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American National Standard for Zinc-Coated Ferrous Eyebolts and Nuts for Overhead Line Construction

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Foreword

(This Foreword is not a part of American National Standard for Zinc-Coated Ferrous Eyebolts and Nuts for Overhead Line Construction, ANSI C135.4-1987.)

This standard covers requirements for zinc-coated eyebolts and nuts commonly used in overhead line construction. It was developed from a proposal submitted by a group of members of American National Standards Committee C135, which is in charge of this work.

Suggestions for improvement of this standard will be welcome. They should be sent to ASC C135 c/o NEMA, 2101 L Street, N.W., Washington, DC 20037.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee on Pole Line Hardware, C135. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the C135 Committee had the following members:

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American National Standard for Zinc Coated Ferrous Eyebolts and Nuts for Overhead Line Construction

1. Scope and Application

1.1 Scope. This standard covers zinc coated ferrous eyebolts and nuts used in overhead line construction.

1.2 Application. Eyebolts and nuts conforming to this standard shall, in all respects, meet the basic dimensional and performance requirements hereinafter stated. The text, specifications or standards references, and associated data sheet supplement each other and shall be considered as parts of this standard.

2. Material

2.1 Eyebolts. All eyebolts shall be made from hot-rolled steel which has been produced by the open-hearth, basic-oxygen, or electric-furnace process and which is of a grade and quality suitable to meet the requirements of this standard.

2.2 Nuts. All steel nuts shall be in accordance with American National Standard for Zinc Coated Ferrous Bolts and Nuts for Overhead Line Construction, ANSI C135.1-1979.

3. Dimensions

3.1 Eyebolts. All dimensions before zinc coating shall be in accordance with Figures 1, 2, and 3, which are part of this standard.

3.1.1 Eyebolt Length. The length of eyebolts shall be the length as measured from under the eye to the last full thread at the end of the bolt, as shown in Figures 1, 2, and 3.

3.1.2 Eyebolt Eyes. The dimensions of eyebolt eyes shall, before zinc coating, be in accordance with Figures 1, 2, and 3. Eyes shall be of either the oval eye or strand eye type.

3.1.3 Semi-Cone Points. Eyebolts, 8 inches and longer, shall have semi-cone points with the following approximate dimensions in inches:

Bolt Size	Approximate Length of Point beyond Last Thread	Approximate Included Angle of Point
5/8	1/4	60°

3.2 Nuts. All nuts shall be regular square or hexagonal in accordance with ANSI C135.1-1979.

4. Threads

4.1 Eyebolts with Unified Coarse Threads. External threads may be machine rolled or cut in accordance with ANSI C135.1-1979.

4.2 External Threaded Portion of Eyebolts. The external threaded portion of all eye bolts shall, after zinc coating, be in such condition that nuts zinc coated and tapped in accordance with ANSI C135.1-1979 will fit the zinc coated eyebolt so that the nut can be run the entire length of the thread without the use of tools.

4.3 Length of Threads. Unless otherwise specified, all bolts shall be furnished with thread lengths as shown in the list of sizes in Section 6.

4.4 Nuts. All nuts shall be tapped oversize after zinc coating in accordance with ANSI C135.1-1979.

5. Strength

5.1 Tensile Tests of Eyebolts. Any assembled eyebolt, when tested by restraining the nut end and applying a tensile load in the direction of the bolt axis by suitable means through the eye of the bolt, shall meet the following minimum tensile strength requirement. Angle-type eyebolts shall meet the same requirements except that the applied load shall be in the direction of the bend with the shank supported as when installed on the pole to prevent the shank from bending but not from moving tangentially. Failure shall occur only in the shank or threaded section of the eyebolt, and the threads shall not strip below the minimum specified tensile strength.

Eyebolt Size	Minimum Tensile Strength (Pounds)
5/8	13,550

5.2 Bend Tests of Eyebolts. The unthreaded shank of eyebolts shall be capable of being bent at room temperature at any point through an angle of 180°, about a diameter equal to the diameter of the shank without cracking the steel on the outside of the bent portion.

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6. Sizes

6.1 Sizes, lengths, and minimum thread lengths in inches shall be as follows:

Type	Sizes, Nominal Diameter	Lengths	Minimum Thread Length
Straight strand eye	5/8	10	4
Straight strand eye	5/8	12, 14	6
Angle strand eye	5/8	8, 10	4
Angle strand eye	5/8	12, 14	6
Oval eye	5/8	8, 9, 10	4
Oval eye	5/8	12, 14	6

7. Corrosion Protection

7.1 Eyebolts shall be zinc coated. The coating shall be applied by:

(1) the hot-dip process in accordance with the Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware, ANSI/ASTM A-153-82, or

(2) another method producing a zinc coating that meets the requirements of ANSI/ASTM A-153-82 for adhesion, purity, and thickness applicable to the class of material being coated.

8. Finish

8.1 Eyebolts shall be free from burrs, seams, laps, fins, and irregular surfaces that affect serviceability.

8.2 Eyebolts shall be free from badly formed, rough, or cracked eyes.

8.3 The inner surface of the eyes shall be smooth and free from projections.

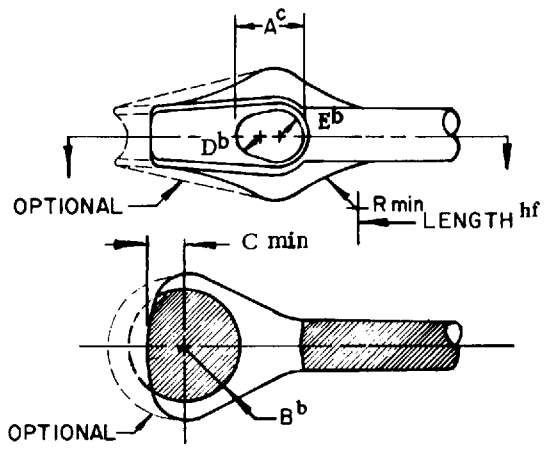
9. Marking

9.1 All eyebolts shall bear the manufacturer's symbol or identification mark.

10. Marking of Shipping Packages

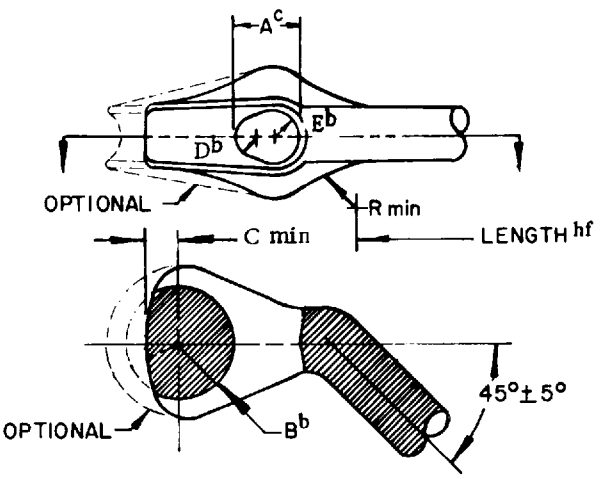
10.1 Each package of eyebolts shall be marked with the manufacturer's name and catalog number.

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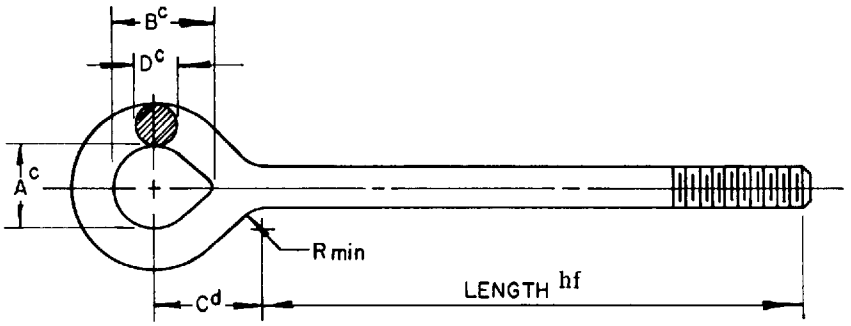
Bolt Dia	A	B	C	D	E	Rmin
5/8	11/16	11/16	5/16	1/4	9/32	3/8

Fig. 1
Specifications for Straight Strand Type Eyebolts



Bolt Dia	A	B	C	D	E	Rmin
5/8	11/16	11/16	5/16	1/4	9/32	3/8

Fig. 2
Specifications for Angle Strand Type Eyebolts



Bolt Dia	A	B	C	D	Rmin
5/8	1-1/2	2	2	35/64	5/16

Fig. 3
Specifications for Oval Eye Eyebolts for Use with Thimbles

All dimensions are given in inches.

ALLOWABLE VARIATIONS

a = 1/64	d = 1/8	g = 3/8	k = 1
b = 1/32	e = 3/16	h = 1/2	x = 0
c = 1/16	f = 1/4	j = 3/4	

A single-letter superscript indicates that the plus and minus value are the same: for example,

$D^b = 1/4 \pm 1/32$ for 5/8-inch bolt diameter.

A double-letter superscript indicates that the plus value is that of the first letter and the minus value is that of the second letter: for example,

Length^{hf} = length + 1/2 – 1/4.

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