

Australian Standard[®]

**FILLER, DRAIN AND PIPE PLUGS
WITH DRYSEAL AMERICAN
STANDARD TAPER PIPE AND
UNIFIED THREADS**

**FOR AUTOMOTIVE AND
INDUSTRIAL USE**

IMPERIAL UNITS

The following scientific, industrial and governmental organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Automobile Association
Australian Pneumatic and Hydraulic Association
Department of Defence (Defence Standardisation Committee)
Department of Shipping and Transport
Federal Chamber of Automotive Industries
Federation of Automotive Products Manufacturers
Institute of Road Transport Engineers
National Association of Australian State Road Authorities
Society of Automotive Engineers—Australasia
Tube Fitting Manufacturers

This standard, prepared by Committee AU/6, Fuel Line Fittings, was approved on behalf of the Council of the Standards Association of Australia on 3 November 1972.

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This standard was issued in draft form for public review as Doc. 1894..

Australian Standard[®]

**FILLER, DRAIN AND PIPE PLUGS
WITH DRYSEAL AMERICAN
STANDARD TAPER PIPE AND
UNIFIED THREADS**

**FOR AUTOMOTIVE AND
INDUSTRIAL USE**

First published 1973

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 4873 8

PREFACE

This standard arose from a request submitted by the National Association of Australian State Road Authorities for a standard on fuel line fittings and drain plugs.

A separate standard on fuel line fittings was prepared by the Committee on Fuel Line Fittings in collaboration with the Society of Automotive Engineers — Australasia, and has been published as AS D26, Tube Fittings with Dryseal American Standard Taper Pipe and Unified Threads for Automotive and Industrial Use.

This present standard is based on SAEJ531 — Automotive Pipe, Filler and Drain Plugs, and SAEJ532 — Automotive Straight Thread Filler and Drain Plugs, and is coordinated with AS D26.

The drawings and tables are presented in readily usable form. The gaps in the numbering of figures and tables have been left for the purpose of including additional fittings should this be necessary.

This standard makes reference to the following standards:

- AS B133 Unified Screw Threads
- ANSI B2.2 Dryseal Pipe Threads
- ASK132 Electroplated Coatings on Threaded Components
 - Part 1 — Cadmium on Steel Components.
 - Part 2 — Zinc on Steel Components.

CONTENTS

	<i>Page</i>		<i>Page</i>
SECTION 1. SCOPE AND SIZE DESIGNATION		4.2 Manufacture	4
1.1 Scope	3	4.3 Workmanship	4
1.2 Size Designation	3	4.4 Finish	4
		4.5 Marking	4
SECTION 2. DIMENSIONS AND TOLERANCES APPLYING TO ALL PLUGS		SECTION 5. ASSEMBLY	
2.1 General	3	5.1 Tapered Filler and Drain Plugs	5
2.2 External Hexagons	3	5.2 Pipe Plugs	5
2.3 External Squares	3	5.3 Straight Thread Filler and Drain Plugs	5
2.4 Washer Face on Hexagon Outside Head Plugs	3	SECTION 6. TAPERED FILLER AND DRAIN PLUGS	
2.5 Contour	3	6.1 Dimensions and Tolerances	5
SECTION 3. SCREW THREADS		SECTION 7. PIPE PLUGS	
3.1 Pipe Threads	4	7.1 Dimensions and Tolerances	5
3.2 Straight Screw Threads	4	SECTION 8. STRAIGHT THREAD FILLER AND DRAIN PLUGS	
SECTION 4. MATERIALS AND MANUFACTURE		8.1 Dimensions and Tolerances	5
4.1 Materials			

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

**FILLER, DRAIN AND PIPE PLUGS WITH DRYSEAL AMERICAN STANDARD TAPER
PIPE AND UNIFIED THREADS FOR AUTOMOTIVE AND INDUSTRIAL USE**

SECTION 1. SCOPE AND SIZE DESIGNATION

1.1 SCOPE. This standard relates to the following types of plugs:

- (a) Plugs with tapered threads
- (b) Plugs with straight threads

The plugs are intended primarily for automotive and related industrial use, and are screwed with the Dryseal SAE Short Taper Pipe Thread (PTF — SAE Short), or the Unified thread, for unpressurized applications (filler and drain plugs).

For pressurized applications, the plugs are screwed with the Dryseal American Standard Taper Pipe Thread (NPTF) (pipe plugs).

The standard specifies the dimensions and tolerances,

materials, and general manufacturing requirements of the plugs.

NOTE: Other plugs in common use are screwed with British Standard Pipe Taper threads and Unified threads. The BSP thread is similar to the PTF and NPTF threads, having the same TPI in the $\frac{1}{2}$ in and $\frac{3}{4}$ in size, and differing by not more than one TPI in the other sizes. BSP and PTF/NPTF threads are however not compatible, having different thread forms and methods of sealing, and the plugs are not interchangeable in any sizes.

1.2 SIZE DESIGNATION. For tapered plugs the size shall be designated by the nominal pipe size of the thread, e.g. $\frac{1}{4}$. For plugs with straight threads the size shall be designated by the nominal diameter of the thread.

SECTION 2. DIMENSIONS AND TOLERANCES APPLYING TO ALL PLUGS

2.1 GENERAL. Dimensions and tolerances as given in Tables 10-14, 20-24, 30-34 shall apply to the plugs in the finished condition, including the electroplating if specified. Tolerances on dimensions not otherwise limited shall be ± 0.010 in.

2.2 EXTERNAL HEXAGONS. The minimum across-corner dimensions of external hexagons shall be 1.092 times the nominal width across flats. The minimum length of flat shall be 0.43 times the nominal width across flats. The corner radii shall not exceed 0.005 in at maximum material condition.

2.3 EXTERNAL SQUARES. The minimum across-corner dimensions of external squares shall be 1.25 times

the nominal width across flats. The minimum length of flat shall be 0.75 times the nominal width across flats. The corner radii shall not exceed 0.005 in at maximum material condition.

2.4 WASHER FACE ON HEXAGON OUTSIDE HEAD PLUGS. The diameter of the washer face on hexagon outside head plugs shall be equal to 95 per cent of the maximum width across flats within a tolerance of ± 5 per cent.

2.5 CONTOUR. Details of contours and recesses shall be optional with manufacturer, provided that the tabulated dimensions are maintained, and serviceability of the fittings is not impaired.

SECTION 3. SCREW THREADS

3.1 PIPE THREADS.

3.1.1 General. Unless there is a specific authorization to the contrary, pipe threads used on filler and drain plugs shall conform to the Dryseal SAE Short Taper Pipe Thread (PTF — SAE Short).

Pipe threads used on pipe plugs (which are required to seal under pressure) shall conform to the Dryseal American Standard Taper Pipe Thread (NPTF), ANSI B2.2.

B3.1.2 Length of Thread. The length of full form thread shall be not less than that shown in Table 1.

TABLE 1
LENGTH FULL THREAD

Thread size in	NPTF		PTF—SAE	
	Length in	Threads	Length in	Threads
1/8	0.301	8.12	0.264	7.12
1/4	0.457	8.23	0.402	7.23
3/8	0.463	8.34	0.408	7.34
1/2	0.605	8.47	0.534	7.47
3/4	0.617	8.64	0.546	7.64
1	0.770	8.85	0.683	7.85

3.1.3 Chamfer. Pipe Threads shall be chamfered or rounded from the diameters shown in Table 2 for 1-1 1/2 threads.

3.2 STRAIGHT SCREW THREADS.

3.2.1 Thread Form. Straight threads shall conform to AS B133, Unified Screw Threads.

3.2.2 Unplated Plugs. Class 2A threads shall apply to unplated plugs.

3.2.3 Plated Plugs. The maximum diameters of Class 2A may be exceeded by an allowance of 30 per

TABLE 2
CHAFERS FOR PIPE THREADS

Nominal pipe thread size in	Chamfer diameter in	
	max.	min.
1/8	0.32	0.30
1/4	0.42	0.40
3/8	0.55	0.53
1/2	0.68	0.66
3/4	0.89	0.87
1	1.12	1.09

cent of Class 2A pitch diameter tolerance, thus increasing the diameter of the plated fittings to the basic diameter.

3.2.4 Chamfer. Straight threads shall be chamfered for 3/4-1 1/4 threads from the diameters shown in Table 3.

TABLE 3
CHAMFERS FOR STRAIGHT THREADS

Thread size	Chamfer diameter (in)	
	max.	min.
5/16-24	0.25	0.24
3/8-24	0.31	0.30
1/2-20	0.43	0.42
5/8-18	0.54	0.52
3/4-16	0.66	0.64
7/8-18	0.79	0.77
1 -18	0.92	0.90
1 1/4 -18	1.17	1.15
1 1/2 -18	1.42	1.40
1 3/4 -16	1.66	1.64
2 -16	1.91	1.89

SECTION 4. MATERIALS AND MANUFACTURE

4.1 MATERIALS. Plugs may be made from low carbon steel, cast iron, malleable iron, brass, bronze or aluminium alloy as specified by the purchaser.

4.2 MANUFACTURE. Plugs may be made by milling, casting, forging or upsetting.

4.3 WORKMANSHIP. Plugs shall be cleanly finished, free from burrs, flashes, sharp edges, slivers and loose scales.

4.4 FINISH. Electroplated plugs shall be cadmium or zinc plated in accordance with AS K132, Electroplated

Coatings on Threaded Components, Parts 1 and 2, and shall be passivated.

4.5 MARKING. Unless otherwise specified by the purchaser tapered thread plugs complying with this standard shall be dyed transparent orange-red. A basic dye stuff giving a waterproof fade-resistant colouring shall be used. The colour film shall be thin and even without undue build up in the threads.

NOTE: A dye-stuff solution of colour intensity 12 on the Gardner scale had been found suitable. Dyeing or spraying methods are applicable.

SECTION 5. ASSEMBLY

5.1 TAPERED FILLER AND DRAIN PLUGS.

Tapered filler and drain plugs dimensions are based on the length of the Dryseal SAE Short Taper Pipe Thread (PTF-SAE Short), and are primarily intended for assembly with Dryseal American Standard Taper (NPTF) or Dryseal American Standard Intermediate Straight (NPSI) internal pipe threads in installations where it is desirable to limit the entry of the small end of the plug.

5.2 PIPE PLUGS. Pipe plug dimensions are based on the length of the Dryseal American Standard Taper Pipe thread (NPTF), and are intended for assembly with all types of Dryseal Taper and Straight internal threads. It is the consensus of manufacturers and users that trouble-free assembly and pressure type joints (without lubricant or sealer) cannot be assured unless a full length thread is used.

5.3 STRAIGHT THREAD FILLER AND DRAIN PLUGS. Straight threads filter and drain plugs are intended for assembly in Class 2B internal threaded holes. See Fig. 1 for recommended hole configuration.

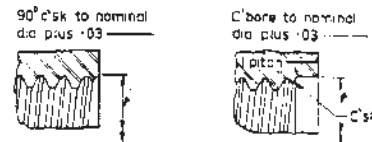


Fig. 1. RECOMMENDED HOLE CONFIGURATION FOR STRAIGHT THREAD PLUGS

SECTION 6. TAPERED FILLER AND DRAIN PLUGS

6.1 DIMENSIONS AND TOLERANCES. The dimensions and tolerances of tapered filler and drain plugs shall be as shown in Figs 10-14 and Tables 10-14 as follows:

Fig. 10, Table 10 Square Inside Head Tapered Filler and Drain Plugs
Fig. 11, Table 11 Hexagon Inside Head Tapered Filler and Drain Plugs

Fig. 12, Table 12 Hexagon Outside Head Tapered Filler and Drain Plugs
Fig. 13, Table 13 Square Countersunk Headless Tapered Filler and Drain Plugs
Fig. 14, Table 14 Hexagon Countersunk Headless Tapered Filler and Drain Plugs

SECTION 7. PIPE PLUGS

7.1 DIMENSIONS AND TOLERANCES. The dimensions and tolerances of pipe plugs shall be as shown in Figs 20-24 and Tables 20-24 as follows:

Fig. 20, Table 20 Square Inside Head Pipe Plugs
Fig. 21, Table 21 Hexagon Inside Head Pipe Plugs

Fig. 22, Table 22 Hexagon Outside Head Pipe Plugs
Fig. 23, Table 23 Square Countersunk Headless Pipe Plugs
Fig. 24, Table 24 Hexagon Countersunk Headless Pipe Plugs

SECTION 8. STRAIGHT THREAD FILLER AND DRAIN PLUGS

8.1 DIMENSIONS AND TOLERANCES. The dimensions and tolerances of straight thread filler and drain plugs shall be as shown in Figs 30-34 and Tables 30-34 as follows:

Fig. 30, Table 30 Hexagon Outside Head Straight Thread Filler and Drain Plugs
Fig. 31, Table 31 Square Inside Head Straight

Thread Filler and Drain Plugs

Fig. 32, Table 32 Hexagon Inside Head Straight Thread Filler and Drain Plugs
Fig. 33, Table 33 Square Socket Head Straight Thread Filler and Drain Plugs
Fig. 34, Table 34 Hexagon Socket Head Straight Thread Filler and Drain Plugs