

JIS

JAPANESE INDUSTRIAL STANDARD

Method of welding procedure qualification test for Nickel and Nickel alloy clad steels

JIS Z 3044—1991

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

JAPANESE INDUSTRIAL STANDARD

J I S

Method of welding procedure qualification
test for Nickel and Nickel alloy clad steels

Z 3044-1991

1. Scope

This Japanese Industrial Standard specifies the testing method to preliminarily verify the properness of the welding procedure where butt welding is performed for nickel-clad or nickel alloy-clad steels as specified in JIS G 3602 (excluding buildup-clad steels); hereinafter referred to as "clad steels".

Remarks: The standards cited in this Standard are shown in Appended Table 1.

2. Definition

The definitions of main terms used in this Standard shall be as specified in JIS Z 3001 and JIS G 0601.

3. Qualification Items for Welding Procedure3.1 Objects of Qualification Items by Kinds of Clad Steels

3.1.1 Clad Steel Class 1 The object of qualification items for the welding procedure shall be the combination of base metal and cladding metal.

3.1.2 Clad Steel Class 2 The object of qualification items for the welding procedure shall be either of the following (1) and (2).

(1) Combination of base metal and cladding metal

(2) Base metal only. However, the qualification test method for the welding procedure on the cladding metal side shall be decided by agreement between the parties concerned.

3.2 Classification of Qualification Items For the qualification items for the welding procedure, a qualification test shall be performed with each different combination of divisions of items respectively specified in 3.3 to 3.14.

3.3 Classification of Welding Methods The classification of welding methods shall be as shown in Table 1. Where two or more welding methods are used in combination in a welding procedure for base metal and cladding metal, that combination shall be taken as one division.

3.4 Classification of Base Metals and Cladding Metals The classification of base metals and cladding metals shall be made based on the P numbers and group numbers in Table 2, and for others than those shown in this table, classification shall be made by the combination of the kind and composition of the base metal and cladding metal.

Further, each combination of respective divisions of base metal and cladding metal shall be taken as one division.

Table 1. Classification of Welding Methods

Division of welding method	Kind of welding method		Classification of welding operations
A	Shielded metal arc welding		Manual
U	Submerged arc welding		Automatic
T	TIG welding		Manual, semi-automatic, automatic
M	MIG welding		Semiautomatic, automatic
C	MAG welding (including CO ₂ gas arc welding)		Semiautomatic, automatic
S	Other welding methods	Self-shielded arc welding, gas welding, electroslag welding, electrogas arc welding, plasma arc welding, electron beam welding, etc. As shown herein, each kind of welding method shall be taken as one division.	Manual, semi-automatic, automatic

3.5 Classification of Welding Materials

3.5.1 Classification of Covered Electrodes Covered electrodes shall be classified according to Table 3, and for others than those shown in Table 3, classification shall be made by the combination of the kind and composition of the electrode.

Further, each combination of electrodes respectively used for welding the base metal and cladding metal shall be taken as one division.

3.5.2 Classification of Welding Wires and Rods Gas shielded arc welding wires and rods shall be classified according to Table 4, and submerged arc welding wires shall be classified according to Table 5. For others than those shown in Table 4 and Table 5, classification shall be made by the combination of the kind and composition of the welding wire or rod.

Further, each combination of welding wires or rods respectively used for the base metal and cladding metal shall be taken as one division.

Table 2. Classification of Base Metals and Cladding Metals

Division of base metal		Component series	Class symbol (example)	Standard No. (example)	Shape
P No.	Group No.				
1	1	Carbon steels with minimum tensile strengths of under 480 N/mm ² specified in JIS	C series	SS 400	Plate
				SM 400 A	
			C-Si series	SB 410, SB 450	
			C-Mn-Si series	SM 400 B to C	
				SPV 235	
				SGV 410, SGV 450	
				SLA 235 A to B, SLA 325 A to B	
			C-Mn-Si-Cu-Cr-(Ni) series	SMA 400 AW to CW, SMA 400 AP to CP	
			C-Si series	SF 490 A, SF 440 A	Forged steel
				SFVC 1	
			C-Mn-Si series	SFL1	JIS G 3205
1	2	Carbon steels with minimum tensile strengths of 480 N/mm ² to under 550 N/mm ² specified in JIS	C-Mn-Si series	SB 480	Plate
				SM 490 A to C, SM 520 B to C, SM 490 YA to YB	
				SPV 315, SPV 355	
				SGV 480	
				SLA 360	
			C-Mn-Si-Cu-Cr-(Ni) series	SMA 490 AW to CW, SMA 490 AP to CP	JIS G 3114
			C-Si series	SF 490 A	Forged steel
				SFVC 2 A to 2 B	
			C-Mn-Si series	SFL 2	JIS G 3205
			C-Mn-Si series	SM 570	Plate
				SPV 450, SPV 490	
3	1	Heat-resistant low alloy steels	C-1/2 Mo series	SB 450 M	Plate
			1/2 Cr-1/2 Mo series	SCMV 1 1	
3	2	Heat-resistant low alloy steels with minimum tensile strengths of 480 N/mm ² to under 550 N/mm ² specified in JIS	C-1/2 Mo series	SB 480 M	Plate
			Mn-1/2 Mo series	SBV 1 A	
			Mn-Si-Cu-Mo series	SEV 245, SEV 295	
			1/2 Cr-1/2 Mo series	SCMV 1 2	
			C-1/2 Mo series	SFVA F 1	Forged steel
			3/4 Cr-1/2 Mo series	SFVA F 2	
					JIS G 3203

4
Z 3044-1991

Table 2. (Cont'd)

Division of base metal		Component series	Class symbol (example)	Standard No. (example)	Shape
P No.	Group No.				
3	3	Heat-resistant low alloy steels with minimum tensile strengths of 550 N/mm ² or over specified in JIS	Mn-1/2 Mo series	SBV 1 B	Plate
				SQV 1 A, SQV 1 B	
			Mn-1/2 Mo-1/2 Ni series	SBV 2	
				SQV 2 A, SQV 2 B	
			Mn-1/2 Mo-3/4 Ni series	SBV 3	
				SQV 3 A, SQV 3 B	
			Mn-Si-Cu-Mo series	SEV 345	Forged steel
			3/4 Ni-1/2 Mo-1/4 Cr-V series	SFVQ 1 A, SFVQ 1 B	
			3/4 Ni-1/2 Mo-1/3 Cr-V series	SFVQ 2 A	
			1/2 Ni-1/4 Cr-0.6 Mo series	SFVQ 2 B	
4	1	Heat-resistant low alloy steels	1 Cr-1/2 Mo series	SCMV 2 1 to 2	Plate
			1 • 1/4 Cr-1/2 Mo series	SCMV 3 1 to 2	
			1 Cr-1/2 Mo series	SFVA F 12	Forged steel
			1 • 1/4 Cr-1/2 Mo series	SFVA F 11 A, SFVA F 11 B	
5	1	Heat-resistant low alloy steels	2-1/4 Cr-1 Mo series	SCMV 4 1 to 2	Plate
			3 Cr-1 Mo series	SCMV 5 1 to 2	
			2-1/4 Cr-1 Mo series	SFVA F 22 A to B	Forged steel
			3 Cr-1 Mo series	SFVA F 21 A to B	
5	2	Heat-resistant low alloy steels	5 Cr-1 Mo series	SCMV 6 1 to 2	Plate
			5 Cr-1 Mo series	SFVA F 5 A to D	Forged steel
			9 Cr-1 Mo series	SFVA F 9	