

BUREAU OF INDIAN STANDARDS

(Not to be reproduced without permission of BIS or used as an Indian Standard)

Draft Indian Standard

**CARBON AND LOW-ALLOY STEEL WIRE RODS FOR SUBMERGED
ARC WELDING AND GAS SHIELDED ARC WELDING ELECTRODES —
SPECIFICATION**

ICS 77.140.60

Wrought Steel Products Sectional Committee,
MTD 04

Last date for receipt of comments:
28 June 2025

FOREWORD

(Formal clauses of the foreword will be added later.)

The continued advancement of welding technology demands materials that ensure consistency, reliability, and superior performance across diverse industrial applications. Recognizing the critical role that wire rods play in the manufacture of welding electrodes, this standard has been developed to specify the requirements for carbon and low-alloy steel wire rods to be used as raw material for manufacture of submerged arc welding (SAW) and gas shielded arc welding (GSAW) electrodes.

For all the tests specified in this standard (chemical/physical/others), the method as specified in relevant ISO standard may also be followed as an alternate method.

The composition of the Committee responsible for formulation of this standard is given in **Annex C**. *(to be added at later stage)*

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (second revision)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

CARBON AND LOW-ALLOY STEEL WIRE RODS FOR SUBMERGED ARC WELDING AND GAS SHIELDED ARC WELDING ELECTRODES — SPECIFICATION

1 SCOPE

This standard covers the requirements of carbon and low-alloy steel wire rods to be used as raw material for manufacture of submerged arc welding and gas shielded arc welding electrodes.

This standard does not cover the requirements of solid filler rods and wires to be directly used as welding consumable.

2 REFERENCES

The standards listed in Annex A contain provisions, which through references in this text constitute provisions 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 editions of these standards.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in relevant parts of IS 812 and IS 1956 shall apply.

4 SUPPLY OF MATERIAL

4.1 General requirements relating to the supply of material shall conform to IS 8910.

4.2 Steel for manufacture of submerged arc welding and gas shielded arc welding electrodes shall be supplied in the form of wire rods in sizes as specified by the purchaser.

4.3 The material shall be supplied on the basis of chemical composition as given in **Table 1**.

5 MANUFACTURE

5.1 The processes used in making the steel and in manufacturing the finished product are left to the discretion of the manufacturer. If required, steel may be further treated in secondary refining or vacuum degassing process.

5.2 Steels used for manufacturing the product covered in the standard shall conform to the requirements of IS 14650. However, the chemical composition of steel shall conform to the product analysis requirements of this standard.

6 CHEMICAL COMPOSITION

The product analysis of the material when carried out either by the method specified in the relevant part of IS 228 or any other established instrumental/chemical method, shall be as given in **Table 1**. In case of dispute, the procedure given in the relevant part of IS 228 shall be the 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.

Table 1 Chemical Composition
(Clause 6)

Designation	Constituent (Product Analysis), Percent															
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	B	Nb	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
CARBON STEEL GRADES FOR SUBMERGED ARC WELDING																
EL8	0.10 Max	0.25- 0.60	0.07 Max	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
EL8K	0.10 Max	0.25- 0.60	0.10- 0.25	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
EL12	0.04- 0.14	0.25- 0.60	0.10 Max	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
S1	0.05- 0.15	0.35- 0.60	0.15 Max	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
S1Si	0.05- 0.15	0.35- 0.60	0.15- 0.40	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
EM11K	0.07- 0.15	1.00- 1.50	0.65- 0.85	0.025 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
EM12	0.06- 0.15	0.80- 1.30	0.15 Max	0.030 Max	0.030 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
S2	0.07- 0.15	0.80- 1.30	0.15 Max	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
S2Si	0.07- 0.15	0.80- 1.30	0.15- 0.40	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
S2Si2	0.07- 0.15	0.80- 1.30	0.40- 0.60	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
EM12K	0.05- 0.15	0.80- 1.25	0.10- 0.35	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
EM13K	0.06- 0.16	0.90- 1.40	0.35- 0.75	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
EM14K	0.06- 0.19	0.90- 1.40	0.35- 0.75	0.025 Max	0.025 Max	-	-	-	-	0.03- 0.17	-	-	0.35 Max	-	-	-
EM15K	0.10- 0.20	0.80- 1.25	0.10- 0.35	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-

Designation	Constituent (Product Analysis), Percent															
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	B	Nb	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EH10K	0.07-0.15	1.30-1.70	0.05-0.25	0.025 Max	0.025 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
S3	0.07-0.15	1.30-1.75	0.15 Max	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
S3Si	0.07-0.15	1.30-1.85	0.15-0.40	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
EH11K	0.06-0.15	1.40-1.85	0.80-1.15	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
EH12K	0.06-0.15	1.50-2.00	0.20-0.65	0.025 Max	0.025 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
LOW-ALLOY STEEL GRADES FOR SUBMERGED ARC WELDING																
S4	0.07-0.15	1.75-2.25	0.15 Max	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
S4Si	0.07-0.15	1.85-2.25	0.15-0.40	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	-	-	-	-	0.30 Max	-	-	-
EH14	0.10-0.20	1.70-2.20	0.10 Max	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.35 Max	-	-	-
ER70S-2	0.07 Max	0.90-1.40	0.40-0.70	0.025 Max	0.035 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	0.05-0.15	0.02-0.12	0.05-0.15	0.50 Max	-	-	-
ER70S-3*	0.06-0.15	0.90-1.40	0.45-0.75	0.025 Max	0.035 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	-	-	-	0.50 Max	-	-	-
ER70S-4*	0.06-0.15	1.00-1.50	0.65-0.85	0.025 Max	0.035 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	-	-	-	0.50 Max	-	-	-
ER70S-6*	0.06-0.15	1.40-1.85	0.80-1.15	0.025 Max	0.035 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	-	-	-	0.50 Max	-	-	-
ER70S-7*	0.07-0.15	1.50-2.00	0.50-0.80	0.025 Max	0.035 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	-	-	-	0.50 Max	-	-	-
ER70S-8	0.02-0.10	1.40-1.90	0.55-1.10	0.025 Max	0.035 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.10-0.30		-	0.50 Max	-	-	-
EA1	0.05-0.15	0.65-1.00	0.20 Max	0.025 Max	0.025 Max	-	-	0.45-0.65	-	-	-	-	0.35 Max	-	-	-

Designation	Constituent (Product Analysis), Percent															
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	B	Nb	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EA1TiB	0.05-0.15	0.65-1.00	0.35 Max	0.025 Max	0.025 Max	-	-	0.45-0.65	-	0.05-0.30	-	-	0.35 Max	0.005-0.030	-	-
EA2TiB	0.05-0.17	0.95-1.35	0.35 Max	0.025 Max	0.025 Max	-	-	0.45-0.65	-	0.05-0.30	-	-	0.35 Max	0.005-0.030	-	-
EA2	0.05-0.17	0.95-1.35	0.20 Max	0.025 Max	0.025 Max	-	-	0.45-0.65	-	-	-	-	0.35 Max	-	-	-
EA3	0.05-0.17	1.65-2.20	0.20 Max	0.025 Max	0.025 Max	-	-	0.45-0.65	-	-	-	-	0.35 Max	-	-	-
EA3K	0.05-0.15	1.60-2.10	0.50-0.80 Max	0.025 Max	0.025 Max	-	-	0.40-0.60	-	-	-	-	0.35 Max	-	-	-
EA4	0.05-0.15	1.20-1.70	0.20 Max	0.025 Max	0.025 Max	-	-	0.45-0.65	-	-	-	-	0.35 Max	-	-	-
EB1	0.10 Max	0.40-0.80	0.05-0.30	0.025 Max	0.025 Max	-	0.40-0.75	0.45-0.65	-	-	-	-	0.35 Max	-	-	-
EB2	0.07-0.15	0.45-1.00	0.05-0.30	0.025 Max	0.025 Max	-	1.00-1.75	0.45-0.65	-	-	-	-	0.35 Max	-	-	-
EB2H	0.28-0.33	0.45-0.65	0.55-0.75	0.015 Max	0.015 Max	-	1.00-1.50	0.40-0.65	0.20-0.30	-	-	-	0.30 Max	-	-	-
EB3	0.05-0.15	0.40-0.80	0.05-0.30	0.025 Max	0.025 Max	-	2.25-3.00	0.90-1.10	-	-	-	-	0.35 Max	-	-	-
EB5	0.15-0.23	0.40-0.70	0.40-0.60	0.025 Max	0.025 Max	-	0.45-0.65	0.90-1.20	-	-	-	-	0.30 Max	-	-	-
EB6	0.10 Max	0.35-0.70	0.05-0.50	0.025 Max	0.025 Max	-	4.50-6.50	0.45-0.70	-	-	-	-	0.35 Max	-	-	-
EB6H	0.25-0.40	0.75-1.00	0.25-0.50	0.025 Max	0.025 Max	-	4.80-6.00	0.45-0.65	-	-	-	-	0.35 Max	-	-	-
EB8	0.10 Max	0.30-0.65	0.05-0.50	0.025 Max	0.025 Max	-	8.00-10.50	0.80-1.20	-	-	-	-	0.35 Max	-	-	-
EB23	0.05-0.12	1.10 Max	0.50 Max	0.015 Max	0.015 Max	0.50 Max	1.9-3.0	0.50 Max	0.15-0.30	-	-	0.04 Max	0.10 Max	0.006 Max	0.02-0.10	0.05 Max
EB24	0.04-0.12	1.00 Max	0.50 Max	0.020 Max	0.015 Max	0.30 Max	1.9-3.0	0.80-1.20	0.15-0.30	-	-	0.04 Max	0.10 Max	0.006 Max	0.02-0.10	0.07 Max

Designation	Constituent (Product Analysis), Percent															
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	B	Nb	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EB91	0.07-0.13	1.25 Max	0.50 Max	0.010 Max	0.010 Max	1.00 Max	8.50-10.50	0.85-1.15	0.15-0.25	-	-	0.04 Max	0.10 Max	-	0.02-0.10	0.03-0.07
EB115	0.06-0.13	0.55 Max	0.15-0.50	0.015 Max	0.010 Max	0.45 Max	9.5-12.0	0.40-0.65	0.10-0.30	-	-	0.04 Max	0.20 Max	-	0.02-0.10	0.02-0.06
EF1	0.07-0.15	0.90-1.70	0.15-0.35	0.025 Max	0.025 Max	0.95-1.60	-	0.25-0.55	-	-	-	-	0.35 Max	-	-	-
EF2	0.10-0.18	1.70-2.40	0.20 Max	0.025 Max	0.025 Max	0.40-0.80	-	0.40-0.65	-	-	-	-	0.35 Max	-	-	-
EF3	0.10-0.18	1.50-2.40	0.30 Max	0.025 Max	0.025 Max	0.70-1.10	-	0.40-0.65	-	-	-	-	0.35 Max	-	-	-
EF4	0.16-0.23	0.60-0.90	0.15-0.35	0.025 Max	0.030 Max	0.40-0.80	0.40-0.60	0.15-0.30	-	-	-	-	0.35 Max	-	-	-
EF5	0.10-0.17	1.70-2.20	0.20 Max	0.010 Max	0.015 Max	2.30-2.80	0.25-0.50	0.45-0.65	-	-	-	-	0.50 Max	-	-	-
EF6	0.07-0.15	1.45-1.90	0.10-0.30	0.015 Max	0.015 Max	1.75-2.25	0.20-0.55	0.40-0.65	-	-	-	-	0.35 Max	-	-	-
EM2	0.10 Max	1.25-1.80	0.20-0.60	0.010 Max	0.015 Max	1.40-2.10	0.30 Max	0.25-0.55	0.05 Max	0.10 Max	0.10 Max	0.10 Max	0.25 Max	-	-	-
EM3	0.10 Max	1.40-1.80	0.20-0.60	0.010 Max	0.015 Max	1.90-2.60	0.55 Max	0.25-0.65	0.04 Max	0.10 Max	0.10 Max	0.10 Max	0.25 Max	-	-	-
EM4	0.10 Max	1.40-1.80	0.20-0.60	0.010 Max	0.015 Max	2.00-2.80	0.60 Max	0.30-0.65	0.03 Max	0.10 Max	0.10 Max	0.10 Max	0.25 Max	-	-	-
ENi1	0.12 Max	0.75-1.25	0.05-0.30	0.020 Max	0.020 Max	0.75-1.25	0.15 Max	0.30 Max	-	-	-	-	0.35 Max	-	-	-
ENi1K	0.12 Max	0.80-1.40	0.40-0.80	0.020 Max	0.020 Max	0.75-1.25	-	-	-	-	-	-	0.35 Max	-	-	-
ENi2	0.12 Max	0.75-1.25	0.05-0.30	0.020 Max	0.020 Max	2.10-2.90	-	-	-	-	-	-	0.35 Max	-	-	-
ENi3	0.13 Max	0.60-1.20	0.05-0.30	0.020 Max	0.020 Max	3.10-3.80	0.15 Max	-	-	-	-	-	0.35 Max	-	-	-
ENi4	0.12-0.19	0.60-1.00	0.10-0.30	0.015 Max	0.020 Max	1.60-2.10	-	0.10-0.30	-	-	-	-	0.35 Max	-	-	-

Designation	Constituent (Product Analysis), Percent															
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	B	Nb	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
ENi5	0.12 Max	1.20- 1.60	0.05- 0.30	0.020 Max	0.020 Max	0.75- 1.25	-	0.10- 0.30	-	-	-	-	0.35 Max	-	-	-
ENi6	0.07- 0.15	1.20- 1.60	0.05- 0.30	0.020 Max	0.020 Max	0.75- 1.25	-	0.10- 0.30	-	-	-	-	0.35 Max	-	-	-
EW	0.12 Max	0.35- 0.65	0.20- 0.35	0.025 Max	0.030 Max	0.40- 0.80	0.50- 0.80	-	-	-	-	-	0.30- 0.80	-	-	-
EG	Not Specified															
CARBON STEEL GRADES FOR GAS SHIELDED ARC WELDING																
S2	0.07 Max	0.90- 1.40	0.40- 0.70	0.025 Max	0.030 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	0.05-0.15	0.02- 0.12	0.05- 0.15	0.50 Max	-	-	-
S15	0.02- 0.15	1.00- 1.60	0.40- 1.00	0.030 Max	0.030 Max	-	-	-	-	- -		-	0.50 Max	-	-	-
S16	0.02- 0.15	0.90- 1.60	0.40- 1.00	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.50 Max	-	-	-
S17	0.02- 0.15	1.50- 2.10	0.20- 0.55	0.030 Max	0.030 Max	-	-	-	-	Ti+Zr: 0.02-0.30		-	0.50 Max	-	-	-
LOW-ALLOY STEEL GRADES FOR GAS SHIELDED ARC WELDING																
2Si	0.06- 0.14	0.90- 1.30	0.50- 0.80	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.15 Max		0.02 Max	0.35 Max	-	-	-
3Si1	0.06- 0.14	1.30- 1.60	0.70- 1.00	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.15 Max		0.02 Max	0.35 Max	-	-	-
3Si2	0.06- 0.14	1.30- 1.60	1.00- 1.30	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.15 Max		0.02 Max	0.35 Max	-	-	-
4Si1	0.06- 0.14	1.60- 1.90	0.80- 1.20	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.15 Max		0.02 Max	0.35 Max	-	-	-
2Ti	0.04- 0.14	0.90- 1.40	0.40- 0.80	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.05-0.25		0.05- 0.20	0.35 Max	-	-	-
2Al	0.08- 0.14	0.90- 1.30	0.30- 0.50	0.025 Max	0.025 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.15 Max		0.35- 0.75	0.35 Max	-	-	-
S11	0.02- 0.15	1.40- 1.90	0.55- 1.10	0.025 Max	0.030 Max	0.15 Max	0.15 Max	0.15 Max	0.03 Max	Ti+Zr: 0.02-0.30		-	0.50 Max	-	-	-

Designation	Constituent (Product Analysis), Percent															
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	B	Nb	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
S12	0.02-0.15	1.25-1.90	0.55-1.00	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.50 Max	-	-	-
S13	0.02-0.15	1.35-1.90	0.55-1.10	0.030 Max	0.030 Max	-	-	-	-	Ti+Zr: 0.02-0.30		0.10-0.50	0.50 Max	-	-	-
S14	0.02-0.15	1.30-1.60	1.00-1.35	0.030 Max	0.030 Max	-	-	-	-	-	-	-	0.50 Max	-	-	-
S18	0.02-0.15	1.60-2.40	0.50-1.10	0.030 Max	0.030 Max	-	-	-	-	Ti+Zr: 0.02-0.30		-	0.50 Max	-	-	-
ER70S-G	-	-	-	-	-	0.15 Max	0.15 Max	0.15 Max	0.03 Max	-	-	-	-	-	-	-
ER70S-A1	0.12 Max	1.30 Max	0.30-0.70	0.025 Max	0.025 Max	0.20 Max	-	0.40-0.65	-	-	-	-	0.35 Max	-	-	-
S2M3	0.12 Max	0.60-1.40	0.30-0.70	0.025 Max	0.025 Max	-	-	0.40-0.65	-	-	-	-	0.50 Max	-	-	-
S2M31	0.12 Max	0.80-1.50	0.30-0.90	0.025 Max	0.025 Max	-	-	0.40-0.65	-	-	-	-	0.50 Max	-	-	-
S3M3T	0.12 Max	1.00-1.80	0.40-1.00	0.025 Max	0.025 Max	-	-	0.40-0.65	-	0.02-0.30	-	-	0.50 Max	-	-	-
S3M1	0.05-0.15	1.40-2.10	0.40-1.00	0.025 Max	0.025 Max	-	-	0.10-0.45	-	-	-	-	0.50 Max	-	-	-
S3M1T	0.12 Max	1.40-2.10	0.40-1.00	0.025 Max	0.025 Max	-	-	0.10-0.45	-	0.02-0.30	-	-	0.50 Max	-	-	-
ER80S-D2	0.07-0.12	1.60-2.10	0.50-0.80	0.025 Max	0.025 Max	0.15 Max	-	0.40-0.60					0.50 Max			
ER90S-D2	0.07-0.12	1.60-2.10	0.50-0.80	0.025 Max	0.025 Max	0.15 Max	-	0.40-0.60					0.50 Max			
S4M3T	0.12 Max	1.60-2.20	0.50-0.80	0.025 Max	0.025 Max	-	-	0.40-0.65	-	-	-	-	0.50 Max	-	-	-
ER80S-B2	0.07-0.12	0.40-0.70	0.40-0.70	0.025 Max	0.025 Max	0.20 Max	1.20-1.50	0.40-0.65					0.35 Max			
ER70S-B2L	0.05 Max	0.40-0.70	0.40-0.70	0.025 Max	0.025 Max	0.20 Max	1.20-1.50	0.40-0.65					0.35 Max			

Designation	Constituent (Product Analysis), Percent															
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	B	Nb	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
ER90S-B3	0.07-0.12	0.40-0.70	0.40-0.70	0.025 Max	0.025 Max	0.20 Max	2.30-2.70	0.90-1.20					0.35 Max			
ER80S-B3L	0.05 Max	0.40-0.70	0.40-0.70	0.025 Max	0.025 Max	0.20 Max	2.30-2.70	0.90-1.20					0.35 Max			
ER80S-B6	0.10 Max	0.40-0.70	0.50 Max	0.025 Max	0.025 Max	0.60 Max	4.50-6.00	0.45-0.65					0.35 Max			
ER80S-B8	0.10 Max	0.40-0.70	0.50 Max	0.025 Max	0.025 Max	0.50 Max	8.00-10.50	0.80-1.20					0.35 Max			
ER90S-B9	0.07-0.13	1.20 Max	0.15-0.50	0.010 Max	0.010 Max	0.80 Max	8.00-10.50	0.85-1.20	0.15-0.30			0.04 Max	0.20 Max			
ER80S-Ni1	0.12 Max	1.25 Max	0.40-0.80	0.025 Max	0.025 Max	0.80-1.10	0.15 Max	0.35 Max	0.05 Max				0.35 Max			
ER80S-Ni2	0.12 Max	1.25 Max	0.40-0.80	0.025 Max	0.025 Max	2.00-2.75							0.35 Max			
ER80S-Ni3	0.12 Max	1.25 Max	0.40-0.80	0.025 Max	0.025 Max	3.00-3.75							0.35 Max			
ER100S-1	0.08 Max	1.25-1.80	0.20-0.55	0.010 Max	0.010 Max	1.40-2.10	0.30 Max	0.25-0.55	0.05 Max	0.10 Max	0.10 Max	0.10 Max	0.25 Max			
ER110S-1	0.09 Max	1.40-1.80	0.20-0.55	0.010 Max	0.010 Max	1.90-2.60	0.50 Max	0.25-0.55	0.04 Max	0.10 Max	0.10 Max	0.10 Max	0.25 Max			
ER120S-1	0.10 Max	1.40-1.80	0.25-0.60	0.010 Max	0.010 Max	2.00-2.80	0.60 Max	0.30-0.65	0.03 Max	0.10 Max	0.10 Max	0.10 Max	0.25 Max			

ERXXS-G	Ni 0.050 Min or Cr 0.30 Min or Mo 0.20 Min															
---------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* These grades can be used for Gas Shielded Arc Welding also.

NOTES

1 Elements not quoted in this table shall not be intentionally added to the steel without the agreement of the purchaser, other than for the purpose of finishing the heat. All reasonable precautions shall be taken to prevent the addition of such elements from scrap or other material used in the manufacture which affect the hardenability, mechanical properties and applicability.

2 Restricted chemistry may be mutually agreed to between the purchaser and the supplier. Reduced residual limits are necessary to meet the requirements of various applications. In such cases, the grades may be suffixed with optional supplemental designator.

3 Analysis of Boron shall be reported if intentionally added or if it is known to be present at levels greater than 0.0010%

7 FREEDOM FROM DEFECTS

The material shall be reasonably free from all harmful defects.

8 DIMENSIONS

8.1 The nominal size of wire rods shall be subject to mutual agreement between the purchaser and the manufacturer.

9 TOLERANCES

9.1 The dimensional tolerances and out-of-roundness (Ovality) of the wire rods shall be as per IS / ISO 16124

10 SELECTION OF TEST SAMPLES

Samples for chemical analysis shall be taken at the rate of one sample for every 25 tonnes or part thereof. For heat size above 100 tonnes, four samples shall be taken and the lot size shall increase proportionally. Samples for product analysis shall be taken in accordance with IS / ISO 14284.

NOTE — A lot shall comprise a part of the material from the same cast.

11 RETEST

Retests shall be as specified in IS 8910.

12 MARKING

12.1 Duplicate tags legibly marked with the cast number, grade, size and manufacturer's name or trade-mark shall be securely tied to each coil. If mutually agreed, the weight of steel may be included in the tag. Further requirements to special marking of the products shall be agreed at the time of enquiry and order.

12.2 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.

ANNEX A*(Clause 2)***LIST OF REFERRED STANDARDS**

<i>IS No.</i>	<i>Title</i>
IS 228 (all parts)	Method for chemical analysis of steel
IS 812 (various parts)	Welding and Allied Processes —Vocabulary
IS 1956 (Part 2) : 2018	Glossary of terms relating to iron and steel: Part 2 steel making (<i>second revision</i>)
IS 1956 (Part 3) : 2019	Glossary of terms relating to iron and steel: Part 3 long products (Including Bars, Rods, Sections And Wires) (<i>second revision</i>)
IS 7598 : 1990	Classification of Steels (<i>first revision</i>)
IS 8910 : 2022/ ISO 404 : 2013	Steel and steel products — General technical delivery requirements (<i>second revision</i>)
IS / ISO 16124:2015	Steel wire rod - Dimensions and tolerances (<i>first revision</i>)
ISO 22034-2:2016	Steel wire and wire products — Tolerances on wire dimensions

ANNEX B

INFORMATION TO BE GIVEN BY THE PURCHASER

B-1 BASIS OF ORDER

While placing the order for carbon and low-alloy steel wire rods, covered by this standard, the purchaser should specify the following:

- a) Steel grade;
- b) Size of wire rods;
- c) Size and dimensions of end product;
- d) End use;
- e) Special requirement, if any.