAL STRAIGHT PIPE TAPS FOR DRYSEAL AMERICAN FUEL INTERNAL STRAIGHT PIPE THREADS, GROUND THREAD LIMITS

NPSF Size	Pitch Diameter Basic	Pitch Diameter Min	Pitch Diameter Max	Major Dia Flat ⁽¹⁾ Min	Major Dia Flat ⁽¹⁾ Max	Minor Dia Flat ⁽²⁾ Max	Major Dia Basic	Major Dia Min	Major Dia Max
1/16-27	0.2812	0.2772	0.2777	0.004	0.005	0.004	0.3108	0.3008	0.3018
1/8 -27	0.3748	0.3696	0.3701	0.004	0.005	0.004	0.4044	0.3932	0.3942
1/4 -18	0.4899	0.4859	0.4864	0.005	0.006	0.005	0.5343	0.5239	0.5249
3/8 -18	0.6270	0.6213	0.6218	0.005	0.006	0.005	0.6714	0.6593	0.6603
1/2 -14	0.7784	0.7712	0.7717	0.005	0.006	0.005	0.8356	0.8230	0.8240
3/4 -14	0.9889	0.9817	0.9822	0.005	0.006	0.005	1.0460	1.0335	1.0345
1 -11-1/2	1.2386	1.2295	1.2305	0.006	0.008	0.006	1.3082	1.2933	1.2943

1. For reference only. Major-diameter flats specified may be slightly larger or smaller with extreme combinations of pitch diameter, major diameter, and half angle.
2. Minor diameter as specified or sharper.

B.10 Chamfer—Plug end 3 to 5 threads, intermediate end 2 to 3 threads, bottom end 1-1/2 to 2 threads.

B.11 Lead Tolerance—A maximum lead error of ± 0.0005 in. in 1 in. of thread is permitted.

B.12 Angle Tolerance—Error in half angle of ± 30 min permitted.

B.13 Marking—In addition to regular markings, Dryseal American Fuel Straight Pipe Taps will be marked NPSF.

B.14 Maximum Major Diameter equals minimum pitch diameter plus sharp-V thread height minus twice tool crest minimum truncation.

B.15 Minimum Major Diameter equals maximum major diameter minus tolerance.

B.16 Maximum Pitch Diameter equals the E_1 pitch diameter at large end of internal thread (Table 2) minus (small) 1-1/2 threads taper.

B.17 Minimum Pitch Diameter equals maximum diameter minus tolerance.

TABLE B5—DRYSEAL STRAIGHT PIPE TAPS FOR DRYSEAL AMERICAN INTERMEDIATE INTERNAL STRAIGHT PIPE THREAD, GROUND THREAD LIMITS

NPSF Size	Pitch Diameter Basic	Pitch Diameter Min	Pitch Diameter Max	Major Dia Flat ⁽¹⁾ Min	Major Dia Flat ⁽¹⁾ Max	Minor Dia Flat ⁽²⁾ Max	Major Dia Basic	Major Dia Min	Major Dia Max
1/16-27	0.2812	0.2795	0.2800	0.004	0.005	0.004	0.3108	0.3031	0.3041
1/8 -27	0.3748	0.3719	0.3724	0.004	0.005	0.004	0.4044	0.3955	0.3965
1/4 -18	0.4899	0.4894	0.4899	0.005	0.006	0.005	0.5343	0.5274	0.5284
3/8 -18	0.6270	0.6248	0.6253	0.005	0.006	0.005	0.6714	0.6628	0.6638
1/2 -14	0.7784	0.7757	0.7762	0.005	0.006	0.005	0.8356	0.8275	0.8285
3/4 -14	0.9889	0.9862	0.9867	0.005	0.006	0.005	1.0460	1.0380	1.0390
1 -11-1/2	1.2386	1.2349	1.2359	0.006	0.008	0.006	1.3082	1.2987	1.2997

1. For reference only. Major-diameter flats specified may be slightly larger or smaller with extreme combinations of pitch diameter, major diameter, and half angle.
2. Minor diameter as specified or sharper.

B.18 Chamfer—Plug end 3 to 5 threads, intermediate end 2 to 3 threads, bottom end 1-1/2 to 2 threads.

B.19 Lead Tolerance—A maximum lead error of ± 0.0005 in. in 1 in. of thread is permitted.

B.20 Angle Tolerance—Error in half angle of ± 30 min permitted.

B.21 Marking—In addition to regular markings, American Intermediate Straight Pipe Taps will be marked NPSI.

B.22 Maximum Major Diameter equals minimum pitch diameter plus sharp-V thread height minus twice tool crest minimum truncation.

B.23 Minimum Major Diameter equals maximum major diameter minus tolerance.

B.24 Maximum Pitch Diameter equals the E_1 pitch diameter at large end of internal thread (Table 2) minus (small) 1/2 thread taper.

B.25 Minimum Pitch Diameter equals maximum pitch diameter minus tolerance.

APPENDIX C

DRYSEAL PIPE-THREAD GAGING

C.1 General Information—There are three accepted methods of checking Dryseal pipe threads with threaded plug and ring gages. The methods separately described in the following sections are:

Section I—Position Method of Gaging with Basic Notch Gages.

Section II—Limit Method of Gaging with Step-Limit Gages.

Section III—Turns-Engagement Method of Gaging with Basic-Notch or Step-Limit Gages.

All methods of gaging external Dryseal threads involve the use of two ring thread gages, the (L_1) thin-ring thread gage for checking the pitch diameter over the hand engagement or (L_1) thread length and the (L_2) full-thread ring gage for checking the pitch diameter over the full thread length to insure adequate threads for wrench tightening.

All methods of gaging internal Dryseal threads involve the use of two plug thread gages, the (L_1) plug thread gage for checking the pitch diameter over the hand engagement or (L_1) thread length and the (L_3) plug thread gage for checking pitch diameter of the thread beyond the hand engagement length.

As indicated in the separate descriptions of the various gaging methods, coordination of the two ring thread gages for external threads and coordination of the two plug thread gages for internal threads control and check thread taper and length. The gages cannot be correlated, however, for external threads of minimum pitch diameter or internal threads of maximum pitch diameter unless the length of the threads is one thread longer than basic full thread length.

Working gages shall not be used where worn beyond the basic dimensions by more than 1/2 turn (thread). Proper allowance shall be made for any variation from basic when using a gage.

The threads of tools and the threads of a percentage of the product or casts in the case of internal threads should be projected as a check on thread form and truncation. Although projection is strongly recommended, the truncation at major diameter of internal thread and minor diameter of external thread may be checked respectively with special plug and ring gages with thread angle reduced to clear the flank of the threads; and the truncation at minor diameter of internal taper thread and major diameter of external taper thread may be checked respectively with plain taper plug gages and plain taper ring gages. Internal straight thread truncation at minor diameter may be checked with plain plug gages.

C.2 Section I—Position Method of Gaging with Basic Notch Gages—The position method of gaging Dryseal threads with plug thread and ring thread gages is a visual check of the position of the gages in relation to the product. It involves estimating the position of a notch or step on the thread gages in relation to the gaging point of the product within the allowable tolerance.

While the method is the same as that used for years past in checking conventional pipe threads without the Dryseal feature, the gages are different with respect to truncation of threads, the crests of the threads at the minor diameter of the ring gages and the major diameter of the plug gages being truncated to a greater extent to clear the increased truncation of the product thread. Another distinction is that the Dryseal (L_2) ring is counterbored larger than the thread diameter at the small end a distance equal to the (L_1) thread length minus one pitch. Conventional rings and plugs, however, may be converted to Dryseal by grinding the crests to conform with the width of flats specified for Dryseal gages, and grinding a counterbore in the (L_2) ring gage.

The gages are turned or screwed hand-tight into or onto the threaded product, the position of the gage notch in relation to the product reference point being noted to determine whether the standoff exceeds the allowable tolerance. Allowance must be made for excessive chamfer at the small end of external threads and the large end of internal threads, the product reference point in the first instance being the beginning of the first thread on the chamfer, and in the second instance being the intersection of the pitch diameter cone and the chamfer cone.

C.2.1 External Threads—Dryseal American Standard External Taper Pipe Threads (NPTF) are gaged with the NPTF (L₁) basic-notch Dryseal ring thread gages (Table C1) and the NPTF (L₂) basic-notch Dryseal ring thread gages (Table C1). Threads are within the allowable tolerance when the product reference point is flush with the gage reference point within a tolerance of plus (small) one turn, minus (large) one turn. As a check on taper, the (L₁) and (L₂) ring thread gages shall gage the same within 1/2 turn.

Dryseal SAE Short External Taper Pipe Threads PTF—SAE Short, which are one thread shorter at the small end than standard full thread length, are gaged with the NPTF (L₁) basic-notch Dryseal ring thread gages (Table C1) and the NPTF (L₂) basic-notch Dryseal ring thread gages (Table C1). Threads are within the allowable tolerance when the product reference point is flush with the gage reference point within a tolerance of plus zero, minus (large) 1-1/2 turns. As a check on taper, the (L₁) and (L₂) ring thread gages shall gage the same within 1/2 turn.

C.2.2 Internal Threads—Dryseal American Standard Internal Taper Pipe Threads (NPTF) are gaged with the NPTF (L₁) basic-notch Dryseal plug thread gages (Table C2) and the NPTF (L₃) basic-notch Dryseal plug thread gages (Table C3). Threads are within the allowable tolerance when the product reference point is flush with the gage notch within the following tolerances:

Plus (large) 1 turn, minus (small) 1 turn.

As a check on taper, the (L₁) and the (L₃) plug thread gages shall gage the same with relation to their respective notches within 1/2 turn.

Dryseal SAE Short Internal Taper Pipe Threads PTF—SAE Short, which are one thread shorter at the large end than standard full thread length, are gaged with the NPTF (L₁) basic-notch Dryseal plug thread gages (Table C2) and the NPTF (L₃) basic-notch Dryseal plug thread gages (Table C3). Threads are within the allowable tolerance when the product reference point is flush with the gage notch within the following tolerances:

Plus (large) 0 turns, minus (small) 1-1/2 turns.

Dryseal American (National) Standard Fuel Internal Straight Pipe Threads (NPSF) are gaged with the NPTF (L₁) basic-notch Dryseal plug thread gages (Table C2). Threads are within the allowable tolerance when the product reference point is flush with the gage notch within the following tolerances:

Plus (large) 0 turns, minus (small) 1-1/2 turns.

As depth gages without regard to gage notches, any of the (L₃) Dryseal plug thread gages may be used to check the full thread length of internal straight pipe threads.

Dryseal American (National) Standard Intermediate Internal Straight Pipe Threads (NPSI) are gaged with the NPTF (L₁) basic-notch Dryseal plug thread gages (Table C2). Threads are within the allowable tolerance when the product reference point is flush with the gage notch within the following tolerances:

Plus (large) 1 turn, minus (small) 1/2 turn.

As depth gages without regard to gage notches, any of the (L₃) Dryseal plug thread gages may be used to check the full thread length of internal straight pipe threads.

C.3 Section II—Limit Method of Gaging with Step-Limit Gages—The limit-gage or step-limit method of checking threaded product with plug thread and ring thread gages is a visual check of the position of the gages in relation to the product. Plug and ring gages with maximum and minimum limit notches are provided for the different thread types: NPTF, PTF—SAE Short, NPSF, and NPSI. The location of the limit notches on the 1/8- and 1/4-in. plugs eliminates the necessity for gaging correction.

The gages are turned or screwed hand-tight into or onto the threaded product, the position of the product reference point in relation to the limit notches on the gage being noted. Allowance must be made for excessive chamfer at the small end of external threads and the large end of internal threads, the product reference point in the first instance being the beginning of the first thread on the chamfer, and in the second instance being the intersection of the pitch diameter cone and the chamfer cone.

C.3.1 External Threads—Dryseal American Standard External Taper Pipe Threads (NPTF) are gaged with the NPTF (L₁) step-limit Dryseal ring thread gages (Table C4) and the NPTF (L₂) step-limit Dryseal ring thread gages (Table C8). Threads are within the allowable tolerance when the product reference point is on or between the limit notches. As a check on taper, the (L₁) and the (L₂) Dryseal ring thread gages shall gage the same in relation to their respective notches within 1/2 turn.

Dryseal SAE Short External Taper Pipe Threads PTF—SAE Short, which are one thread shorter at the small end than standard full thread length, are gaged with the PTF—SAE (L₁ Short) step-limit Dryseal ring thread gages (Table C8) and the PTF—SAE (L₂ Short) step-limit ring thread gages (Table C9). Threads are within the allowable tolerance when the product reference point is on or between the limit notches. As a check on taper, the (L₁ Short) and the (L₂ Short) Dryseal ring thread gages shall gage the same with relation to their respective notches within 1/2 turn.

C.3.2 Internal Threads—Dryseal American Standard Internal Taper Pipe Threads (NPTF) are gaged with the NPTF (L₁) step-limit Dryseal plug thread gages (Table C6) and the NPTF (L₃) step-limit Dryseal plug thread gages (Table C7). Threads are within the allowable tolerance when the product reference point is on or between the limit notches. As a check on taper, the (L₁) and (L₃) Dryseal plug thread gages shall gage the same with relation to their respective notches within 1/2 turn.

Dryseal SAE Short Internal Taper Pipe Threads PTF—SAE Short, which are one thread shorter at the large end than standard full thread length, are gaged with the PTF—SAE (L₁ Short) step-limit Dryseal plug thread gages (Table C10) and the PTF—SAE (L₃ Short) step-limit Dryseal plug thread gages (Table C11). Threads are within the allowable tolerance when the product reference point is on or between the limit notches. As a check on taper, the (L₁ Short) and (L₃ Short) Dryseal plug thread gages shall gage the same with relation to their respective notches within 1/2 turn.

Dryseal American Standard Fuel Internal Straight Pipe Threads (NPSF) are gaged with the NPSF (L₁ Short) step-limit Dryseal plug thread gages (Table C10). Threads are within the allowable tolerance when the product reference point is on or between the limit notches. As depth gages without regard to limit notches, any of the (L₃) Dryseal plug thread gages may be used to check the full thread length of internal straight pipe threads.

Dryseal American Standard Intermediate Internal Straight Pipe Threads (NPSI) are gaged with the NPSI (L₁) step-limit Dryseal plug thread gages (Table C12). Threads are within the allowable tolerance when the product reference point is on or between the limit notches. As depth gages without regard to limit notches, any of the (L₃) Dryseal plug thread gages may be used to check the full thread length of internal straight pipe threads.

C.4 Section III—Turns-Engagement Method of Gaging with Basic-Notch or Step-Limit Gages—The turns engagement method of checking threaded product with plug thread and ring thread gages is a tactual check of the position of the gages in relation to the product. In checking by this method, either the basic-notch or the step-limit gages may be used. The gages are turned or screwed into or onto the threaded product and the turns to remove the gages are counted. This method compensates for gage chamfer and eliminates the variable of product chamfer.

C.4.1 Basic Turns Engagement of Ring Gages—The basic turns engagement of the (L_1) ring thread gages (Tables C1, C4, and C8) with Dryseal external taper pipe threads is the product of the (L_1) thread length of the ring gage used and the threads per inch, minus one turn to compensate for chamfer of the external threads and chamfer of the ring gages. (See accompanying tabulation of basic turns engagement.)

The basic turns engagement of the (L_2) ring thread gages (Tables C1, C5, and C9) with Dryseal external taper pipe threads is the product of the (L_2) thread length and the threads per inch, minus 1-1/4 turns to compensate for chamfer of the external threads and the chamfer and taper of the ring gages. (See accompanying tabulation of basic turns engagement.)

C.4.2 External Threads—Dryseal American Standard External Taper Pipe Threads (NPTF) by the turns-engagement method may be gaged with any combination of (L_1) and (L_2) Dryseal ring thread gages (Tables C1, C4, C5, C8, and C9). Nominal turns engagement equals basic turns engagement. The tolerance is plus (small) 1 turn, minus (large) 1 turn. As a check on taper, the difference in turns engagement with the (L_1) and the (L_2) Dryseal ring thread gages shall be within 1/2 turn of the difference between the basic turns engagement of the ring gages.

Dryseal SAE Short External Taper Pipe Threads PTF—SAE Short, which are one thread shorter at the small end than standard full thread length, may be gaged by the turns-engagement method with any combination of (L_1) and (L_2) Dryseal ring thread gages (Tables C1, C4, C5, C8, and C9). Nominal turns engagement is one turn less than basic turns engagement. The tolerance is plus (small) 1 turn, minus (large) 1/2 turn. As a check on taper, the difference in turns engagement with the (L_1) and the (L_2) Dryseal ring thread gages shall be within 1/2 turn of the difference between the basic turns engagement of the ring gages.

C.4.3 Basic Turns Engagement of Plug Gages—The basic turns engagement of the (L_1) Dryseal plug thread gages (Tables C2, C6, C10, and C12) and Dryseal internal pipe threads is the product of the (L_1) thread length (Table 2) and the threads per inch, minus 1/2 turn to compensate for chamfer on plug gages. (See accompanying tabulation of basic turns engagement.)

The basic turns engagement of the (L_3) Dryseal plug thread gages (Tables C3, C7, and C11) with Dryseal internal pipe threads is the (L_1) thread length (Table 2) plus three threads multiplied by the threads per inch, minus 3/4 turn to compensate for chamfer and taper on plug gages. (See accompanying tabulation of basic turns engagement.)

C.4.4 Internal Threads—Dryseal American Standard Internal Taper Pipe Threads (NPTF) are gaged with any combination of (L_1) and (L_3) Dryseal plug thread gages (Tables C2, C3, C6, C7, C10, C11, and C12). The nominal turns engagement equals basic turns engagement. The tolerance is plus (large) 1 turn, minus (small) 1 turn. As a check on taper, the difference in turns engagement of the (L_1) and the (L_3) Dryseal plug thread gages shall not be less than 2-1/4 turns nor more than 3-1/4 turns.

Dryseal SAE Short Internal Taper Pipe Threads PTF—SAE Short, which are one thread shorter at the large end than standard full thread length, are gaged with any combination of (L_1) and (L_3) Dryseal plug thread gages (Tables C2, C3, C6, C7, C10, C11, and C12). The nominal turns engagement is one turn less than basic turns engagement. The tolerance is plus (large) 1 turn, minus (small) 1/2 turn. As a check on taper, the difference in turns engagement of the (L_1) and the (L_3) Dryseal plug thread gages shall not be less than 2-1/4 turns nor more than 3-1/4 turns.

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Dryseal American Standard Fuel Internal Straight Pipe Threads (NPSF) are gaged with any of the (L₁) Dryseal plug thread gages (Tables C2, C6, C10, and C12). The nominal turns engagement is one turn less than basic turns engagement. The tolerance is plus (large) 1 turn, minus (small) 1/2 turn. As depth gages without regard to limit notches, any of the (L₃) Dryseal plug thread gages may be used to check the full thread length of internal straight pipe threads.

Dryseal American Standard Intermediate Internal Straight Pipe Threads (NPSI) are gaged with any of the (L₁) Dryseal plug thread gages (Tables C2, C6, C10, and C12). The nominal turns engagement equals basic turns engagement. The tolerance is plus (large) 1 turn, minus (small) 1/2 turn. As depth gages without regard to limit notches, any of the (L₃) Dryseal plug thread gages may be used to check the full thread length of internal straight pipe threads.

BASIC TURNS ENGAGEMENT⁽¹⁾

Size	Thread Gage L ₁ Rings Basic-Notch, Table C1	Thread Gage L ₁ Rings Step-Limit, Tables C4 and C8	Thread Gage All L ₂ Rings	Thread Gage All L ₁ Plugs	Thread Gage All L ₃ Plugs
1/16-27	3.32	3.32	5.80	3.82	6.57
1/8 -27	3.36	3.36	5.87	3.86	6.61
1/4 -18	3.10	3.10	5.98	3.60	6.35
3/8 -18	3.32	3.32	6.09	3.82	6.57
1/2 -14	3.48	3.48	6.22	3.98	6.73
3/4 -14	3.75	3.75	6.39	4.25	7.00
1 -11-1/2	3.60	3.60	6.60	4.10	6.85
1-1/4 -11-1/2	3.83	3.83	6.88	4.33	7.08
1-1/2 -11-1/2	3.83	3.83	7.07	4.33	7.08
2 -11-1/2	4.01	4.01	7.45	4.51	7.26
2-1/2 -8	4.46	4.46	7.85	4.96	7.71
3 -8	5.13	5.13	8.35	5.63	8.38

1. Derivation of nominal turns engagement and tolerance for the different thread types, NPTF, PTF—SAE Short, NPSF, and NPSI, is explained in the accompanying text.

C.5 Dryseal American Taper Pipe Thread (L_1 And L_2) Ring Gages

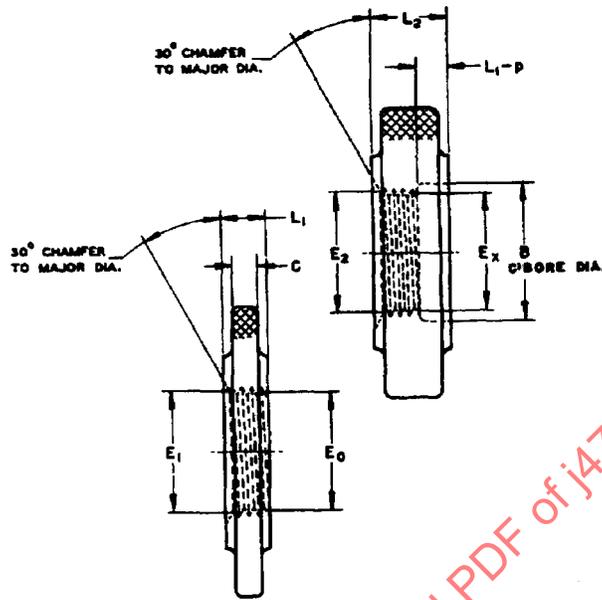


FIGURE C1—

TABLE C1—BASIC DIMENSIONS OF DRYSEAL AMERICAN TAPER PIPE THREAD (L_1 AND L_2) BASIC-NOTHC RING GAGES

Size	(L_2) Basic-Notch Full-Ring Gauges L_2	(L_2) Basic-Notch Full-Ring Gauges Pitch Dia, E_2	(L_2) Basic-Notch Full-Ring Gauges Minor Dia at Large End ⁽¹⁾	(L_2) Basic-Notch Full-Ring Gauges Pitch Dia at $L_1 - p$, E_x	(L_2) Basic-Notch Full-Ring Gauges Minor Dia at $L_1 - p$ ⁽¹⁾	(L_2) Basic-Notch Full-Ring Gauges $L_1 - p$	(L_2) Basic-Notch Full-Ring Gauges B	(L_1) Basic-Notch Thin-Ring Gauges L_1	(L_1) Basic-Notch Thin-Ring Gauges Pitch Dia, E_1	(L_1) Basic-Notch Thin-Ring Gauges Minor Dia at Large End ⁽¹⁾	(L_1) Basic-Notch Thin-Ring Gauges Pitch Dia, E_0	(L_1) Basic-Notch Thin-Ring Gauges Minor Dia at Small End ⁽¹⁾
1/16-27	0.26113	0.28750	0.27024	0.27886	0.26160	0.12296	0.38	0.1600	0.28118	0.26392	0.27118	0.25392
1/8 -27	0.26385	0.38000	0.36274	0.37129	0.35403	0.12446	0.47	0.1615	0.37360	0.35634	0.36351	0.34625
1/4 -18	0.40178	0.50250	0.47661	0.48816	0.46227	0.17224	0.59	0.2278	0.49163	0.46574	0.47739	0.45150
3/8 -18	0.40778	0.63750	0.61161	0.62354	0.59765	0.18444	0.72	0.2400	0.62701	0.60112	0.61201	0.58612
1/2 -14	0.53371	0.79179	0.75850	0.77396	0.74067	0.24857	0.88	0.3200	0.77843	0.74514	0.75843	0.72514
3/4 -14	0.54571	1.00179	0.96850	0.98440	0.95111	0.26757	1.09	0.3390	0.98887	0.95558	0.96768	0.93439
1 -11-1/2	0.68278	1.25630	1.21577	1.23320	1.19267	0.31304	1.34	0.4000	1.23863	1.19810	1.21363	1.17310
1-1/4 -11-1/2	0.70678	1.60130	1.56077	1.57794	1.53741	0.33304	1.69	0.4200	1.58338	1.54285	1.55713	1.51660
1-1/2 -11-1/2	0.72348	1.84130	1.80077	1.81690	1.77637	0.33304	1.94	0.4200	1.82234	1.78181	1.79609	1.75556
2 -11-1/2	0.75652	2.31630	2.27577	2.29084	2.25031	0.34904	2.50	0.4360	2.29627	2.25574	2.26902	2.22849
2-1/2 -8	1.13750	2.79062	2.73237	2.75434	2.69609	0.55700	2.94	0.6820	2.76216	2.70391	2.71953	2.66128
3 -8	1.20000	3.41562	3.35737	3.38068	3.32243	0.54100	3.56	0.7660	3.38850	3.33025	3.34062	3.28237

1. Minor diameter is based on crest minimum truncation of 0.20 p.

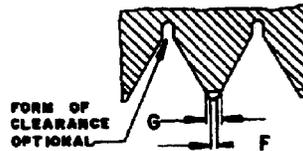


FIGURE C2—

TABLE C1-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.5.1 Marking—In addition to the regular markings, Dryseal American Standard Taper Thread Thin-Ring Gages will be marked NPTF (L₁) and Full-Ring Gages will be marked NPTF (L₂) on the entering side of gage.

C.5.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at the minor diameter of ring gages and major diameter of plug gages shall be truncated 0.20p minimum to 0.25p maximum producing the minimum and maximum widths of flats specified in Table C1-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Thread Working Plug Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standards published in Commercial Standard CS8.

C.6 Dryseal American Taper Pipe Thread (L₁) Plug Gages Taper Lock Design Range 1/8 To 3 in., Inclusive

C.6.1 Marking—In addition to the regular markings, Dryseal American Standard Taper Pipe Thread (L₁) Plug Gages will be marked NPTF (L₁).

C.6.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at the minor diameter of ring gages and major diameter of plug gages shall be truncated 0.20p minimum to 0.25p maximum producing the minimum and maximum widths of flats specified in Table C2-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Thread Working Plug Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standards published in Commercial Standard CS8.

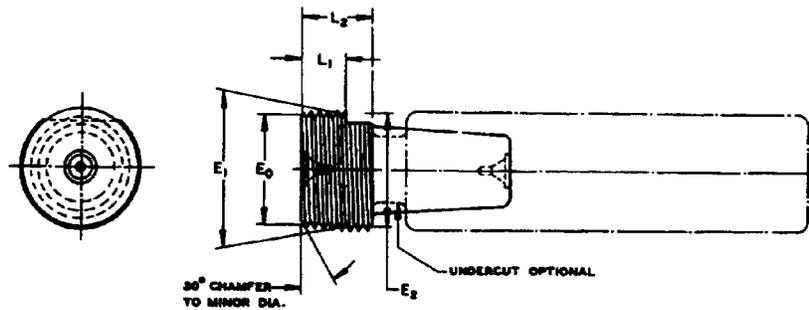


FIGURE C3—

TABLE C2—BASIC DIMENSIONS OF DRYSEAL AMERICAN TAPER PIPE THREAD (L_1) BASIC-NOTCH PLUG GAGES

Size	L_1	L_2	Small End Pitch Dia, E_0	Small End Major Dia ⁽¹⁾	Gaging Notch Pitch Dia, E_1	Gaging Notch Major Dia ⁽¹⁾	Large End Pitch Dia, E_2	Large End Major Dia ⁽¹⁾
1/16-27	0.1600	0.26113	0.27118	0.28844	0.28118	0.29844	0.28750	0.30476
1/8 -27	0.1615	0.26385	0.36351	0.38077	0.37360	0.39086	0.38000	0.39726
1/4 -18	0.2278	0.40178	0.47739	0.50328	0.49163	0.51752	0.50250	0.52839
3/8 -18	0.2400	0.40778	0.61201	0.63790	0.62701	0.65290	0.63750	0.66339
1/2 -14	0.3200	0.53371	0.75843	0.79170	0.77843	0.81170	0.79179	0.82506
3/4 -14	0.3390	0.54571	0.96768	1.00095	0.98887	1.02214	1.00179	1.03506
1 -11-1/2	0.4000	0.68278	1.21363	1.25416	1.23863	1.27916	1.25630	1.29683
1-1/4 -11-1/2	0.4200	0.70678	1.55713	1.59766	1.58338	1.62391	1.60130	1.64183
1-1/2 -11-1/2	0.4200	0.72348	1.79609	1.83662	1.82234	1.86287	1.84130	1.88183
2 -11-1/2	0.4360	0.75652	2.26902	2.30955	2.29627	2.33680	2.31630	2.35683
2-1/2 -8	0.6820	1.13750	2.71953	2.77778	2.76216	2.82041	2.79062	2.84887
3 -8	0.7660	1.20000	3.34062	3.39887	3.38850	3.44675	3.41562	3.47387

1. Major diameter is based upon crest minimum truncation of 0.20 p.

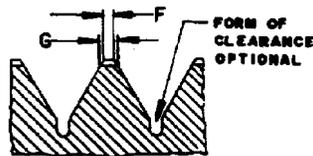


FIGURE C4—

TABLE C2-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.7 Dryseal American Taper Pipe Thread (L_3) Length Plug Gages

C.7.1 Marking—In addition to the regular markings, Dryseal American Standard Taper Pipe Thread (L_3) Plug Gages will be marked NPTF (L_3).

C.7.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at major diameter shall be truncated 0.20p minimum to 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C3-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Thread Working Plug Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standards published in Commercial Standard CS8.

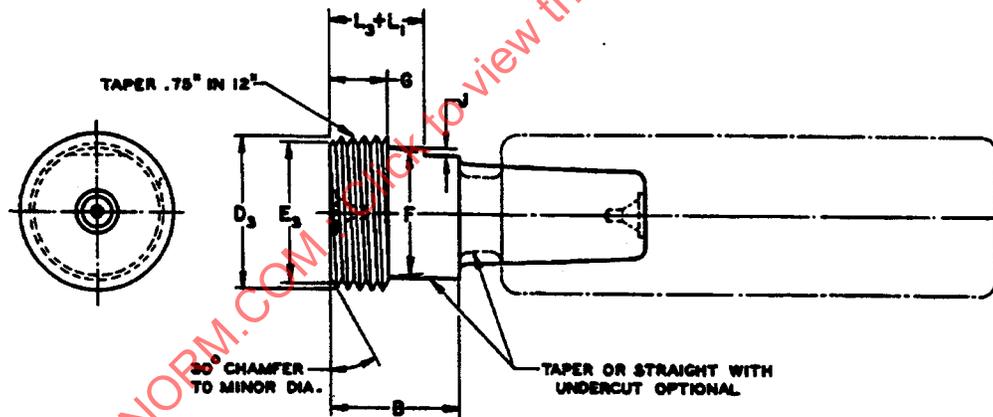


FIGURE C5—

**TABLE C3—BASIC DIMENSIONS OF DRYSEAL AMERICAN TAPER PIPE
THREAD (L₃) BASIC-NOTCH LENGTH PLUG GAGES**

Size	Small End Pitch Dia, E ₃	Small End Major Dia ⁽¹⁾ , D ₃	Relief Dia, F [E ₃ + (0.0625 x 4p)—Sharp-V Thread Height—0.020 to 0.025 below Sharp Root] +0.005 -0.000	Four Threads, G (L ₃ + p)	L ₁ Plus 3 Threads (L ₁ + L ₃)	Blank Length, B	Notch Depth, J +0.005 -0.000
1/16-27	0.2642	0.2815	0.216	0.1482	0.2711	0.38	0.030
1/8 -27	0.3566	0.3738	0.309	0.1482	0.2726	0.41	0.030
1/4 -18	0.4670	0.4928	0.409	0.2222	0.3945	0.50	0.030
3/8 -18	0.6016	0.6275	0.542	0.2222	0.4067	0.56	0.030
1/2 -14	0.7451	0.7783	0.676	0.2857	0.5343	0.69	0.040
3/4 -14	0.9543	0.9876	0.886	0.2857	0.5533	0.72	0.040
1 -11-1/2	1.1973	1.2379	1.118	0.3478	0.6609	0.88	0.050
1-1/4 -11-1/2	1.5408	1.5814	1.462	0.3478	0.6809	0.88	0.050
1-1/2 -11-1/2	1.7798	1.8203	1.701	0.3478	0.6809	0.88	0.050
2 -11-1/2	2.2527	2.2932	2.174	0.3478	0.6969	0.88	0.050
2-1/2 -8	2.6961	2.7543	2.590	0.5000	1.0570	1.50	0.050
3 -8	3.3172	3.3754	3.214	0.5000	1.1410	1.50	0.050

1. Major diameter is based upon crest minimum truncation of 0.20 p.

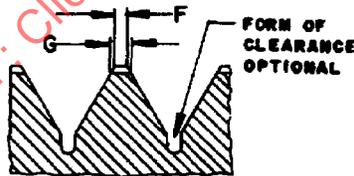


TABLE C3-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.8 Dryseal American Standard Taper Pipe Thread (L_1) Step-Limit Thin-Ring Gages

C.8.1 Marking—In addition to the regular markings, Dryseal American Standard Taper Thread Ring Gages will be marked NPTF (L_1) on the entering side of gage.

C.8.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at the minor diameter shall be truncated 0.20p minimum to 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C4-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Working Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standard published in Commercial CS8.

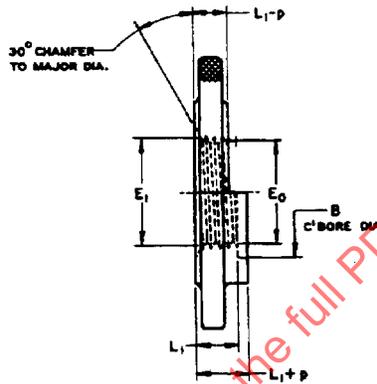


TABLE C4—BASIC DIMENSIONS OF DRYSEAL AMERICAN STANDARD TAPER PIPE THREAD (L_1) STEP-LIMIT THIN-RING GAGES

Size	(L_1) Step-Limit Thin-Ring Gages L_1	(L_1) Step-Limit Thin-Ring Gages Max Pitch Dia Gaging Step $L_1 - p$	(L_1) Step-Limit Thin-Ring Gages Min. Pitch Dia Gaging Step $L_1 + p$	(L_1) Step-Limit Thin-Ring Gages Pitch Dia, E_1	(L_1) Step-Limit Thin-Ring Gages Minor Dia at Large End	(L_1) Step-Limit Thin-Ring Gages Pitch Dia of Small End Counterbore E_0	(L_1) Step-Limit Thin-Ring Gages Minor Dia at Small End Counterbore (1)	(L_1) Step-Limit Thin-Ring Gages B
1/16-27	0.1600	0.12296	0.19704	0.28118	0.26392	0.27118	0.25392	0.38
1/8 -27	0.1615	0.12446	0.19854	0.37360	0.35634	0.36351	0.34625	0.47
1/4 -18	0.2278	0.17224	0.28336	0.49163	0.46574	0.47739	0.45150	0.59
3/8 -18	0.2400	0.18444	0.29556	0.62701	0.60112	0.61201	0.58612	0.72
1/2 -14	0.3200	0.24857	0.39143	0.77843	0.74514	0.75843	0.72514	0.88
3/4 -14	0.3390	0.26757	0.41043	0.98887	0.95558	0.96768	0.93439	1.09
1 -11-1/2	0.4000	0.31304	0.48696	1.23863	1.19810	1.21363	1.17310	1.34
1-1/4 -11-1/2	0.4200	0.33304	0.50696	1.58338	1.54285	1.55713	1.51660	1.69
1-1/2 -11-1/2	0.4200	0.33304	0.50696	1.82234	1.78181	1.79609	1.75556	1.94
2 -11-1/2	0.4360	0.34904	0.52296	2.29627	2.25574	2.26902	2.22849	2.50
2-1/2 -8	0.6820	0.55700	0.80700	2.76216	2.70391	2.71953	2.66128	2.94
3 -8	0.7660	0.64100	0.89100	3.38850	3.33025	3.34062	3.28237	3.56

1. Minor diameter is based on crest minimum truncation of 0.20 p.

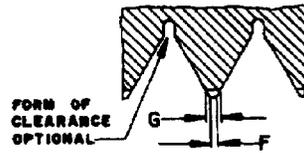


FIGURE C6—

TABLE C4-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.9 Dryseal American Standard Taper Pipe Thread (L_2) Step-Limit Full-Ring Gages

C.9.1 Marking—In addition to the regular markings, Dryseal American Standard Taper Pipe Thread Ring Gages will be marked NPTF (L_2) on the entering side of gage.

C.9.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at the minor diameter shall be truncated 0.20p minimum to 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C5-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Working Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standard published in Commercial Standard CS8.

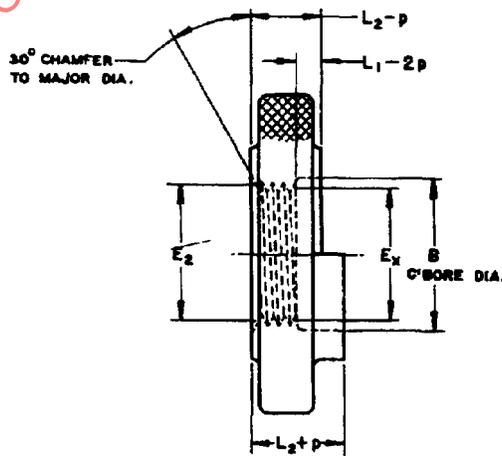


FIGURE C7—

TABLE C5—BASIC DIMENSIONS OF DRYSEAL AMERICAN STANDARD TAPER PIPE THREAD (L₂) STEP-LIMIT FULL-RING GAGES

Size	(L ₂) Step-Limit Full-Ring Gages L ₂	(L ₂) Step-Limit Full-Ring Gages Max Pitch Dia Gaging Step L ₂ - p	(L ₂) Step-Limit Full-Ring Gages Min Pitch Dia Gaging Step L ₂ + p	(L ₂) Step-Limit Full-Ring Gages Pitch Dia, E ₂	(L ₂) Step-Limit Full-Ring Gages Minor Dia at Large End ⁽¹⁾	(L ₂) Step-Limit Full-Ring Gages Pitch Dia at L ₁ from Min Pitch Dia Gaging Step (E _x)	(L ₂) Step-Limit Full-Ring Gages Minor Dia at Small End Counterbore	(L ₂) Step-Limit Full-Ring Gages L ₁ - 2p	(L ₂) Step-Limit Full-Ring Gages B
1/16-27	0.26113	0.22409	0.29817	0.28750	0.27024	0.27886	0.26160	0.08592	0.38
1/8 -27	0.26385	0.22681	0.30089	0.38000	0.36274	0.37129	0.35403	0.08742	0.47
1/4 -18	0.40178	0.34622	0.45734	0.50250	0.47661	0.48816	0.46227	0.11668	0.59
3/8 -18	0.40778	0.35222	0.46334	0.63750	0.61161	0.62354	0.59765	0.12888	0.72
1/2 -14	0.53371	0.46228	0.60514	0.79179	0.75850	0.77396	0.74067	0.17714	0.88
3/4 -14	0.54571	0.47428	0.61714	1.00179	0.96850	0.98440	0.95111	0.19614	1.09
1 -11-1/2	0.68278	0.59582	0.76974	1.25630	1.21577	1.23320	1.19267	0.22608	1.34
1-1/4 -11-1/2	0.70678	0.61982	0.79374	1.60130	1.56077	1.57794	1.53741	0.24608	1.69
1-1/2 -11-1/2	0.72348	0.63652	0.81044	1.84130	1.80077	1.81690	1.77637	0.24608	1.94
2 -11-1/2	0.75652	0.66956	0.84348	2.31630	2.27577	2.29084	2.25031	0.26208	2.50
2-1/2 -8	1.13750	1.01250	1.26250	2.79062	2.73237	2.75434	2.69609	0.43200	2.94
3 -8	1.20000	1.07500	1.32500	3.41562	3.35737	3.38068	3.32243	0.51600	3.56

1. Minor diameter is based on crest minimum truncation of 0.20 p.

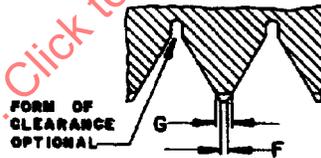


FIGURE C8—

TABLE C5-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.10 Dryseal American Standard Taper Pipe Thread (L₁) Step-Limit Plug Gages

C.10.1 Marking—In addition to the regular markings, Dryseal American Standard Taper Pipe Thread (L₁) Plug Gages will be marked NPTF (L₁).

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C.10.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at major diameter shall be truncated 0.20p minimum to 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C6-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Thread Working Plug Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standards published in Commercial Standards CS8.

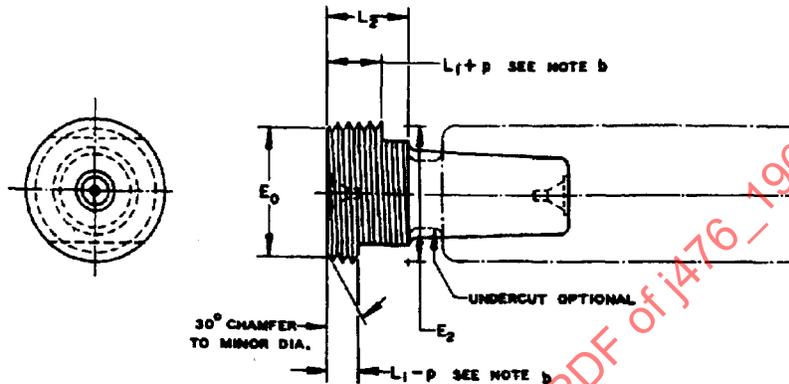


FIGURE C9—

TABLE C6—BASIC DIMENSIONS OF DRYSEAL AMERICAN STANDARD TAPER PIPE THREAD (L_1) STEP-LIMIT PLUG GAGES

Size	L_1	L_2	Small End Pitch Dia, E_0	Small End Major Dia ⁽¹⁾	Min Pitch Dia Gaging Step ⁽²⁾ $L_1 - p$	Min Pitch Dia Gaging Step ⁽²⁾ Pitch Dia	Max Pitch Dia Gaging Step ⁽²⁾ $L_1 + p$	Max Pitch Gaging Step ⁽²⁾ Pitch Dia	Large End Pitch Dia, E_2	Large End Major Dia ⁽¹⁾
1/16-27	0.1600	0.26113	0.27118	0.28844	0.12296	0.27887	0.19704	0.28350	0.28750	0.30476
1/8 -27	0.1615	0.26385	0.36351	0.38077	0.12446	0.37129	0.19854	0.37592	0.38000	0.39726
1/4 -18	0.2278	0.40178	0.47739	0.50328	0.17224	0.48816	0.28336	0.49510	0.50250	0.52839
3/8 -18	0.2400	0.40778	0.61201	0.63790	0.18444	0.62354	0.29556	0.63048	0.63750	0.66339
1/2 -14	0.3200	0.53371	0.75843	0.79172	0.24857	0.77397	0.39143	0.78289	0.79179	0.82508
3/4 -14	0.3390	0.54571	0.96768	1.00097	0.26757	0.98441	0.41043	0.99333	1.00179	1.03508
1 -11-1/2	0.4000	0.68278	1.21363	1.25416	0.31304	1.23320	0.48696	1.24407	1.25630	1.29683
1-1/4 -11-1/2	0.4200	0.70678	1.55713	1.59766	0.33304	1.57795	0.50696	1.58882	1.60130	1.64183
1-1/2 -11-1/2	0.4200	0.72348	1.79609	1.83662	0.33304	1.81691	0.50696	1.82778	1.84130	1.88183
2 -11-1/2	0.4360	0.75652	2.26902	2.30955	0.34904	2.29084	0.52296	2.30171	2.31630	2.35683
2-1/2 -8	0.6820	1.13750	2.71953	2.77778	0.55700	2.75435	0.80700	2.76997	2.79062	2.84887
3 -8	0.7660	1.20000	3.34062	3.39887	0.64100	3.38069	0.89100	3.39631	3.41562	3.47387

- Major diameter is based on crest minimum truncation of 0.20 p.
- Maximum and minimum pitch-diameter steps are gaging limits. Notch formulas on drawing apply to all sizes.

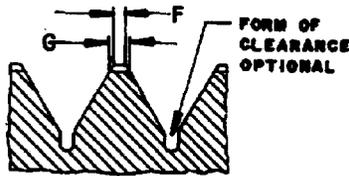


FIGURE C10—

TABLE C6-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.11 Dryseal American Standard Taper Thread (L_3) Length Step-Limit Plug Gages

C.11.1 Marking—In addition to the regular markings, Dryseal American Standard Taper Pipe Thread (L_3) Plug Gages will be marked PTF (L_3).

C.11.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at major diameter shall be truncated 0.20p minimum and 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C7-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Thread Working Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standards published in Commercial Standard CS8.

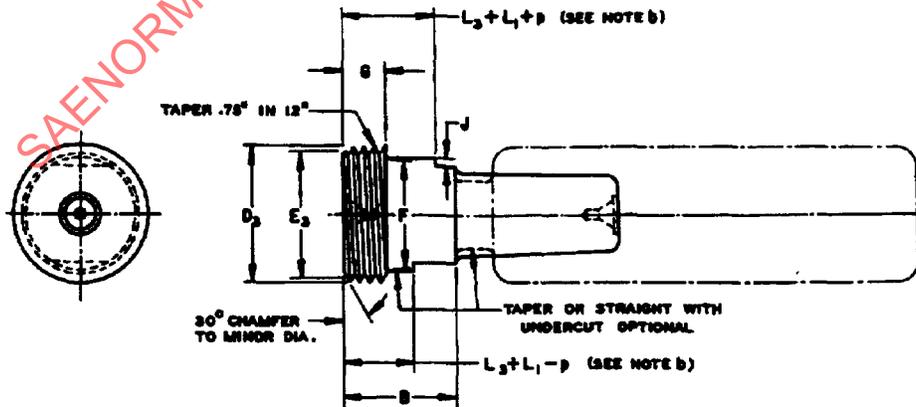


FIGURE C11—

**TABLE C7—BASIC DIMENSIONS OF DRYSEAL AMERICAN STANDARD
TAPER THREAD (L₃) LENGTH STEP-LIMIT PLUG GAGES**

Size	Small End Pitch Dia, E ₃	Small End Major Dia, ⁽¹⁾ D ₃	Relief Dia, F [E ₃ + (0.0625x4p)—Sharp-V Thread Height—0.020 to 0.025 below Sharp Root] +0.005 -0.000	Four Threads, G (L ₃ + p)	Pitch Dia Gaging Step ⁽²⁾ Plus 3 Threads (L ₃ + L ₁ - p) Min	Pitch Dia Gaging Step ⁽²⁾ Plus 3 Threads (L ₃ + L ₁ - p) Max	Blank Length B	Notch Depth, J +0.005 -0.000
1/16-27	0.2642	0.2815	0.216	0.1482	0.2341	0.3082	0.38	0.030
1/8 -27	0.3566	0.3738	0.309	0.1482	0.2356	0.3097	0.41	0.030
1/4 -18	0.4670	0.4928	0.409	0.2222	0.3389	0.4500	0.50	0.030
3/8 -18	0.6016	0.6275	0.542	0.2222	0.3511	0.4622	0.56	0.030
1/2 -14	0.7451	0.7783	0.676	0.2857	0.4628	0.6057	0.69	0.040
3/4 -14	0.9543	0.9876	0.886	0.2857	0.4818	0.6247	0.72	0.040
1 -11-1/2	1.1973	1.2379	1.118	0.3478	0.5739	0.7478	0.88	0.050
1-1/4 -11-1/2	1.5408	1.5814	1.462	0.3478	0.5939	0.7678	0.88	0.050
1-1/2 -11-1/2	1.7798	1.8203	1.701	0.3478	0.5939	0.7678	0.88	0.050
2 -11-1/2	2.2527	2.2932	2.174	0.3478	0.6099	0.7838	0.88	0.050
2-1/2 -8	2.6961	2.7543	2.590	0.5000	0.9320	1.1820	1.50	0.050
-8	3.3172	3.3754	3.214	0.5000	1.0160	1.2660	1.50	0.050

1. Major diameter is based upon crest minimum truncation of 0.20 p.
2. Maximum and minimum pitch-diameter steps are gaging limits. Notch formulas on drawing apply to all sizes.

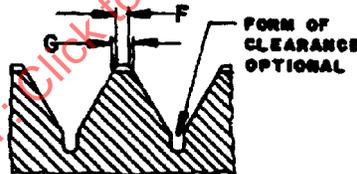


FIGURE C12—

TABLE C7-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.12 Dryseal SAE Short Taper Pipe Thread (L_1 Short) Step-Limit Thin-Ring Gages

C.12.1 Marking—In addition to the regular markings, Dryseal SAE Short Taper Pipe Thread Ring Gages will be marked PTF—SAE Short (L_1 Short) on the entering side of gage.

C.12.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at the minor diameter shall be truncated 0.20p minimum to 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C8-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Working Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standard published in Commercial Standard CS8.

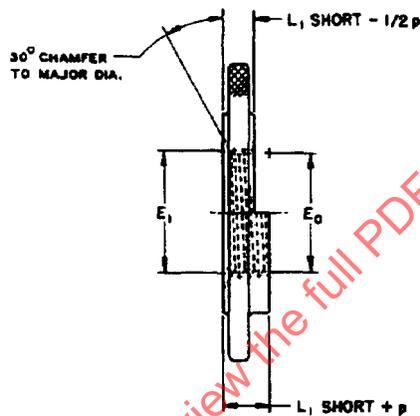


FIGURE C13—

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TABLE C8—BASIC DIMENSIONS OF DRYSEAL SAE SHORT TAPER PIPE THREAD (L₁ SHORT) STEP-LIMIT THIN-RING GAGES

Size	(L ₁ Short) Step-Limit Thin-Ring GagesL ₁ Short	(L ₁ Short) Step-Limit Thin-Ring GagesMax Pitch Dia Gaging StepL ₁ Short - 1/2 p	(L ₁ Short) Step-Limit Thin-Ring GagesMin Pitch DiaGaging StepL ₁ Short + p	(L ₁ Short) Step-Limit Thin-Ring GagesPitch Dia E ₁	(L1 Short) Step-Limit Thin-Ring GagesMinor Diaat Large End ⁽¹⁾	(L ₁ Short) Step-Limit Thin-Ring GagesPitch Dia at Min Pitch DiaGaging StepE ₀	(L ₁ Short) Step-Limit Thin-Ring GagesMinor Diaat Small End ⁽¹⁾
1/16-27	0.12296	0.10444	0.16000	0.28118	0.26392	0.27118	0.25392
1/8 -27	0.12446	0.10594	0.16150	0.37360	0.35634	0.36351	0.34625
1/4 -18	0.17224	0.14446	0.22780	0.49163	0.46574	0.47739	0.45150
3/8 -18	0.18444	0.15666	0.24000	0.62701	0.60112	0.61201	0.58712
1/2 -14	0.24857	0.21286	0.32000	0.77843	0.74514	0.75843	0.72514
3/4 -14	0.26757	0.23186	0.33900	0.98887	0.95558	0.96768	0.93439
1 -11-1/2	0.31304	0.26956	0.40000	1.23863	1.19810	1.21363	1.17310
1-1/4 -11-1/2	0.33304	0.28956	0.42000	1.58338	1.54285	1.55713	1.51660
1-1/2 -11-1/2	0.33304	0.28956	0.42000	1.82234	1.78181	1.79609	1.75556
2 -11-1/2	0.34904	0.30556	0.43600	2.29627	2.25574	2.26902	2.22849
2-1/2 -8	0.55700	0.49450	0.68200	2.76216	2.70391	2.71953	2.66128
3 -8	0.64100	0.57850	0.76600	3.38850	3.33025	3.34062	3.28237

1. Minor diameter is based on crest minimum truncation of 0.20 p.

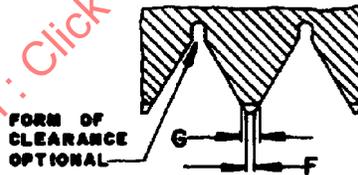


FIGURE C14—

TABLE C8-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.13 Dryseal SAE Short Taper Pipe Thread (L₂ Short) Step-Limit Full-Ring Gages

C.13.1 Marking—In addition to the regular markings, Dryseal SAE Short Taper Pipe Thread Ring Gages will be marked PTF—SAE Short (L₂ Short) on the entering side of gage.

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C.13.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at the minor diameter shall be truncated 0.20p minimum to 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C9-1.

All other thread dimensions shall be within tolerance specified for the Dryseal American Standard Pipe Working Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standard published in Commercial Standard CS8.

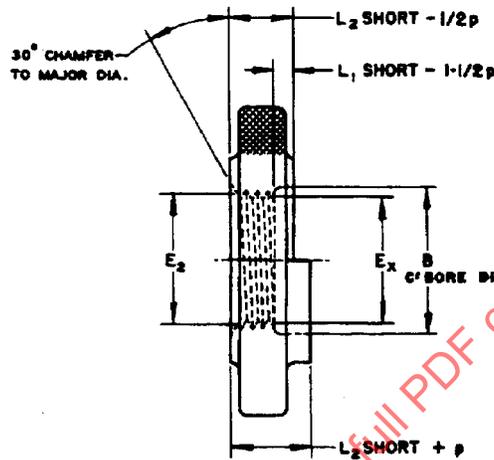


FIGURE C15—

TABLE C9—BASIC DIMENSIONS OF DRYSEAL SAE SHORT TAPER PIPE THREAD (L SHORT) STEP-LIMIT FULL-RING GAGES

Size	L_2 Short	(L_2 Short) Step-Limit Full-Ring Gages Max Pitch Dia Gaging Step L_2 Short - $1/2p$	(L_2 Short) Step-Limit Full-Ring Gages Max Pitch Dia Gaging Step L_2 Short + p	(L_2 Short) Step-Limit Full-Ring Gages Pitch Dia E_2	(L_2 Short) Step-Limit Full-Ring Gages Minor Dia at Large End ⁽¹⁾	(L_2 Short) Step-Limit Full-Ring Gages Pitch Dia at L_1 Short - $1-1/2p$ from Min Pitch Dia Gaging Ste, E_x	(L_2 Short) Step-Limit Full-Ring Gages Minor Dia at Small End Counterbore	(L_2 Short) Step-Limit Full-Ring Gages L_1 Short - $1-1/2p$	(L_2 Short) Step-Limit Full-Ring Gages Pitch Dia B
1/16-27	0.2241	0.20557	0.26113	0.28750	0.27024	0.27886	0.26160	0.06740	0.38
1/8 -27	0.2268	0.20829	0.26385	0.38000	0.36274	0.37129	0.35403	0.06890	0.47
1/4 -18	0.3462	0.31845	0.40178	0.50250	0.47661	0.48816	0.46227	0.08891	0.59
3/8 -18	0.3522	0.32445	0.40778	0.63750	0.61161	0.62354	0.59765	0.10111	0.72
1/2 -14	0.4623	0.42657	0.53371	0.79179	0.75850	0.77396	0.74067	0.14143	0.88
3/4 -14	0.4743	0.43857	0.54571	1.00179	0.96850	0.98440	0.95111	0.16043	1.09
1 -11-1/2	0.5958	0.55235	0.68278	1.25630	1.21577	1.23320	1.19267	0.18260	1.34
1-1/4 -11-1/2	0.6198	0.57635	0.70678	1.60130	1.56077	1.57794	1.53741	0.20260	1.69
1-1/2 -11-1/2	0.6365	0.59305	0.72348	1.84130	1.80077	1.81690	1.77637	0.20260	1.94
2 -11-1/2	0.6695	0.62609	0.75652	2.31630	2.27577	2.29084	2.25031	0.21860	2.50
2-1/2 -8	1.0125	0.95000	1.13750	2.79062	2.73237	2.75434	2.69609	0.36950	2.94
3 -8	1.0750	1.01250	1.20000	3.41562	3.35737	3.38068	3.32243	0.45350	3.56

1. Minor diameter is based on crest minimum truncation of 0.20 p.

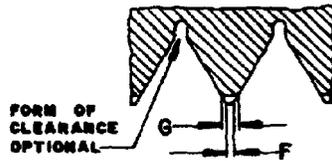


FIGURE C16—

TABLE C9-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.14 Dryseal SAE Short Taper Pipe Thread And Dryseal American Standard Fuel Internal Straight Pipe Thread (L_1 Short) Step-Limit Plug Gages

C.14.1 Marking—In addition to the regular markings, Dryseal SAE Short Taper Pipe Thread L_1 Short Plug Gages will be marked PTF—SAE Short (L_1 Short). Dryseal American Standard Fuel Internal Straight Pipe Thread Taper Plug Gages will be marked NPSF (L_1 short).

C.14.2 Thread Form—The threads in all particulars excepting truncation shall conform to American Standard Taper Pipe Thread practice. Crests of threads at major diameter shall be truncated 0.20p minimum to 0.25p maximum, producing the minimum and maximum widths of flat specified in Table C10-1.

All other thread dimensions shall be within tolerances specified for the Dryseal American Standard Pipe Thread Working Plug Gages (ASA B2.2). Other gage details shall conform to American Gage Design Standards published in Commercial Standard CS8.

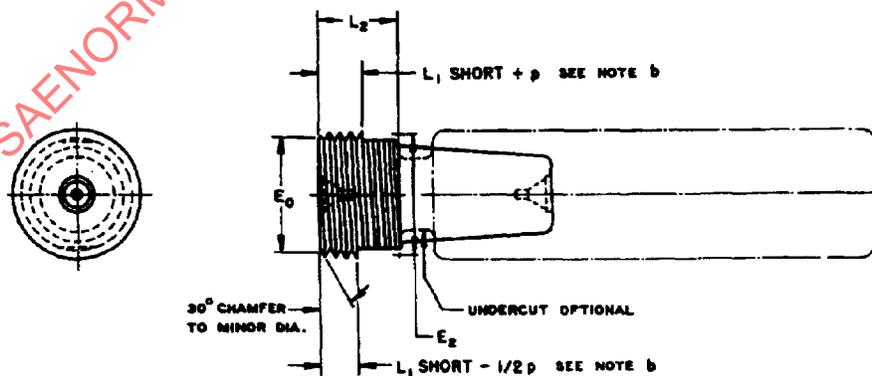


FIGURE C17—

SAE J476a Revised JUN61

TABLE C10—BASIC DIMENSIONS OF DRYSEAL SAE SHORT TAPER PIPE THREAD AND DRYSEAL AMERICAN STANDARD FUEL INTERNAL STRAIGHT PIPE THREAD (L₁ SHORT) STEP-LIMIT PLUG GAGES

Size	L ₁ Short	L ₂	Small End Pitch Dia, E ₀	Small End Major Dia ⁽¹⁾	Min Pitch Dia Gaging Step ⁽²⁾ L ₁ Short - 1/2 p	Min Pitch Dia Gaging Step ⁽²⁾ Pitch Dia	Max Pitch Dia Gaging Step ⁽²⁾ L ₁ Short + p	Max Pitch Dia Gaging Step ⁽²⁾ Pitch Dia	Large End Pitch Dia, E ₂	Large End Major Dia ⁽¹⁾
1/16-27	0.12296	0.26113	0.27118	0.28844	0.10444	0.27771	0.16000	0.28118	0.28750	0.30476
1/8 -27	0.12446	0.26385	0.36351	0.38077	0.10594	0.37013	0.16150	0.37360	0.38000	0.39726
1/4 -18	0.17224	0.40178	0.47739	0.50328	0.14446	0.48642	0.22780	0.49163	0.50250	0.52839
3/8 -18	0.18444	0.40778	0.61201	0.63790	0.15666	0.62180	0.24000	0.62701	0.63750	0.66339
1/2 -14	0.24857	0.53371	0.75843	0.79170	0.21286	0.77174	0.32000	0.77843	0.79179	0.82506
3/4 -14	0.26757	0.54571	0.96768	1.00095	0.23186	0.98218	0.33900	0.98887	1.00179	1.03506
1 -11-1/2	0.31304	0.68278	1.21363	1.25416	0.26956	1.23048	0.40000	1.23863	1.25630	1.29683
1-1/4 -11-1/2 ⁽³⁾	0.33304	0.70678	1.55713	1.59766	0.28956	1.57523	0.42000	1.58338	1.60130	1.64183
1-1/2 -11-1/2 ⁽³⁾	0.33304	0.72348	1.79609	1.83662	0.28956	1.81419	0.42000	1.82234	1.84130	1.88183
2 -11-1/2 ⁽³⁾	0.34904	0.75652	2.26902	2.30955	0.30556	2.28812	0.43600	2.29627	2.31630	2.35683
2-1/2 -8 ⁽³⁾	0.55700	1.13750	2.71953	2.77778	0.49450	2.75044	0.68200	2.76216	2.79062	2.84887
3 -8 ⁽³⁾	0.64100	1.20000	3.34062	3.39887	0.57850	3.37678	0.76600	3.38850	3.41562	3.47387

1. Major diameter is based on crest minimum truncation of 0.20 p.
2. Maximum and minimum pitch-diameter steps are gaging limits. Notch formulas on drawing apply to all sizes.
3. For reference only above 1-11-1/2 NPSF.

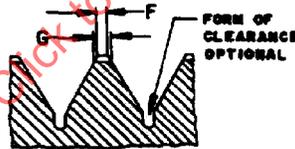


FIGURE C18—

TABLE C10-1—THREAD FLATS

Threads per in.	F	G
27	0.0086	0.0107
18	0.0128	0.0160
14	0.0165	0.0206
11-1/2	0.0201	0.0251
8	0.0289	0.0361

C.15 Dryseal Sae Short Taper Pipe Thread (L₃ Short) Length Step-limit Plug Gages

C.15.1 Marking—In addition to the regular markings, Dryseal SAE Short Taper Pipe Thread (L₃) Plug Gages will be marked PTF—SAE Short (L₃ Short).