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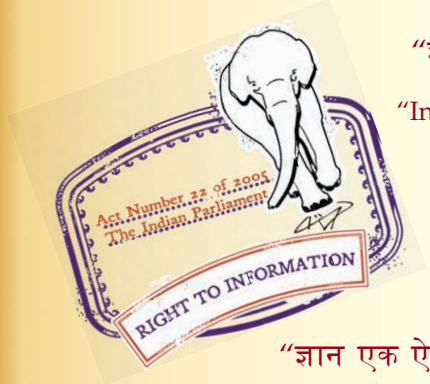

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Indian Standard

COMPARISON OF INDIAN AND OVERSEAS CLASSIFICATION AND CODING OF WELDING FILLER MATERIALS

PART 1 FLUX COATED MILD STEEL AND MEDIUM TENSILE STEEL STICK ELECTRODES FOR MANUAL METAL-ARC WELDING

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Indian Standard

COMPARISON OF INDIAN AND OVERSEAS CLASSIFICATION AND CODING OF WELDING FILLER MATERIALS

PART 1 FLUX COATED MILD STEEL AND MEDIUM TENSILE STEEL STICK ELECTRODES FOR MANUAL METAL-ARC WELDING

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Indian Standard

COMPARISON OF INDIAN AND OVERSEAS CLASSIFICATION AND CODING OF WELDING FILLER MATERIALS

PART 1 FLUX COATED MILD STEEL AND MEDIUM TENSILE STEEL STICK ELECTRODES FOR MANUAL METAL-ARC WELDING

0. FOREWORD

0.1 This Indian Standard (Part 1) was adopted by the Indian Standards Institution on 28 June 1985, after the draft finalized by the Welding General Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This comparison of Indian and overseas standard for manual metal-arc welding electrodes has been prepared keeping in view the following two important aspects:

a) A number of light, medium and heavy industries in public and private sectors in our country have collaboration arrangements with other industrially advanced countries. These industries, besides taking guidance from the Indian Standard specifications, are also obliged to follow classifications and standards of the respective collaborating countries. Without some parity and understanding of the individual country's pattern of conveying relevant details through the standards, specifications and codings, a compromise for selection of materials becomes difficult.

b) In the recent years India has made excellent progress in the field of manufacture and application of welding consumables in general and welding technology in particular. India has also entered into export market for engineering goods, plant and equipment. Since most of the countries have their own national standards and specifications, very often the overseas purchase enquiry contain the codings prevalent in respective countries.

0.3 Comparison has been made between different national standards keeping the gradation given in the American Welding Society classification (AWS) as the basis because AWS classification has got limited

number of grades and numerous grades possible in other standards by permutation and combination of various parameters are simply excluded in the AWS system of classification.

0.4 This comparison standard is meant to assist the manufacturer and users of welding consumables to find out to what extent the filler material conforming to Indian Standard satisfies the requirements of a classification and coding of another national standard. Such knowledge will not only help the manufacturer of the welding consumables to quote against the enquiry the right type of electrode for export, but also the information will be helpful to square up communication gap if any, in inland and overseas fabrication contracts and collaborations.

1. SCOPE

1.1 This comparison standard is meant to serve as a guide to the selection of near equivalent indigenous and overseas (or *vice-versa*) welding filler materials on the basis of the classification systems of the respective countries (*see* Table 1).

1.1.1 Individual countries have individual basis for classification and coding of welding consumables. Individual countries emphasis on such chemical composition, mechanical and other properties for the welding filler material as will meet the service and other needs as may be prevalent in those countries.

1.1.2 Symbols and digits used by the individual countries in their standards for the classification and coding of welding consumables have been explained in Appendix A.

1.1.3 The technical details available for a particular type or all types of electrodes in the specification of one country, may not match in totality with the similar or all types of filler materials listed in the specification of other countries.

1.1.4 Keeping this possible and logical differences in view, this comparison standard has been compiled. This comparison is meant only to serve as a guide and it is not meant to serve as a standard specification.

1.1.5 Table 1 lists the comparison of codes for mild steel and medium tensile steel electrodes.

TABLE 1 NEAR EQUIVALENT DESIGNATIONS OF MILD STEEL COVERED ARC WELDING ELECTRODES

Specification No.	AWS-SFA 5.1	AS-1552 SFA 1973	NF-A 81-309-1975	BS-639 1976	CSA-W48.1-M 1980	DIN-1913 Pt 1 1913	IS : 815-1974	ISO 2560-1973	JIS Z3211 Z3213 (Reaffirmed 1980)	O NORM-M7820 Teil 1	UNE-14003
Country	USA	Australia	France	U.K.	Canada	Germany	India	International	Japan	Austria	Italy
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Near Equivalent Electrode Designation	E 6010	E 4110	E434/0C10	E4340C10	E41010	E4340C4	E100414	E434C10	—	E4340C10 +	E434C10
	E 6011	E 4111	E434/0C16	E4340C16	E41011	E4340C4	E104414	E434C16	D4311	E4340C14	E434C16
	E 6012	E 4112	E431/0R12	E4310R12	E41012	E4310R (C)3	E212411	E431R12	—	E4310R(C)15	E431R12
	E 6013	E 4113	E431/0R11	E4310R14	E41013	E4310R2	E316411	E431R11	D4313	E4310R11	E431R11
	E 6020	E 4120	E432/0A32	E4310A32	—	E4310A5	E442412	E432A32	—	E4310A32	E432A32
	E 6022	E 4120	E430/0A41	E4300A44	—	E4300A5	E436410	E430A41	—	E4300A41	A430A41
	E 6027	E 4127	E434/0A32	E4340A32	E41027	E4340A5	E546414	E434A32	D4327	E4340A32	E434A32
	E 7014	E 4814	E511/0R11	E5110RR11	E48014	E5110RR8	E205511	E511R11	—	E5110RR11	E511R11
	E 7015	E 4815	E514/0B10	E5140B10	E48015	E5140B9	E600514	E514B10	—	E5140B10 +	E514B10
	E 7016	E 4816	E514/0B16	E5140B16	E48016	E5140BR9	E604514	E514B16	D6216	E5140B16	E514B16
	E 7018	E 4818	E514/0B16	E5140B16	E48018	E5140BR9	E604514	E514B16	D6218	E5140B16	E514B16
	E 7024	E 4824	E511/0R31	E5110RR31	E48024	E5110RR11	E246511	E511RR31	—	E5110RR31	E511RR31
	E 7027	E 4827	E514/0A31	E5140A31	E48027	E5140A5	E546514	E514A31	—	E5140A33	E514A31
	E 7028	E 4828	E513/0B36	E5130B32	E48028	E5130B12	E641513	E513B36	—	E5130B36	E513B36
	E 7048	—	—	E5140B93	E48048	—	E614414	—	—	—	—

1.1.6 This comparison standard does not mean in any form to uphold, contradict or comment on the quality of individual welding consumable or the standards, specifications and codes of procedures of all those countries whose specification codes have been referred to in this comparison standard. It does not give complete information on any national standard cited in Table 1 or the properties and other characteristics of the electrodes and, as such the respective national standard must be referred to for complete information and application purposes.

APPENDIX A

(*Clause* 1.1.2)

CLARIFICATION ON SYMBOLS AND DIGITS

A-1. In all the standards the first alphabat 'E' represents electrode except the Japanese standard where the first alphabet 'D' represents electrodes.

a) AWS SFA 5·1	First and second digits	Represent UTS minimum in Ksi
	Third and fourth digits	Give covering and current conditions
b) Australian	First and second digits	Represent minimum UTS in 1/10th of Mega Pascal (MPa)
AS-1552-1973	Third and fourth digits	Represent welding position, current conditions and covering
c) French	First and second digits	Represent the minimum UTS in N/mm^2
NF-A81-309-1975	Third digit	Represents elongation and temperature corresponding to minimum impact value of 28 J
	Fourth digit	Represents temperature corresponding to a minimum impact value of 47 J
	Fifth alphabet	Represents the type of covering
	Sixth digit	Represents the welding position
	Seventh digit	Represents the type of current

d) UK BS 639-1976	First and second digits	Represent minimum UTS in N/mm^2
	Third and fourth digits	Represent elongation and impact
	Fifth alphabet	Gives the nature of covering
	Sixth digit	Represents the welding position
	Seventh digit	Gives current and voltage conditions
e) Canadian CSA-W48·1-M 1980	First, second and third digits	Represent minimum UTS in MPa
	Fourth digit	Represents welding position
	Fifth digit	Represents type of current and covering
f) German DIN 1913 Part I	First and second digits	Represent minimum UTS and yield strength in kg/mm^2
	Third digit	Represents elongation and temperature for minimum impact energy for 28 J
	Fourth digit	Represents temperature for minimum impact energy for 47 J
	Fifth alphabet	Gives the type of covering
	Sixth digit	Gives the class of electrode
g) Indian IS : 815-1974	First digit	Represents type of covering
	Second digit	Represents the welding position
	Third digit	Represents the current condition
	Fourth and fifth digits	Give the tensile and yield strength in N/mm^2
	Sixth digit	Represents elongation and temperature for impact value of 47 J
h) ISO 2560-1973	First and second digits	Represent minimum UTS in N/mm^2
	Third digit	Represents elongation and impact

	Fourth alphabet	Represents the nature of covering
	Fifth and sixth digits	Represents the efficiency of the electrode
j) Austrian ONORM-M 7820 Part I	First and second digits	Represent minimum UTS and YS in N/mm^2
	Third digit	Gives elongation and temperature for impact energy of 28 J
	Fourth digit	Gives temperature for impact energy of 47 J
	Fifth and sixth alphabets	Represent the nature of covering
	Seventh digit	Represents the welding position
	Eighth digit	Gives the nature of current
k) Italian UNE-14003	First and second digits	Represent tensile strength in kg/mm^2
	Third digit	Represents elongation and temperature for minimum impact energy of 27·5 J
	Fourth alphabet	Gives the nature of coating
	Fifth digit	Represents electrode efficiency
	Sixth digit	Represents welding position
m) Japanese JSI Z 3211 Z 3213	First and second digits	Represent minimum UTS and YS in kg/mm^2 (N/mm^2)
	The last two digits	Represent type of covering, welding position and type of current

(*Continued from page* 2)

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

AMENDMENT NO. 1 NOVEMBER 1987

TO

IS:11368(Part 1)-1985 COMPARISON OF INDIAN AND OVERSEAS CLASSIFICATION AND CODING OF WELDING FILLER MATERIALS

PART 1 FLUX COATED MILD STEEL AND MEDIUM TENSILE STEEL STICK ELECTRODES FOR MANUAL METAL-ARC WELDING

(Page 5, Table 1, column 8, last entry) - Substitute 'E 614514' for 'E 614414'.

(SMDC 14)

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