WELDED STEEL CHAIN SPECIFICATIONS

Adopted April 11, 2010
by the
National Association of Chain Manufacturers

Use and Performance Limitation

These size and related specifications are applicable to chain 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 performance. Sudden application 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 WELDED STEEL CHAIN SPECIFICATIONS

1.0 TITLE

1.1 NACM Welded Steel Chain Specifications

2.0 SCOPE

2.1 These specifications cover properties and grades of welded steel chain for industrial and commercial uses produced to accepted commercial tolerances. Special products such as sprocket chain, pocket wheel chain, etc., are not covered by this specification. For specific applications, the user should consult the manufacturer for recommendations as to size and grade.

Grade 100 Alloy Chain	Premium quality, highest strength alloy chain, heat treated, used in a variety of sling and tie down applications. For overhead lifting applications, only Alloy Chain should be used.
Grade 80 Alloy Chain	Premium quality, high strength alloy chain, heat treated, used in a variety of sling and tie down applications. For overhead lifting applications, only Alloy Chain should be used.
Grade 70 Transport Chain	A high quality, high strength carbon steel chain, heat treated, used for load securement. **Not to be used in overhead lifting.**
Grade 43 High Test Chain	A carbon steel chain widely used in industry, construction, agricultural and lumbering operations. **Not to be used in overhead lifting.**
Grade 30 Proof Coil Chain	General purpose, carbon steel chain. Used in a wide range of applications. **Not to be used in overhead lifting.**
Machine Chain	Short pitch straight link or twist link, general utility chain made of carbon steel. **Not to be used in overhead lifting.**
Coil Chain	Long pitch straight link or twist link, general utility chain made of carbon steel. **Not to be used in overhead lifting.**
Passing Link Chain	Short, wide link chain which resists kinking or tangling, made of carbon steel. **Not to be used in overhead lifting.**
Stainless Steel Chain	A corrosion-resistant chain manufactured from stainless steel, used in food processing, chemical, marine, and high temperature environments. Certain stainless steel chains may be used for overhead lifting. Consult with the manufacturer before using any stainless steel chain for overhead lifting.

3.0 DEFINITIONS

3.1 **Working Load Limit (WLL)**
The "Working Load Limit" (rated capacity) is the maximum load that shall be applied in direct tension to an undamaged straight length of chain.

3.2 **Proof Test**
The "Proof Test" (manufacturing test force) is a term designating the minimum tensile force which has been applied to a chain under a constantly increasing force in direct tension during the manufacturing process. These loads are manufacturing integrity tests and **shall not** be used as criteria for service and design purposes.

3.3 **Minimum Breaking Force**
The "Minimum Breaking Force" is the minimum force at which the chain during manufacture has been found by testing to break when a constantly increasing force is applied in direct tension. Breaking force values are not guarantees that all chain segments will endure these loads (see Section 5.2). This test is a manufacturer's attribute acceptance test and **shall not** be used as criteria for service and design purposes.

3.4 Overhead Lifting
That process of lifting that would elevate a freely suspended load to such a position that dropping the load would present a possibility of bodily injury or property damage.

3.5 Overload
Any static or dynamic load in excess of "Working Load Limit."

3.6 Traceability Code
A series of letters, numbers, or both embossed on the chain which enables its manufacturing history, including the identity of the steel heat, to be traced.

3.7 Date Code
A series of letters, numbers, or both embossed on the chain which enables its manufacturing history to be traced.

3.8 Manufacturer's Identification Mark or Symbol
A mark, such as a letter or series of letters, or symbol embossed on the chain by the manufacturer to identify manufacturing origin.

4.0 MATERIALS AND MANUFACTURING

4.1 Material – Carbon Chain
The selection of the base steel is left to the judgment of the individual chain manufacturer provided the steel meets the following criteria: Carbon, 0.35% max.; Phosphorous, 0.040% max.; and Sulfur, 0.050% max.

4.2 Material – Grade 80 Alloy Chain
The selection and amounts of the alloying elements in the steel are left to the judgment of the individual chain manufacturer provided the steel meets the following criteria: Carbon, 0.35% max.; Phosphorous, 0.025% max.; Sulfur, 0.025% max. Nickel must be present in an alloying amount (0.40% min.), and at least one of the following elements must be present in an alloying amount: Chromium (0.40% min.) or Molybdenum (0.15% min.).

4.3 Material – Grade 100 Alloy Chain
The selection and amounts of the alloying elements in the steel are left to the judgment of the individual chain manufacturer provided the steel meets the following criteria: Carbon, 0.35% max.; Phosphorous, 0.025% max.; Sulfur, 0.025% max. The following elements shall all be present in alloying amounts, nickel (0.40% min.), chromium (0.40% min.), and molybdenum (0.15% min.).

4.4 Material – Stainless Steel Chain
The material shall be a 300 series austenitic stainless steel.

4.5 Welding Process
Steel chain shall be made by the electric welding or gas welding process.

4.6 Manufacturing Methods
The manufacturer will select suitable manufacturing methods such that the chain complies with the requirements contained within this specification.

5.0 TESTING

5.1 The mechanical properties of the various chain sizes and designations are given in Tables I through XI.

5.2 Proof Test
Every link of chain shall be tested to at least the proof test load prescribed in Tables I through V, VII, and IX through XI for the appropriate size and type chain. When so tested, the chain shall withstand this load without the loss of chain integrity. Links or chain segments not withstanding the load shall be removed.

Note: Twist link styles of machine and coil chain do not require proof testing, as the twist operation is an adequate verification of weld integrity.

5.3 Selection of Samples

For the purpose of acceptance testing of chain, a lot shall consist of 3,000 ft. (1,000 m) or fraction thereof of the same grade and size of chain. If a continuous length of chain exceeds 3,000 ft. (1,000 m), it is also considered a lot.

At least one sample from each lot shall be tensile tested. If the original test specimen fails to conform to the breaking force requirements as prescribed in Tables I through XI for their respective sizes, two additional test specimens from the same lot may be tested. If both additional test specimens conform to the requirements specified, the lot of chain will be considered acceptable.

Note: The elongation and breaking force tests may be performed at the same time on the same test specimen.

5.4 Tensile tests to determine breaking force and elongation shall be performed in the following manner.

5.4.1 The breaking force test specimen shall consist of a length of chain from any stage of manufacture after hardening and tempering, if applicable, and shall contain at least the number of links in the following Table.

Size of Chain	Minimum Number of Links in Test Specimen
5.5 mm or smaller	9
Greater than 5.5 mm but less than 20.0 mm	7
20.0 mm or greater	3

5.4.2 Fixtures for securing chain test specimen in testing machine must securely support shoulder of link.

The slot width shall not exceed 1.25 times the stock diameter being tested. Links in the testing fixture shall not be considered part of the test specimen.

5.4.3 Elongation

5.4.3.1 All chain which is heat treated must be in the quenched and tempered condition before elongation is measured.

5.4.3.2 The elongation test specimen shall consist of a length from the lot containing at least the number of links in the Table in Section 5.4.1.

5.4.3.3 A positive load not exceeding 10% of the proof test shall be applied for determining the original gauge length (L_O).

5.4.3.4 The elongation shall be based on the total extension at fracture. This is expressed as a percentage of the change in length (ΔL) divided by the original gauge length (L_O). The elongation may be determined by the equation below or by autographic recorder or side scale.

$$\text{Elongation } (\%) = \{\Delta L / L_O\} \times 100$$

Where

ΔL = The test specimen final length at fracture - the test specimen original gauge length (L_O) .

L_O = The original gauge length (the sum of the inside lengths of the test chain links not counting the fixture links, or as determined in 5.4.3.3).

5.4.4 Elongation shall not be less than 20% for Grades 80 and 100; 15% for Grades 30, 43, 70, and Stainless; and 10% for Machine, Coil, and Passing Link chain.

6.0 DIMENSIONS

6.1 The dimensional requirements of the various chain sizes and designations are given in Tables I through XI. The inside length dimension can be measured either by individual link or by measuring the span of 100 links and dividing by 100.

6.2 The diameter of the material from which the chain is manufactured shall be the diameter as specified in Tables I through XI within the following tolerances: -3% for Grades 80 and 100, -7% for all other chains. Oversized material may be used for all applications.

7.0 INSPECTION

7.1 Preparation for Testing
Testing and inspection at a manufacturer's plant shall be performed on chain while free of paint or other coating which could conceal defects.

7.2 Certification
A certificate of proof test shall be issued by the chain manufacturer to the purchaser or his representative when requested on the sales agreement.

8.0 IDENTIFICATION

8.1 Grade 30, 43, and 70 Chain
Grade 43, 70, and 5/16" (8.4 mm) and larger Grade 30 chains shall have periodic embossing for identification purposes. The embossing shall include the manufacturer's identification mark or symbol and the grade indicator as shown in 8.1.2 through 8.1.4.

8.1.1 5/16" (8.7 mm) and 3/8" (10 mm) Grade 43 and 70 chain shall be embossed at intervals no grater than 1 ft. (0.3 m). All other Grade 30, 43, and 70 chains shall be embossed at intervals no greater than 3 ft. (0.9 m).

8.1.2 5/16" (8.4 mm) and larger Grade 30 chains shall be embossed at least with 3, 30, or 300.

8.1.3 Grade 43 chains shall be embossed at least with 4, 43, or 430.

8.1.4 Grade 70 chains shall be embossed at least with 7, 70, or 700.

8.1.5 1/4" (7 mm) and smaller Grade 30 chains may be embossed at the option of the manufacturer.

8.2 Grade 80 and 100 Chain
Grade 80 and 100 chains shall have periodic embossing for identification purposes. The embossing shall include the manufacturer's identification mark or symbol, the traceability code or date code, and the grade indicator as specified in 8.2.2 and 8.2.3.

8.2.1 Grade 80 and 100 chains shall be embossed at intervals no greater than 3 ft. (0.9 m).

8.2.2 Grade 80 chain shall be embossed at least with 8, 80, or 800.

8.2.3 Grade 100 chain shall be embossed at least with 10, 100, or 1000.

8.3 Machine, Coil, Passing Link, and Stainless Chain
Machine, Coil, and Passing Link, and Stainless chains may be embossed at the option of the manufacturer.

8.4 Embossment Requirement
All chain identification markings shall be embossed using raised characters. Chain links shall not be marked with indented characters.

9.0 FINISH

9.1 If required, Stainless chain shall be polished by a suitable mechanical, chemical, or electro-chemical method. Mechanical polishing shall be done on equipment and with a process that does not allow non-stainless steel particles to be imbedded on the surface of the chain.

9.2 The manufacturer may apply a surface treatment or coating of his or customer's choice for identification or corrosion resistance unless the customer specifies otherwise.

10.0 WARNING

The use of chain is 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. Any such abuse or misuse may cause injury or property damage for which the manufacturer accepts no liability.

All chains should be periodically inspected for wear, elongation, nicks, gouges, cracks, and suitability for the application. 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.

Chains should not be used outside of the -40 °F to 400 °F (-40 °C to 204 °C) temperature range without consulting the chain manufacturer. The specific working load limit reductions for Grade 80 and Grade 100 chains used at and after exposure to elevated temperatures have been established and are shown in Table XII. The specific working load limit reductions for Stainless chains used at elevated temperatures have been established and are shown in Table XIII.

Removal criteria for wear and damage have also been established for the chains covered under specification, and are listed in Table XIV. All chain should be removed from service if the material thickness at any location on the link is less than the listed minimum value.

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 should be used for overhead lifting applications unless otherwise recommended by the manufacturer.

Annex A (Informative)

Chain Grade Calculation:

The chain Grade is based on the nominal stress in the link at the design breaking force strength. It is calculated by taking the minimum breaking force load and dividing by two times the nominal cross sectional area of the link.

Metric Units

Grade = 1/10 of the minimum breaking force in newtons divided by two times the nominal cross sectional area in square millimeters.

$= (MBF) / (0.005)(\pi)(d)^2$

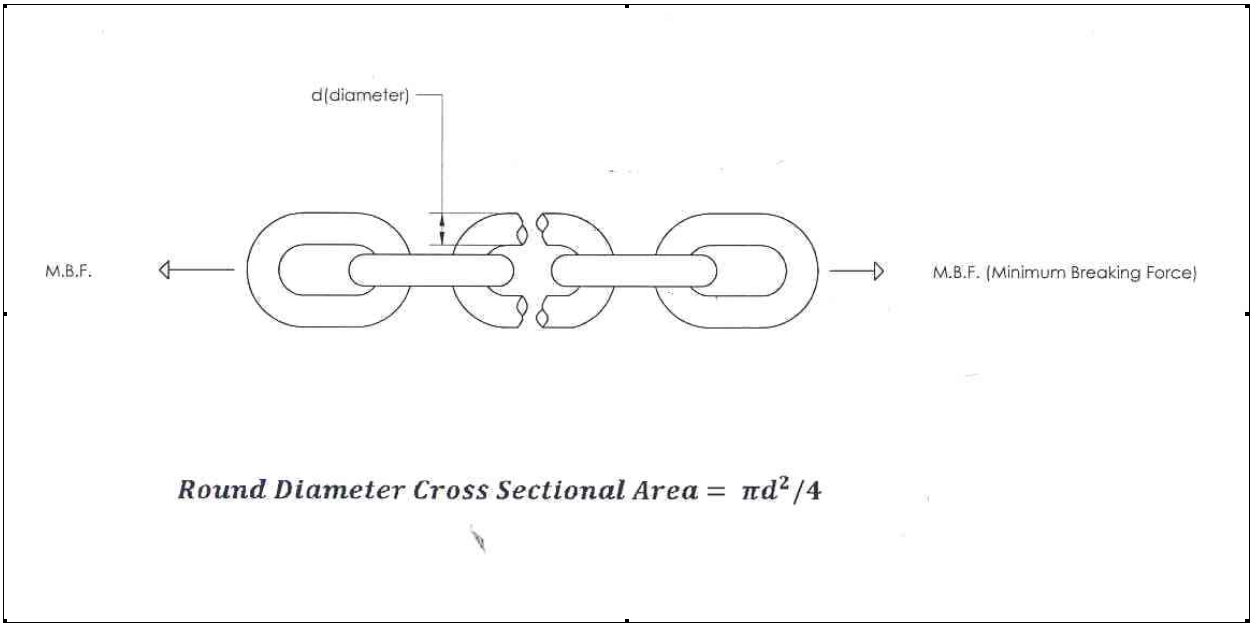
English Units

Grade = 0.000689 of the minimum breaking force in lbs. divided by two times the nominal cross sectional area in square inches.

$= (0.000689)(MBF) / (0.5)(\pi)(d)^2$

MBF = Minimum Breaking Force (lbs. or kN)
d = chain diameter (in. or mm)

Note: The above formulas are for round diameter links only. If different cross sections are used, the actual cross section of the link would need to be calculated and used.



NATIONAL ASSOCIATION OF CHAIN MANUFACTURERS
Welded Steel Chain Specifications

TABLE I
Grade 30 Proof Coil Chain
(Not to be used in overhead lifting applications)

Nominal Chain Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Inside Length (Max.)		Inside Width (Min.)	
in	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
1/8	4.0	0.156	4.0	400	180	800	3.6	1,600	7.2	0.94	23.9	0.25	6.4
3/16	5.5	0.217	5.5	800	365	1,600	7.2	3,200	14.4	0.98	24.8	0.30	7.7
1/4	7.0	0.276	7.0	1,300	580	2,600	11.6	5,200	23.2	1.24	31.5	0.38	9.8
5/16	8.0	0.331	8.4	1,900	860	3,800	16.9	7,600	33.8	1.29	32.8	0.44	11.2
3/8	10.0	0.394	10.0	2,650	1,200	5,300	23.6	10,600	47.2	1.38	35.0	0.55	14.0
7/16	11.9	0.468	11.9	3,700	1,680	7,400	32.9	14,800	65.8	1.64	41.6	0.65	16.6
1/2	13.0	0.512	13.0	4,500	2,030	9,000	40.0	18,000	80.0	1.79	45.5	0.72	18.2
5/8	16.0	0.630	16.0	6,900	3,130	13,800	61.3	27,600	122.6	2.20	56.0	0.79	20.0
3/4	20.0	0.787	20.0	10,600	4,800	21,200	94.3	42,400	188.6	2.76	70.0	0.98	25.0
7/8	22.0	0.866	22.0	12,800	5,810	25,600	114.1	51,200	228.2	3.03	77.0	1.08	27.5
1	26.0	1.020	26.0	17,900	8,140	35,800	159.1	71,600	318.2	3.58	90.9	1.25	31.7

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

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TABLE II
Grade 43 High Test Chain
(Not to be used in overhead lifting applications)

Nominal Chain Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Inside Length (Max.)		Inside Width (Min.)	
in	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
1/4	7.0	0.276	7.0	2,600	1,180	3,900	17.3	7,800	34.6	1.24	31.5	0.38	9.8
5/16	8.7	0.343	8.7	3,900	1,770	5,850	26.0	11,700	52.0	1.29	32.8	0.44	11.2
3/8	10.0	0.406	10.3	5,400	2,450	8,100	36.0	16,200	72.0	1.38	35.0	0.55	14.0
7/16	11.9	0.468	11.9	7,200	3,270	10,800	48.0	21,600	96.0	1.64	41.6	0.65	16.6
1/2	13.0	0.531	13.5	9,200	4,170	13,800	61.3	27,600	122.6	1.79	45.5	0.72	18.2
5/8	16.0	0.630	16.0	13,000	5,910	19,500	86.5	39,000	173.0	2.20	56.0	0.79	20.0
3/4	20.0	0.787	20.0	20,200	9,180	30,300	134.7	60,600	269.4	2.76	70.0	0.98	25.0
7/8	22.0	0.866	22.0	24,500	11,140	36,750	163.3	73,500	326.6	3.03	77.0	1.08	27.5

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

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TABLE III
Grade 70 Transport Chain
(Not to be used in overhead lifting applications)

Nominal Chain Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Inside Length (Max.)		Inside Width (Min.)	
in	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
1/4	7.0	0.281	7.0	3,150	1,430	6,300	28.0	12,600	56.0	1.24	31.5	0.38	9.8
5/16	8.7	0.343	8.7	4,700	2,130	9,400	41.8	18,800	83.6	1.29	32.8	0.44	11.2
3/8	10.0	0.406	10.3	6,600	2,990	13,200	58.7	26,400	117.4	1.38	35.0	0.55	14.0
7/16	11.9	0.468	11.9	8,750	3,970	17,500	77.8	35,000	155.4	1.64	41.6	0.65	16.6
1/2	13.0	0.531	13.5	11,300	5,130	22,600	100.4	45,200	200.8	1.79	45.5	0.72	18.2
5/8	16.0	0.630	16.0	15,800	7,170	31,600	140.4	63,200	280.8	2.20	56.0	0.79	20.0
3/4	20.0	0.787	20.0	24,700	11,200	49,400	219.6	98,800	439.2	2.76	70.0	0.98	25.0

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

NATIONAL ASSOCIATION OF CHAIN MANUFACTURERS
Welded Steel Chain Specifications

TABLE IV
Grade 80 Alloy Chain
(For overhead lifting applications, only alloy chain should be used)

Nominal Chain Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Inside Length (Max.)		Inside Width Range	
in	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
7/32	5.5	0.217	5.5	2,100	970	4,200	19.0	8,400	38.0	0.69	17.6	0.281 - 0.325	7.14 - 8.25
9/32	7.0	0.276	7.0	3,500	1,570	7,000	30.8	14,000	61.6	0.90	22.9	0.375 - 0.430	9.53 - 10.92
5/16	8.0	0.315	8.0	4,500	2,000	9,000	40.3	18,000	80.6	1.04	26.4	0.430 - 0.500	10.92 - 12.70
3/8	10.0	0.394	10.0	7,100	3,200	14,200	63.0	28,400	126.0	1.26	32.0	0.512 - 0.600	13.00 - 15.20
1/2	13.0	0.512	13.0	12,000	5,400	24,000	107.0	48,000	214.0	1.64	41.6	0.688 - 0.768	17.48 - 19.50
5/8	16.0	0.630	16.0	18,100	8,200	36,200	161.0	72,400	322.0	2.02	51.2	0.812 - 0.945	20.63 - 24.00
3/4	20.0	0.787	20.0	28,300	12,800	56,600	252.0	113,200	504.0	2.52	64.0	0.984 - 1.180	25.00 - 30.00
7/8	22.0	0.866	22.0	34,200	15,500	68,400	305.0	136,800	610.0	2.77	70.4	1.080 - 1.300	27.50 - 33.00
1	26.0	1.020	26.0	47,700	21,600	95,400	425.0	190,800	850.0	3.28	83.2	1.280 - 1.540	32.50 - 39.00
1-1/4	32.0	1.260	32.0	72,300	32,800	144,600	644.0	289,200	1,288.0	4.03	102.4	1.580 - 1.890	40.00 - 48.00

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

NATIONAL ASSOCIATION OF CHAIN MANUFACTURERS
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TABLE V
Grade 100 Alloy Chain
(For overhead lifting applications, only alloy chain should be used)

Nominal Chain Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Inside Length (Max.)		Inside Width Range	
in	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
7/32	5.5	0.217	5.5	2,700	1,220	5,400	23.8	10,800	47.6	0.69	17.6	0.281 - 0.325	7.14 - 8.25
9/32	7.0	0.276	7.0	4,300	1,950	8,600	38.5	17,200	77.0	0.90	22.9	0.375 - 0.430	9.53 - 10.92
5/16	8.0	0.315	8.0	5,700	2,600	11,400	51.0	22,800	102.0	1.04	26.4	0.430 - 0.500	10.92 - 12.70
3/8	10.0	0.394	10.0	8,800	4,000	17,600	79.0	35,200	158.0	1.26	32.0	0.512 - 0.600	13.00 - 15.20
1/2	13.0	0.512	13.0	15,000	6,800	30,000	134.0	60,000	268.0	1.64	41.6	0.688 - 0.768	17.48 - 19.50
5/8	16.0	0.630	16.0	22,600	10,300	45,200	201.0	90,400	402.0	2.02	51.2	0.812 - 0.945	20.63 - 24.00
3/4	20.0	0.787	20.0	35,300	16,000	70,600	315.0	141,200	630.0	2.52	64.0	0.984 - 1.180	25.00 - 30.00
7/8	22.0	0.866	22.0	42,700	19,400	85,400	381.0	170,800	762.0	2.77	70.4	1.080 - 1.300	27.50 - 33.00

The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

NATIONAL ASSOCIATION OF CHAIN MANUFACTURERS
Welded Steel Chain Specifications

TABLE VI
Machine Chain – Twist Link
(Not to be used in overhead lifting applications)

Trade Size		Material Diameter		Working Load Limit (Max.)		Minimum Breaking Force**		Nominal Inside Length*		Nominal Inside Width*	
	mm	in	mm	lbs	kg	lbs	kN	in	mm	in	mm
4	3.0	0.120	3.0	205	93	820	3.64	0.52	13.1	0.17	4.3
3	3.4	0.135	3.4	255	116	1,020	4.53	0.56	14.2	0.20	5.1
2	3.8	0.148	3.8	310	141	1,240	5.51	0.58	14.7	0.21	5.3
1	4.1	0.162	4.1	370	168	1,480	6.58	0.59	15.0	0.24	6.1
1/0	4.5	0.177	4.5	440	200	1,760	7.82	0.68	17.2	0.26	6.6
2/0	4.9	0.192	4.9	520	236	2,080	9.24	0.73	18.5	0.28	7.1
3/0	5.3	0.207	5.3	605	274	2,420	10.76	0.80	20.3	0.31	7.9
4/0	5.5	0.218	5.5	670	304	2,680	11.91	0.89	22.5	0.32	8.1
5/0	6.4	0.250	6.4	880	400	3,520	15.64	1.00	25.3	0.37	9.4

*Actual inside lengths and widths not to vary more than ±5% from nominal dimensions.
The Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

NATIONAL ASSOCIATION OF CHAIN MANUFACTURERS
Welded Steel Chain Specifications

TABLE VII
Machine Chain – Straight Link
(Not to be used in overhead lifting applications)

Trade Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Nominal Inside Length*		Nominal Inside Width*	
	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
4	3.0	0.120	3.0	215	98	430	1.91	860	3.82	0.55	14.0	0.21	5.3
3	3.4	0.135	3.4	270	122	540	2.40	1,080	4.80	0.59	15.0	0.24	6.1
2	3.8	0.148	3.8	325	147	650	2.89	1,300	5.78	0.61	15.5	0.26	6.6
1	4.1	0.162	4.1	390	177	780	3.47	1,560	6.93	0.63	16.0	0.28	7.1
1/0	4.5	0.177	4.5	465	211	930	4.14	1,860	8.27	0.74	18.8	0.31	7.9
2/0	4.9	0.192	4.9	545	247	1,090	4.85	2,180	9.69	0.78	19.8	0.34	8.6
3/0	5.3	0.207	5.3	635	288	1,270	5.65	2,540	11.29	0.85	21.6	0.36	9.1
4/0	5.5	0.218	5.5	700	318	1,400	6.23	2,800	12.44	0.99	25.1	0.38	9.6
5/0	6.4	0.250	6.4	925	420	1,850	8.23	3,700	16.44	1.07	27.2	0.44	11.2

*Actual inside lengths and widths not to vary more than ±5% from nominal dimensions.
The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

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TABLE VIII
Coil Chain – Twist Link
(Not to be used in overhead lifting applications)

Trade Size		Material Diameter		Working Load Limit (Max.)		Minimum Breaking Force**		Nominal Inside Length*		Nominal Inside Width*	
	mm	in	mm	lbs	kg	lbs	kN	in	mm	in	mm
4	3.0	0.120	3.0	195	88	780	3.47	1.09	27.6	0.18	4.56
3	3.4	0.135	3.4	240	109	970	4.31	1.14	28.9	0.21	5.32
2	3.8	0.148	3.8	295	134	1,180	5.25	1.15	29.1	0.22	5.58
1	4.1	0.162	4.1	350	159	1,405	6.24	1.22	30.9	0.25	6.34
1/0	4.5	0.177	4.5	415	188	1,670	7.43	1.22	30.9	0.27	6.85
2/0	4.9	0.192	4.9	495	225	1,975	8.78	1.24	31.4	0.29	7.36
3/0	5.3	0.207	5.3	575	261	2,300	10.23	1.26	31.9	0.32	8.12
4/0	5.5	0.218	5.5	635	288	2,545	11.32	1.34	34.0	0.33	8.32
5/0	6.4	0.250	6.4	835	379	3,345	14.86	1.47	37.3	0.38	9.65

*Actual inside lengths and widths not to vary more than ±5% from nominal dimensions.
The Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

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TABLE IX
Coil Chain – Straight Link
(Not to be used in overhead lifting applications)

Trade Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Nominal Inside Length*		Nominal Inside Width*	
	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
4	3.0	0.120	3.0	205	93	410	1.82	820	3.64	1.11	28.1	0.21	5.32
3	3.4	0.135	3.4	255	116	510	2.27	1,020	4.53	1.17	29.6	0.24	6.09
2	3.8	0.148	3.8	310	141	620	2.76	1,240	5.51	1.18	29.9	0.26	6.59
1	4.1	0.162	4.1	370	168	740	3.29	1,480	6.58	1.25	31.7	0.28	7.10
1/0	4.5	0.177	4.5	440	200	880	3.91	1,760	7.82	1.25	31.7	0.31	7.86
2/0	4.9	0.192	4.9	520	236	1,040	4.63	2,080	9.24	1.26	31.9	0.34	8.62
3/0	5.3	0.207	5.3	605	274	1,210	5.38	2,420	10.76	1.30	32.9	0.36	9.13
4/0	5.5	0.218	5.5	670	304	1,340	5.96	2,680	11.91	1.39	35.2	0.38	9.64
5/0	6.4	0.250	6.4	880	399	1,760	7.83	3,520	15.64	1.52	38.5	0.44	11.20

*Actual inside lengths and widths not to vary more than ±5% from nominal dimensions.
The Proof Test and Minimum Breaking Force loads **shall not be used as criteria for service and design purposes. See Section 3.0.

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TABLE X
Passing Link Chain
(Not to be used in overhead lifting applications)

Trade Size		Material Diameter		Working Load Limit (Max.)		Proof Test** (Min.)		Minimum Breaking Force**		Nominal Inside Length*		Nominal Inside Width*	
	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
2/0	4.9	0.192	4.9	450	204	900	4.00	1,800	8.01	0.875	22.2	0.47	11.9
4/0	5.5	0.218	5.5	600	272	1,200	5.34	2,400	10.68	0.875	22.2	0.50	12.7

*Actual inside lengths and widths not to vary more than ±5% from nominal dimensions.
** The Proof Test and Minimum Breaking Force loads **shall not** be used as criteria for service and design purposes. See Section 3.0.

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TABLE XI
Stainless Steel Chain

Trade Size		Material Diameter		Working Load Limit (Max.)		Proof Test ** (Min.)		Minimum Breaking Force **		Inside Length (Max.)		Inside Width (Min.)	
in	mm	in	mm	lbs	kg	lbs	kN	lbs	kN	in	mm	in	mm
5/32	4	0.156	4.0	500	230	1,000	4.5	2,000	9.0	0.94	23.9	0.25	6.4
3/16	5	0.197	5.0	930	420	1,860	8.3	3,720	16.6	0.98	24.8	0.30	7.7
7/32	5.5	0.218	5.5	1,200	540	2,400	10.7	4,800	21.4	0.98	24.8	0.25	6.4
1/4	6.5	0.250	6.5	1,570	710	3,140	14.0	6,280	28.0	1.24	31.5	0.30	7.7
9/32	7	0.276	7.0	2,000	910	4,000	17.8	8,000	35.6	1.24	31.5	0.34	8.6
5/16	8	0.315	8.0	2,400	1,090	4,800	21.4	9,600	42.8	1.29	32.8	0.38	9.8
3/8	10	0.394	10.0	3,550	1,610	7,100	31.6	14,200	63.2	1.38	35.0	0.55	14.0
7/16	12	0.472	12.0	5,400	2,450	10,800	48.1	21,600	96.2	1.64	41.6	0.65	16.6
1/2	13	0.512	13.0	6,500	2,950	13,000	58.0	26,000	116.0	1.79	45.5	0.62	15.8
5/8	16	0.630	16.0	9,800	4,450	19,600	87.0	39,200	174.0	2.20	56.0	0.79	20.0
3/4	20	0.750	20.0	15,000	6,820	30,000	134.0	60,000	268.0	2.85	72.4	0.98	55.0
1	26	1.000	26.0	23,250	10,570	46,500	207.0	93,000	414.0	3.58	90.0	1.25	31.7

** The Proof Test and Minimum Breaking Force loads **shall not** be used as criteria for service and design purposes. See Section 3.0.

TABLE XII
Effect of Elevated Temperature on the Working Load Limit of Alloy Chain

Temperature		Grade of Chain			
		Grade 80		Grade 100	
(°F)	(°C)	Reduction of Working Load Limit WHILE AT Temperature	Permanent Reduction of Working Load Limit AFTER EXPOSURE to Temperature	Reduction of Working Load Limit WHILE AT Temperature	Permanent Reduction of Working Load Limit AFTER EXPOSURE to Temperature
Below 400	Below 204	None	None	None	None
400	204	10%	None	15%	None
500	260	15%	None	25%	5%
600	316	20%	5%	30%	15%
700	371	30%	10%	40%	20%
800	427	40%	15%	50%	25%
900	482	50%	20%	60%	30%
1000	538	60%	25%	70%	35%
Over 1000	Over 538	OSHA 1910.184 requires all slings exposed to temperatures over 1000 °F to be removed from service			

Table XIII
Effect of Elevated Temperature on the Working Load Limit of Stainless Chain

Temperature		Reduction of Working Load Limit WHILE AT Temperature	Permanent Reduction of Working Load Limit AFTER EXPOSURE to Temperature
(°F)	(°C)		
Below 400	Below 204	None	None
400 - 800	204 - 426	10%	None
801 - 1000	427 - 537	20%	None
1001 - 1200	538 - 649	30%	None
1201 - 1300	650 - 704	40%	None
1301 - 1400	705 - 760	50%	None
1401 - 1500	761 - 815	60%	None
1501 - 1600	816 - 871	75%	None
Over 1601	Over 872	Refer to Manufacturer	

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TABLE XIV
Minimum Allowable Thickness Measurement At Any Location on the Chain

Trade Size		Chain Type Or Grade	Nominal Material Diameter		Minimum Allowable Thickness on Link	
in	mm		in	mm	in	mm
4	3.0	Machine, Coil	.120	3.0	.104	2.64
3	3.4	Machine, Coil	.135	3.4	.117	2.97
2	3.8	Machine, Coil	.148	3.8	.128	3.25
1	4.1	Machine, Coil	.162	4.1	.140	3.56
1/0	4.5	Machine, Coil	.177	4.5	.153	3.89
2/0	4.9	Machine, Coil, Passing Link	.192	4.9	.166	4.22
3/0	5.3	Machine, Coil	.207	5.3	.179	4.55
4/0	5.5	Machine, Coil, Passing Link	.218	5.5	.189	4.80
5/0	6.4	Machine, Coil	.250	6.4	.217	5.50
1/8 5/32	4.0	Grade 30 Stainless	.156	4.0	.135	3.43
3/16	5.0	Stainless	.197	5.0	.171	4.33
3/16 7/32	5.5	Grade 30, 80, 100 Stainless	.217	5.5	.189	4.80
1/4	6.5	Stainless	.250	6.5	.217	5.50
1/4 9/32	7.0	Grade 30, 43, 70, 80, 100, Stainless	.276 G43: .281	7.0	.239	6.07
5/16	8.4	Grade 30	.331	8.4	.286	7.28
5/16	8.7	Grade 43, 70	.343	8.7	.297	7.54
5/16	8.0	Grade 80, 100 Stainless	.312 .315	8.0	.273	6.93
3/8	10.0	Grade 30, 80, 100, Stainless	.394	10.0	.342	8.69
3/8	10.3	Grade 43, 70	.406	10.3	.351	8.93
7/16	11.9 12.0	Grade 30, 43, 70 Stainless	.468 .472	11.9	.405	10.30
1/2	13.0	Grade 30, 80, 100 Stainless	.512	13.0	.443	11.26
1/2	13.5	Grade 43, 70	.531	13.5	.460	11.68
5/8	16.0	Grade 30, 43, 70, 80, 100, Stainless	.630	16.0	.546	13.87
3/4	20.0	Grade 30, 43, 70, 80, 100	.787	20.0	.687	17.45
3/4	20.0	Stainless	.750	19.0	.650	16.50
7/8	22.0	Grade 30, 43, 80, 100	.866	22.0	.750	19.05
1	26.0	Grade 30, 80, 100 Stainless	1.02 1.00	26.0	.887	22.53
1-1/4	32.0	Grade 80, 100	1.26	32.0	1.091	27.71

Warning: Remove chain from service if the thickness is less than the minimum shown in Table XIV at any location on the link.