NOTICE OF ADOPTION

ADOPTION NOTICE 1
29 August 1990 for
ANSI C135.7-1987
1987*
SUPERSEDING
MIL-1-23972C(YD)
21 May 1984

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New York, NY 10018

Title of Document: American National Standard for Zinc-Coated Spool Type Secondary Racks

Date of Specific Issue Adopted: 1987* (No specific date of issue)

Releasing Non-Government Standards Body: National Electrical Manufacturers Association

Custodian:
Navy - YD

Military Coordinating Activity:
Navy - YD

(Project 5970-1069)

FSC 5970

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C135.7-87 6470247 0007208 5 A-09.09

ANSI C135.7-1987

American National Standard

for zinc-coated spool type secondary racks

american national standards institute, inc.
1430 broadway, new york, new york 10018

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C135.7-1987

American National Standard for Zinc-Coated Spool Type Secondary Racks

Published by

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

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Foreword

(This Foreword is not a part of American National Standard for Zinc-Coated Spool Type Secondary Racks, ANSI C135.7-1987.)

This standard covers requirements for pole mounted zinc-coated spool type secondary racks 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:

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American National Standard for Zinc-Coated Spool Type Secondary Racks

1. Scope and Application

1.1 Scope. These standards cover pole-mounted zinc coated spool type secondary racks with button head spool pins, exclusive of porcelain spools, commonly used in overhead line construction.

1.2 Application. Spool type secondary racks shall conform in all respects to the basic dimensional and performance requirements hereinafter stated. The text, specification references and associated data sheets supplement each other and shall be considered as parts of these standards.

2. Materials

2.1 All spool type secondary racks, and button-headpins shall be made from hot-rolled steel which has been produced by the open-hearth, basic-oxygen, or electrical-furnace process, or malleable or ductile type ferrous castings, which are of a grade and quality to meet the requirements of the standards.

2.2 Cotters for button-head spool pins shall be made of a good commercial grade of red brass, bronze, hard-chrome copper, or other corrosion-resistant metal and shall be self-locking.

3. Types

3.1 Spool type secondary racks shall be of the following general types as listed in Table 1 and shown on the data sheets.

3.2 The spool type secondary racks of paragraph 3.1 shall be furnished with a 5/8 inch diameter button-head spool pin for use with 3- by 3-inch porcelain spools.

4. Dimensions

4.1 The basic mounting and spacing dimensions of spool type secondary racks shall conform to the data sheets 1, 2, and 3.

4.2 The minimum head diameter of the button-head spool pin shall exceed the maximum hold diameter in the points by not less than 1/8 inch.

4.3 Spacing between points shall accommodate porcelain spools conforming to Class 53-3 American National Standards Institute standards for Wet-Process Porcelain Insulators (Spool Type), ANSI C29.3-1986.

5. Strength

5.1 The strength of secondary racks conforming to these standards shall meet the minimum requirements of Table 2, when tested as shown on Data sheets 4 and 5.

5.2 For Table 2 load values, the maximum test deflection shall not exceed 3/8- and 3/16-inch permanent set measured at the point of load on that spool showing the greatest deflection.

5.3 Each point of a secondary rack shall withstand, without permanent deformation, a vertical load of 200 pounds applied at the eye of the point.

6. Test Procedure

6.1 Spool type secondary racks shall be tested for conformance to these standards by the methods described in paragraph 6.2 through 6.6 and shown on the data sheets.

6.2 For the tests, the spool type secondary rack shall be attached to a rigid metal block with a curved surface of the same radius as on the rack back.

6.3 With an equalizer the total load shall be equally and simultaneously distributed on all spools as shown on the data sheets, 4 and 5.

6.4 The zero deflection shall be established with an initial load of 50 pounds applied to each spool.

6.5 The load shall be applied at approximately 0.4 inch per minute.

6.6 The loads shall be recorded at each 1/16-inch deflection until 1/4-inch deflection is reached. At this point, return the load to the 50-pound initial load and measure permanent set. Thereafter, load and permanent set values shall be recorded for each additional 1/16-inch to 3/8-inch deflection.

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Table 1

TYPE	Description
HX-3S-8	Heavy extended, 3-spool, 8-inch wire spacing
HX-4S-8	Heavy extended, 4-spool, 8-inch wire spacing
HNX-3S-8	Heavy nonextended, 3-spool, 8-inch wire spacing
HNX-4S-8	Heavy nonextended, 4-spool, 8-inch wire spacing
MX-3S-8	Medium extended, 3-spool, 8-inch wire spacing
MX-4S-8	Medium extended, 4-spool, 8-inch wire spacing
MNX-3S-8	Medium nonextended, 3-spool, 8-inch wire spacing
LX-3S-8	Light extended, 3-spool, 8-inch wire spacing
LNX-3S-8	Light nonextended, 3-spool, 8-inch wire spacing
LNX-2S-8	Light nonextended, 2-spool, 8-inch wire spacing

7. Corrosion Protection

7.1 Spool type secondary racks shall be zinc coated after fabrication with the exception of the cotter hole in the button-head spool pin, which may be drilled after coating. The coating shall be applied by:

7.1.1 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

7.1.2 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.

8. Finish

8.1 Spool type secondary racks shall be free from sharp edges or projections. The upper exposed surface of each point shall be rounded or have rounded edges to provide a smooth bearing surface for rope lines and conductors.

8.2 The holes in points for button-head spool pins shall be properly aligned.

9. Design

9.1 The rack design shall permit insertion of mounting bolts between spool positions without removal of spool pin.

9.2 The rack design shall avoid water pockets when in the installed position.

10. Marking

10.1 All spool type secondary racks shall bear the manufacturer's symbol or identification mark on the face of the rack or head of the button-head spool pin.

10.2 Each rack shall be marked with a distinctive mark indicating light, medium, or heavy corresponding to load ratings as noted in Table 2.

11. Packing

11.1 Porcelain insulator spools shall be suitably packed in separate containers to prevent damage in transportation and handling.

11.2 Each package of spool type secondary racks shall be marked with the manufacturer's name and catalog number.

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Table 2

TYPE	Mounting Bolt Positions (See Note a)	Deadend Wire Stress (Pounds)	Deadend Wire Stress Per Spool (See Note b) (Pounds)	Total Side Pull Wire Stress (Pounds)
HX-3S-8	0,0	3,000	1,000	1,200
HX-3S-8	2,4	7,500	2,500	2,100
HX-3S-8	0,3,0	9,000	3,000	2,500
HNX-3S-8	1,5	9,000	3,000	1,800
HNX-3S-8	1,3,5	9,000	3,000	3,000
HX-4S-8	0,0	2,400	600	1,000
HX-4S-8	2,6	6,000	1,500	1,800
HX-4S-8	0,4,0	8,000	2,000	2,400
HNX-4S-8	2,4,6	10,000	2,500	3,000
HNX-4S-8	1,4,7	12,000	3,000	3,400
HNX-4S-8	1,3,5,7	12,000	3,000	4,000
MX-3S-8	0,0	2,700	900	750
MX-3S-8	2,4	5,400	1,800	1,500
MX-3S-8	0,3,0	9,000	3,000	1,900
MNX-3S-8	1,5	7,500	2,500	1,200
MNX-3S-8	1,3,5	9,000	3,000	2,100
MX-4S-8	0,4,0	8,000	2,000	1,800
MX-4S-8	1,4,7	10,000	2,500	2,400
MX-4S-8	1,3,5,7	12,000	3,000	2,800
LX-3S-8	0,0	1,050	350	450
LX-3S-8	2,4	3,000	1,000	900
LNX-3S-8	1,5	4,500	1,500	600
LNX-3S-8	1,3,5	9,000	3,000	1,500
LNX-25-8	1,3	6,000	3,000	1,500

Note a: Mounting bolt positions are shown on the data sheets and are the same for both deadend and side-pull tests.
Note b: Individual wire loads are not shown above 3,000 pounds, which is consistent with the ultimate breaking strength of porcelain spool Insulators.

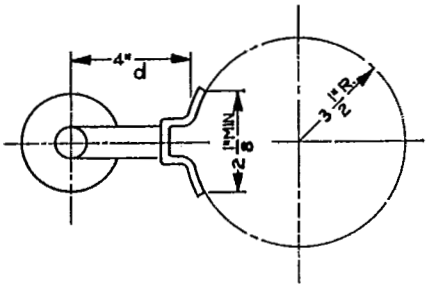
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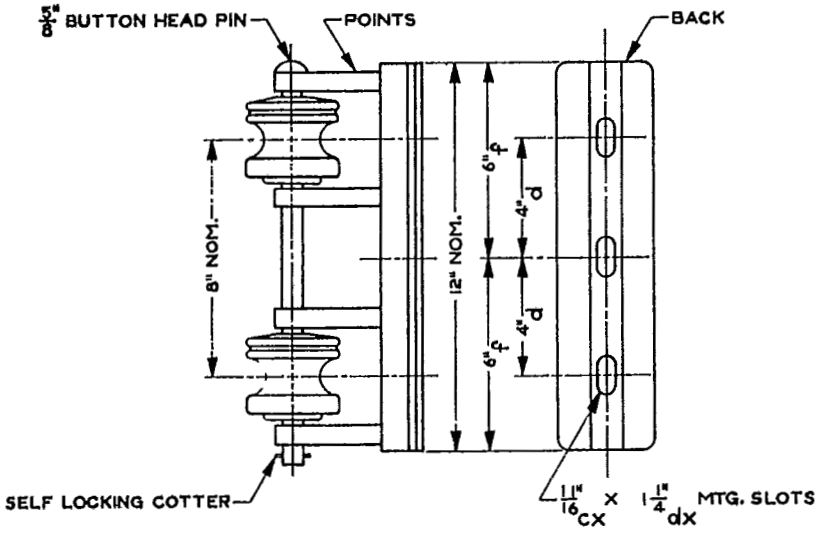
DATA SHEET 1

TWO SPOOL SECONDARY RACK

NOTE 1: DRAWING SHOWS TYPICAL CONSTRUCTION. DIMENSIONS APPLY TO ALL MATERIALS AND TYPES.

NOTE 2: EITHER FLAT OR CHANNEL BACK PERMISSIBLE ON LIGHT RACKS.





NON-EXTENDED

TYPE	DESCRIPTION		NO. SPOOL	WIRE SPACING
LNX-2S-8	LIGHT NON-EXTENDED		2	8"

a -- 1/64 d -- 1/8 g -- 3/8
b -- 1/32 c -- 3/16 h -- 1/2
c -- 1/16 f -- 1/4 x -- 0"

ALLOWABLE VARIATIONS

SINGLE LETTER INDICATES SAME + OR -, a = ± 1/64

TWO LETTERS INDICATE FIRST +, SECOND -, aX = + 1/64 - 0"

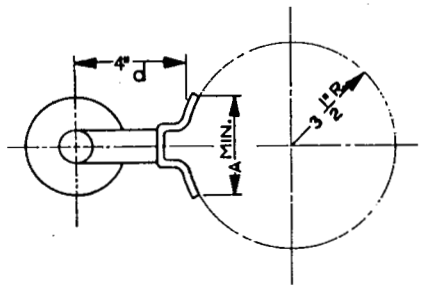
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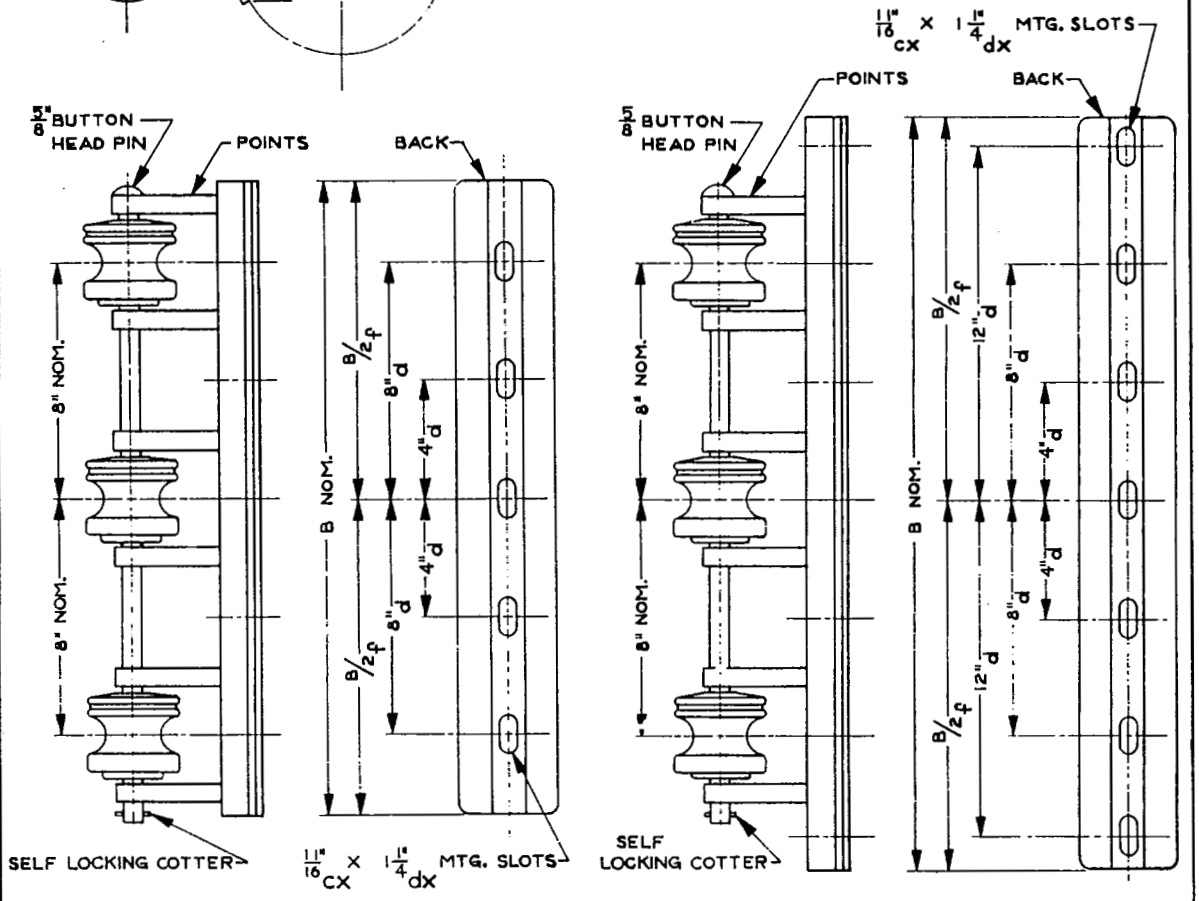
DATA SHEET 2

THREE SPOOL SECONDARY RACK

NOTE 1: DRAWING SHOWS TYPICAL CONSTRUCTION. DIMENSIONS APPLY TO ALL MATERIALS AND TYPES.

NOTE 2: EITHER FLAT OR CHANNEL BACK PERMISSIBLE ON LIGHT RACKS.





TYPE	DESCRIPTION	NO. SPOOL	WIRE SPACING	A	B	B/2
HX - 3S - 8	HEAVY EXTENDED	3	8"	3"	26"	13"
HNX - 3S - 8	HEAVY NON-EXTENDED	3	8"	3"	21 3/4"	10 7/8"
MX - 3S - 8	MEDIUM EXTENDED	3	8"	2 3/4"	26"	13"
MNX - 3S - 8	MEDIUM NON-EXTENDED	3	8"	2 3/4"	21 3/4"	10 7/8"
LX - 3S - 8	LIGHT EXTENDED	3	8"	2 1/8"	26"	13"
LNX - 3S - 8	LIGHT NON-EXTENDED	3	8"	2 1/8"	20"	10"

a -- 1/64" d -- 1/8" g -- 3/8"
b -- 1/32" e -- 3/16" h -- 1/2"
c -- 1/16" f -- 1/4" x -- 0"

ALLOWABLE VARIATIONS

SINGLE LETTER INDICATES SAME + OR -, a = ± 1/64"

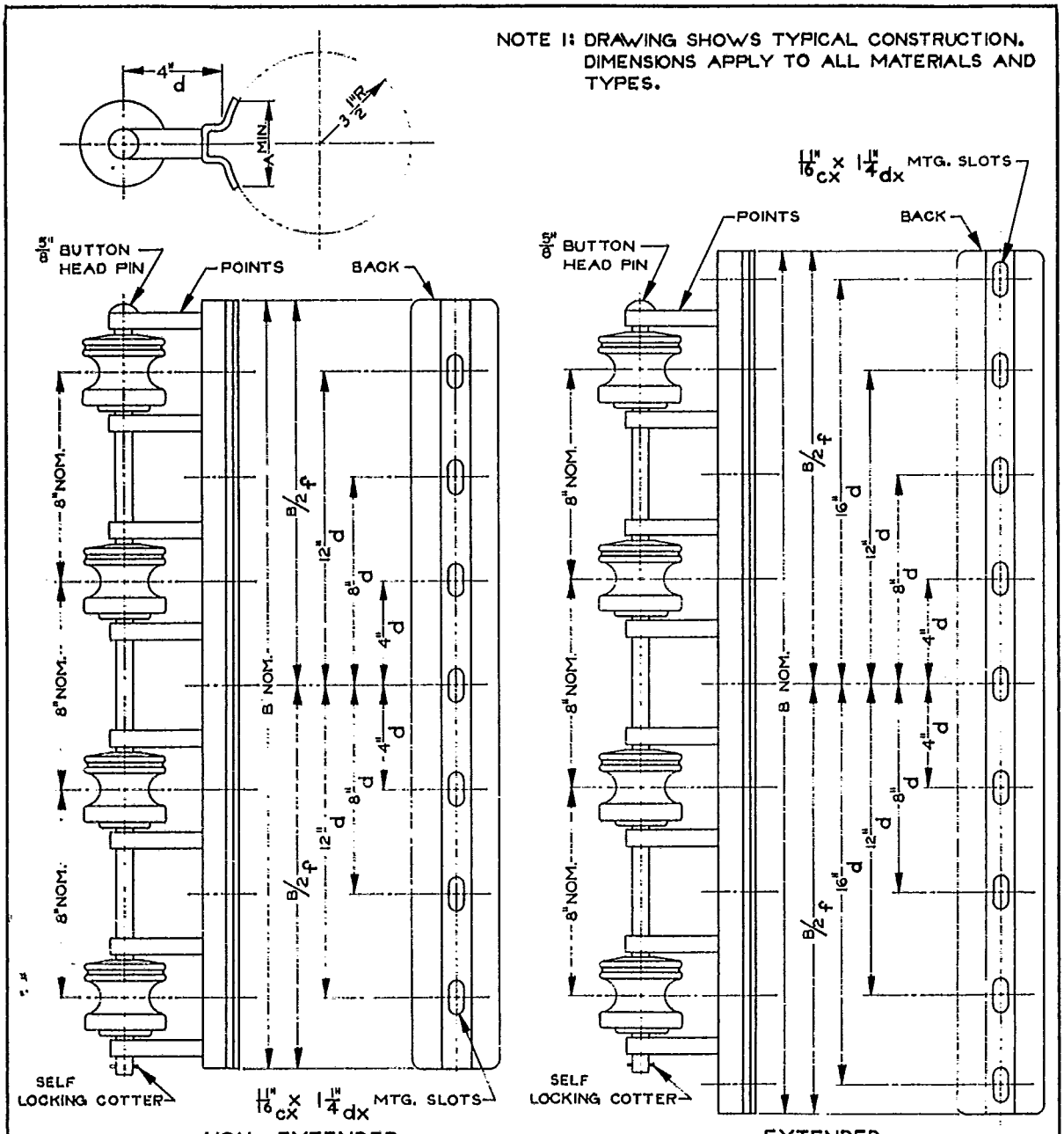
TWO LETTERS INDICATE FIRST +, SECOND -, aX = + 1/64" - 0"

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DATA SHEET 3

FOUR SPOOL SECONDARY RACK

NOTE 1: DRAWING SHOWS TYPICAL CONSTRUCTION. DIMENSIONS APPLY TO ALL MATERIALS AND TYPES.



TYPE	DESCRIPTION	NO. SPOOL	WIRE SPACING	A	B	B/2
HX - 4S - 8	HEAVY EXTENDED	4	8"	3"	34"	17"
HNX-4S - 8	HEAVY NON-EXTENDED	4	8"	3"	29 3/4"	14 7/8"
MX - 4S - 8	MEDIUM EXTENDED	4	8"	2 3/4"	34"	17"

a--1/64" d--1/8" g--3/8"
b--1/32" e--3/16" h--1/2"
c--1/16" f--1/4" x--0"

ALLOWABLE VARIATIONS

SINGLE LETTER INDICATES SAME + OR -, a = ± 1/64"

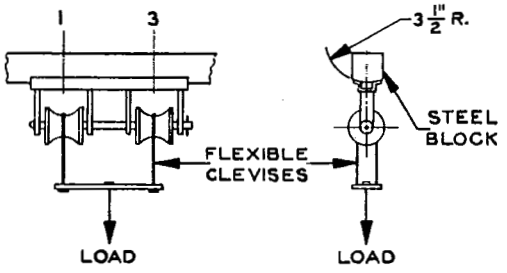
TWO LETTERS INDICATE FIRST +, SECOND -, ax = + 1/64" - 0"

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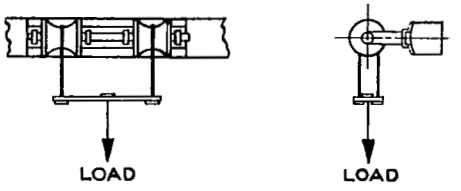
DATA SHEET 4

TYPICAL TEST METHODS

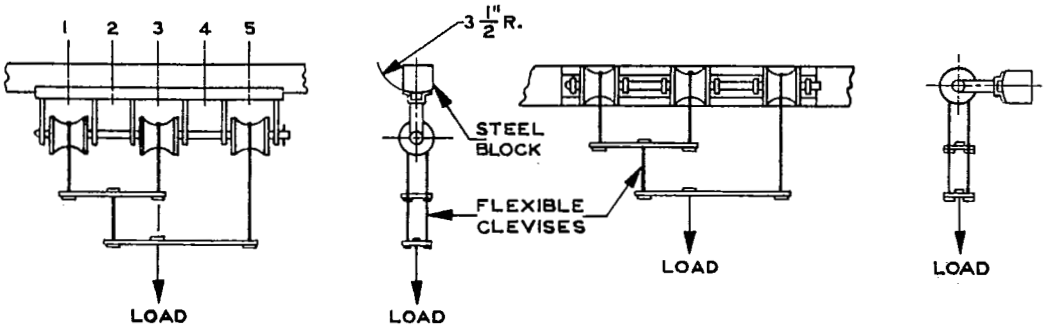
DEAD END PULL



SIDE PULL



2 SPOOL LIGHT TYPE NON-EXTENDED



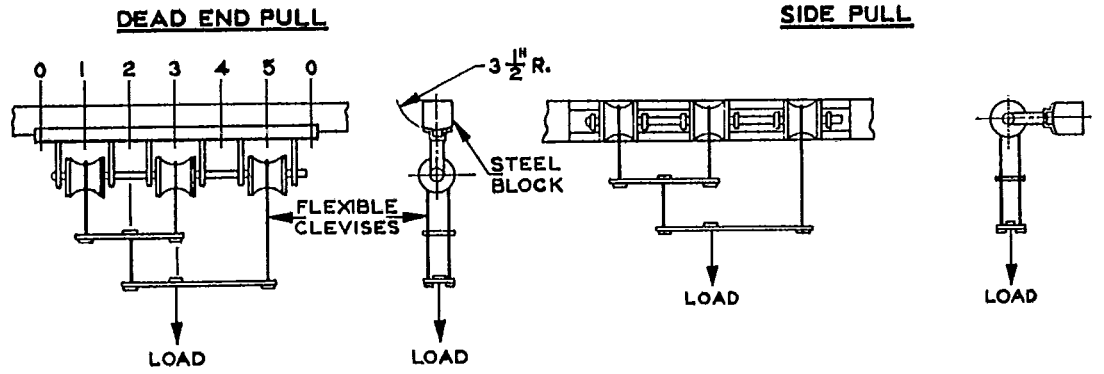
3 SPOOL HEAVY, MEDIUM OR LIGHT TYPE NON-EXTENDED

SEE TABLE II, PAGE 7, FOR BOLT POSITIONS
TO TEST AND MINIMUM REQUIREMENTS

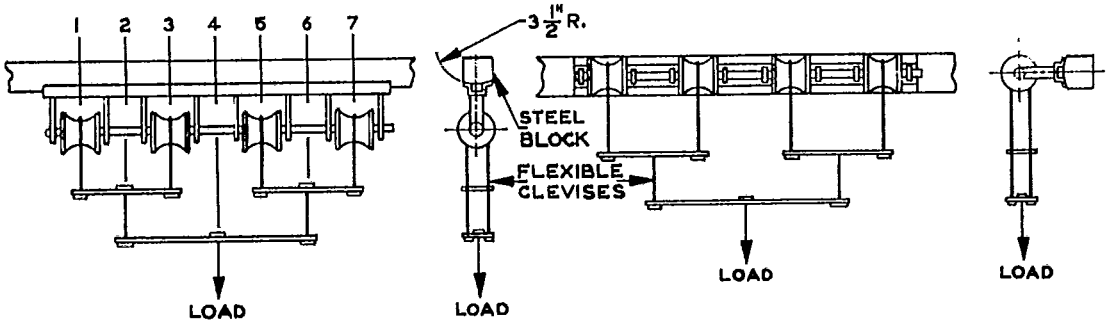
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DATA SHEET 5

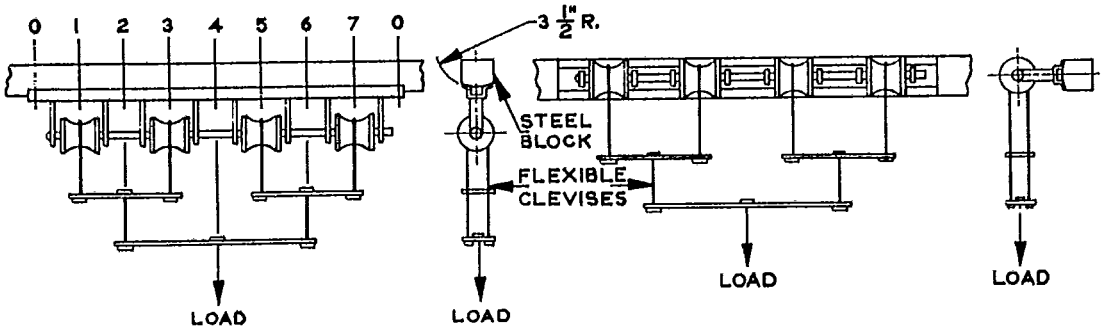
TYPICAL TEST METHODS



3 SPOOL HEAVY, MEDIUM OR LIGHT TYPE EXTENDED



4 SPOOL HEAVY TYPE NON-EXTENDED



4 SPOOL HEAVY OR MEDIUM TYPE EXTENDED

SEE TABLE II, PAGE 7, FOR BOLT POSITIONS
TO TEST AND MINIMUM REQUIREMENTS

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