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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 32963-2026

Replacing GB/T 32963-2016

Zinc-aluminium alloy coated steel wire cable

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1 Scope

GB/T 32963-2026 is the Chinese national standard covering the cable of a suspension or cable-stayed bridge - high strength wire with a zinc-aluminium coating that outlasts plain galvanising by a wide margin, and the cable construction, the sockets and the corrosion protection of the whole assembly. At 24,500 words it replaces GB/T 32963-2016 and has been in force since 1 October 2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, replacing GB/T 32963-2016. The document is under the responsibility of the China Iron and Steel Association. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the structural forms, types and specifications, manufacturing requirements, technical requirements, test methods, inspection rules, as well as marks, packaging, transportation, and storage for zinc-aluminum alloy coated steel wire cable. This document applies to prefabricated parallel zinc-aluminum alloy coated steel wire strand for suspension bridge main cables, and to zinc-aluminum alloy coated steel wire cable with hot extrusion polyethylene for cable-stayed bridges. It may also be used as a reference for zinc-aluminum alloy coated steel wire on suspension bridges and arch bridges.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 223 (all parts), Methods for chemical analysis of iron, steel and alloys

GB/T 228.1, Metallic materials -- Tensile testing -- Part

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 zinc-aluminum alloy coated steel wire A steel wire produced by applying a molten hot-dip coating of a zinc-aluminum alloy to the surface of a bright steel wire. NOTE. Including steel wire coated with zinc-5% aluminum alloy (designated Zn-5%Al), zinc-10% aluminum alloy (designated Zn-10%Al), and zinc-aluminum-magnesium alloy (designated ZnAlMg), among others.

3.2 zinc-aluminum alloy coated steel wire cable Cables made of zinc-aluminum alloy steel wire. NOTE. This includes prefabricated parallel zinc-aluminum alloy coated steel wire strand for suspension bridge main cables, and zinc-aluminum alloy coated steel wire cable with hot extrusion polyethylene for cable-stayed bridges.

3.3 prefabricated parallel zinc-aluminum alloy coated steel wire strand A cable strand formed by arranging several zinc-aluminum alloy coated steel wires in parallel according to a specific pattern, wrapping them with high-strength polyester fiber tape at set intervals, and anchoring the ends using anchorages.

3.4 zinc-aluminum alloy coated steel wire cable with hot extrusion polyethylene A stay cable manufactured by lightly twisting a specific number of zinc-aluminum alloy coated steel wires - with an outermost twist angle of (3 ± 0.5)° - wrapping them with high-strength polyester fiber tape, hot-extruding a high-density polyethylene protective sheath over the surface, anchoring the ends with anchorages, and applying an effective anti-corrosion seal between the anchorages and the cable body.

3.5 anchorage A connecting component that transfers tensile force between the cable and the structure.

3.6 nominal breaking load of the cable The product of the standard tensile strength of the zinc-aluminum alloy coated steel wire and the nominal cross-sectional area of the individual wires within the cable's steel wire bundle.

4 Symbols

The following symbols apply to this document. A - Sum of the nominal cross-sectional areas of the steel wires within the cable's steel wire bundle, in square millimeters (mm^2); B - Outer diameter of the anchor cup, in millimeters (mm); C - Outer diameter of the anchor ring, in millimeters (mm); D - Nominal outside diameter of the embedded pipe, in millimeters (mm); E - Modulus of elasticity, in megapascals (MPa); F - Transverse force applied to the cable during the bending fatigue test, in kilonewtons (kN); Rm - Standard tensile strength of zinc-aluminum alloy coated steel wire, in megapascals (MPa); H - Anchor ring height, in millimeters (mm); Lco - Stress-free length of the zinc-aluminum alloy coated steel wire cable at the reference temperature, in meters (m); Lcp - Length of the zinc-aluminum alloy coated steel wire cable under tensile force P1, in meters (m); LS - Anchor cup length, in millimeters (mm); L20 - Length of the zinc-aluminum alloy coated steel wire cable corresponding to 20% of the over-tensioning force, in meters (m); DeltaLP - Change in length of the zinc-aluminum alloy coated steel wire cable corresponding to loads P1 and P2, in meters (m); P - Over-tensioning force of zinc-aluminum alloy coated steel wire cable, in kilonewtons (kN); Pb - Nominal breaking load of the cable of the zinc-aluminum alloy coated steel wire cable, in kilonewtons (kN); PS - Measured maximum cable force of the zinc-aluminum alloy coated steel wire cable, in kilonewtons (kN); P1 - Initial tensile force during the determination of the modulus of elasticity of a zinc- aluminum alloy coated steel wire cable, in newtons (N); P2 - Final tensile force during the determination of the modulus of elasticity of a zinc- aluminum alloy coated steel wire cable, in newtons (N); P20 - 20% over-tensioning force, in Newtons (N); S - Nominal wall thickness of the embedded pipe, in millimeters (mm); t - Stable and uniform temperature during the measurement of the length of the zinc- aluminum alloy coated steel wire cable, in degrees Celsius (°C); t0 - Design reference temperature for the zinc-aluminum alloy coated steel wire cable, determined by the design, in degrees Celsius (°C); alpha - Coefficient of linear expansion of the zinc-aluminum alloy coated steel wire cable, taken as 1.2 x 10^-5/°C; eta - Efficiency coefficient of the zinc-aluminum alloy coated steel wire cable; Deltasigma - Stress amplitude in the fatigue test, in megapascals (MPa).

5.1.1 Zinc-aluminum alloy coated steel wire cable

5.1.1.1 Prefabricated parallel zinc-aluminum alloy coated steel wire strand Figure 1 shows the structural layout of the prefabricated parallel zinc-aluminum alloy coated steel wire strand. The cross-section of the strand is hexagonal. Figure 2 illustrates the cross-sectional structure.

5.3.1 The key technical parameters of prefabricated parallel zinc-aluminum alloy coated steel wire strand shall comply with the provisions of Annex B.

5.3.2 The key technical parameters of zinc-aluminum alloy coated steel wire cable with hot extrusion polyethylene shall comply with the provisions of Annex C. The main dimensions of the anchorages shall comply with the provisions of Annex D. The cross- sectional arrangement of the cable body is shown in Annex E.

6 Manufacturing requirements

6.1 Manufacturing of prefabricated parallel zinc-aluminum alloy coated steel wire strand

6.1.1 Fabrication of standard wires and marker wires In the regular hexagonal cross-section of the cable strand, the wire located at the top- left corner serves as the marker wire and must be painted red along its entire length; the wire located at the top-right corner serves as the standard wire, used to control the length of the strand.

6.1.2 Ply-forming The cross-section of the cable strand is formed into a regular hexagon using the number of steel wires specified in the design, and both end faces must be flat. To maintain the cross-sectional shape, high-strength polyester fiber tape is wrapped around the strand at intervals of

0.1 m along its length, with 6~12 layers applied at each location; the wrapping interval must remain consistent for strands of the same specification. Steel wire bindings or clamps shall be applied at appropriate locations. The steel wires within the fabricated strand must remain parallel, with no crossing or twisting.

6.1.3 Mark At the locations of control points on the standard wire - corresponding to the centers of the splay saddles and main cable saddles, as well as the mid-spans of the side and main spans and the starting points of the side-span anchorages - distinct marks using specific color combinations shall be applied in accordance with design requirements.

6.1.4 Grouting of anchors

6.1.4.1 Prior to grouting the cable anchorage, the cable body shall be secured at appropriate locations using wire wrapping or clamps to prevent displacement of the steel wire strands.

6.1.4.2 After the steel wires at the ends of the cable body have been fanned out, remove any oil and rust. Use a wire-separating plate to space the wires apart at appropriate intervals.

6.1.4.3 Clean the inner walls of the anchorage. Preheat the anchorage before pouring the hot-cast anchoring material.

6.1.4.4 The tolerance for the insertion depth of the cable body into the anchorage shall be controlled within ±5 mm. Align the center of the cable body with the center of the anchorage and secure it in place.

6.1.4.5 The alloy casting temperature shall be (460 ± 10) °C.

6.1.4.6 The alloy casting shall be dense and free of voids. The casting volume shall be at least 95% of the capacity of each anchorage cup.

6.1.4.7 The angle between the cable axis and the end face of the anchorage shall be