NEMA C135.3 87 ■ 6470247 0506846 726 ■

ANSI®
C135.3-1987

American National Standard for Zinc-Coated Ferrous Lag Screws for Pole and Transmission Line Construction

Published by

National Electrical Manufacturers Association
2101 L Street, NW
Washington, DC 20037
(202) 457-8400

© 1988 by National Electrical Manufacturers Association

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

Foreword

(This Foreword is not a part of American National Standard for Zinc-Coated Ferrous Lag Screws for Pole and Transmission Line Construction, ANSI C135.3-1987.)

This standard covers requirements for various types of zinc coated ferrous lag screws 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 on a joint basis with members of the NEMA Pole and Transmission Line Construction Materials Section Technical Committees.

Suggestions for improvement of this standard will be welcome. They should be sent to the Acredited Standards Committee C135 c/o the National Electrical Manufacturers Association, 2101 L St., N.W., Suite 300, Washington, D.C. 20037.

This standard was processed and approved for submittal to ANSI by American National 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:

C.M. Giltner, Chairman
J. Gauthier, Secretary

Organization Represented	*Name of Representative*
American Public Power Association	R. L. Schucker
American Society of Mechanical Engineers	R. B. Belford
Bonneville Power Administration	C. M. Sande
Electric Light and Power Group	G. C. Croft
	J. F. Gillespie
	E. E. Gruchalla
	M. W. Henderson
	J. P. Markey (Alt)
	J. W. Likens
	E. J. Simmons
	S. S. Swift
	G. F. Thompson (Chm)
Institute of Electrical and Electronics Engineers	Myron Brochat
	K. E. Lindsey (Chm)
	J. T. Morgan
National Electrical Manufacturers Association	J. R. D'Agati
	E. J. Danko
	R. N. Essig
	S. C. Garton
	C. M. Giltner (Chm)
	J. R. Patterson
	G. Rokos
	J. A. Rolls
	F. Stiff
	L. J. Brooks (Alt)
	J. S. Barr (Alt)
	R. H. Dawson (Alt)
	E. Dziedzic (Alt)
	A. Medler (Alt)
	H. F. Van der Voort (Alt)
Occupational Safety and Health Administration	D. M. Wallis
Rural Electrification Administration	D. G. Heald
Telephone Group	R. E. Hitchcock
Tennessee Valley Authority	L. J. Berry, Jr.

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

Foreword

(This Foreword is not a part of American National Standard for Zinc-Coated Ferrous Lag Screws for Pole and Transmission Line Construction, ANSI C135.3-1987.)

This standard covers requirements for various types of zinc coated ferrous lag screws 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 on a joint basis with members of the NEMA Pole and Transmission Line Construction Materials Section Technical Committees.

Suggestions for improvement of this standard will be welcome. They should be sent to the Acredited Standards Committee C135 c/o the National Electrical Manufacturers Association, 2101 L St., N.W., Suite 300, Washington, D.C. 20037.

This standard was processed and approved for submittal to ANSI by American National 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:

C.M. Giltner, Chairman
J. Gauthier, Secretary

Organization Represented	*Name of Representative*
American Public Power Association	R. L. Schucker
American Society of Mechanical Engineers	R. B. Belford
Bonneville Power Administration	C. M. Sande
Electric Light and Power Group	G. C. Croft
	J. F. Gillespie
	E. E. Gruchalla
	M. W. Henderson
	J. P. Markey (Alt)
	J. W. Likens
	E. J. Simmons
	S. S. Swift
	G. F. Thompson (Chm)
Institute of Electrical and Electronics Engineers	Myron Brochat
	K. E. Lindsey (Chm)
	J. T. Morgan
National Electrical Manufacturers Association	J. R. D'Agati
	E. J. Danko
	R. N. Essig
	S. C. Garton
	C. M. Giltner (Chm)
	J. R. Patterson
	G. Rokos
	J. A. Rolls
	F. Stiff
	L. J. Brooks (Alt)
	J. S. Barr (Alt)
	R. H. Dawson (Alt)
	E. Dziedzic (Alt)
	A. Medler (Alt)
	H. F. Van der Voort (Alt)
Occupational Safety and Health Administration	D. M. Wallis
Rural Electrification Administration	D. G. Heald
Telephone Group	R. E. Hitchcock
Tennessee Valley Authority	L. J. Berry, Jr.

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

American National Standard for Zinc Coated Ferrous Lag Screws

1. Scope and Application

1.1 Scope These standards cover zinc coated ferrous lag screws of the fetter drive and gimlet point types commonly used in overhead line construction.

1.2 Application The lag screws conforming to these standards shall in all respects meet the basic dimensional and performance requirements hereinafter stated. The text, specification or standard references and associated Data Sheet Nos. 1, 2, 3 and 4 supplement each other and all shall be considered as parts of these standards.

2. Material

2.1 All lag screws shall be made of one of the following materials:

2.1.1 Hot-headed lag screws 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 these standards.

2.1.2 Cold-headed lag screws shall be made from steel cold-heading wire 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 these standards and shall be reheated if necessary to meet requirements.

3. Dimensions

3.1 All dimensions are in inches prior to zinc coating.

3.2 All lag screw heads shall be square or hex and in accordance with the American National Standards Institute standards for Square and Hex Bolts and Screws Inch Series ANSI B18.2.1.81, as specified in the Data Sheets Nos. 3 and 4.

3.3 Lag screw threads shall be machine-rolled or cut as specified in the data sheets.

4. Strength

4.1 Lag screw heads shall be of sufficent strength to develop the body tensile strength of the screws and in no case less than the following:

Nominal Diameter of Screw (Inches)	Minimum Strength (Pounds)
1/4	1,500
5/16	2,300
3/8	3,500
1/2	6,500

4.2 Cold Bend Test.

4.2.1 After removal of the threads to the root diameter, the unthreaded portion of bolts shall be capable of being bent while at room temperature at any point through an angle of 180°, about a diameter equal to the diameter of the bolt without cracking the steel on the outside of the bent portion.

5. Corrosion Protection

5.1 Lag screws shall be zinc coated. The coating shall be applied by:

5.1.1 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

5.1.2 Any other 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.

6. Sizes and Types

The sizes and types shall be as specified on the data sheets.

7. Finish

All lag screws shall be free from badly formed or otherwise defective heads and bodies.

8. Marking

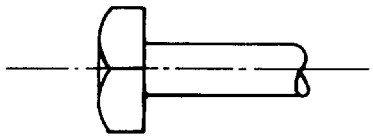
Lag screws shall bear the manufacturer's symbol or identification mark.

9. Marking of Shipping Packages

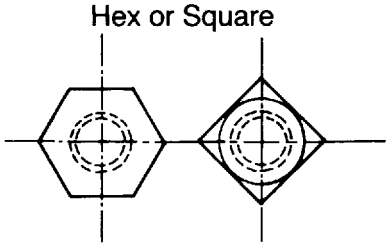
Each package shall be marked with the manufacturer's name and catalog number.

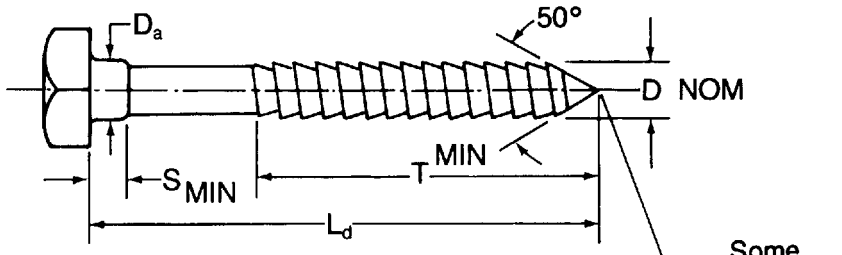
Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

DATA SHEET 1
DIMENSIONS FOR FETTER DRIVE LAG SCREWS

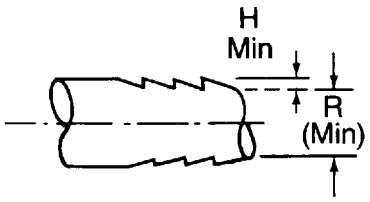


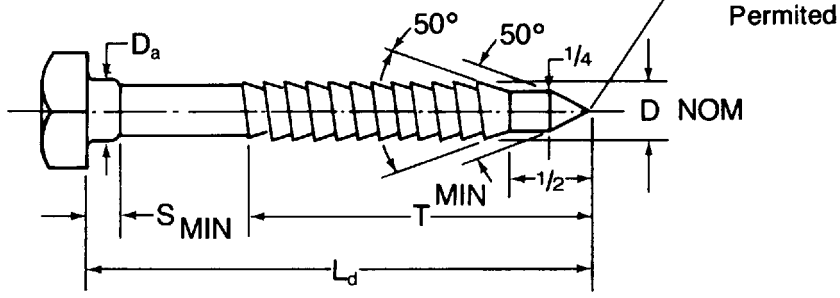
Alternate Shank





Cone Point





Pilot Point

BODY DIMENSIONS				THREADS PER INCH		
D	L	T	S		RA	HB
DIA. OF SCREW	LENGTH	MIN. THREAD	SHOULDER		ROOT DIA.	DEPTH OF THREAD
¼	2½	1¾	.094	10	.18	.01
3/8	2½	1¾	.125	8 or 9	.30	.02
	3	2				
½	4	2½	.156	6 or 7	.41	.02
	4½	2¾				

All Dimensions In Inches

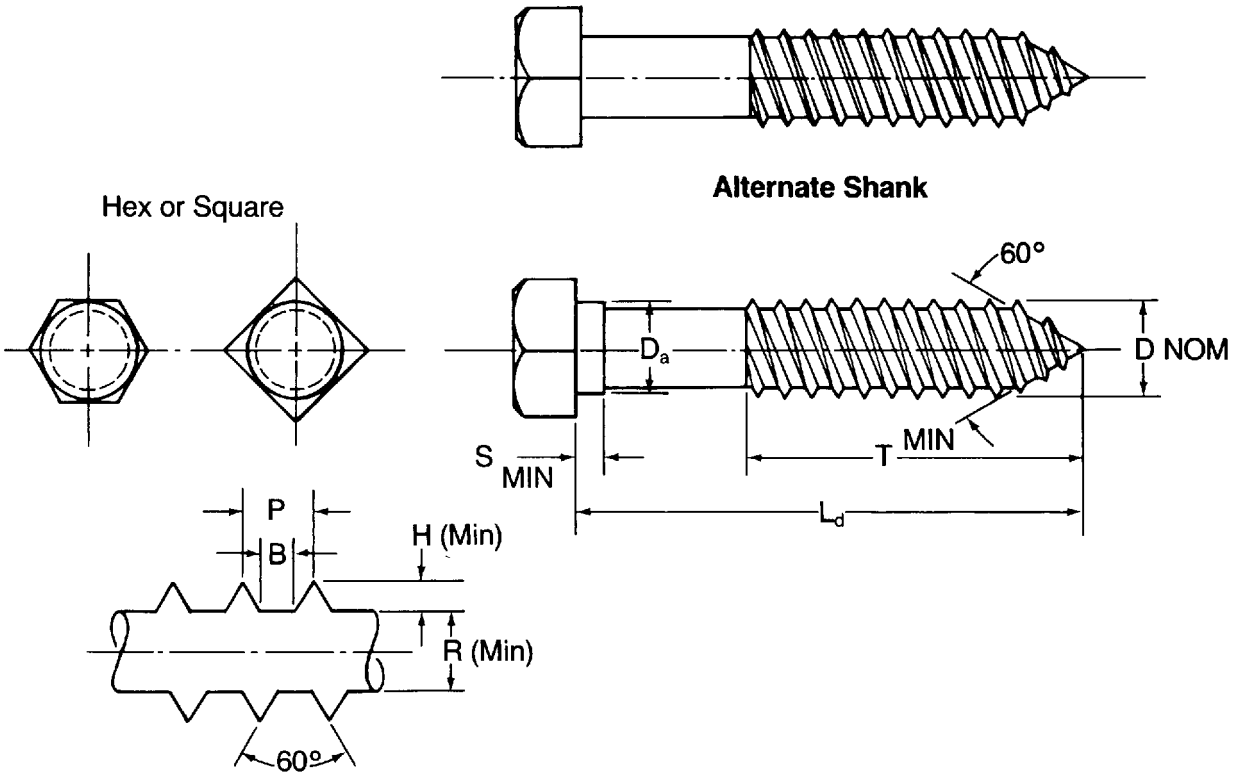
FETTER DRIVE LAG SCREW
ROLLED THREAD

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

ALLOWABLE VARIATIONS
SINGLE LETTER INDICATES, SAME + or −, a: ± 1/64
TWO LETTERS INDICATE, FIRST + SECOND −, ax: + 1/64 − 0

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

DATA SHEET 2
DIMENSIONS FOR GIMLET POINT LAG SCREWS



D	L	T	P	B	H	R	S	
DIA. OF SCREW	LENGTH	MIN. THREAD LENGTH	THREADS DIMENSIONS				SHOULDER	THREADS PER INCH
			PITCH	FLAT AT ROOT	DEPTH OF THREAD	ROOT DIA.		
¼	2	1½	.100	.043	.02	.16	.094	10
	2½	1¾						
	3	2						
5/16	2½	1¾	.111	.048	.02	.21	.125	9
	3	2						

All Dimensions in Inches

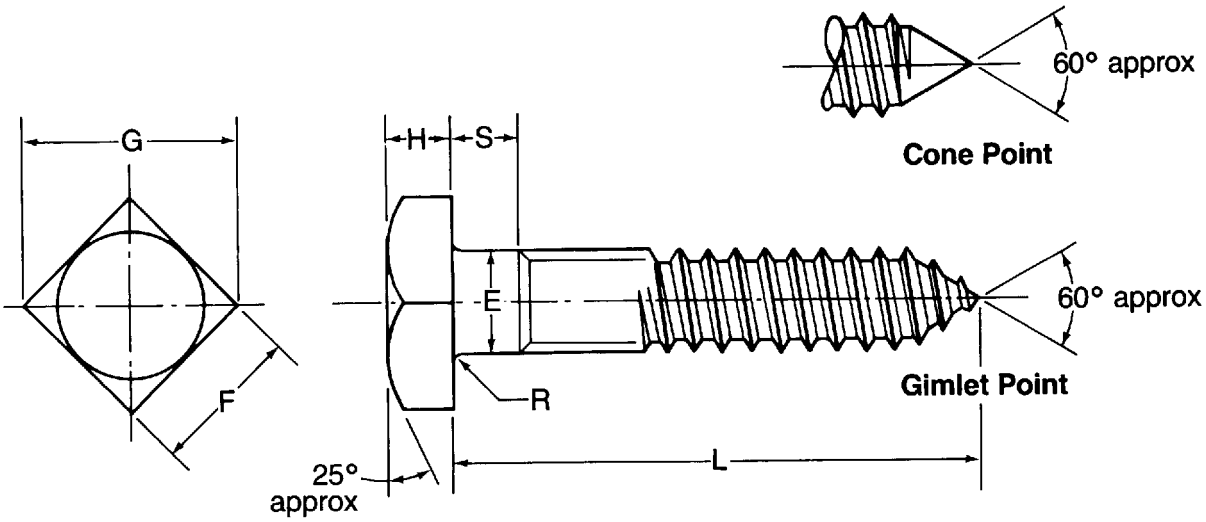
GIMLET POINT LAG SCREW
ROLLED OR CUT THREAD

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	

ALLOWABLE VARIATIONS
SINGLE LETTER INDICATES, SAME + or −, a: ± 1/64
TWO LETTERS INDICATE, FIRST + SECOND −, ax: + 1/64 − 0

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

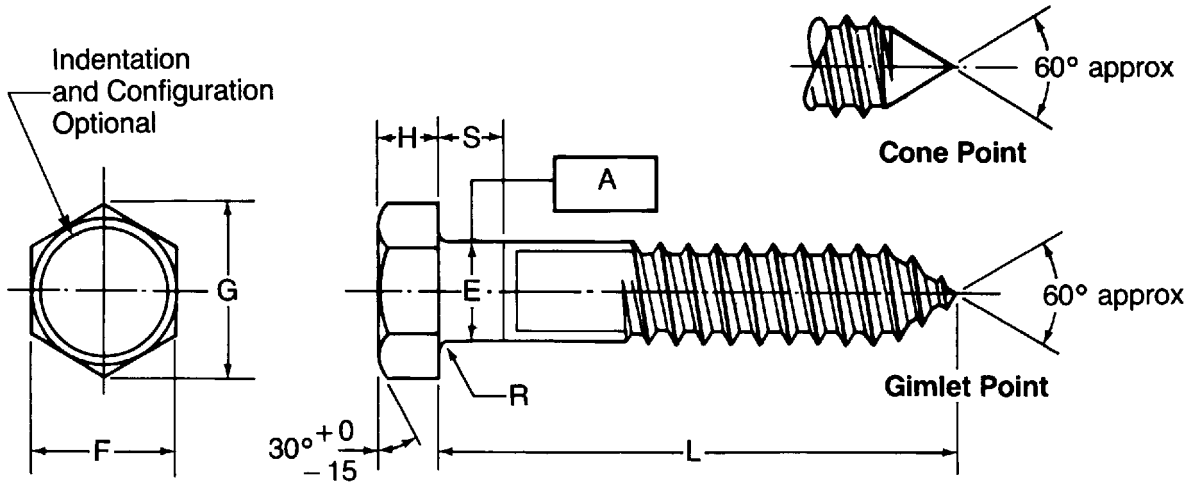
DATA SHEET 3
DIMENSIONS OF SQUARE LAG SCREWS



Nominal Size or Basic Product Dia (12)		E		F			G		H			S	R	
		Body or Shoulder Dia (6), (7)		Width Across Flats (3)			Width Across Corners		Height			Shoulder Length (7)	Radius of Fillet	
		Max	Min	Basic	Max	Min	Max	Min	Basic	Max	Min	Min	Max	Min
No. 10	0.1900	0.199	0.178	9/32	0.281	0.271	0.398	0.372	1/8	0.140	0.110	0.094	0.03	0.01
1/4	0.2500	0.260	0.237	3/8	0.375	0.362	0.530	0.498	11/64	0.188	0.156	0.094	0.03	0.01
5/16	0.3125	0.324	0.298	1/2	0.500	0.484	0.707	0.665	13/64	0.220	0.186	0.125	0.03	0.01
3/8	0.3750	0.388	0.360	9/16	0.562	0.544	0.795	0.747	1/4	0.268	0.232	0.125	0.03	0.01
7/16	0.4375	0.452	0.421	5/8	0.625	0.603	0.884	0.828	19/64	0.316	0.278	0.156	0.03	0.01
1/2	0.5000	0.515	0.482	3/4	0.750	0.725	1.061	0.995	21/64	0.348	0.308	0.156	0.03	0.01
5/8	0.6250	0.642	0.605	1-5/16	0.938	0.906	1.326	1.244	27/64	0.444	0.400	0.312	0.06	0.02
3/4	0.7500	0.768	0.729	1-1/8	1.125	1.088	1.591	1.494	1/2	0.524	0.476	0.375	0.06	0.02
7/8	0.8750	0.895	0.852	1-5/16	1.312	1.269	1.856	1.742	19/32	0.620	0.568	0.375	0.06	0.02
1	1.0000	1.022	0.976	1-1/2	1.500	1.450	2.121	1.991	21/32	0.684	0.628	0.625	0.09	0.03
1 1/8	1.1250	1.149	1.098	1-11/16	1.688	1.631	2.386	2.239	3/4	0.780	0.720	0.625	0.09	0.03
1 1/4	1.2500	1.277	1.223	1-7/8	1.875	1.812	2.652	2.489	27/32	0.876	0.812	0.625	0.09	0.03

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

DATA SHEET 4
DIMENSIONS OF HEX LAG SCREWS



Nominal Size or Basic Product Dia (12)		E		F			G		H			S	R	
		Body or Shoulder Dia (6), (7)		Width Across Flats (3)			Width Across Corners		Height			Shoulder Length (7)	Radius of Fillet	
		Max	Min	Basic	Max	Min	Max	Min	Basic	Max	Min	Min	Max	Min
No. 10	0.1900	0.199	0.178	9/32	0.281	0.271	0.323	0.309	1/8	0.140	0.110	0.094	0.03	0.01
1/4	0.2500	0.260	0.237	7/16	0.438	0.425	0.505	0.484	11/64	0.188	0.150	0.094	0.03	0.01
5/16	0.3125	0.324	0.298	1/2	0.500	0.484	0.577	0.552	7/32	0.235	0.195	0.125	0.03	0.01
3/8	0.3750	0.388	0.360	9/16	0.562	0.544	0.650	0.620	1/4	0.268	0.226	0.125	0.03	0.01
7/16	0.4375	0.452	0.421	5/8	0.625	0.603	0.722	0.687	19/64	0.316	0.272	0.156	0.03	0.01
1/2	0.5000	0.515	0.482	3/4	0.750	0.725	0.866	0.826	11/32	0.364	0.302	0.156	0.03	0.01
5/8	0.6250	0.642	0.605	1-5/16	0.938	0.906	1.083	1.033	27/64	0.444	0.378	0.312	0.06	0.02
3/4	0.7500	0.768	0.729	1-1/8	1.125	1.088	1.299	1.240	1/2	0.524	0.455	0.375	0.06	0.02
7/8	0.8750	0.895	0.852	1-5/16	1.312	1.269	1.516	1.447	37/64	0.604	0.531	0.375	0.06	0.02
1	1.0000	1.022	0.976	1-1/2	1.500	1.450	1.732	1.653	43/64	0.700	0.591	0.625	0.09	0.03
1-1/8	1.1250	1.149	1.098	1-11/16	1.688	1.631	1.949	1.859	3/4	0.780	0.658	0.625	0.09	0.03
1-1/4	1.2500	1.277	1.223	1-7/8	1.875	1.812	2.165	2.066	27/32	0.876	0.749	0.625	0.09	0.03

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale