

Australian Standard™

Copper and copper alloy waste fittings



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Australian Standard™

Copper and copper alloy waste fittings

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PREFACE

This Standard was prepared by the Standards Australia Committee WS-002, *Sanitary Plumbing Fittings*, to supersede AS 1589 — 1994.

The objective of this Standard is to include information on the functional aspects and basic designs of waste fittings and various industrial and editorial revisions according to Standards Australia requirements.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

This Standard is intended to allow for introduction of innovative designs, as applicable to waste components.

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STANDARDS AUSTRALIA

Australian Standard

Copper and copper alloy waste fittings

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for copper and copper alloy waste fittings (hereinafter referred to as fittings) for use in plumbing installations and includes traps, gullies, waste outlets, gratings, and connectors.

NOTE: Illustrations used in this Standard are diagrammatic only and have been chosen without prejudice.

1.2 APPLICATION

Copper and copper alloy waste fittings shall comply with the requirements of Section 1 and with the following Sections, as appropriate:

Section 2 — Copper and Copper Alloy Waste Traps and Gullies

Section 3 — Copper and Copper Alloy Waste Outlets and Gratings

Section 4 — Copper and Copper Alloy Waste Connectors.

1.3 REFERENCED DOCUMENTS

Referenced documents are listed in Appendix A.

1.4 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 3500.0 and those below apply.

1.4.1 Combination trap

A trap with a swivel joint to facilitate use as an 'S' trap or 'P' trap.

1.4.2 Component

That part, or a sub-assembly of, parts that contributes to the construction of a total assembly by choice or design which may offer variations of fitment for the application to the major element of the product, whether produced by that same manufacturer or not.

1.4.3 Loose coupling nut

A nut retained to the fitting by means of a shoulder and capable of turning relative to the fitting.

1.4.4 Type test

A test intended to prove the suitability and performance of a new material, a new manufacturing or processing technique, or a new design or size of joint or fitting.

NOTE: Type tests are generally performed when a change is made in material composition or method of manufacture.

1.5 DESIGN

1.5.1 Fittings

Fittings shall comply with the requirements specified in the appropriate Section of this Standard.

1.5.2 Alternative designs

Fitting types are not restricted to the basic designs specified in this Standard. Variations are accepted provided that the finished product complies with the performance requirements of this Standard.

1.6 MATERIALS

1.6.1 Copper

The following apply to copper materials:

- (a) Alloy designation C12200 shall be in accordance with AS 2738.
- (b) Tube shall be in accordance with AS 1432.

1.6.2 Copper alloy

The following apply to copper alloy materials:

- (a) Castings, including waste outlet connections, shall contain not less than 58% copper and not more than 1% aluminium.
- (b) Hot pressings shall comply with AS/NZS 1568.
- (c) Rod for machined parts shall comply with AS/NZS 1567.
- (d) Copper alloy tube shall comply with AS 3795 or AS 1572, alloy designation C26130.

Copper alloy tube shall be relieved of stresses after final fabrication so that, when tested in accordance with the mercurous nitrate test specified in AS 2136, the fitting shall not show signs of any attack when removed from the solution. For the purpose of this test, the entire copper alloy tube component shall be submerged in the test solution.

- (e) Dezincification-resistant copper alloy fittings shall comply with AS 2345.

1.6.3 Stainless steel

Stainless steel shall comply with the requirements of ASTM A240/A240M and shall have corrosion resistance at least equal to Grade 304.

1.6.4 Filler metals

Filler metals shall be one of the following brazing alloys:

- (a) Silver brazing alloy containing not more than 0.05% cadmium, complying with AS 1167.1.
- (b) Copper-phosphorus brazing alloy with a minimum of 1.8% silver, complying with AS 1167.1.

1.6.5 Sealing gaskets and rings

Materials for sealing gaskets and rings shall comply with the material and physical property requirements of AS 1646 or BS 2494.

1.6.6 Flexible diaphragms for pan connectors

Materials for diaphragms for pan connectors shall comply with the relevant requirements of AS 1646. For diaphragms manufactured from nitrile rubbers, the evaluation of material properties shall be in accordance with ASTM D 3187 or ASTM D 3848, as applicable, or BS 6064. For diaphragms manufactured from EPDM rubbers, the evaluation of material properties shall be in accordance with ASTM D 3568 or BS 6063. Other materials proven to be satisfactory for pan connectors may be acceptable. Any such materials shall comply with the properties set out in AS 1646 that are relevant to the connector design.

NOTE: Guidance on immersion data and selection of seal compositions for nitrile and EPDM rubbers can be found in ASTM D 2934.

1.6.7 Plastic components

Plastic components, including backnuts, shall comply with the material and physical property requirements of AS 2887.

1.7 CONNECTION ENDS

1.7.1 General

Connection ends of copper and copper alloy waste fittings shall have one of the forms specified in Clauses 1.7.2 to 1.7.7.

1.7.2 Plain spigots

Plain spigots shall comply with the dimensions to suit compatible piping products as appropriate.

1.7.3 Capillary socket ends

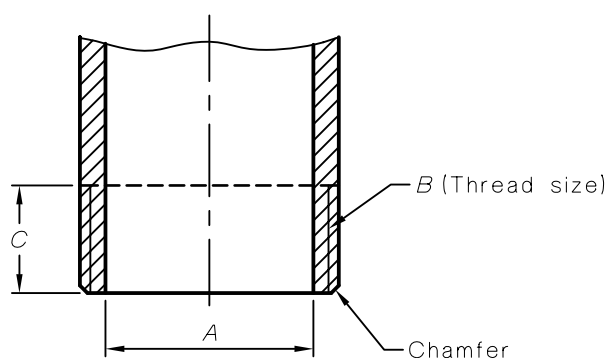
Capillary socket ends shall comply with the dimensions specified in AS 3688.

1.7.4 Threaded ends and thread stops

Threaded ends shall have a thread complying with the requirements of Clause 1.9 and shall conform to the dimensions shown in Figure 1.1 for externally threaded connection ends, Figure 1.2 for internally threaded connection ends, or Figure 1.3 for externally threaded union ends.

Internal fastening threads shall be provided with a stop at the end of the thread for at least 25% of the circumference. The stop shall be in one of the following forms:

- (a) Plain end-stop—a thread runout with at least 1.5 mm of unremoved material after the thread finishes.
- (b) Shoulder-stop—a shoulder at least 1.5 mm thick.



Nominal size DN	A Min. internal diameter within length C mm	B* Thread size designation	C Min. length of thread mm
32	31.8	1¼	12.7
40	38.1	1½	12.7
50	50.8	2	15.8
65	63.5	2½	17.4
80	76.2	3	20.6
100	101.6	4	25.4
150	152.4	6	28.5

* Nominal size of Series GA or Series GB thread to AS 1722.2

NOTE: Thread length (C) is measured from the end of the fitting, and includes the complete threads but excludes the runout thread. Runout thread is the part of the thread that is not fully formed at the roots.

FIGURE 1.1 EXTERNALLY THREADED CONNECTION ENDS

1.7.5 Loose nut union end

Loose nut union ends shall have a thread complying with the requirements of Clause 1.9, and shall conform to the dimensions given in Figure 1.4. When assembled the thread engagement shall be as given in AS 3688.

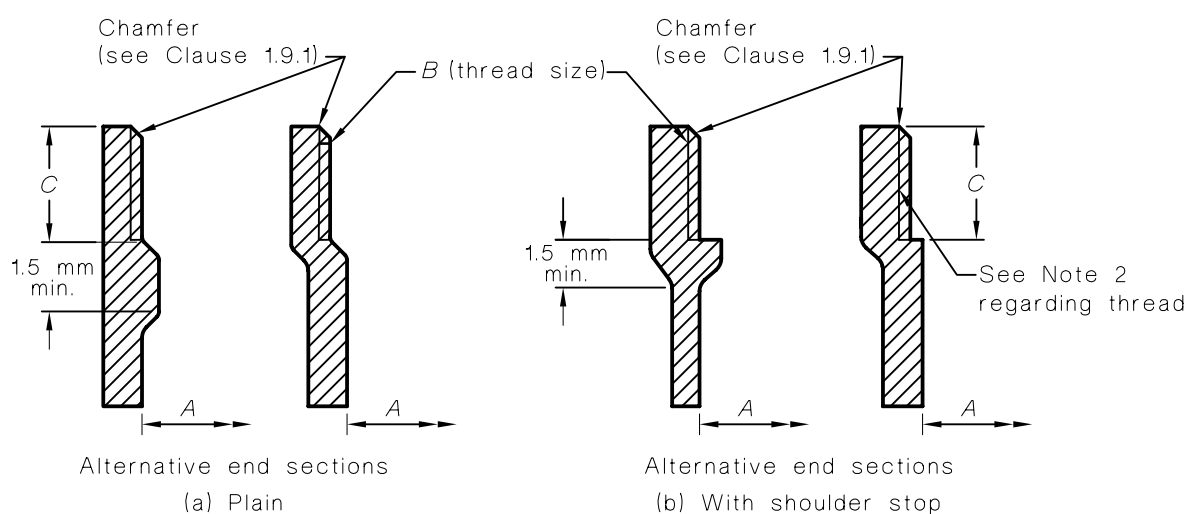
1.7.6 Compression union end assemblies

Compression union end assemblies shall have a thread complying with the requirements of Clause 1.9, and shall be designed for joining to one of the following pipes:

- Copper or copper alloy tube with dimensions complying with AS 1432 or AS 3795.
- UPVC pipe complying with AS/NZS 1477.
- Galvanized steel pipe complying with AS 1074.
- Stainless steel tube complying with AS 1769.

1.7.7 Rubber ring ends

Connection ends may incorporate a rubber ring end housed in a groove on the waste outlet, to enable a seal to be achieved when the connection end is inserted.



Nominal size DN	A Min. internal diameter within length C mm	B* Thread size designation	C Min. length of thread mm
32	31.8	1¼	12.7
40	38.1	1½	12.7
50	50.8	2	15.8
65	63.5	2½	17.4
80	76.2	3	20.6
100	101.6	4	25.4
150	154.2	6	28.5

* Nominal size of Series G thread to AS 1722.2.

NOTES:

- 1 Thread length (C) is measured from the end of the fitting, and includes the complete threads and the runout thread. Runout thread is the part of the thread that is not fully formed at the roots.
- 2 Thread relief may be provided between the thread and the shoulder stop.

FIGURE 1.2 INTERNALLY THREADED CONNECTION ENDS

1.8 INTERMEDIATE JOINTS

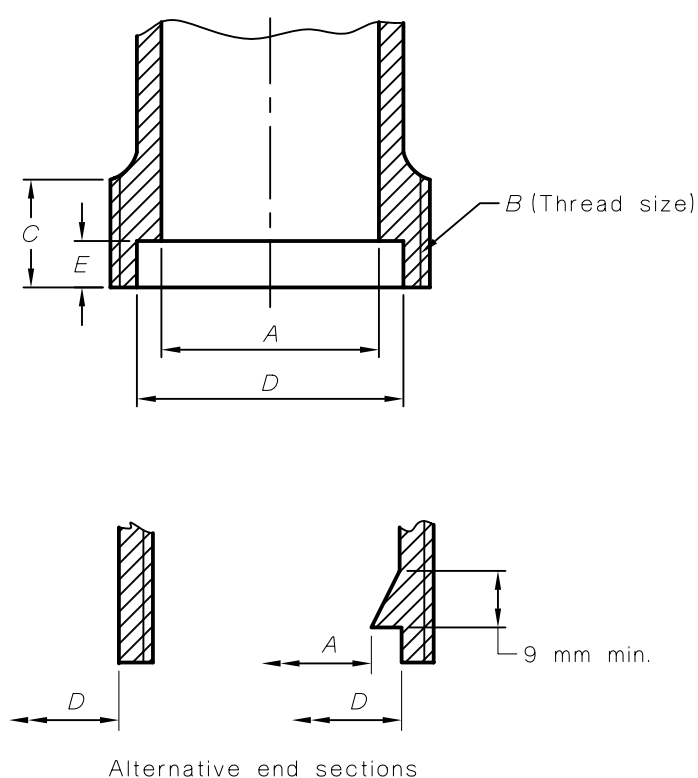
1.8.1 General

Intermediate joints shall comply with the test requirements of Clause 1.13, and Clauses 1.8.2 and 1.8.3, as appropriate.

1.8.2 Adjustable intermediate joints

Adjustable intermediate joints may take the form of compression union joints or other adjustable joints and may be incorporated into the body of the waste fitting.

Components of the joint shall comply to the requirements specified in the appropriate Section of this Standard.



Nominal size DN	A Internal diameter		B* Thread size designation	C Min. length of thread mm	D Min. internal diameter within length E mm	E Min. depth of recess mm
	Min. mm	Max. mm				
32	30.0	30.6	1¼	12.7	34.3	6.3
40	35.9	36.5	1½	12.7	40.2	6.3
50	47.7	48.3	2	15.8	52.0	6.3
65	61.7	62.3	2½	17.4	66.8	6.3
80	74.4	75.0	3	20.6	79.5	6.3
100	97.9	98.8	4	25.4	103.6	6.3
150	145.0	146.0	6	28.5	152.8	6.3

* Nominal size of Series GA or Series GB thread to AS 1722.2.

NOTE: D maximum is determined by minimum wall thickness requirement (see Table 1.2).

FIGURE 1.3 EXTERNALLY THREADED UNION ENDS

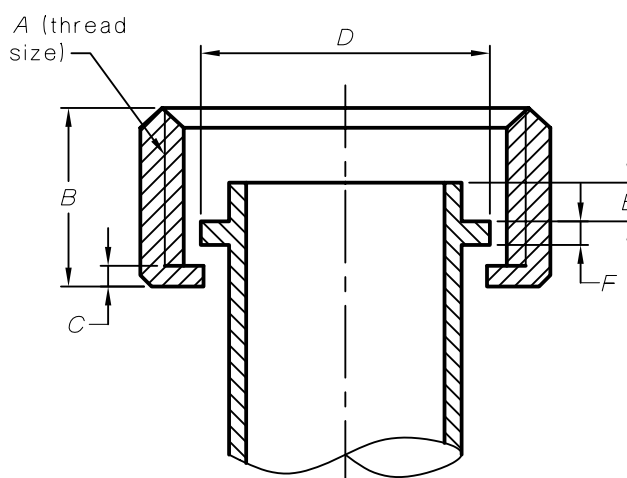
1.8.3 Fixed intermediate joints

Fixed intermediate joints (i.e. those not intended to be adjustable) shall be joined by one of the following methods:

- Capillary joints complying with the requirements of Clauses 1.7.1 and 1.7.2, and joined using a brazing alloy.
- Capillary joints other than those specified in Item (a), provided that the length of engagement is not less than 3 mm, and the joint is made using brazing alloy.

- (c) Threaded joints complying with AS 3688 which, after assembly, are brazed using a brazing alloy.
- (d) Other permanently assembled joint designs, provided that the joint is capable of withstanding the tests specified in Clause 1.13 both before and after any plating process.

Sealing rings or washers may be used as part of the assembled joint, provided that the fitting has no capillary connection ends or, during the manufacturing process, no heating (e.g. during the plating process) of the fabricated joint occurs after the joint is made.



Nominal Size DN	A	B		C	D		E		F
	Thread size designation	Min. mm	Max. mm	Min. mm	Min. mm	Max. mm	Min. mm	Max. mm	Min. mm
32	1¼	13.7	14.7	2.9	37.80	38.55	5.5	6.7	2.0
40	1½	14.9	15.9	2.9	43.70	44.45	5.5	6.7	3.2
50	2	15.7	16.7	2.9	55.50	56.25	5.5	6.7	3.2
65	2½	21.0	23.0	3.2	71.00	71.50	5.5	6.7	3.2
80	3	21.0	23.0	3.2	83.70	84.20	5.5	6.7	3.2
100	4	25.0	27.0	3.2	108.80	109.30	5.5	6.7	3.2
150	6	27.0	29.0	3.2	159.10	159.60	5.5	6.7	3.2

* Nominal size of Series GA or Series GB thread to AS 1722.2

FIGURE 1.4 LOOSE NUT UNION ENDS

1.8.4 Flexible/expansion joints

Waste outlets incorporating a flexible joint for expansion/movement purposes shall comply with Appendix B, in addition to the general requirements of this Standard.

1.9 THREAD FORMS

1.9.1 General

After manufacture is completed, including any plating operation, all threads shall be of the size specified and shall comply with the requirements of Clauses 1.9.2 and 1.9.3, as appropriate. Threads shall also comply with the following:

- (a) Threads for connection ends to be right-hand and to be chamfered at the face to an included angle of not less than 60° and not greater than 90°, for not less than one-half a thread depth or more than one full thread depth.
- (b) Back nuts for waste outlet fittings shall be suitable for use with fittings that have threads to AS 1722.2 and assessed for suitability by means of torque test requirements specified in Clause 1.13.3.

1.9.2 Connection ends

Thread forms for threaded and union connection ends for making a threaded or union joint with pipes and fittings threaded with pipe threads, in accordance with AS 1722.1 and AS 1722.2, shall be as follows:

- (a) Fastening pipe threads shall comply with AS 1722.2.
- (b) Sealing pipe threads shall comply with the requirements for external, tapered pipe threads (Series R) of AS 1722.1.
- (c) Internal sealing pipe threads shall not be used for connection ends.

1.9.3 Other than connection ends

Thread forms for intermediate threaded joints and compression union nuts, which are not intended for threading to another threaded pipe or fitting, shall comply with the requirements of Clause 1.13.3.

The pitch of the thread shall be not less than 0.9 mm.

The number of full threads engaged for intermediate joints and compression union connection ends when tightened shall be not less than that given in AS 3688.

1.10 WALL THICKNESS

Except where other dimensions apply, the following requirements are applicable to wall thickness:

- (a) *Minimum wall thickness* At any point, the wall thickness of the fitting shall be not less than the value given in Table 1.1 or Table 1.2, as appropriate to the nominal size of the section of the fitting.
- (b) *Tapered fittings* Minimum wall thickness of the tapered portion shall be based on the requirement for the nominal size of the larger connection end.
- (c) *Branch fittings* Minimum wall thickness in each portion of the fitting shall be based on the requirement for the nominal size of each branch connection end.
- (d) *Fabricated fittings* Minimum wall thickness at any point of a component of a fabricated fitting shall be not less than the value given in Table 1.1, as appropriate to the nominal size of the largest connection end of the component.

TABLE 1.1
WALL THICKNESS OF PLAIN SECTIONS

Nominal size DN	Minimum wall thickness at any point, mm			
	Cast	Hot pressed and shell-moulded	Tubular (see Note)	
			Type B application	Type D application
32	1.5	1.3	1.09	0.81
40	1.5	1.3	1.09	0.81
50	1.5	1.3	1.09	0.81
65	1.9	1.7	1.09	0.81
80	1.9	1.7	1.47	1.09
90	2.3	2.1	1.47	1.09
100	2.3	2.1	1.47	1.09
125	3.1	2.9	1.47	1.27
150	3.1	2.9	1.83	1.47

NOTE: These dimensions refer to fittings that comply with the thickness requirements for Type B and Type D tubes of AS 1432 and AS 3795.

TABLE 1.2
WALL THICKNESS OF THREADED SECTIONS

Nominal size DN	Minimum wall thickness at any point including thread, except where other dimensions are specified, mm			
	Internally threaded sections		Externally threaded sections	
	Cast	Hot-pressed and shell-moulded	Cast	Hot-pressed
32	3.7	3.3	3.4	3.0
40	3.7	3.3	3.4	3.0
50	3.7	3.3	3.4	3.0
65	4.1	3.7	3.8	3.4
80	4.1	3.7	3.8	3.4
90	4.5	4.1	4.2	3.8
100	4.5	4.1	4.2	3.8
125	5.3	4.9	5.0	4.6
150	5.3	4.9	5.0	4.6

1.11 PLATING AND OTHER SURFACE FINISHES

Plating and other finishes may be applied to surfaces in accordance with manufacturer's requirements.

1.12 FREEDOM FROM DEFECTS

Finished fittings shall comply with the following requirements:

- (a) In all respects sound and free from metal folds, laps, laminations, and blow holes that would clearly affect the performance of the fitting in service.
- (b) Free of pits on jointing surfaces.
- (c) Clean and free of sand and swarf.
- (d) Free from burrs, fins, and sharp edges.

For the purpose of this Standard, the fitting's ability to pass the strength test of Clause 1.13.2 shall be taken as an indication of its ability to perform in service.

1.13 TEST REQUIREMENTS

1.13.1 General

Tests specified in Sections 1, 2, 3 and 4 shall be performed on fittings after all manufacturing operations have been completed and before any plating or coating operations.

NOTE: For test requirements applicable to specific fittings, see Sections 2, 3 or 4, as appropriate.

1.13.2 Strength test

(Applicable only to fittings with fixed intermediate joints and fittings suspected to be free of metal folds, laps, laminations, blow holes, or other structural defects). When tested in accordance with the strength test of Appendix C, the fitting shall show no sign of weeping, cracking, leakage, or other failure.

1.13.3 Torque test

When tested in accordance with Appendix D, all threaded components of connection ends and all adjustable intermediate joints and fixed intermediate joints referred to in Clause 1.8.3(d) and including the backnut to waste outlet fittings, shall be capable of being tightened without damage to the components or the fitting, or jumping or stripping of threads when a torque, as given in Table D1 of Appendix D, is applied.

1.14 MARKING

1.14.1 Space for marking

Provision shall be made on every product for the reception of the stamp or mark or tamper-proof sticker of a testing authority or certifying body. The area shall be of sufficient size to accommodate the stamp or sticker.

1.14.2 Components

As a minimum requirement, components shall bear the manufacturer's identification mark. The only exception being, in the event the component is too small to be marked effectively with the manufacturer's identification mark and the other marking as defined in this Standard, then the item offered for sale shall be suitably packaged and marked in accordance with the marking requirements nominated.