

JIS

JAPANESE INDUSTRIAL STANDARD

**Aluminium and Aluminium Alloy
Bus Conductors**

Ⓢ JIS H 4180—1990

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JAPANESE INDUSTRIAL STANDARD

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Aluminium and Aluminium Alloy Bus
Conductors

H 4180-1990

1. Scope

This Japanese Industrial Standard specifies aluminium and aluminium alloy plate and tubular conductors (hereafter referred to as "conductors").

Remark: The units and numerical values given in { } in this Standard are based on the International System of Units (SI) and are appended for informative reference.

Further, the traditional units and numerical values shall be replaced by the accompanying SI units and the relevant converted values given in { } on January 1, 1991.

2. Types and Symbols

The conductors shall be classified as specified in Table 1.

Further, the extruded plate conductors and the tubular conductors shall be classified each into two grades according to the dimensional tolerances.

Applicable Standards: See page 22.

Table 1. Types and Symbols

Type		Grade	Shape of edge	Symbol
Alloy number	Classification by manufacturing method			
1060	Rolled plate conductors	—	Square edge	A 1060 PB
	Extruded plate conductors	Normal grade	Square edge	A 1060 SB
			Round edge	A 1060 SBC
		Special grade	Square edge	A 1060 SBS
			Round edge	A 1060 SBSC
	Rolled plate conductors	—	Square edge	A 6101 PB
6101	Extruded plate conductors	Normal grade	Square edge	A 6101 SB
			Round edge	A 6101 SBC
		Special grade	Square edge	A 6101 SBS
			Round edge	A 6101 SBSC
	Tubular conductors	Normal grade	—	A 6101 TB
		Special grade	—	A 6101 TBS
6061	Tubular conductors	Normal grade	—	A 6061 TB
		Special grade	—	A 6061 TBS
6063	Tubular conductors	Normal grade	—	A 6063 TB
		Special grade	—	A 6063 TBS

Remark: The symbols indicating the temper grade⁽¹⁾ shall be affixed to the above symbols.

Note ⁽¹⁾ The temper grade shall be as specified in JIS H 0001.

3. Quality

3.1 Appearance The conductors shall be correct in shape, adequately finished, uniform in quality, and free from defects harmful to the use of the products.

3.2 Chemical Composition The chemical composition of conductors shall conform to Table 2.

Table 2. Chemical Composition

Alloy number	Chemical composition %										Other elements ⁽²⁾		Al
	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	B		Individual	Total	
1060	0.25 max.	0.35 max.	0.05 max.	0.03 max.	0.03 max.	—	0.05 max.	0.03 max.	—		0.03 max.	—	99.60 min.
6101	0.30 to 0.7	0.50 max.	0.10 max.	0.03 max.	0.35 to 0.8	0.03 max.	0.10 max.	—	0.06 max.		0.03 max.	0.10 max.	Remainder
6061	0.40 to 0.8	0.7 max.	0.15 to 0.40	0.15 max.	0.8 to 1.2	0.04 to 0.35	0.25 max.	0.15 max.	—		0.05 max.	0.15 max.	Remainder
6063	0.20 to 0.6	0.35 max.	0.10 max.	0.10 max.	0.45 to 0.9	0.10 max.	0.10 max.	0.10 max.	—		0.05 max.	0.15 max.	Remainder

Note (2) The other elements shall be analyzed only where their presence is anticipated or where signs of their presence in quantities exceeding the specified range are shown in the normal procedure of analysis.

3.3 Mechanical Properties The mechanical properties (tensile strength, proof stress, elongation and bending) shall conform to Table 3. When the bending test is performed, no cracks shall occur on the outer surface of the bend. However, the proof stress and bending tests shall be applied only to products for which the purchaser particularly requires such tests.

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Table 3. Mechanical Properties (Applicable till the end of 1990)

Symbol	Temper grade	Tensile test				Bend test	
		Thickness mm	Tensile strength kgf/mm ² {N/mm ² }	Proof stress kgf/mm ² {N/mm ² }	Elongation %	Thickness mm	Inside radius
A 1060 PB	H 14 H 24	0.8 or over up to and incl. 1.3	8.5 min. {83 min.}	6.5 min. {64 min.}	4 min.		
		Over 1.3 up to and incl. 2.9	8.5 min. {83 min.}	6.5 min. {64 min.}	5 min.	0.8 or over up to and incl. 12	Equal to thickness
		Over 2.9 up to and incl. 12	8.5 min. {83 min.}	6.5 min. {64 min.}	6 min.		
A 1060 PB	H 112	4 or over up to and incl. 6.5	7.5 min. {74 min.}	3.5 min. {34 min.}	10 min.		
		Over 6.5 up to and incl. 13	7.0 min. {69 min.}	3.5 min. {34 min.}	10 min.	6 or over up to and incl. 16	Equal to thickness
		Over 13 up to and incl. 25	6.0 min. {59 min.}	2.5 min. {25 min.}	16 min.		
A 1060 SB A 1060 SBC A 1060 SBS A 1060 SBSC	H 112	Over 25 up to and incl. 50	5.5 min. {54 min.}	2.0 min. {20 min.}	22 min.		
		3 or over up to and incl. 30	6.0 min. {59 min.}	3.0 min. {29 min.}	25 min.	3 or over up to and incl. 16	Equal to thickness

Table 3 (Continued)

Symbol	Temper grade	Tensile test				Bend test	
		Thickness mm	Tensile strength kgf/mm ² {N/mm ² }	Proof stress kgf/mm ² {N/mm ² }	Elongation %	Thickness mm	Inside radius
A 6101 PB A 6101 SB A 6101 SBC A 6101 SBS A 6101 SBSC	T 6	3 or over up to and incl. 7	20 min. {196 min.}	17 min. {167 min.}	10 min.	3 or over up to and incl. 9	2 times the thickness
		Over 7 up to and incl. 17	20 min. {196 min.}	17 min. {167 min.}	12 min.		
		Over 17 up to and incl. 30	18 min. {176 min.}	15 min. {147 min.}	14 min.	Over 9 up to and incl. 16	2.5 times the thickness
A 6101 SB A 6101 SBC A 6101 SBS A 6101 SBSC	T 7	3 or over up to and incl. 17	14 min. {137 min.}	11 min. {108 min.}	10 min.	3 or over up to and incl. 13	Equal to thickness
						Over 13 up to and incl. 17	2 times the thickness
A 6101 TB A 6101 TBS	T 6	3 or over up to and incl. 12	20 min. {196 min.}	17 min. {167 min.}	10 min.		
		Over 12 up to and incl. 16	18 min. {176 min.}	15 min. {147 min.}	14 min.		
A 6061 TB A 6061 TBS	T 6	3 or over up to and incl. 6	27 min. {265 min.}	25 min. {245 min.}	8 min.		
		Over 6 up to and incl. 16	27 min. {265 min.}	25 min. {245 min.}	10 min.		
A 6063 TB A 6063 TBS	T 6	3 or over up to and incl. 16	21 min. {206 min.}	18 min. {178 min.}	8 min.		

Remark: The mechanical properties of products having dimensions outside the specified range of thickness shall be as agreed upon by the parties concerned with delivery.

3.4 Electric Conductivity The electric conductivity of conductors shall conform to Table 4.

Table 4. Electric Conductivity

Symbol	Temper grade	Electric conductivity %
A 1060 PB	H 14 H 24	61.0 min.
	H 112	
A 1060 SB	H 112	
A 1060 SBC		
A 1060 SBS		
A 1060 SBSC		
A 6101 PB	T 6	55.0 min.
A 6101 SB		
A 6101 SBC		
A 6101 SBS		
A 6101 SBSC		
A 6101 SB	T 7	57.0 min.
A 6101 SBC		
A 6101 SRS		
A 6101 SBSC		
A 6101 TB	T 6	55.0 min.
A 6101 TBS		
A 6061 TB	T 6	39.0 min.
A 6061 TBS		
A 6063 TB	T 6	51.0 min.
A 6063 TBS		