DR 92154

1993 ED.

AS 1167.1—1984
UDC 621.791.3

AS 1167
Welding and brazing—Filler metals

AS 1167.1—1993
Filler metal for brazing and braze welding
(In Professional Package 36)
7pp *CC*
Specifies the chemical composition and approximate melting ranges of 29 types of brazing alloys grouped as silver brazing, copper-phosphorus brazing, copper brazing, and aluminium brazing alloys. A uniform system of colour coding for the purposes of identification is included together with a table of the equivalent British, American, German and ISO designations.
Committee WD/2: Supersedes AS 1167.1—1984: Draft for Comment DR 92154: Publication date 1993-05-17: ISBN 0 7262 8087 9.

Australian Standard 167.1—1984

WELDING AND BRAZING—FILLER METALS

Part 1—FILLER METAL FOR BRAZING AND BRAZE WELDING

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

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This Australian standard was prepared by Committee WD/2, Electrodes and Filler Rods. It was approved on behalf of the Council of the Standards Association of Australia on 17 April 1984 and published on 3 August 1984.

The following interests are represented on Committee WD/2:

Australian Gas Association

Australian Institute of Petroleum Limited

Australian Welding Institute

Australian Welding Research Association

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

Department of Defence

Department of Defence Support

Department of Industrial Relations, N.S.W.

Department of Labour and Industry, Vic.

Lloyd's Register of Shipping

Metal Trades Industry Association of Australia

Metropolitan Water, Sewerage and Drainage Board, N.S.W.

Railways of Australia Committee

This standard was issued in draft form for comment as DR 83117.

Melbourne Office

STANDARDS ASSOCIATION OF AUSTRALIA

Date 16 June 1965 File No. WD/2/2

Memo. by N.R. KOLTA To JENNY RITCHIE

Re ~~Letter~~ Telex AS 1167.1 - 1964 of date 17 June 1965

Dear Jenny

With reference to your above telex concerning colour coding to AS 2700, please find enclosed copy of the relevant section of AS 1167.1 showing the equivalent colour No's in BS 381C - 1980 (or 1964 edition).

Subsequent to the publication of AS 1167.1, some colour No's of AS 2700 have been changed, the new numbers of one shown as appropriate.

Kind Regards

Nabil Kolta

A31

TABLE 2
COPPER-PHOSPHORUS BRAZING ALLOYS

1	2		3	4		5	6	7	8	
Alloy classification	Chemical composition*, percent					Melting range†, °C		Colour identification		
	Silver		Copper	Phosphorus		Solidus	Liquidus	Colour	AS 2700 Colour No	Equivalent No. in BS 381C - 1980
	min.	max.		min.	max.					
B1	—	—	Remainder	7.00	8.25	705	800	Signal Red	R13	537
B2	1.80	2.20	Remainder	6.00	7.00	645	704	Canary	Y11	309
B3	4.75	5.25	Remainder	5.75	6.50	646	740	Silver	—	
B4	14.50	15.50	Remainder	4.50	5.50	645	700	Tan	X51	410

*Max. impurity levels applicable to all types of alloys are as follows:

Cadmium	0.05 percent
Zinc	0.05 percent
Lead	0.02 percent
Aluminium	0.01 percent
Tellurium	0.005 percent
Bismuth	0.001 percent
Total of all impurities	0.2 percent

†The melting range shown is for general information only and does not constitute a test requirement for the product concerned.

TABLE 1
SILVER BRAZING ALLOYS

1	2		3		4		5		6		7		8	9	10	11
Alloy classification	Chemical composition*, percent												Melting range† °C		Colour identification	
	Silver		Copper		Zinc		Cadmium		Tin		Nickel		Solidus	Liquidus	Colour	AS 2700 colour no
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.				
A1	71.0	73.0	27.0	29.0	—	—	—	0.05	—	—	—	—	780	780	Orange	X14
A2	55.0	57.0	21.0	23.0	15.0	19.0	—	0.05	4.5	5.5	—	—	618	650	White	—
A3	49.0	51.0	33.0	35.0	14.0	18.0	—	0.05	—	—	—	—	688	774	Dusty Pink	P21
A4	49.0	51.0	14.5	16.5	14.5	18.5	17.0	19.0	—	—	—	—	620	640	Palm green	G34
A5	49.0	51.0	14.5	16.5	13.5	17.5	15.0	17.0	—	—	2.5	3.5	645	685	Light Mid grey	N35
A6	44.0	46.0	14.0	16.0	14.0	18.0	23.0	25.0	—	—	—	—	607	620	Oriental blue	T32
A7	41.0	43.0	16.0	18.0	15.0	17.0	24.0	26.0	—	—	—	—	610	620	Black	—
A8	39.0	41.0	29.0	31.0	26.0	30.0	—	0.05	—	—	1.5	2.5	660	780	Gold	—
A9	37.0	39.0	19.0	21.0	21.0	23.0	19.0	21.0	—	—	—	—	605	650	Pewter	N51
A10	34.0	36.0	25.0	27.0	19.0	23.0	17.0	19.0	—	—	—	—	607	702	Royal blue	B12
A11	34.0	36.0	21.0	23.0	22.0	26.0	18.0	22.0	—	—	—	—	610	670	Shamrock	G22
A12	29.0	31.0	27.0	29.0	19.0	23.0	19.0	23.0	—	—	—	—	600	690	Golden yellow	Y14
A13	43.0	45.0	29.0	32.0	24.0	28.0	—	0.05	—	—	—	—	675	735	Violet	P13
A14	29.0	31.0	37.0	39.0	30.0	34.0	—	0.05	—	—	—	—	680	770	Straw	Y24
A15	38.0	40.0	29.5	31.5	26.0	30.0	—	0.05	2.25	2.75	—	—	650	705	Dark brown	X65
A16	29.0	31.0	34.5	36.5	30.0	34.0	—	0.05	2.25	2.75	—	—	—	—	Lilac	P33

Dusty Pink

New Nos of AS 2700

	Equivalent No in BS 381C-1980
X15	567
P81	—
G44	483
	216
	627
T22	174 *
	—
	—
N63	632
	110
G23	221
	356
	796
	352
	412
P23	497

*The maximum impurity levels applicable to all types of alloys are as follows:

Aluminium + beryllium	0.0015 percent
Bismuth	0.005 percent
Titanium + zirconium	0.005 percent
Tellurium	0.005 percent
Cadmium	0.05 percent
Phosphorus	0.010 percent
Arsenic + indium + antimony + tin (as an impurity)	0.10 percent
Other elements present as impurities	0.05 percent
Total of all impurities	0.25 percent

†The melting range shown is for general information only and does not constitute a test requirement for the product concerned.

* Equivalent No in BS 381C-1964

8	9	10		11	12	13	14	15	16	
						Melting range† °C		Colour identification‡		
Tin	Iron	Nickel inc. cobalt		Phosphorus	Zinc	Solidus	Liquidus	Colour	AS 2700 colour no	Equivale[illegible] in BS3[illegible] 198[illegible]
max.	max.	min.	max.	max.						
1.0	0.25	—	—	—	Rem	870	900	White	—	
0.75 to 1.10	0.25 to 1.25	—	—	—	Rem	870	900	Aqua	B25	117
0.5	0.5	9.0	11.0	0.25	Rem	920	940	Claret	R65 R55	54[illegible]
1.5	0.50	—	—	—	1.5 max.	970	1020	Not coloured	—	

* Equivalent No. in BS 381 C [illegible]

11	12	13	14	15	16	17	18	19	20	
						Melting range, °C*		Tip colour identification		
				Other elements						
Tin	Beryllium	Chromium	Titanium	Each	Total	Solidus	Liquidus	Colour	AS 2700 colour no	Equivale[illegible] in BS3[illegible] 1980
max.	max.	max.	max.	max.	max.					
—	0.0008	—	—	0.05	0.15	565	595	Golden yellow	Y14	356
—	0.0008	—	0.20	0.05	0.15	565	630	Not coloured†	—	
—	0.0008	—	—	0.05	0.15	565	610	Signal red	R13	537

AUSTRALIAN STANDARD

WELDING AND BRAZING—FILLER METALS

Part 1
FILLER METAL FOR BRAZING AND BRAZE WELDING

AS 1167.1—1984

AS 1167 first published 1971
Part 1 separately published 1984

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 3406 0

PREFACE

This standard was prepared by a subcommittee of the Association's Committee on Electrodes and Filler Rods to supersede AS 1167—1971, Alloy Filler Rods for Brazing.

This standard has as its object the specification of suitable compositions for brazing filler metal to be used under Australian conditions. It includes requirements for chemical composition and analysis, packing and marking. In addition, a standard form of colour coding for identification purposes has been adopted, designed to be mutually acceptable to manufacturers and users. The methods of chemical analysis are in accordance with those in the ASTM Book of Standards.

This standard is limited to the brazing alloys currently in general use in Australia. Some additional alloys have been included in Table 1 of this standard that were not in Table 1 of AS 1167—1971; however, the tables do not include all the brazing alloys specified in BS 1845, Specification for Filler Metals for Brazing, nor in ANSI A5.8, Specification for Brazing Filler Metals, to which reference should be made for alloys that are not covered by the Australian standard. Attention is drawn also to AS 1588, Filler Rods for Welding, which specifies alloys that, although intended for a different purpose, have similar compositions to certain alloys in this standard.

The committee decided that because many filler metals are available in more than one form, the form in which the material is required should be specified by the purchaser.

Mechanical properties of brazed joints are not covered in this standard but will generally be found in relevant application standards such as AS 1200, SAA Boiler Code, or AS 2468, Steel Cylinders for Compressed Gases—Brazed—0.1 kg to 11 kg.

Other Australian standards dealing with consumables are as follows:

AS 1552	Classification of Covered Electrodes
AS 1553	Covered Electrodes for Welding Part 1—Low Carbon Steel Electrodes for Manual Metal-arc Welding of Carbon and Carbon-manganese Steels
AS 1586	Low Alloy Steel Covered Electrodes for Manual Metal-arc Welding
AS 1588	Filler Rods for Welding*
AS 1858	Electrodes and Fluxes for Submerged-arc Welding of Carbon and Low Alloy Steels
AS 2203	Carbon Steel Electrodes, Cored (for Arc Welding)
AS 2576	Welding Consumables for Build-up and Wear Resistance—Classification System
AS 2717	Welding—Electrodes—Gas Metal Arc Part 1—Ferritic Steel Electrodes

*In course of revision, to be issued as Part 2 of this standard.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
WELDING AND BRAZING—FILLER METALLS

PART 1—FILLER METAL FOR BRAZING AND BRAZE WELDING

1 SCOPE. This standard specifies requirements for filler metals in all forms for brazing and braze welding processes.

NOTE: In this standard the term brazing is used to imply both processes.

2 REFERENCED DOCUMENTS. The following documents are referred to in this standard:

AS 1674	Fire Precautions in Cutting, Heating and Welding Operations
AS 2700	Colour Standards for Paints and Related Materials*
AS Z5	Glossary of Metal Welding Terms and Definitions Part 1— General Terms for Welding, Brazing and Cutting
ASTM	Annual ASTM Book of Standards Part 12—Chemical Analysis of Metals; Sampling and Analysis of Metal Bearing Ores
AWRA-AWI	Technical Note 7—Health and Safety in Welding.

3 DEFINITIONS. For the purpose of this standard, the definitions given in AS Z5, Part 1, and the following apply:

Filler metal—brazing filler metal in the form of rod, wire, strip, formed shapes and powder including powder in paste form.

4 CHEMICAL COMPOSITION AND ANALYSIS. The chemical composition of the brazing alloy, determined in accordance with the relevant methods in the Annual Book of ASTM Standards, Part 12, or in accordance with other methods not less accurate, shall comply with the appropriate requirements given in Tables 1 to 4.

NOTE: Appendix A gives Australian alloy designations and their British, American, German and ISO equivalents.

5 IDENTIFICATION. Where colour coding is employed to identify the composition of the individual items of filler metal, the colours employed shall comply with the appropriate requirement given in Tables 1 to 4.

6 FORM AND SIZE.

NOTE: Specification of the required form and size is a matter for the purchaser at the time of placing the order. If required, filler rods can be supplied coated with a suitable brazing flux.

7 PACKING. Brazing filler metals shall be packed to guard against damage and deterioration during transportation, handling and storage.

8 WARNINGS.

8.1 General safety warning. A label shall be attached or a statement displayed with at least the following warning:

*In course of preparation.

WARNING: Protect yourself and others. Read and understand this label.

FUMES AND GASES—can be dangerous to your health.

ARC RADIATION—can injure eyes and burn skin.

ELECTRIC SHOCK—can kill.

* Read and understand the manufacturer's instructions and your employer's safety practices.
* Keep your head out of the fumes.
* Use enough natural ventilation, exhaust ventilation at the fume source, or both, to keep fumes and gases from the breathing zone and the general area.
* Wear correct eye, ear and body protection.
* Do not touch live electrical parts.
* See AS 1674 and AWRA-AWI Technical Note 7 or your electrode supplier's recommendations for further information.

DO NOT REMOVE OR COVER THIS WARNING