

Unofficial Translation

Thai Industrial Standard for Low Carbon Steel Wire Rods TIS 348-2540 (1997)

1. Scope

- 1.1 This standard specifies symbols, sizes and tolerances, chemical composition, requirements, marking and labelling, sampling and criteria for conformity and testing for low carbon steel wire rods.
- 1.2 The low carbon steel wire rods complying with this standard are not appropriate to be used for concrete reinforcement.
- 1.3 This standard does not cover wire rods for the manufacture of core wire of welding electrodes, nor does it cover steel bars and steel wire rods of circular cross section, the standards for which have been already specified.
- 1.4 This standard covers steel bars of circular cross section which may be used for the manufacture of steel wires.

2. Definition

For the purpose of this standard, the following definitions apply :

- 2.1 **LOW CARBON STEEL WIRE RODS** : hereinafter referred to as “WIRE RODS” : Semi finished hot rolled low carbon steel products of circular cross section in the form of coiled wire having chemical composition and symbols as specified in Table 1 or Table 2, used for the manufacture of steel wires such as wire rods for galvanized wires, wire rods for wire nails, annealed wire.
- 2.2 **COIL** : A wire rod of continuous length without joint wound into coil.

3. Symbols

- 3.1 Wire rods shall be classified by the chemical composition and designated by 8 symbols as specified in Table 1 or Table 2.

4. Sizes and tolerances

- 4.1 Nominal sizes, diameter and tolerances of wire rods shall comply with Table 3. Compliance is checked by the test in accordance with clause 9.1.

Table 1 Symbols and chemical composition determined by ladle analysis
(clauses 2.1, 3.1 and 5.1)

Symbol	Chemical composition %			
	Carbon	Manganese	Phosphorus max.	Sulfur max.
SWRM 6	0.08 max	0.60 max	0.040	0.040
SWRM 8	0.10 max	0.60 max	0.040	0.040
SWRM 10	0.08 up to 0.13	0.30 up to 0.60	0.040	0.040
SWRM 12	0.10 up to 0.15	0.30 up to 0.60	0.040	0.040
SWRM 15	0.13 up to 0.18	0.30 up to 0.60	0.040	0.040
SWRM 17	0.15 up to 0.20	0.30 up to 0.60	0.040	0.040
SWRM 20	0.18 up to 0.23	0.30 up to 0.60	0.040	0.040
SWRM 22	0.20 up to 0.25	0.30 up to 0.60	0.040	0.040

Table 2 Symbols and chemical composition determined by product analysis
(clauses 2.1, 3.1 and 5.1)

Symbol	Chemical composition %			
	Carbon	Manganese	Phosphorus max.	Sulfur max.
SWRM 6	0.11 max	0.63 max	0.050	0.050
SWRM 8	0.13 max	0.63 max	0.050	0.050
SWRM 10	0.06 up to 0.16	0.27 up to 0.63	0.050	0.050
SWRM 12	0.08 up to 0.18	0.27 up to 0.63	0.050	0.050
SWRM 15	0.11 up to 0.22	0.27 up to 0.63	0.050	0.050
SWRM 17	0.13 up to 0.24	0.27 up to 0.63	0.050	0.050
SWRM 20	0.15 up to 0.27	0.27 up to 0.63	0.050	0.050
SWRM 22	0.17 up to 0.29	0.27 up to 0.63	0.050	0.050

Table 3 Nominal sizes, diameter, out-of-round and tolerances
(clause 4.1)

Nominal size	Diameter mm	Tolerances mm	Maximum out-of-round mm
5.5	5.5	±0.40	0.64
6	6	±0.40	0.64
6.5	6.5	±0.40	0.64
7	7	±0.40	0.64
7.5	7.5	±0.40	0.64
8	8	±0.40	0.64
8.5	8.5	±0.40	0.64
9	9	±0.40	0.64
9.5	9.5	±0.40	0.64
10	10	±0.40	0.64
11	11	±0.40	0.64
12	12	±0.40	0.64
13	13	±0.40	0.64
14	14	±0.40	0.64
15	15	±0.40	0.64
16	16	±0.50	0.80
17	17	±0.50	0.80
19	19	±0.50	0.80

5. Chemical composition

5.1 The chemical composition of wire rods when determined by the ladle analysis shall conform to Table 1. When determined by the product analysis, it shall conform to Table 2.

Compliance is checked by the test in accordance with clause 9.2.

6. Requirements

6.1 Appearance

Wire rods shall be free from fracture, crack, pits and other defects harmful to use. Surface rusting is acceptable.

Compliance is checked by visual inspection.

7. Marking and labelling

- 7.1 A tag shall be attached to each coil of wire rod and the tag shall bear at least number, letter or mark indicating legibly and clearly the following information :
- (1) Symbol
 - (2) Nominal size in millimeter
 - (3) Weight in kilograms
 - (4) Cast number or other equally informative mark
 - (5) Name of manufacturer or factory or registered trade-mark

In case foreign language is used, the meaning shall correspond to that in Thai specified above.

8. Sampling and criteria for conformity

- 8.1 Lot : Wire rods of the same symbol and nominal size which are manufactured or delivered or purchased at the same time.
- 8.2 Sampling and acceptance shall comply with the sampling plan below or other technically equivalent plan.
- 8.2.1 Sampling and acceptance for testing on size and appearance
- 8.2.1.1 Test pieces shall be taken at random from the same lot as specified in Table 4. They shall each be cut from either end of a coil, and shall be approximately 500 mm long.
 - 8.2.1.2 Provided that all test pieces which do not satisfy the requirements of clauses 4 and 6 do not exceed acceptance number as specified in Table 4, that lot shall be deemed as conforming to the requirements in Table 4.

Table 4 Sampling plan for testing on size and appearance

(Clause 8.2.1.1)

Weight per lot Ton	Test specimen (Coil)	Acceptance number
150 or less	5	0
Over 150 up to and including 500	13	1
Over 500	20	2

- 8.2.2 Sampling and acceptance for testing on chemical composition
- 8.2.2.1 Four test pieces complying with clause 8.2.1.2 shall be taken at random. The test pieces shall be cut from either end of a coil, and shall each be of adequate length for making at least 3 test specimens, 1 of which shall be tested and the other 2 reserved for retest.
 - 8.2.2.2 Provided that all specimens satisfy the requirements of clause 5, that lot shall be deemed as conforming to the requirements. Should any

specimen fail to fulfill the requirements of clause 5, the 2 reserved specimens shall be taken for retest, the results of which shall satisfy all requirements of clause 5 for that lot to be deemed as conforming to the requirements.

8.3 Criteria for conformity

Provided that the samples satisfy all the requirements of clauses 8.2.1.2 and 8.2.2.2, that lot shall be deemed as conforming to this standard.

9. Testing

9.1 Diameter and out-of-round

9.1.1 Apparatus

A measuring device accurate to 0.01 mm.

9.1.2 Method of measurement

The specimen shall be measured at 3 positions within the length portion, which is turned around during the measurement. The maximum and minimum values shall be determined.

9.1.2.1 Diameter of wire rod

The diameter of wire rod shall be determined from the maximum and minimum values obtained.

9.1.2.2 Out-of-round

The difference between the maximum and minimum values of diameter at each position shall be determined as the out-of-round.

9.1.3 Report

All values of measured diameter and the out-of-round of the samples shall be reported.

9.2 Chemical composition

The chemical composition of the test specimens shall be determined by a general chemical analysis or an equivalent method, then the element content shall be reported to 3 or 4 decimal places as applicable.