

JIS

JAPANESE INDUSTRIAL STANDARD

**Aluminium and Aluminium Alloy
Welded Pipes and Tubes**

Ⓔ **JIS H 4090**—1990

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In the event of any doubt arising,
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Aluminium and Aluminium Alloy
Welded Pipes and Tubes

H 4090-1990

1. Scope

This Japanese Industrial Standard specifies the aluminium and aluminium alloy welded pipes and tubes prepared by welding aluminium and aluminium alloy strips and aluminium alloy brazing sheet by high-frequency induction welding (hereafter referred to as "welded pipes and tubes") and those prepared by welding aluminium and aluminium alloy sheets by inert gas shielded arc welding or other equivalent welding methods (hereafter referred to as "arc welded pipes and tubes").

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 with numerical values and the accompanying SI units with converted numerical values given in { } in this Standard shall be replaced by the units with the relevant converted values given in Annex on January 1, 1991.

2. Types and Designations

The welded and arc welded pipes and tubes shall be classified each into 9 types according to the chemical composition as given in Table 1, and the welded pipes and tubes shall further be subdivided into the normal and the special classes according to the degree of dimensional tolerances.

Applicable Standards: See page 30.

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Table 1. Classification

Type		Designation	
Alloy number	Classification by manufacturing process	Normal class	Special class
1050	Welded pipes and tubes	A 1050 TW	A 1050 TWS
1100		A 1100 TW	A 1100 TWS
1200		A 1200 TW	A 1200 TWS
3003		A 3003 TW	A 3003 TWS
3203		A 3203 TW	A 3203 TWS
BA 11		BA 11 TW	BA 11 TWS
BA 12		BA 12 TW	BA 12 TWS
5052		A 5052 TW	A 5052 TWS
5154		A 5154 TW	A 5154 TWS
1070	Arc welded pipes and tubes	A 1070 TWA	
1050		A 1050 TWA	
1100		A 1100 TWA	
1200		A 1200 TWA	
3003		A 3003 TWA	
3203		A 3203 TWA	
5052		A 5052 TWA	
5154		A 5154 TWA	
5083		A 5083 TWA	

Remark: The temper grade symbol⁽¹⁾ should follow the above designations.

Note (1) For temper grades, refer to JIS H 0001.

3. Quality

3.1 Appearance The welded and the arc welded pipes and tubes shall have correct shapes, workmanlike finishes and uniform quality, and be free from defects harmful to the use of the products.

The arc welded pipes and tubes shall meet the following quality requirements.

- (1) The base metal shall be formed into a tubular shape and have smooth surfaces.
- (2) Bead surfaces without a particular finish shall be as smooth as possible and uniform in shape.
- (3) The height of reinforcement of weld in butt welding shall conform to 5.8 (3) of JIS Z 3604.

3.2 Quality of Welded Pipes and Tubes

3.2.1 Mechanical Properties The mechanical properties of the welded pipes and tubes (tensile strength, proof stress and elongation) shall meet the requirements of Table 2. However, the proof stress are applicable only when particularly required by the purchaser.

Table 2. Mechanical Properties of Welded Pipes and Tubes (Applicable till the end of 1990)

Alloy designation	Temper grade ⁽¹⁾	Tensile test			
		Wall thickness mm	Tensile strength kgf/mm ² {N/mm ² }	Proof stress kgf/mm ² {N/mm ² }	Elongation %
A 1050 TW A 1050 TWS	0	0.3 or over up to and incl. 0.5	6.0 {59} or over up to and incl. 10 {98}	—	15 min.
		Over 0.5 up to and incl. 0.8		—	20 min.
		Over 0.8 up to and incl. 1.3		2.0 {20} min.	25 min.
		Over 1.3 up to and incl. 3		2.0 {20} min.	30 min.
	H 14 H 24 ⁽²⁾	0.3 or over up to and incl. 0.5	9.5 {94} or over up to and incl. 13 {127}	—	2 min.
		Over 0.5 up to and incl. 0.8		—	3 min.
		Over 0.8 up to and incl. 1.3		7.3 {74} min.	4 min.
		Over 1.3 up to and incl. 3		7.3 {74} min.	5 min.
	H 18	0.3 or over up to and incl. 0.5	13 {127} or over	—	1 min.
		Over 0.5 up to and incl. 0.8		—	2 min.
		Over 0.8 up to and incl. 1.3		—	3 min.
		Over 1.3 up to and incl. 3		—	4 min.

Table 2 (Continued)

Alloy designation	Temper grade ⁽¹⁾	Tensile test			
		Wall thickness mm	Tensile strength kgf/mm ² {N/mm ² }	Proof stress kgf/mm ² {N/mm ² }	Elongation %
A 1100 TW A 1200 TW A 1100 TWS A 1200 TWS	0	0.3 or over up to and incl. 0.5	7.5 {74} or over up to and incl. 11 {108}	—	15 min.
		Over 0.5 up to and incl. 0.8		—	20 min.
		Over 0.8 up to and incl. 1.3		2.5 {25} min.	25 min.
		Over 1.3 up to and incl. 3		2.5 {25} min.	30 min.
A 1100 TW A 1200 TW A 1100 TWS A 1200 TWS	H 14 H 24 ⁽²⁾	0.3 or over up to and incl. 0.5	12 {118} or over up to and incl. 15 {147}	—	2 min.
		Over 0.5 up to and incl. 0.8		—	3 min.
		Over 0.8 up to and incl. 1.3		9.5 {94} min.	4 min.
		Over 1.3 up to and incl. 3		9.5 {94} min.	5 min.
	H 18	0.3 or over up to and incl. 0.5	16 {157} or over	—	1 min.
		Over 0.5 up to and incl. 0.8		—	2 min.
		Over 0.8 up to and incl. 1.3		—	3 min.
		Over 1.3 up to and incl. 3		—	4 min.

Table 2 (Continued)

Alloy designation	Temper grade ⁽¹⁾	Tensile test			
		Wall thickness mm	Tensile strength kgf/mm ² {N/mm ² }	Proof stress kgf/mm ² {N/mm ² }	Elongation %
A 3003 TW A 3203 TW A 3003 TWS A 3203 TWS	0	0.3 or over up to and incl. 0.8	9.5 {94} or over up to and incl. 13 {127}	—	20 min.
		Over 0.8 up to and incl. 1.3		3.5 {34} min.	23 min.
		Over 1.3 up to and incl. 3		3.5 {34} min.	25 min.
	H 14 H24 ⁽²⁾	0.3 or over up to and incl. 0.5	14 {137} or over up to and incl. 18 {177}	—	2 min.
		Over 0.5 up to and incl. 0.8		—	3 min.
		Over 0.8 up to and incl. 1.3		12 {118} min.	4 min.
		Over 1.3 up to and incl. 3		12 {118} min.	5 min.
	H 18	0.3 or over up to and incl. 0.5	19 {186} or over	—	1 min.
		Over 0.5 up to and incl. 0.8		—	2 min.
		Over 0.8 up to and incl. 1.3		17 {167} min.	3 min.
		Over 1.3 up to and incl. 3		17 {167} min.	4 min.

Table 2 (Continued)

Alloy designation	Temper grade ⁽¹⁾	Tensile test			
		Wall thickness mm	Tensile strength kgf/mm ² {N/mm ² }	Proof stress kgf/mm ² {N/mm ² }	Elongation %
BA 11 TW BA 12 TW BA 11 TWS BA 12 TWS	0	0.3 or over up to and incl. 0.8	14 {137} or under	—	18 min.
		Over 0.8 up to and incl. 1.3		—	20 min.
		Over 1.3 up to and incl. 3		—	23 min.
	H 14	0.3 or over up to and incl. 0.8	14 {137} or over up to and incl. 18 {177}	—	2 min.
		Over 0.8 up to and incl. 1.3		—	3 min.
		Over 1.3 up to and incl. 3		—	5 min.
A 5052 TW A 5052 TWS	0	0.3 or over up to and incl. 0.5	18 {177} or over up to and incl. 22 {216}	—	15 min.
		Over 0.5 up to and incl. 0.8		—	16 min.
		Over 0.8 up to and incl. 1.3		6.5 {64} min.	18 min.
		Over 1.3 up to and incl. 3		6.5 {64} min.	19 min.
	H 14 H 24 ⁽²⁾ H 34	0.3 or over up to and incl. 0.5	24 {235} or over up to and incl. 29 {284}	—	3 min.
		Over 0.5 up to and incl. 0.8		—	4 min.
		Over 0.8 up to and incl. 1.3		18 {177} min.	4 min.
		Over 1.3 up to and incl. 3		18 {177} min.	6 min.

Table 2 (Continued)

Alloy designation	Temper grade ⁽¹⁾	Tensile test			
		Wall thickness mm	Tensile strength kgf/mm ² {N/mm ² }	Proof stress kgf/mm ² {N/mm ² }	Elongation %
A 5052 TW A 5052 TWS	H 18	0.3 or over up to and incl. 0.8	28 {275} or over	—	3 min.
	H 38	Over 0.8 up to and incl. 1.3		23 {226} min.	4 min.
		Over 1.3 up to and incl. 3		23 {226} min.	4 min.
A 5154 TW A 5254 TWS	0	0.5 or over up to and incl. 0.8	21 {206} or over up to and incl. 29 {284}	—	12 min.
		0.8 or over up to and incl. 1.3		7.5 {74} min.	14 min.
		1.3 or over up to and incl. 3		7.5 {74} min.	16 min.
	H 14 H 24 ⁽²⁾ H 34	0.5 or over up to and incl. 0.8	28 {275} or over up to and incl. 32 {314}	—	4 min.
		Over 0.8 up to and incl. 1.3		21 {206} min.	4 min.
		Over 1.3 up to and incl. 3		21 {206} min.	6 min.
	H 18 H 38	0.5 or over up to and incl. 0.8	32 {314} or over	25 {245} min.	3 min.
		Over 0.8 up to and incl. 1.3		25 {245} min.	3 min.
		Over 1.3 up to and incl. 3		25 {245} min.	4 min.

Note ⁽²⁾ Temper grade H 24 is applicable to pipes and tubes as-welded. However, its upper limit of tensile strength and proof stress should be excepted from the application.

Remark: The mechanical properties of pipes and tubes having wall thicknesses outside the specified range shall be subject to agreement between the parties concerned with delivery.