

May 15, 2014

Stephen A. Keppler, Executive Director
Commercial Vehicle Safety Alliance
6303 Ivy Lane – Suite 310
Greenbelt MD 20770-6319

SUBJECT: NACM Forged Grade 30, 43, and 70 Hook Specifications

Greetings Mr. Keppler

On April 27, 2014 our Board of Directors adopted a new specification after many months of review. The work on this specification began as a result of encouragement from CVSA. A copy of the document is attached for your perusal and file. The National Association of Chain Manufacturers launched this effort because the product category is somewhat an orphan. There is currently no recognized standard for these hooks. Our work in development of the specification used ASTM A952 as a basis document. The specification covers both eye, and clevis, grab hooks and slip hooks now in common use with chain for cargo securement applications.

In approximately two or three weeks we will be posting the new specification with our other existing specifications on the NACM website (www.nacm.info) where hard copies may be downloaded free of charge. We hope you will bring this new development to the attention of your Vehicle Committee and also to any other regulatory bodies and committees that are appropriate.

Respectfully,



Donald Sayenga, Executive Director

ATTACHMENT: NACM Forged Grade 30, 43, and 70 Hook Specifications

Copies: Jim Riley, Laclede

Brian Todd, Apex Tool Group (Campbell)

Forged Grade 30, Grade 43, and Grade 70 Chain Hook Specifications



Adopted April 27, 2014
by the
National Association of Chain Manufacturers

NACM Forged Grade 30, Grade 43, and Grade 70 Chain Hook Specifications

Use and Performance Limitation

This specification is applicable to chain hooks in proper physical condition used at or below the working load limit in normal use conditions.

The conditions involving use in certain environmental situations such as unusual (high or low) temperature, chemical, etc., can cause changes in chain and chain hook performance. Sudden applications of dynamic loads, which cause the load in the chain to exceed the working load limit, are to be avoided. Individual manufacturers will provide information and recommendations concerning those conditions most likely to cause problems.

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NACM Forged Grade 30, Grade 43, and Grade 70 Chain Hook Specifications

1. Scope

1.1 This specification covers the requirements for forged hooks used with Grade 30, Grade 43, and Grade 70 chain as described in the NACM Welded Steel Chain Specifications.

1.2 Three grades of hooks are covered:

1.2.1 Grade 30.

1.2.2 Grade 43.

1.2.3 Grade 70.

1.3 The values stated in either inch-pound or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

2. Referenced Documents

2.1 NACM Welded Steel Chain Specifications

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *breaking force, minimum*—the minimum force in pounds or newtons at which the hook has been found by verification testing to break when a constantly increasing force was applied in direct tension. This test is a manufacturer's design verification test and shall not be used as criteria for service.

3.1.2 *proof test*—the minimum force in pounds or newtons at which the hook has been found by verification testing to support without deformation.

3.1.3 *working load limit (WLL)*—the maximum combined static and dynamic load in pounds or kilograms that shall be applied in direct tension to the hook.

3.1.4 *manufacturer's identification mark or symbol* – A mark, such as a series of letters, or symbol embossed on the hook by the manufacturer to identify manufacturing origin.

4. Classification

4.1 Only Grade 30, Grade 43, and Grade 70 chain hooks are covered under this specification.

4.2 Four styles of hooks are covered under this specification. The general configurations of these hooks are shown in Fig. 1.

4.2.1 Eye Grab Hook.

4.2.2 Clevis Grab Hook.

4.2.3 Eye Slip Hook.

4.2.4 Clevis Slip Hook.

5. Materials

5.1 The selection of the base steel is left to the judgment of the individual hook manufacturer provided that the steel meets the performance requirements of Section 7.

6. Manufacture

6.1 The body of all hooks shall be forged hot in one piece.

6.2 Excess metal flash shall be cleanly removed, leaving the surface free from sharp edges.

6.3 Ancillary components such as load pins, latches, springs, and cotter pins need not be forged components.

6.4 Welding shall not be used to repair forged components. Grinding of surface discontinuities may be carefully performed as long as no dimension is altered outside of the manufacturer's dimensions and tolerances for that component. All ground areas must blend in smoothly with the surface.

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7. Performance Requirements

7.1 Design Verification Requirements:

7.1.1 The purpose of the verification tests is to prove the design, material, heat treatment, and method of manufacture of each size of component. Any change of design, material, heat treatment, method of manufacture or in any dimension outside normal manufacturing tolerances shall require that verification be performed on the modified components.

7.1.2 The tests specified in 7.2 shall be performed on at least three samples of each size of component of each design, material, heat treatment, and method of manufacture. During testing, the force shall be applied to the component axially without shock.

7.2 Design Verification Tests:

7.2.1 *Deformation Test*—Three samples shall be tested and each shall withstand the proof test load as listed in Tables 1 through 3 for the appropriate size and grade hook. No dimension shall be altered after the proof test by more than 1 % of the initial dimension.

7.2.2 Breaking Force Test:

7.2.2.1 Three samples shall be tested and be capable of withstanding the minimum breaking force as prescribed in Table 1 through 3 for the appropriate size and grade hook. .

NOTE 1—It is not necessary to test the component to its actual breaking force as long as the minimum breaking force loads and deformation requirements are obtained.

NOTE 2—The breaking force tests may be conducted on the samples used for the deformation tests.

8. Dimensional Requirements

9.1 The dimensions of the hooks are left to the judgment of the component manufacturer provided that the dimensions are sufficient to meet the requirements set forth in this specification.

9. Finish

9.1 The manufacturer may apply a surface treatment or coating of their own choice for identification or corrosion resistance unless the customer specifies otherwise.

10. Retests

10.1 If one of the verification test samples fails to meet the requirements of 7.2, two additional samples shall be tested. If both additional tests meet or exceed the requirements, the hook is considered in compliance with this specification. If two or more of the original samples or one of the retests fail to meet the requirements of 7.2, the hook does not comply with this specification.

11. Product Marking

11.1 *Forged Hooks*—Each hook shall be legibly and indelibly marked in a manner which will not impair the mechanical properties of the hook. This marking shall include at least the following:

11.1.1 Chain size in either inches or mm or both.

11.1.2 Chain Grade

11.1.2.1 The marking for Grade 30 shall be at least 3, 30 or 300, or any combination.

11.1.2.2 The marking for Grade 43 shall be at least 4, 43 or 430, or any combination.

11.1.2.3 The marking for Grade 70 shall be at least 7, 70 or 700, or any combination.

11.1.3 The manufacturer's symbol, mark, or code.

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12 Warning

The use of chain and hooks are subject to certain hazards that cannot be met by mechanical means, but only by the exercise of intelligence, care and common sense. Serious hazards are: Overloading, dropping or slipping of the load caused by improper rigging, obstruction to free passage of the load, bending, twisting and the use of damaged chain or hooks. Any such abuse or misuse may cause injury or property damage for which the manufacturer accepts no liability.

All chains and hooks should be periodically inspected for damage. The examination should look for excessive wear, elongation or deformation, and the presence of any nicks, gouges, or cracking in the hook or load pins. Chains or hooks containing such damage should be removed from service.

Removal criteria for wear has been established for the Grade 30, Grade 43, and Grade 70 chains and are contained in the NACM Welded Steel Chain Specifications. All chain should be removed from service if the material thickness at any location on the link is less than the listed minimum value.

Chains and hooks should not be used outside of the -40 °F to 400 °F (-40 °C to 204 °C) temperature range without consulting the chain manufacturer. Excessive high or low temperatures or exposure to chemically active environments such as acids or corrosive liquids or fumes can reduce the performance of the chain.

Under no conditions, permit loads to be transported or suspended over people.

Manufacturers do not accept any liability for injury or damage which may result from dynamic or static loads in excess of the working load limit or used in a manner contrary to the manufacturer's instructions or recommendations. When mixing grades of chain or components, all chain assemblies shall be rated at the working load limit of the lowest rated chain or component.

Only Grade 80 or 100 chains and components should be used for overhead lifting applications unless otherwise recommended by the manufacturer. These components are not covered under this specification.

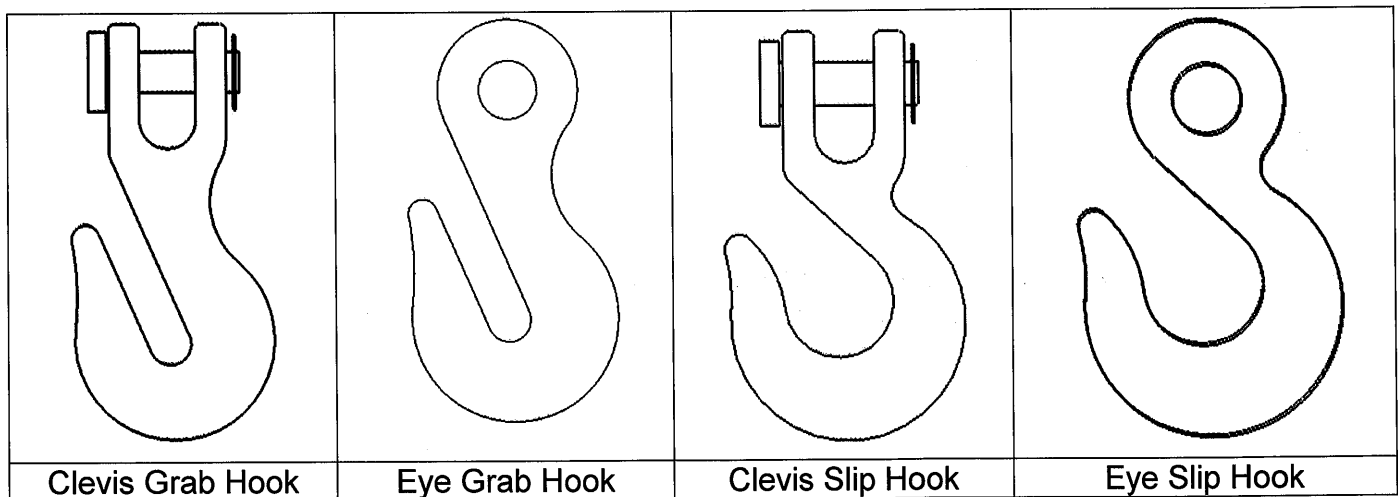


Figure 1: General Hook Configuration

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NATIONAL ASSOCIATION OF CHAIN MANUFACTURERS

TABLE 1

Grade 30 (Proof Coil) Chain Hook Requirements
(Not to be used in overhead lifting applications)

Nominal Chain Size		Working Load Limit (Max)		Proof Test (Min) **		Minimum Breaking Force **	
in	mm	lbs	kg	lbs	kN	lbs	kN
1/8	4.0	400	180	800	3.6	1,600	7.2
3/16	5.5	800	365	1,600	7.2	3,200	14.4
1/4	7.0	1,300	580	2,600	11.6	5,200	23.2
5/16	8.0	1,900	860	3,800	16.9	7,600	33.8
3/8	10.0	2,650	1,200	5,300	23.6	10,600	47.2
7/16	11.9	3,700	1,680	7,400	32.9	14,800	65.8
1/2	13.0	4,500	2,030	9,000	40.0	18,000	80.0
5/8	16.0	6,900	3,130	13,800	61.3	27,600	122.6
3/4	20.0	10,600	4,800	21,200	94.3	42,400	188.6
7/8	22.0	12,800	5,810	25,600	114.1	51,200	228.2
1	26.0	17,900	8,140	35,800	159.1	71,600	318.2

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for use or service.

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TABLE 2

Grade 43 (High Test) Chain Hook Requirements
(Not to be used in overhead lifting applications)

Nominal Chain Size		Working Load Limit (Max)		Proof Test (Min) **		Minimum Breaking Force **	
in	mm	lbs	kg	lbs	kN	lbs	kN
1/4	7.0	2,600	1,180	3,900	17.3	7,800	34.6
5/16	8.0	3,900	1,770	5,850	26.0	11,700	52.0
3/8	10.0	5,400	2,450	8,100	36.0	16,200	72.0
7/16	11.9	7,200	3,270	10,800	48.0	21,600	96.0
1/2	13.0	9,200	4,170	13,800	61.3	27,600	122.6
5/8	16.0	13,000	5,910	19,500	86.5	39,000	173.0
3/4	20.0	20,200	9,180	30,300	134.7	60,600	269.4
7/8	22.0	24,500	11,140	36,750	163.3	73,500	326.6

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for use or service.

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TABLE 3

Grade 70 (Transport) Chain Hook Requirements
(Not to be used in overhead lifting applications)

Nominal Chain Size		Working Load Limit (Max)		Proof Test (Min) **		Minimum Breaking Force **	
in	mm	lbs	kg	lbs	kN	lbs	kN
1/4	7.0	3,150	1,430	6,300	28.0	12,600	56.0
5/16	8.0	4,700	2,130	9,400	41.8	18,800	83.6
3/8	10.0	6,600	2,990	13,200	58.7	26,400	117.4
7/16	11.9	8,750	3,970	17,500	77.8	35,000	155.4
1/2	13.0	11,300	5,130	22,600	100.4	45,200	200.8
5/8	16.0	15,800	7,170	31,600	140.4	63,200	280.8
3/4	20.0	24,700	11,200	49,400	219.6	98,800	439.2

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for use or service.