DRAFT AMENDMENT NO. 2

TO

IS 6419 : 1996 WELDING RODS AND BARE ELECTRODES FOR GAS SHIELDED ARC WELDING OF STRUCTURAL STEELS — SPECIFICATION

(First Revision)

ICS 25.160.20; 77.140.40

Welding General and its Applications Sectional Committee, MTD 11	Last date for receipt of comment is 29 November 2024

(*Page* 1, *clause* 2) — Substitute the following for the existing clause:

‘2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

IS No.	*Title*
IS 228 (relevant parts)	Methods of chemical analysis of steels
IS 812 (all parts)	Welding and allied processes — Vocabulary
IS 1387 : 1993	General requirements for the supply of metallurgical materials (*second revision*)
IS 1608 (Part 1) : 2022/ ISO 6892-1 : 2019	Metallic materials — Tensile testing: Part 1 Method of test at room temperature (*fifth revision*)
IS 1757 (Part 1) : 2020/ ISO 148-1 : 2016	Metallic Materials — Charpy pendulum impact test: Part 1 Test method (*fourth revision*)
IS 2002 : 2024	Steel plate for pressure vessel for intermediate and high temperature service including boilers — Specification (*fourth revision*)
IS 2062 : 2011	Hot rolled medium and high tensile structural steel — Specification (*seventh revision*)
IS 3039 : 2024	Structural steel for ship construction — Specification (*third revision*)
IS 18632 : 2024/ ISO 14344 : 2010	Welding Consumables — Procurement of Filler Materials and Fluxes

(*Page* 1, *clause* **3**) — Substitute ‘IS 812 (Part 1 to 4)’ for ‘IS 812 : 1957’.

(*Page* 1, *clause* **4**) — Substitute ‘IS 1387’ for ‘IS 1387 : 1993’.

(*Page* 1, *Clause* **5**, *Table* 1) — Substitute the following for the existing Table:

Sl No.	**Nominal Diameter**	**Tolerance**, mm	
	mm	Plus	Minus
(1)	(2)	(3)	(4)
i)	0.6	0.01	0.03
ii)	0.8	0.01	0.04
iii)	0.9	0.01	0.04
iv)	1.0	0.01	0.04
v)	1.2	0.01	0.04
vi)	1.4	0.01	0.04
vii)	1.6	0.01	0.04
viii)	1.8	0.01	0.04
ix)	2.0	0.01	0.07
x)	2.4	0.01	0.07
xi)	2.5	0.01	0.07
xii)	2.8	0.01	0.07
xiii)	3.0	0.01	0.07
xiv)	3.15	0.01	0.07
xv)	3.2	0.01	0.07
xvi)	4.0	0.01	0.07
xvii)	5.0	0.01	0.07

(*Page* 2, *Clause* **8.1**, *Table* 2) **—** Add following Note under Table 2:

NOTE **—** Other dimensions can be as agreed between the purchaser and the manufacturer.

(*Page* 3, *Clause* **10.2**) **—** Substitute the following for the existing clause:

‘**10.2 Cast and Helix of Wire**

10.2.1 *Cast*

The cast of coiled filler metals shall be such as to have imparted a curvature to the filler metal so that a specimen sufficient in length to found one loop or a maximum 3 m when cut from the package and laid on a flat surface without restraint, shall form a circle or portion thereof of the diameter shown for the cast in Table 6.

10.2.2 *Helix*

The helix of coiled filler metal as executed by the ring used to determine the cast, when placed in flat surface without restraint, shall be such that the maximum distance from any point on the filler metal to flat surface shall not exceed the dimension shown for helix in Table 6.’

(*Page* 4, *Table* 5) **—** Delete.

(*Page* 5, *Table* 6) **—** Substitute the following for the existing Table:

Table 6 Diameter of Cast and Helix

(*Clauses* 10.2.1 *and* 10.2.2)

Sl No.	**Type of Package**	**Standard Size**	**Cast**	**Maximum Helix**
		mm	mm	mm
(1)	(2)	(3)	(4)	(5)
i)	100 mm spool	1.2 and less	200 to 230	13
ii)	All except 100 mm spool	0.8 and less	305, *Min*	25
		0.9 and larger	380, *Min*	25

(*Page* 5, *Clause* **13.1**, *Informal Table*) **—** Substitute the following for the existing informal Table:

Sl No.	*Symbol*	*Yield Strength, Min*	*Tensile Strength, Min*	*Percentage Elongation at Gauge Length* $5.65\sqrt{S_0}$, *Min*
		MPa	MPa	
(1)	(2)	(3)	(4)	(5)
i)	50	400	490	22

(*Page* 5, *clause* **12**) — Substitute the following for the existing clause:

‘**12 CHEMICAL COMPOSITION**

The chemical composition of filler rods and wires when analyzed in accordance with the relevant part of IS 228 or any other established instrumental method shall be as per Table 7. In case of dispute, the procedure given in the relevant part of IS 228 shall be referee method. However, where the method is not given in IS 228 or its relevant parts, the referee method shall be as agreed to between the purchaser and the manufacturer.’

(*Page* 5, *clause* **14.1**) — Substitute the following for the existing clause:

‘**14.1 Chemical Composition**

The chemical composition of the filler wire/rod should satisfy the chemical analysis as per Table 7. For the wires having less than 3 mm diameter, the chemical analysis may be performed on the raw material from which the wires are to be drawn.’

(*Page* 6, *Table* 7) — Substitute the following for the existing Table:

Table 7 Chemical Composition of Filler Rods and Wires

(*Clauses* 12 *and* 14.1)

Sl No.	**IS Classification**	**Chemical Composition, Percent by Weight**													
		Limits	C	Mn	Si	P	S	Ni	Cr	Mo	V	Cu[a)]	Ti	Zr	Al
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
i)	S1	*Min*	—	0.90	0.40	—	—	—	—	—	—	—	0.05	0.02	0.03
		Max	0.07	1.40	0.70	0.025	0.025	c)	c)	c)	c)	0.50	0.15	0.12	0.15

ii)	S2	*Min*	0.06	0.90	0.45	—	—	—	—	—	—	—	—	—	—
		Max	0.15	1.40	0.70	0.025	0.025	c)	c)	c)	c)	0.50	—	—	—
iii)	S3	*Min*	0.07	1.00	0.65	—	—	—	—	—	—	—	—	—	—
		Max	0.15	1.50	0.85	0.025	0.025	c)	c)	c)	c)	0.50	—	—	—
iv)	S4	*Min*	0.06	1.40	0.80	—	—	—	—	—	—	—	—	—	—
		Max	0.15	1.85	1.15	0.025	0.025	c)	c)	c)	c)	0.50	—	—	—
v)	S5	*Min*	0.07	1.50	0.50	—	—	—	—	—	—	—	—	—	—
		Max	0.15	2.00 d)	0.80	0.025	0.025	c)	c)	c)	c)	0.50	—	—	—
vi)	S6	No chemical requirements[b)]													

NOTES

a) The maximum weight percent of copper in the rod or electrode due to any coating plus the residual copper content in the steel shall be 0.50 *Max*,

b) For this classification, there are no chemical requirements for the elements listed, with the exception that there shall be no intentional addition of Ni, Cr, Mo or V,

c) These elements may be present but are not intentionally added

Mo + Ni + Cr < 0.45,

d) In this classification, the maximum Mn may exceed 2.0 percent. If it does, the maximum C must be reduced by 0.01 percent for each 0.05 percent increases in Mn or part thereof.

(*Page* 6, *clause* **15.1**) — Substitute the following for the existing clause:

'**15.1** The lot classification shall be as per clause **4.1** of IS 18632 and testing schedule shall be as per clause **5.5** of IS 18632.'

(*Page* 7, *clause* **17.2**) — Substitute the following for the existing clause:

'**17.2 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.'

(*Page* 7, *clause* **A-1.1**) **—** Substitute 'IS 2062, IS 2002, IS 3039' for 'IS 2062 : 1992, IS 2002 : 1992, IS 3039 : 1988'.

(*Page* 8, *clause* **A-5**) — Substitute 'IS 1608 (Part 1)' for 'IS 1608 : 1995'.

(*Page* 9, *clause* **A-6**) — Substitute 'IS 1757 (Part 1)' for 'IS 1757 : 1988'.

(MTD 11)