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(JWES/JSA)

**Covered electrodes for mild steel,
high tensile strength steel and
low temperature service steel**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Welding Engineering Society (JWES)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS Z 3211**:2000 is replaced with this Standard. Also, **JIS Z 3212**:2000 and **JIS Z 3241**:1999 are withdrawn and replaced with this Standard.

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Covered electrodes for mild steel, high tensile strength steel and low temperature service steel

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **ISO 2560** published in 2002 and the first edition of **ISO 18275** published in 2005 with some modifications of the technical contents. **ISO 2560** is a combined standard of **EN 499** and the standard used around the Pacific Rim, and **ISO 18275** is a combined standard of **EN 757** and the standard used around the Pacific Rim. Either of them may be used in different global markets. According to this, this Standard gives requirements corresponding to the standards used in Pacific Rim (system B of **ISO 2560** and system B of **ISO 18275**) in the text, and those of **EN 499** and **EN 757** (system A of **ISO 2560** and system A of **ISO 18275**) in Annex A and Annex B for reference.

The portions given sidelines or dotted underlines are the matters in which the contents of the corresponding International Standards have been modified. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies the covered electrodes (hereafter referred to as “electrodes”) to be used for welding of mild steel, high tensile strength steel whose tensile strength is between 490 MPa grade and 830 MPa grade and low temperature service steel.

NOTE : The International Standards corresponding to this Standard are as follows.

ISO 2560:2002 *Welding consumables—Covered electrodes for manual metal arc welding of non-alloy and fine grain steels—Classification*

ISO 18275:2005 *Welding consumables—Covered electrodes for manual metal arc welding of high-strength steels—Classification*

(Overall evaluation: MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are **IDT** (identical), **MOD** (modified), and **NEQ** (not equivalent) according to **ISO/IEC Guide 21**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS G 0321 *Product analysis and its tolerance for wrought steel*

JIS G 3101 *Rolled steels for general structure*

JIS G 3106 *Rolled steels for welded structure*

JIS G 3126 *Carbon steel plates for pressure vessels for low temperature service*

JIS G 3127 Nickel steel plates for pressure vessels for low temperature services

JIS Z 3001-1 Welding and allied processes—Vocabulary—Part 1: General

JIS Z 3001-2 Welding and allied processes—Vocabulary—Part 2: Welding processes

JIS Z 3011 Welding position defined by means of angles of slope and rotation

NOTE : Corresponding International Standard: ISO 6947 *Welds—Working positions—Definitions of angles of slope and rotation* (MOD)

JIS Z 3111 Methods of tension and impact tests for deposited metal

NOTE : Corresponding International Standard: ISO 15792-1 *Welding consumables—Test methods—Part 1: Test methods for all-weld metal test specimens in steel, nickel and nickel alloys* (MOD)

JIS Z 3118 Method for measurement of amount of hydrogen evolved from steel welds

NOTE : Corresponding International Standard: ISO 3690 *Welding and allied processes—Determination of hydrogen content in ferritic steel arc weld metal* (MOD)

JIS Z 3181 Method of fillet weld test for welding consumables

NOTE : Corresponding International Standard: ISO 15792-3 *Welding consumables—Test methods—Part 3: Classification testing of positional capacity and root penetration of welding consumables in a fillet weld* (MOD)

JIS Z 3184 Method of preparing deposited metal pad and samples for chemical analysis

NOTE : Corresponding International Standard: ISO 6847 *Welding consumables—Deposition of a weld metal pad for chemical analysis* (MOD)

JIS Z 3200 Welding consumables—Technical delivery conditions for welding filler materials—Type of product, dimensions, tolerances and markings

NOTE : Corresponding International Standard: ISO 544 *Welding consumables—Technical delivery conditions for welding filler materials—Type of product, dimensions, tolerances and markings* (MOD)

JIS Z 3423 Procurement guidelines for welding consumables

NOTE : Corresponding International Standard: ISO 14344 *Welding and allied processes—Flux and gas shielded electrical welding processes—Procurement guidelines for consumables* (MOD)

3 Terms and definitions

For the purposes of this Standard, the definitions given in **JIS Z 3001-1** and **JIS Z 3001-2**, and the following definitions apply.

3.1 deposited metal

the weld metal of which the proportion of fused parent material is suppressed to the required level according to the specified procedure for the purpose of performance test and classification of electrode

NOTE : The definition in **JIS Z 3001-1** is modified.

4 Classification and symbol indication method

The electrode shall be classified according to the tensile strength of deposited metal, type of coating flux, principle chemical composition of deposited metal, condition of post weld heat treatment and Charpy absorbed energy level of deposited metal at the test temperature specified in table 5, and the classification and symbol indication method shall be in accordance with figure 1. Also, classification by hydrogen content in deposited metal and/or type of temperature of Charpy impact test may be added.

According to the condition of post weld heat treatment, classification by the tensile strength of deposited metal and/or Charpy absorbed energy level may be used.

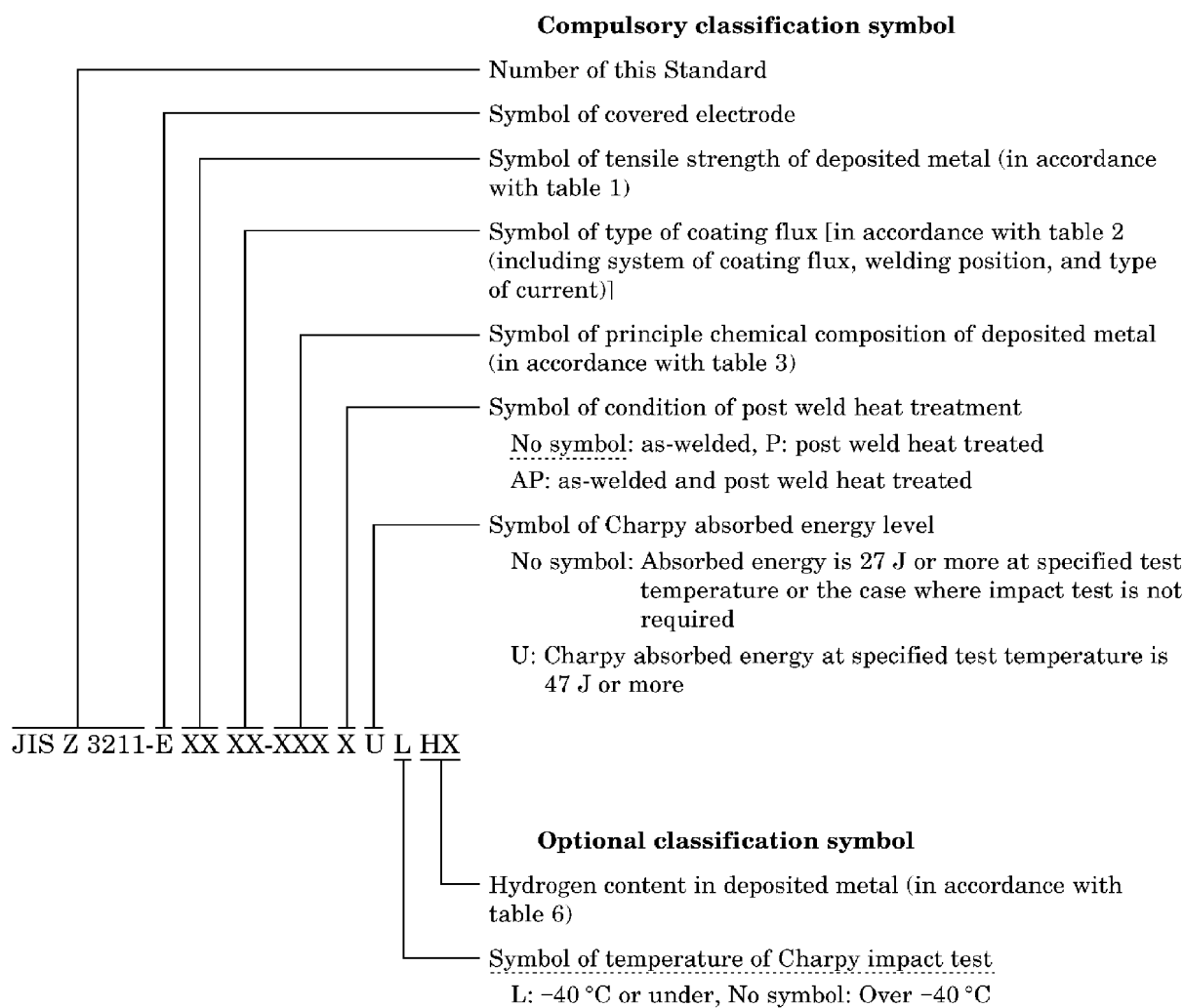


Figure 1 Classification and symbol indication method of electrode

Table 1 Symbol of tensile strength of deposited metal

Unit: MPa

Symbol	Tensile strength	Symbol	Tensile strength
43	430 min.	62	620 min.
49	490 min.	69	690 min.
55	550 min.	76	760 min.
57	570 min.	78	780 min.
<u>57J</u>	570 min.	<u>78J</u>	780 min.
59	590 min.	83	830 min.
<u>59J</u>	590 min.	—	—

Table 2 Symbol of type of coating flux

Symbol	System of coating flux	Welding position ^{a)}	Type of current ^{b)}
03	Lime titania	All positions ^{c)}	AC and/or DC (±)
10	High cellulose	All positions	DC (+)
11	High cellulose	All positions	AC and/or DC (+)
12	High titanium oxide	All positions ^{c)}	AC and/or DC (−)
13	High titanium oxide	All positions ^{c)}	AC and/or DC (±)
14	Iron-powder titanium oxide	All positions ^{c)}	AC and/or DC (+)
15	Low hydrogen	All positions ^{c)}	DC (+)
16	Low hydrogen	All positions ^{c)}	AC and/or DC (+)
18	Iron-powder low hydrogen	All positions ^{c)}	AC and/or DC (+)
19	Ilmenite	All positions ^{c)}	AC and/or DC (⊥)
20	Iron oxide	PA and PB	AC and/or DC (−)
24	Iron-powder titanium oxide	PA and PB	AC and/or DC (±)
27	Iron-powder iron oxide	PA and PB	AC and/or DC (−)
28	Iron-powder low hydrogen	PA, PB and PC	AC and/or DC (+)
40	<u>Special</u> (no specification)	Manufacturer's recommendation	
48	Low hydrogen	All positions ^{d)}	AC and/or DC (+)
Notes ^{a)} The welding position shall be in accordance with JIS Z 3011. PA = flat, PB = horizontal vertical, PC = horizontal ^{b)} The meaning of symbol used for type of current shall be as follows. AC: Alternative DC (+): Electrode positive DC (−): Electrode negative DC (=): Electrode positive and electrode negative ^{c)} For vertical position, PF (vertical up) is applicable. ^{d)} For vertical position, PG (vertical down) is applicable.			

Table 3 Symbol of principle chemical composition of deposited metal

Unit: % (mass fraction)

Symbol	Nominal level of principle chemical composition			
	Mn	Ni	Cr	Mo
No symbol, -1 or -P1	1	—	—	—
-1M3	—	—	—	0.5
-3M2	1.5	—	—	0.4
-3M3	1.5	—	—	0.5
-N1	—	0.5	—	—
-N2	—	1	—	—
-N3	—	1.5	—	—
-3N3	1.5	1.5	—	—
-N5	—	2.5	—	—
-N7	—	3.5	—	—
-N13	—	6.5	—	—
-N2M3	—	1	—	0.5
-4M2	2.0	—	—	0.4
-N1M1	—	0.5	—	0.2
-N2M1	—	1.0	—	0.2
-N3M1	—	1.5	—	0.2
-N3M2	—	1.5	—	0.4
-N4M1	—	2.0	—	0.2
-N4M2	—	2.0	—	0.4
-N4M3	—	2.0	—	0.5
-N5M1	—	2.5	—	0.2
-N5M4	—	2.5	—	0.6
-N9M3	—	4.5	—	0.5
-N13L	—	6.5	—	—
-N3CM1	—	1.5	0.2	0.2
-N4CM2	—	1.8	0.3	0.4
-N4C2M1	—	2.0	0.7	0.3
-N4C2M2	—	2.0	1.0	0.4
-N5CM3	—	2.5	0.3	0.5
-N7CM3	—	3.5	0.3	0.5
-G ^{a)}	—	—	—	—
Note ^{a)} Upon the agreement between the purchaser and the manufacturer.				

5 Quality

5.1 Dimensions and tolerances of electrode

The dimensions and tolerances of electrode shall conform to clause 4 of **JIS Z 3200**.

5.2 Product condition

The product condition shall conform to clause 5 of JIS Z 3200.

5.3 Chemical composition of deposited metal

The chemical composition of deposited metal shall conform to the specifications given in table 4, when the chemical analysis test is carried out in accordance with the method of 6.1.

Table 4 Chemical composition of deposited metal

Unit: % (mass fraction)

Type of electrode		Chemical composition ^{b)}								
Symbol ^{a)}	Symbol of condition of post weld heat treatment	C	Si	Mn	P	S	Ni	Cr	Mo	Others
E4303	No symbol, P, AP	0.20 max.	1.00 max.	1.20 max.	—	—	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4310										
E4311										
E4312										
E4313										
E4316										
E4318	No symbol, P, AP	0.03 max.	0.40 max.	0.60 max.	0.025 max.	0.015 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4319	No symbol, P, AP	0.20 max.	1.00 max.	1.20 max.	—	—	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4320										
E4324										
E4327										
E4340	No symbol, P, AP	—	—	—	—	—	—	—	—	—
E4903	No symbol, P, AP	0.15 max.	0.90 max.	1.25 max.	—	—	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4910	No symbol, P, AP	0.20 max.	0.90 max.	1.25 max.	—	—	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4911										
E4912	No symbol, P, AP	0.20 max.	1.00 max.	1.20 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4913										
E4914	No symbol, P, AP	0.15 max.	0.90 max.	1.25 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4915	No symbol, P, AP	0.15 max.	0.75 max.	1.25 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4916	No symbol, P, AP	0.15 max.	0.75 max.	1.60 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4918	No symbol, P, AP	0.15 max.	0.90 max.	1.60 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4919	No symbol, P, AP	0.15 max.	0.90 max.	1.25 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4924										
E4927	No symbol, P, AP	0.15 max.	0.75 max.	1.60 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.

Table 4 (continued)

Unit: % (mass fraction)

Type of electrode		Chemical composition ^{b)}								
Symbol ^{a)}	Symbol of condition of post weld heat treatment	C	Si	Mn	P	S	Ni	Cr	Mo	Others
E4928	No symbol, P, AP	0.15	0.90	1.60	0.035	0.035	0.30	0.20	0.30	V: 0.08
E4948		max.	max.	max.	max.	max.	max.	max.	max.	max.
E5716	No symbol, P, AP	0.12	0.90	1.60	0.03	0.03	1.00	0.30	0.35	—
E5728		max.	max.	max.	max.	max.	max.	max.	max.	—
E4910-1M3	No symbol, P, AP	0.12	0.40	0.60	0.03	0.03	—	—	0.40 to 0.65	—
E4910-P1	No symbol, P, AP	0.20	0.60	1.20	0.03	0.03	1.00	0.30	0.50	V: 0.10
E4911-1M3	No symbol, P, AP	0.12	0.40	0.60	0.03	0.03	—	—	0.40 to 0.65	—
E4915-1M3	No symbol, P, AP	0.12	0.60	0.90	0.03	0.03	—	—	0.40 to 0.65	—
E4916-1M3		max.	max.	max.	max.	max.	—	—	max.	—
E4918-1M3	No symbol, P, AP	0.12	0.80	0.90	0.03	0.03	—	—	0.40 to 0.65	—
E4919-1M3	No symbol, P, AP	0.12	0.40	0.90	0.03	0.03	—	—	0.40 to 0.65	—
E4920-1M3	No symbol, P, AP	0.12	0.40	0.60	0.03	0.03	—	—	0.40 to 0.65	—
E4924-1	No symbol, P, AP	0.15	0.90	1.25	0.035	0.035	0.30	0.20	0.30	V: 0.08
E4927-1M3	No symbol, P, AP	0.12	0.40	1.00	0.03	0.03	—	—	0.40 to 0.65	—
E5510-P1	No symbol, P, AP	0.20	0.60	1.20	0.03	0.03	1.00	0.30	0.50	V: 0.10
E57J16-N1M1	No symbol, P, AP	0.12	0.80	0.70 to 1.50	0.03	0.03	0.30 to 1.00	—	0.10 to 0.40	—
E57J18-N1M1		max.	max.	max.	max.	max.	max.	—	max.	—
E5916-3M2	No symbol, P, AP	0.12	0.60	1.00 to 1.75	0.03	0.03	0.90	—	0.25 to 0.45	—
E5916-N1M1	No symbol, P, AP	0.12	0.80	0.70 to 1.50	0.03	0.03	0.30 to 1.00	—	0.10 to 0.40	—
E5918-N1M1		max.	max.	max.	max.	max.	max.	—	max.	—
E59J16-N1M1	No symbol, P, AP	0.12	0.80	0.70 to 1.50	0.03	0.03	0.30 to 1.00	—	0.10 to 0.40	—
E59J18-N1M1		max.	max.	max.	max.	max.	max.	—	max.	—
E6216-3M2	No symbol, P, AP	0.12	0.60	1.00 to 1.75	0.03	0.03	0.90	—	0.20 to 0.50	—
E6216-N1M1	No symbol, P, AP	0.12	0.80	0.70 to 1.50	0.03	0.03	0.30 to 1.00	—	0.10 to 0.40	—
E6216-N2M1	No symbol, P, AP	0.12	0.80	0.70 to 1.50	0.03	0.03	0.80 to 1.50	—	0.10 to 0.40	—
E6218-N1M1	No symbol, P, AP	0.12	0.80	0.70 to 1.50	0.03	0.03	0.30 to 1.00	—	0.10 to 0.40	—

Table 4 (continued)

Unit: % (mass fraction)

Type of electrode		Chemical composition ^{b)}								
Symbol ^{a)}	Symbol of condition of post weld heat treatment	C	Si	Mn	P	S	Ni	Cr	Mo	Others
E6218-N2M1	No symbol, P, AP	0.12 max.	0.80 max.	0.70 to 1.50	0.03 max.	0.03 max.	0.80 to 1.50	—	0.10 to 0.40	—
E6916-N3CM1	No symbol	0.12 max.	0.80 max.	1.20 to 1.70	0.03 max.	0.03 max.	1.20 to 1.70	0.10 to 0.30	0.10 to 0.30	—
E6916-N4M3	No symbol, P, AP	0.12 max.	0.80 max.	0.70 to 1.50	0.03 max.	0.03 max.	1.50 to 2.50	—	0.35 to 0.65	—
E7816-N4CM2	No symbol	0.12 max.	0.80 max.	1.20 to 1.80	0.03 max.	0.03 max.	1.50 to 2.10	0.10 to 0.40	0.25 to 0.55	—
E7816-N5CM3	No symbol	0.12 max.	0.80 max.	1.00 to 1.60	0.03 max.	0.03 max.	2.10 to 2.80	0.10 to 0.40	0.30 to 0.65	—
E78J16-N4CM2	No symbol	0.12 max.	0.80 max.	1.20 to 1.80	0.03 max.	0.03 max.	1.50 to 2.10	0.10 to 0.40	0.25 to 0.55	—
E78J16-N5CM3	No symbol	0.12 max.	0.80 max.	1.00 to 1.60	0.03 max.	0.03 max.	2.10 to 2.80	0.10 to 0.40	0.30 to 0.65	—
E78J16-N5M4	No symbol	0.12 max.	0.80 max.	1.40 to 2.00	0.03 max.	0.03 max.	2.10 to 2.80	—	0.50 to 0.80	—
E4916-N1	No symbol, P, AP	0.12 max.	0.90 max.	0.60 to 1.60	0.03 max.	0.03 max.	0.30 to 1.00	—	0.35 max.	V: 0.05 max.
E4916-N2	No symbol, P, AP	0.08 max.	0.50 max.	0.40 to 1.40	0.03 max.	0.03 max.	0.80 to 1.10	0.15 max.	0.35 max.	V: 0.05 max.
E4916-N3	No symbol, P, AP	0.10 max.	0.60 max.	1.25 max.	0.03 max.	0.03 max.	1.10 to 2.00	—	0.35 max.	—
E4928-N1	No symbol, P, AP	0.12 max.	0.90 max.	0.60 to 1.60	0.03 max.	0.03 max.	0.30 to 1.00	—	0.35 max.	V: 0.05 max.
E5516-N1		0.12 max.	0.90 max.	0.60 to 1.60	0.03 max.	0.03 max.	0.30 to 1.00	—	0.35 max.	V: 0.05 max.
E5516-N2	No symbol, P, AP	0.12 max.	0.80 max.	0.40 to 1.25	0.03 max.	0.03 max.	0.80 to 1.10	0.15 max.	0.35 max.	V: 0.05 max.
E5518-N2		0.12 max.	0.80 max.	0.40 to 1.25	0.03 max.	0.03 max.	0.80 to 1.10	0.15 max.	0.35 max.	V: 0.05 max.
E5518-N2M3	No symbol, P, AP	0.10 max.	0.60 max.	0.80 to 1.25	0.02 max.	0.02 max.	0.80 to 1.10	0.10 max.	0.40 to 0.65	V: 0.02 max., Cu: 0.10 max. and Al: 0.05 max.
E5528-N1	No symbol, P, AP	0.12 max.	0.90 max.	0.60 to 1.60	0.03 max.	0.03 max.	0.30 to 1.00	—	0.35 max.	V: 0.05 max.
E6216-N4M1	No symbol, P, AP	0.12 max.	0.80 max.	0.75 to 1.35	0.03 max.	0.03 max.	1.30 to 2.30	—	0.10 to 0.30	—
E7816-N4C2M1	No symbol	0.12 max.	0.80 max.	1.00 to 1.50	0.03 max.	0.03 max.	1.50 to 2.50	0.50 to 0.90	0.10 to 0.40	—
E4916-1	No symbol, P, AP	0.15 max.	0.75 max.	1.60 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.
E4918-1	No symbol, P, AP	0.15 max.	0.90 max.	1.60 max.	0.035 max.	0.035 max.	0.30 max.	0.20 max.	0.30 max.	V: 0.08 max.

Table 4 (continued)

Unit: % (mass fraction)

Type of electrode		Chemical composition ^{b)}								
Symbol ^{a)}	Symbol of condition of post weld heat treatment	C	Si	Mn	P	S	Ni	Cr	Mo	Others
E4918-N2	No symbol, P, AP	0.08 max.	0.50 max.	0.40 to 1.40	0.03 max.	0.03 max.	0.80 to 1.10	0.15 max.	0.35 max.	V: 0.05 max.
E5516-3M3	No symbol, P, AP	0.12 max.	0.80 max.	1.00 to 1.80	0.03 max.	0.03 max.	0.90 max.	—	0.40 to 0.65	—
E5516-3N3	No symbol, P, AP	0.10 max.	0.60 max.	1.60 max.	0.03 max.	0.03 max.	1.10 to 2.00	—	—	—
E5516-N3	No symbol, P, AP	0.10 max.	0.60 max.	1.25 max.	0.03 max.	0.03 max.	1.10 to 2.00	—	0.35 max.	—
E5518-3M2	No symbol, P, AP	0.12 max.	0.80 max.	1.00 to 1.75	0.03 max.	0.03 max.	0.90 max.	—	0.25 to 0.45	—
E5518-3M3	No symbol, P, AP	0.12 max.	0.80 max.	1.00 to 1.80	0.03 max.	0.03 max.	0.90 max.	—	0.40 to 0.65	—
E5518-N3	No symbol, P, AP	0.10 max.	0.80 max.	1.25 max.	0.03 max.	0.03 max.	1.10 to 2.00	—	—	—
E6215-3M2	P	0.12 max.	0.60 max.	1.00 to 1.75	0.03 max.	0.03 max.	0.90 max.	—	0.25 to 0.45	—
E6218-3M2	P	0.12 max.	0.80 max.	1.00 to 1.75	0.03 max.	0.03 max.	0.90 max.	—	0.25 to 0.45	—
E6218-3M3	P	0.12 max.	0.80 max.	1.00 to 1.80	0.03 max.	0.03 max.	0.90 max.	—	0.40 to 0.65	—
E6218-N3M1	No symbol	0.10 max.	0.80 max.	0.60 to 1.25	0.030 max.	0.030 max.	1.40 to 1.80	0.15 max.	0.35 max.	V: 0.05 max.
E6915-4M2	P	0.15 max.	0.60 max.	1.65 to 2.00	0.03 max.	0.03 max.	0.90 max.	—	0.25 to 0.45	—
E6916-4M2	P	0.15 max.	0.60 max.	1.65 to 2.00	0.03 max.	0.03 max.	0.90 max.	—	0.25 to 0.45	—
E6918-4M2	P	0.15 max.	0.80 max.	1.65 to 2.00	0.03 max.	0.03 max.	0.90 max.	—	0.25 to 0.45	—
E6918-N3M2	No symbol	0.10 max.	0.60 max.	0.75 to 1.70	0.030 max.	0.030 max.	1.40 to 2.10	0.35 max.	0.25 to 0.50	V: 0.05 max.
E7618-N4M2	No symbol	0.10 max.	0.60 max.	1.30 to 1.80	0.030 max.	0.030 max.	1.25 to 2.50	0.40 max.	0.25 to 0.50	V: 0.05 max.
E8318-N4C2M2	No symbol	0.10 max.	0.60 max.	1.30 to 2.25	0.030 max.	0.030 max.	1.75 to 2.50	0.30 to 1.50	0.30 to 0.55	V: 0.05 max.
E4928-N5	No symbol, P, AP	0.10 max.	0.80 max.	1.00 max.	0.025 max.	0.020 max.	2.00 to 2.75	—	—	—
E5516-N5	No symbol, P, AP	0.12 max.	0.60 max.	1.25 max.	0.03 max.	0.03 max.	2.00 to 2.75	—	—	—
E5518-N5	No symbol, P, AP	0.12 max.	0.80 max.	1.25 max.	0.03 max.	0.03 max.	2.00 to 2.75	—	—	—
E5916-N5M1	No symbol, P, AP	0.12 max.	0.80 max.	0.60 to 1.20	0.03 max.	0.03 max.	2.00 to 2.75	—	0.30 max.	—
E6216-N5M1		0.12 max.	0.80 max.	0.60 to 1.20	0.03 max.	0.03 max.	2.00 to 2.75	—	0.30 max.	—

Table 4 (continued)

Unit: % (mass fraction)

Type of electrode		Chemical composition ^{b)}								
Symbol ^{a)}	Symbol of condition of post weld heat treatment	C	Si	Mn	P	S	Ni	Cr	Mo	Others
E6916-N7CM3	No symbol	0.12 max.	0.80 max.	0.80 to 1.40	0.03 max.	0.03 max.	3.00 to 3.80	0.10 to 0.40	0.30 to 0.60	—
E7816-N5M4	No symbol	0.12 max.	0.80 max.	1.40 to 2.00	0.03 max.	0.03 max.	2.10 to 2.80	—	0.50 to 0.80	—
E4915-N5	No symbol, P, AP	0.05 max.	0.50 max.	1.25 max.	0.03 max.	0.03 max.	2.00 to 2.75	—	—	—
E4916-N5										
E4918-N5										
E5516-N7	No symbol, P, AP	0.12 max.	0.80 max.	1.25 max.	0.03 max.	0.03 max.	3.00 to 3.75	—	—	—
E5518-N7										
E7816-N9M3	No symbol	0.12 max.	0.80 max.	1.00 to 1.80	0.03 max.	0.03 max.	4.20 to 5.00	—	0.35 to 0.65	—
E4915-N7	No symbol, P, AP	0.05 max.	0.50 max.	1.25 max.	0.03 max.	0.03 max.	3.00 to 3.75	—	—	—
E4916-N7										
E4918-N7										
E5516-N13	No symbol, P, AP	0.06 max.	0.60 max.	1.00 max.	0.025 max.	0.020 max.	6.00 to 7.00	—	—	—
E6215-N13L	P	0.05 max.	0.50 max.	0.40 to 1.00	0.03 max.	0.03 max.	6.00 to 7.25	—	—	—
E49XX-G ^{e)}	No symbol, P, AP	—	—	—	—	—	—	—	—	—
E55XX-G ^{e)}										
E57XX-G ^{e)}										
E57J16-G										
E57J18-G										
E59J16-G	No symbol, P, AP	Si: 0.80 min., Mn: 1.00 min., Ni: 0.50 min., Cr: 0.30 min., Mo: 0.20 min., V: 0.10 min. or Cu: 0.20 min. shall conform. Addition of chemical composition requirements not specified in this table shall be upon the agreement between the purchaser and the manufacturer.								
E59J18-G										
E6210-G										
E6211-G										
E6213-G										
E6215-G										
E6216-G										
E6218-G										
E6910-G										
E6911-G										
E6913-G										
E6915-G										
E6916-G										
E6918-G										
E7610-G										

Table 4 (concluded)

Unit: % (mass fraction)

Type of electrode		Chemical composition ^{b)}								
Symbol ^{a)}	Symbol of condition of post weld heat treatment	C	Si	Mn	P	S	Ni	Cr	Mo	Others
E7611-G	No symbol, P, AP	Si: 0.80 min., Mn: 1.00 min., Ni: 0.50 min., Cr: 0.30 min., Mo: 0.20 min., V: 0.10 min. or Cu: 0.20 min. shall conform. Addition of chemical composition requirements not specified in this table shall be upon the agreement between the purchaser and the manufacturer.								
E7613-G										
E7615-G										
E7616-G										
E7618-G										
E7816-G										
E78J16-G										
E78J18-G										
E8310-G										
E8311-G										
E8313-G										
E8315-G										
E8316-G										
E8318-G										
NOTE : Classification sequence of electrode: mild steel/high tensile strength steel, low temperature service steel, principle chemical composition of deposited metal-G										
Notes ^{a)} Tensile strength of deposited metal, type of coating flux and principle chemical composition of deposited metal										
^{b)} “—” means that the chemical composition thereof is not required to be specified.										
^{c)} The symbol XX is one of the symbols for the type of coating flux given in table 2.										

5.4 Mechanical properties of deposited metal

The mechanical properties of deposited metal shall be as follows.

- The tensile strength, proof strength (0.2 % proof strength or lower yield strength) and elongation of deposited metal shall conform to the specifications given in table 5, when the tensile test is carried out in accordance with the method of 6.2.
- The value of Charpy absorbed energy of deposited metal for the electrode of which the test temperature is specified in table 5 shall be as follows when the impact test is carried out in accordance with the method of 6.2.

For the electrode of which the test temperature in table 5 is “—”, the impact test is not applicable.

- For the case where the symbol of Charpy absorbed energy level is “no symbol”, the number of test pieces shall be 1 or less whose average value at the specified test temperature or under is 27 J or more, the minimum value is 20 J or over up to and including 27 J.
- When the symbol of Charpy absorbed energy level is “U”, the average value shall be 47 J or more at the specified test temperature or under.