



SLOVENSKI STANDARD
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Aluminium-magnesium-silicon alloy wire for overhead line conductors

Aluminium-magnesium-silicon alloy wire for overhead line conductors

Fils en alliage d'aluminium-magnésium-silicium pour conducteurs de lignes aériennes

Ta slovenski standard je istoveten z: IEC 60104

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ALUMINIUM-MAGNESIUM-SILICON ALLOY WIRE
FOR OVERHEAD LINE CONDUCTORS**

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by IEC Technical Committee No. 7: Bare Aluminium Conductors.

This second edition of IEC Publication 104 replaces the first edition, which was issued in 1958.

This standard replaces Clauses 3, 5, 6 and 13, and the requirements of Clauses 4 and 12 and Sub-clause 8.1 of IEC Publication 208 (1966): Aluminium Alloy Stranded Conductors (Aluminium-Magnesium-Silicon Type). It also replaces Clauses 3, 6, 15, Sub-clause 7.1 and the requirements of Clause 5, Sub-clauses 9.1, 13.2 and 13.3 of IEC Publication 210 (1966): Aluminium Alloy Conductors, Steel-reinforced.

The text of this standard is based on the following documents:

Six Months' Rule	Report on Voting
7(CO)420	7(CO)423

Further information can be found in the Report on Voting indicated in the table above.

The following IEC publication is quoted in this standard:

Publication No. 468 (1974): Method of Measurement of Resistivity of Metallic Materials.

Other publications quoted:

ISO Standard 6892 (1984): Metallic Materials – Tensile Testing.

ISO Standard 7802 (1983): Metallic Materials – Wire-Wrapping Test.

ALUMINIUM-MAGNESIUM-SILICON ALLOY WIRE FOR OVERHEAD LINE CONDUCTORS

1. Scope

This standard is applicable to aluminium-magnesium-silicon alloy wires of two types having different mechanical and electrical properties for the manufacture of stranded conductors for overhead power transmission purposes. It specifies the mechanical and electrical properties of wires in the diameter range 1.50 mm to 4.50 mm.

The two types are designated *Type A* and *Type B* respectively.

2. Values for aluminium-magnesium-silicon alloy wire

For calculation purposes the following values for aluminium-magnesium-silicon alloy wire conforming to this standard shall be used.

	<i>Type A</i>	<i>Type B</i>
Resistivity at 20°C, maximum (nΩ·m)	32.840 *	32.530 **
Density at 20°C (kg/dm ³)	2.703	2.703
Coefficient of linear expansion (per °C)	23×10 ⁻⁶	23×10 ⁻⁶
Constant-mass temperature coefficient of resistance at 20°C (per °C)	0.0036	0.0036

* Corresponding to 52.5% IACS (International Annealed Copper Standards).

** Corresponding to 53.0% IACS.

3. Material

The wires shall be of heat treated aluminium-magnesium-silicon alloy having a composition appropriate to the mechanical and electrical properties specified hereinafter for *Type A* and *Type B* respectively.

4. Freedom from defects

The wires shall be smooth and free from all imperfections not consistent with good commercial practice.

5. Diameter and tolerance on diameter

The nominal diameter of the wires shall be expressed in millimetres to two decimal places.

Each measurement of wire diameter shall not depart from the nominal diameter by more than the following amounts:

Nominal diameter		Tolerance
Over	Up to and including	
mm	mm	±0.03 mm ±1%
- 3.00	3.00 -	

For the purpose of checking compliance with the above requirement, the diameter shall be determined by two measurements at right angles taken at the same cross-section.

6. Length and tolerance on length

The nominal length of each coil or reel of wire and the tolerance on length shall be the subject of agreement between manufacturer and purchaser.

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7. Joints

Joints may be made prior to final drawing. A joint could also be made in the finished wire, provided that:

- the coil is 500 kg or heavier,
- not more than one joint in such coils,
- not more than 10% of such coils shall contain a joint,
- when requested by the purchaser, the manufacturer shall provide evidence that the joints have a tensile strength of not less than 130 MPa.

The coils containing a joint made in the finished wire shall be clearly identified.

8. Sampling

Samples for the tests specified in Clauses 10 and 11 shall be taken by the manufacturer from 10% of the individual lengths of wire included in any one consignment.

Alternatively, or where a quality assurance procedure is operated, the sampling rate shall be the subject of agreement between manufacturer and purchaser.

9. Place of testing

Unless otherwise agreed between manufacturer and purchaser at the time of ordering, all tests shall be made at the manufacturer's works.

10. Mechanical tests

10.1 Tensile and elongation tests

One specimen cut from each of the samples taken according to Clause 8 shall be subjected to a tensile test in accordance with ISO Standard 6892. The rate of separation of the jaws of the testing machine shall be not less than 25 mm/min, and not greater than 100 mm/min. A gauge length of 250 mm shall be used for the determination of elongation.

The tensile strength and elongation at break shall be not less than the appropriate value given in Table I, page 11.

10.2 Wrapping test

One specimen cut from each of the samples taken according to Clause 8 shall be subjected to a wrapping test in accordance with ISO Standard 7802.

Eight turns shall be wrapped round a mandrel of diameter equal to the wire diameter at a speed not exceeding 60 turns per minute.

The wire shall not break.

11. Resistivity test

The electrical resistivity of one sample cut from each of the samples taken according to Clause 8 shall be determined by the routine method specified in IEC Publication 468: Method of Measurement of Resistivity of Metallic Materials. The resistivity at 20°C shall be not greater than 32.840 nΩ·m for *Type A* wire or 32.530 nΩ·m for *Type B* wire.

12. Certificate of compliance

The manufacturer shall, if requested, supply the purchaser with a certificate giving the results of all the tests carried out on the samples.

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TABLE I

Mechanical properties of aluminium alloy wires

Nominal diameter		<i>Type A</i>		<i>Type B</i>	
Over	Up to and including	Minimum tensile strength at break	Minimum elongation at break on 250 mm	Minimum tensile strength at break	Minimum elongation at break on 250 mm
mm	mm	MPa	%	MPa	%
– 3.5	3.5 –	325 315	3.0 3.0	295 295	3.5 3.5

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