

RIGGINGACCESSORIES

HG-223

## Rigging Accessories

## DESIGN

The theoretical reserve capability of turnbuckles should be five times the orking Load Limit (FF-T-791). Known as the DESIGN FACTOR, it is usually computed by dividing the catalog ultimate load by the Working Load Limit. The ultimate load is the average load or force at which the product fails or no longer supports the load. The Working Load Limit is the maximum mass or force which the product

## Croshy

Ask: What is the design factor?
Most competitors do not provide turnbuckle assemblies that exceed Crosby's Working
Load Limits with a design factor of 5 to 1 .

All turnbuckles are designed with a design factor of at least 5 to 1. Crosby turnbuckles have the highest Working Load Limits in the industry. Crosby working load limits and design factors are based on extensive testing. is authorized to support in general service. The design factor is generally expressed as a ratio, such as 5 to 1 .

## HEAT TREATMENT

Heat treatment assures the uniformity of performance and maximizes the properties of the steel. This assures that each turnbuckle will meet its rated strength. The requirements of your job demand this reliability and consistency. All turnbuckle bodies should be normalized and end fitings should be normalized or quenched and tempered in order to assure uniformity. These heat treat processes develop a tough material that reduces the risk of a brittle, catastrophic failure, and assures the performance of the turnbuckle assembly.

## THE COMPETITION

Ask: Do they utilize the combination of heat treatment that assures the performance of the turnbuckle assembly?

Most normalize both the turnbuckle body and end fittings. Some provide turnbuckles in an "as forged" condition.

## Crosly

All turnbuckles are heat treated. Bodies are normalized, and end fittings are quenched and tempered or normalized. These heat treat processes provide a turnbuckle assembly that has superior impact and fatigue qualities and assures performance.


## GALVANIZE AND THREAD FORM

Galvanizing provides the best resistance to corrosion. Turnbuckle ends are the most highly stressed part of the assembly. This stress is at its peak at the root of the threaded shank. The turnbuckle ends should be threaded with a modified thread that minimizes the stress at the root of the thread.

## THE COMPETITION

Ask: Do they use the modified UNJ thread
Most galvanize their turnbuckles but do not utilize the modified thread.

## Aroshy"

All turnbuckles are available galvanized. Turnbuckle ends are threaded with a modified UNJ thread. This thread form, in conjunction with quench and tempering, gives Crosby turnbuckles their superior impact and fatigue performance.

## FULL LINE AND IDENTIFICATION

The proper application of turnbuckles requires that the correct type and size of turnbuckle be used. The turnbuckle size, the manufacturer's logo, and a product identification code should be clearly and boldly marked in the end fittings as well as in the turnbuckle bod. Traceability of the material chemistry is essential for total confidence in the manufacturer of the product. Availability over the full range of sizes of hook, eye, and jaw type turnbuckle assemblies is essential for flexibility in the design of a total system

## THE COMPETITION

Ask: Do they have a traceability system?
Ask: Is the full range of type and size turnbuckles offered?

Most competitors do not have the full line that Crosby produces, or a traceability system.

## Fraslay"

Crosby forges its logo, sizes, and the Product Identification Code (PIC) into each component of its full line of hook, jaw, and eye type turnbuckles.


G-414
G-414 meets the performance requirements of Federal Specification FF-T-276b Type III, except for those provisions required of the contractor. For additional information, see page 452.

- Available in Hot Dip galvanized or Stainless Steel (Type 304).
- Stainless steel recommended for more corrosive environments where greater protection is required.
- Greater protection against wear and deformation of the wire rope eye.
- Longer service life.


## Extra heavy Wire Rope Thimbles

| Rope Dia. |  | Stock No. |  | Weight Per 100 <br> (lb) | Dimensions (in) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) | G-414 <br> Stock No | $\begin{gathered} \text { SS-414 } \\ \text { Stainless } \end{gathered}$ |  | A | B | C | D | E | F | G | H |
| *1/4 | 6-7 | 1037639 | 1037960 | 7 | 2.19 | 1.62 | 1.50 | . 88 | . 41 | . 28 | . 06 | . 25 |
| * 5/16 | 8 | 1037657 | 1037988 | 14 | 2.50 | 1.88 | 1.81 | 1.06 | . 50 | . 34 | . 08 | . 30 |
| * 3/8 | 9-10 | 1037675 | 1038004 | 23 | 2.88 | 2.12 | 2.12 | 1.12 | . 63 | . 41 | . 11 | . 39 |
| 7/16 | 11-12 | 1037693 | - | 37 | 3.25 | 2.38 | 2.38 | 1.25 | . 72 | . 47 | . 12 | . 45 |
| * 1/2-9/16 | 13-15 | 1037719 | 1038022 | 50 | 3.62 | 2.75 | 2.75 | 1.50 | . 89 | . 59 | . 15 | . 48 |
| * 5/8 | 16 | 1037755 | 1038040 | 82 | 4.25 | 3.25 | 3.12 | 1.75 | 1.00 | . 66 | . 16 | . 53 |
| * 3/4 | 18-20 | 1037773 | 1038068 | 157 | 5.00 | 3.75 | 3.81 | 2.00 | 1.22 | . 78 | . 22 | . 69 |
| 7/8 | 22 | 1037791 | - | 190 | 5.50 | 4.25 | 4.25 | 2.25 | 1.38 | . 94 | . 22 | . 78 |
| 1 | 24-26 | 1037817 | - | 280 | 6.12 | 4.50 | 4.75 | 2.50 | 1.56 | 1.06 | . 25 | . 88 |
| 1-1/8-1-1/4 | 28-32 | 1037835 | - | - | 7.00 | 5.12 | 5.88 | 2.88 | 1.88 | 1.31 | . 25 | 1.25 |
| 1-1/4-1-3/8 | 32-35 | 1037853 | - | 830 | 9.08 | 6.50 | 6.81 | 3.50 | 2.25 | 1.44 | . 37 | 1.29 |
| 1-3/8-1-1/2 | 35-38 | 1037871 | - | 1250 | 9.00 | 6.25 | 7.12 | 3.50 | 2.62 | 1.56 | . 50 | 1.31 |
| 1-5/8 | 40 | 1037899 | - | - | 11.25 | 8.00 | 8.12 | 4.00 | 3.00 | 1.72 | . 50 | 1.38 |
| 1-3/4 | 44 | 1037915 | - | 1860 | 12.19 | 9.00 | 8.50 | 4.50 | 3.06 | 1.84 | . 50 | 1.50 |
| 1-7/8-2 | 48-52 | 1037933 | - | 2780 | 15.12 | 12.00 | 10.38 | 6.00 | 3.38 | 2.09 | . 50 | 1.69 |
| 2-1/4 | 56 | 1037951 | - | - | 17.50 | 14.00 | 11.88 | 7.00 | 3.88 | 2.38 | . 62 | 1.82 |



G-414 SL
G-414 SL meets the performance requirements of Federal Specification FF-T-276b Type III, except for those provisions required of the contractor. For additional information, see page 452.

- Prevents the shackle from being removed and replaced in the field, which could compromise the certified integrity of the sling assembl.
- Available in Hot Dip galvanized. Crosby's shackle locking thimbles are galvanized after the welding of the wedge has been completed.
- Greater protection against wear and deformation of the wire rope eye.
- Longer service life.


Scan our QR code with your smart device to visit the online flye


## Extra Heavy Wire Rope Thimbles (Shackle-Loc)

| Rope Dia. |  | Stock No. | $\begin{aligned} & \text { Weight Per } \\ & 100 \\ & \text { (lb) } \end{aligned}$ | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) | G-414SL <br> Stock No |  | A | B | C | D | E | F | G | H | J |
| 3/8 | 9-10 | 1036800 | 24 | 2.88 | 2.12 | 2.12 | 1.12 | . 63 | . 41 | . 11 | . 39 | . 81 |
| 1/2-9/16 | 13-15 | 1036808 | 55 | 3.62 | 2.75 | 2.75 | 1.50 | . 89 | . 59 | . 15 | . 48 | 1.12 |
| 5/8 | 16 | 1036817 | 82 | 4.25 | 3.25 | 3.12 | 1.75 | 1.00 | . 66 | . 16 | . 53 | 1.25 |
| 3/4 | 18-20 | 1036826 | 161 | 5.00 | 3.75 | 3.81 | 2.00 | 1.22 | . 78 | . 22 | . 69 | 1.50 |
| 7/8 | 22 | 1036835 | 206 | 5.50 | 4.25 | 4.25 | 2.25 | 1.38 | . 94 | . 22 | . 78 | 1.63 |
| 1 | 24-26 | 1036844 | 300 | 6.12 | 4.50 | 4.75 | 2.50 | 1.56 | 1.06 | . 25 | . 88 | 1.88 |
| 1-1/8-1-1/4 | 28-32 | 1036853 | 425 | 7.00 | 5.12 | 5.88 | 2.88 | 1.88 | 1.31 | . 25 | 1.25 | 2.13 |
| 1-3/8-1-1/2 | 35-38 | 1036862 | 1317 | 9.00 | 6.25 | 7.12 | 3.50 | 2.62 | 1.56 | . 50 | 1.31 | 2.50 |



G-411

- Hot Dip galvanized steel.
- The standard choice for light duty applications and loading conditions.


Standard Wire Rope Thimbles

| Rope Dia. |  | G-411 <br> Stock No | Weight Per 100 <br> (lb) | Dimensions (in) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  | A | B | C | D | E | F | G | H |
| 1/8 | 3-4 | 1037256 | 3.50 | 1.94 | 1.31 | 1.06 | . 69 | . 25 | . 16 | . 05 | . 13 |
| 3/16 | 5 | 1037274 | 3.50 | 1.94 | 1.31 | 1.06 | . 69 | . 31 | . 22 | . 05 | . 13 |
| 1/4 | 6-7 | 1037292 | 3.50 | 1.94 | 1.31 | 1.06 | . 69 | . 38 | . 28 | . 05 | . 13 |
| 5/16 | 8 | 1037318 | 4.00 | 2.13 | 1.50 | 1.25 | . 81 | . 44 | . 34 | . 05 | . 13 |
| 3/8 | 9-10 | 1037336 | 6.70 | 2.38 | 1.63 | 1.47 | . 94 | . 53 | . 41 | . 06 | . 16 |
| 1/2 | 11-13 | 1037354 | 12.50 | 2.75 | 1.88 | 1.75 | 1.13 | . 69 | . 53 | . 08 | . 19 |
| 5/8 | 16 | 1037372 | 34.50 | 3.50 | 2.25 | 2.38 | 1.38 | . 91 | . 66 | . 13 | . 34 |
| 3/4 | 18-20 | 1037390 | 47.10 | 3.75 | 2.50 | 2.69 | 1.63 | 1.08 | . 78 | . 14 | . 34 |
| 7/8 | 22 | 1037416 | 84.60 | 5.00 | 3.50 | 3.19 | 1.88 | 1.27 | . 94 | . 16 | . 44 |
| 1 | 24-26 | 1037434 | 97.50 | 5.69 | 4.25 | 3.75 | 2.50 | 1.39 | 1.06 | . 16 | . 41 |
| 1-1/8-1-1/4 | 28-32 | 1037452 | 175.00 | 6.25 | 4.50 | 4.31 | 2.75 | 1.75 | 1.31 | . 22 | . 50 |

G-411 meets the performance requirements of Federal Specification FF- -276b Type II, except for those provisions required of the contractor. For additional information, see page 444.

(Open Pattern)

- Hot Dip galvanized Steel.
- Recommended for light duty applications in which it is being assembled into another fitting (i.e., shackle or master link).


Open Pattern Thimbles

| Rope Dia. |  | $\begin{gathered} \text { G-408 } \\ \text { Stock No } \\ \hline \end{gathered}$ | Weight Per 100 <br> (lb) | Dimensions (in) |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  | A | B | C | D | E | F |
| 1/4 | 6-7 | 1037531 | 3.00 | . 28 | . 69 | 1.06 | 1.41 | 2.03 | . 38 |
| 5/16 | 8 | 1037559 | 3.80 | . 34 | . 81 | 1.25 | 1.53 | 2.16 | . 50 |
| 3/8 | 9-10 | 1037577 | 7.00 | . 44 | . 94 | 1.47 | 1.72 | 2.47 | . 62 |
| 1/2 | 11-13 | 1037595 | 12.50 | . 53 | 1.12 | 1.75 | 1.97 | 2.84 | 75 |
| 5/8 | 16 | 1037611 | 25.00 | . 66 | 1.38 | 2.38 | 2.34 | 3.59 | 1.00 |

- Cast Ductile Iron.
- Fits pin for open wire rope socket, boom pendant clevis and wedge socket.


Solid Wire Rope Thimbles

| Rope Dia. |  | S-412 <br> Stock No | Weight Per 100 <br> (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  | A | B | C | D | E | F | G | H | J | K | L |
| 1/2 | 13 | 1037121 | . 61 | 2.81 | 1.75 | . 25 | 1.06 | . 75 | . 56 | . 28 | . 88 | 2.13 | 1.63 | 1.56 |
| 5/8 | 16 | 1037149 | 2.21 | 4.69 | 3.00 | . 38 | 1.31 | 1.06 | . 81 | . 41 | 1.13 | 3.38 | 2.25 | 2.56 |
| 3/4 | 18-20 | 1037167 | 2.32 | 4.69 | 3.00 | . 38 | 1.50 | 1.06 | . 81 | . 41 | 1.38 | 3.38 | 2.25 | 2.56 |
| 7/8 | 22 | 1037185 | 5.45 | 6.06 | 3.81 | . 50 | 1.75 | 1.38 | 1.06 | . 53 | 1.63 | 4.50 | 3.25 | 3.44 |
| 1 | 24-26 | 1037201 | 5.25 | 6.06 | 3.81 | . 50 | 2.13 | 1.38 | 1.06 | . 53 | 1.81 | 4.50 | 3.25 | 3.44 |
| 1-1/8 | 28-30 | 1037229 | 9.29 | 7.25 | 4.56 | . 63 | 2.38 | 1.75 | 1.31 | . 66 | 2.06 | 5.38 | 3.88 | 4.06 |
| 1-1/4-1-3/8 | 32-35 | 1037247 | 9.81 | 7.25 | 4.56 | . 63 | 2.63 | 1.94 | 1.53 | . 78 | 2.31 | 5.38 | 3.88 | 4.13 |



A-342 Alloy Master Links

- Alloy Steel — Quenched and Tempered.
- Individually Proof Tested to values shown, with certification
- Proof Tested with special fixtures sized to prevent localized point loading. See foot notes, and reference page 276.
- Forgings have a Product Identification Code (PIC) for material traceabilit, along with the size, the name Crosby and USA in raised lettering.
- Selected sizes designated with "W" in the size column have enlarged inside dimensions to allow additional room for sling hardware and crane hook.
- Crosby 7/8" to 2" 342 master links are type approved to DNV GL-ST-E271-2.7-1 Offshore Containers. These Crosby master links are 100\% proof tested, MPI and impact tested. The tests are conducted by Crosby and
 3.1 test certification is available upon request. Refer to page 164 for Crosby COLD TUFF ${ }^{\oplus}$ master links that meet the additional requirements of DNV rules for certification of lifting appliances - Loose Gea .
- Incorporates patented QUIC-CHECK ${ }^{\circledR}$ deformation indicators.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these links meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


A-342 Alloy Master Links

| Size |  | A-342 <br> Stock No | Weight Each <br> (lb) | Working Load Limit (lb)* | Proof Load (lb)** | Dimensions (in) |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  |  |  | A | B | C | Deformation Indicator |
| 1/2W | 13W | 1014266 | 1.3 | 7400 | 17200 | . 62 | 2.80 | 5.00 | 3.50 |
| 5/8 | 16 | 1014280 | 1.5 | 9000 | 18000 | . 62 | 3.00 | 6.00 | 3.50 |
| 3/4W | 19W | 1014285 | 2.0 | 12300 | 28400 | . 73 | 3.20 | 6.00 | 4.00 |
| 7/8W | 22W | 3522213 | 3.3 | 15200 | $\dagger 38000$ | . 88 | 3.75 | 6.38 | 4.50 |
| 1W | 26W | 3522214 | 6.1 | 26000 | $\dagger 65000$ | 1.10 | 4.30 | 7.50 | 5.50 |
| 1-1/4W | 32W | 3522215 | 12.0 | 39100 | †97750 | 1.33 | 5.50 | 9.50 | 7.00 |
| 1-1/2W | 38W | 3522216 | 18.6 | 61100 | $\dagger 152750$ | 1.61 | 5.90 | 10.50 | 6.50 |
| 1-3/4 | 44 | 3522217 | 25.2 | 84900 | $\dagger 212250$ | 1.75 | 6.00 | 12.00 | 7.50 |
| 2 | 51 | 3522218 | 37.0 | 102600 | $\dagger 256500$ | 2.00 | 7.00 | 14.00 | 9.00 |
| 2-1/4 | 57 | 1014422 | 54.1 | 143100 | 289200 | 2.25 | 8.00 | 16.00 | 10.00 |
| 2-1/2 | 63 | 1014468 | 68.5 | 160000 | 320000 | 2.50 | 8.38 | 16.00 | 11.00 |
| 2-3/4 | 70 | 1014440 | 94.0 | 216900 | 433800 | 2.75 | 9.88 | 18.00 | 12.50 |
| 3 | 76 | 1014486 | 115 | 228000 | 456000 | 3.00 | 9.88 | 18.00 | 13.00 |
| 3-1/4 | 83 | 1014501 | 145 | 262200 | 524400 | 3.25 | 10.00 | 20.00 | 13.50 |
| 3-1/2 | 89 | 1014529 | 200 | 279000 | 558000 | 3.50 | 12.00 | 24.00 | 15.50 |
| 3-3/4 | 95 | 1015051 | 198 | 336000 | 672000 | 3.75 | 10.00 | 20.00 | 13.50 |
| 4 | 102 | 1015060 | 264 | 373000 | 746000 | 4.00 | 12.00 | 24.00 | 16.00 |
| †† 4-1/4 | $\dagger \dagger 108$ | 1015067 | 302 | 354000 | 708000 | 4.25 | 12.00 | 24.00 | - |
| †† 4-1/2 | $\dagger \dagger 114$ | 1015079 | 345 | 360000 | 720000 | 4.50 | 14.00 | 28.00 | - |
| $\dagger \dagger$ 4-3/4 | $\dagger \dagger 121$ | 1015088 | 436 | 389000 | 778000 | 4.75 | 14.00 | 28.00 | - |
| ††5 | $\dagger \dagger 127$ | 1015094 | 516 | 395000 | 790000 | 5.00 | 15.00 | 30.00 | - |

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A-345
Alloy Master Links

- Alloy Steel - Quenched and Tempered.
- Individually Proof Tested to values shown, with certification
- Proof Tested with $60 \%$ inside width special fixtures sized to prevent localized point loading per ASTM A952, reference page 276.
- Forgings have a Product Identification Code (PIC) for material traceabilit, along with the size, the name Crosby and USA in raised lettering.
- Selected sizes designated with "W" in the size column have enlarged inside dimensions to allow additional room for sling hardware and crane hook.
- Incorporates patented QUIC-CHECK ${ }^{\oplus}$ deformation indicators.
- Meets or exceeds all requirements of ASMEB30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these links meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


QUIC-CHECK
$\square$
MAXOUGH ${ }^{\text { }}$

A-345 Master Link Assembly
with Engineered Flat for use with S-1325A coupler link.

| Size |  | A-345 <br> Stock No. | Weight Each <br> (lb) | Working Load Limit Based on 5:1 Design Factor (lb)* | Proof Load (lb) ** | $\underset{(i n)}{\text { Dimensions }}$ |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  |  |  | A | B | C | D | E | F | G | Deformation Indicator |
| 3/4W | 19W | 1014739 | 3.5 | 12300 | 28400 | . 73 | 3.20 | 6.00 | . 56 | 3.35 | 1.77 | . 30 | 4.00 |
| 7/8W | 22W | 1014742 | 4.8 | 15200 | 35200 | . 88 | 3.75 | 6.38 | . 56 | 3.35 | 1.77 | . 30 | 4.50 |
| 1W | 26W | 1014766 | 9.3 | 26000 | 60000 | 1.10 | 4.30 | 7.50 | . 75 | 3.94 | 2.36 | . 33 | 5.50 |
| 1-1/4W | 32W | 1014779 | 15.8 | 39100 | 90400 | 1.33 | 5.50 | 9.50 | 1.00 | 6.30 | 3.54 | . 51 | 7.00 |
| 1-1/2W | 38W | 1014807 | 34.1 | 61100 | 141200 | 1.61 | 5.90 | 10.50 | 1.25 | 7.09 | 3.94 | . 65 | 7.50 |
| 1-3/4 | 44 | 1014814 | 46.7 | 84900 | 212250 | 1.75 | 6.00 | 12.00 | 1.38 | 8.00 | 5.00 | . 73 | 7.50 |
| 2 | 51 | 1014832 | 67.2 | 102600 | 256500 | 2.00 | 7.00 | 14.00 | 1.50 | 9.00 | 5.75 | - | 9.00 |
| 2-1/2 | 64 | 1014855 | 206 | 160000 | 320000 | 2.50 | 8.38 | 16.00 | 2.50 | 16.00 | 8.38 | - | 11.00 |
| 2-3/4 | 70 | 1014864 | 282 | 216900 | 433800 | 2.75 | 9.88 | 18.00 | 2.75 | 18.00 | 9.88 | - | 12.50 |
| 4 | 102 | 1014999 | 667 | 373000 | 746000 | 4.00 | 12.00 | 24.00 | 3.50 | 24.00 | 12.00 | - | $15.50{ }^{* * *}$ |

[^2][^3]

Ultimate Load is 5 times the Working Load Limit. Applications with wire rope and synthetic sling generally require a design factor of 5 . Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to 120 degrees. ** Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9. For use with chain slings, refer to page 240 for sling ratings and page 245 for proper master link selection.

- Alloy Steel - Quenched and Tempered.
- Individually Proof Tested to values shown, with certification
- Proof Tested with $60 \%$ inside width special fixtures sized to prevent localized point leading per ASME A-952, reference page 276.
- Each link has a Product Identification Code (PIC) for material traceability, along with the size and the name Crosby ${ }^{\circledR}$ or "CG".
- Large inside width and length to allow additional room for sling hardware and crane hook.
- Engineered Flat for use with S-1325A coupler link.
- Meets or exceeds all requirements of ASME B30.26 including
 identification, ductility, design factor, proof load and temperature
requirements. Importantly, these links meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- Master links are type approved to DNV Certification Notes 2.7-1- Offshore Containers. These Crosby master links are 100\% proof tested, MPI and impact tested. The tests are conducted by Crosby and 3.1 test certification is available upon request. Refer to page 164 for Crosby COLD TUFF ${ }^{\circledR}$ master links that meet the additional requirements of DNV rules for certification of lifting appliances-Loose Gea .
- 7/16" through 1-7/32" have Engineered Flat.

A-344 Welded Master Links with Engineered Flat

|  |  | A-344 <br> Stock No | Weight Each (lb) | Working Load Limit <br> (Ib)* | Proof Load (lb)** | Dimensions (in) |  |  |  | $\begin{aligned} & \text { Engineered Flat Size } \\ & \text { for S-1325A } \\ & \text { (in) } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  |  |  | A | B | C | G |  |
| 7/16 | 12 | 1256862 | 0.66 | 3500 | 8800 | . 47 | 2.36 | 4.72 | . 24 | 1/4 |
| 1/2 | 13 | 1256932 | 0.79 | 5500 | 14000 | . 51 | 2.36 | 4.72 | . 26 | 1/4 |
| 11/16 | 17 | 1257002 | 1.85 | 9000 | 22700 | . 67 | 3.54 | 6.30 | . 33 | 3/8 |
| 3/4 | 19 | 1257072 | 2.36 | 14700 | 36800 | . 75 | 3.54 | 6.30 | . 33 | 3/8 |
| 7/8 | 22 | 1257212 | 3.55 | 18700 | 46800 | . 87 | 3.94 | 7.10 | . 41 | 1/2 |
| 1 | 25 | 1257282 | 5.22 | 25300 | 63400 | . 98 | 4.53 | 8.10 | . 53 | 1/2 |
| 1-1/8 | 28 | 1257382 | 8.33 | 28600 | 71700 | 1.10 | 5.71 | 10.83 | . 53 | 1/2 |
| 1-7/32 | 31 | 1257422 | 10.3 | 37400 | 93700 | 1.22 | 5.71 | 10.83 | . 61 | 5/8 |
| 1-7/16 | 36 | 1257492 | 15.1 | 52900 | 132200 | 1.42 | 6.10 | 11.20 | - | - |
| 1-9/16 | 40 | 1257532 | 19.6 | 61900 | 154900 | 1.57 | 6.30 | 11.80 | - | - |
| 1-3/4 | 45 | 1257562 | 28.1 | 84400 | 211100 | 1.77 | 7.10 | 13.40 | - | - |
| 2 | 51 | 1257632 | 38.1 | 99200 | 248000 | 2.00 | 8.50 | 15.30 | - | - |

*Ultimate Load is 5 times the Working Load Limit. Applications with wire rope and synthetic sling generally require a design factor of 5 . Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to 120 degrees. **Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9.


## A-347

Welded Master Links
Ultimate Load is 5 times the Working Load Limit. Applications with wire rope and synthetic sling generally require a design factor of 5 . Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to 120 degrees. ** Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9. For use with chain slings, refer to page 240 for sling ratings and page 245 for proper master link selection.

- Alloy Steel — Quenched and Tempered.
- Individually Proof Tested to values shown, with certification
- Proof Tested with $60 \%$ inside width special fixtures sized to prevent localized point loading per ASME A-952, reference page 276.
- Forgings have a Product Identification Code (PIC) for material traceability, along with the size, the name Crosby and USA in raised lettering.
- Selected sizes designated with "W" in the size column have enlarged inside dimensions to allow additional room for sling hardware and crane hook.
- Crosby $1 \frac{1}{4}$ " to 2 " $344 / 347$ master links are type approved to DNV Certification Notes 2.7-1- Offshore Containers. These Crosby master links are $100 \%$ proof tested, MPI and impact tested. The tests are conducted by Crosby and 3.1 test certification is available upon request. Refer to page 164 for Crosby COLD TUFF ${ }^{\circledR}$ master links that meet the additional requirements of DNV rules for certification of lifting ppliances Loose Gear.
- Engineered Flat for use with S-1325A coupler link.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these links meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.




## A-347 Welded Master Link Assembly with Engineered Flat

| Size |  | A-347 Stock No | Weight Each <br> (lb) | Working Load Limit <br> (Ib)* | Proof Load (lb)** | Dimensions (in) |  |  |  |  |  |  | Engineered Flat Size for S-1325A <br> (in) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  |  |  | A | B | C | D | E | F | G |  |
| 1/2 | 13/12 | 1257692 | 1.80 | 5300 | 13200 | . 51 | 2.36 | 4.72 | . 47 | 3.35 | 1.77 | . 24 | - |
| 11/16 | 17/13 | 1257762 | 3.40 | 9000 | 22700 | . 67 | 3.54 | 6.30 | . 51 | 4.72 | 2.36 | . 26 | 1/4 |
| 3/4 | 19/13 | 1257832 | 4.00 | 9300 | 23400 | . 75 | 3.54 | 6.30 | . 51 | 4.72 | 2.36 | . 26 | 1/4 |
| 7/8 | 22/17 | 1257972 | 7.20 | 14700 | 36800 | . 87 | 3.94 | 7.10 | . 67 | 6.30 | 3.54 | . 33 | 5/16 |
| 1-1/8 | 28/22 | 1258142 | 15.4 | 31900 | 79800 | 1.10 | 5.71 | 10.83 | . 87 | 7.10 | 3.94 | . 41 | 3/8 |
| 1-7/32 | 31/25 | 1258182 | 20.8 | 37500 | 93700 | 1.22 | 5.71 | 10.83 | . 98 | 8.10 | 4.53 | . 53 | 1/2 |
| 1-9/16 | 40/31 | 1258332 | 40.5 | 61900 | 154900 | 1.57 | 6.30 | 11.80 | 1.22 | 10.63 | 5.50 | - | - |
| 1-3/4 | 45/36 | 1258402 | 58.2 | 84400 | 211100 | 1.77 | 7.10 | 13.40 | 1.42 | 11.20 | 6.10 | - | - |
| 2 | 51/45 | 1258462 | 95.0 | 99200 | 248000 | 2.00 | 7.50 | 13.80 | 1.80 | 13.40 | 7.10 | - | - |

*Ultimate Load is 5 times the Working Load Limit. Applications with wire rope and synthetic sling generally require a design factor of 5 . Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to 120 degrees.**Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9.


For use with chain slings, refer to page 246 for sling ratings and page 240 for proper master link selection.


- Alloy Steel - Quenched and Tempered
- Individually proof tested at 2 times Working Load Limit with certification
- Finish is Inorganic Zinc Primer.
- Certified to meet charpy impact testing of 31 ft -lbs. min. avg. at $-4^{\circ}$.
- Individually serialized and all certification shipped with each link
- COLD TUFF ${ }^{\circledR}$ master links are suitable for use at $-50^{\circ} \mathrm{F}$.
- Type Approval and certification in accordance with DNV 2.7-1 $O$ fshore Containers, DNV-OS-E101, and Rules for Certification of Lifting Appliances, and are produced in accordance with DNV MSA requirements, including required documents.
- Refer to page 88 for COLD TUFF ${ }^{\circledR}$ Shackles.

- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these fittings meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



## A-342CT Master Links

| Size <br> (in) | A-342CT <br> Stock No. | Working Load Limit (lb)* | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | B | C | D | E | Deformation Indicator |
| 7/8W | 1261392 | 15200 | 3.3 | 0.88 | 3.75 | 6.38 | 5.51 | 8.14 | 4.50 |
| 1-1/4W | 1261407 | 39100 | 12.0 | 1.33 | 5.50 | 9.50 | 8.16 | 12.16 | 7.00 |
| 1-1/2W | 1261418 | 61100 | 18.6 | 1.61 | 5.90 | 10.50 | 9.12 | 13.72 | 7.50 |
| 1-3/4 | 1261423 | 62520 | 25.2 | 1.75 | 6.00 | 12.00 | 9.50 | 15.50 | 7.50 |
| 2 | 1261433 | 97680 | 37.0 | 2.00 | 7.00 | 14.00 | 11.00 | 18.00 | 9.00 |

*Minimum Ultimate Load is 5 times the Working Load Limit.


A-345CT
Master Links Assembly

- Alloy Steel - Quenched and Tempered
- Individually proof tested at 2 times Working Load Limit with certification
- Finish is Inorganic Zinc Primer.
- Certified to meet charpy impact testing of 31 ft -lbs. min. avg. at $-4^{\circ}$
- COLD TUFF ${ }^{\circledR}$ master links are suitable for use at $-50^{\circ} \mathrm{F}$.
- Type Approval and certification in accordance with DNV 2.7-1 O fshore Containers, DNV-OS-E101, and Rules for Certification of Lifting Appliances, and are produced in accordance with DNV MSA requirements, including required documents.
- Refer to page 88 for COLD TUFF ${ }^{®}$ Shackles.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these fittings meet other critical performance requirements including fatigue ife,
 impact properties and material traceability, not addressed by ASME B30.26.



## A-345CT Master Link Assembly

| Size <br> (in) | A-345CT Stock No. | Working Load Limit (lb)* | Weight Each <br> (lb) | $\begin{aligned} & \hline \text { Dimensions } \\ & \text { (in) } \end{aligned}$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | B | C |
| 1-1/4 | 1261609 | 35160 | 30.0 | 1.25 | 4.38 | 8.75 |
| 1-1/2 | 1261620 | 47880 | 51.0 | 1.50 | 5.25 | 10.50 |
| 1-3/4 | 1261631 | 62520 | 78.0 | 1.75 | 6.00 | 12.00 |
| 2 | 1261642 | 97680 | 123.0 | 2.00 | 7.00 | 14.00 |

[^4]

G-340 from $5 / 8^{\prime \prime}$ thru $7 / 8^{\prime \prime}$ meet the performance requirements of Federal Specification RR-C-271F, Type XV, except for those provisions required of the contractor. For additional information, see page 452.


두염 $C \in$

## G-340/S-340 Weldless End Links

| Size (A)(in) | Stock No. |  | Working Load Limit (lb)* | Weight Each <br> (lb) | Dimensions (in) |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | G-340 Galv. | S-340 S.C. |  |  | A | B | C | D |
| 5/16 | 1014057 | 1014066 | 2500 | . 15 | . 31 | . 50 | 1.75 | 1.18 |
| 3/8 | 1014075 | 1014084 | 3800 | . 22 | . 38 | . 56 | 1.88 | 1.38 |
| 1/2 | 1014093 | 1014100 | 6500 | . 49 | . 50 | . 75 | 2.38 | 1.81 |
| 5/8 | 1014119 | 1014128 | 9300 | . 97 | . 63 | 1.00 | 3.25 | 2.32 |
| 3/4 | 1014137 | 1014146 | 14000 | 1.51 | . 75 | 1.13 | 3.50 | 2.68 |
| 7/8 | 1014155 | 1014164 | 12000 | 2.59 | . 88 | 2.00 | 5.13 | 3.75 |
| 1 | 1014173 | 1014182 | 15200 | 3.95 | 1 | 2.25 | 5.75 | 4.25 |
| 1-1/4 | 1014191 | 1014208 | 26400 | 7.30 | 1.25 | 2.50 | 7.00 | 5.00 |
| 1-3/8 | 1014217 | 1014226 | 30000 | 10.38 | 1.38 | 2.75 | 7.75 | 5.50 |

*Ultimate Load is 5 times the Working Load Limit. Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to $120^{\circ}$.


## S-643 Weldless Rings

| $\begin{aligned} & \text { Size } \\ & \text { (in) } \\ & \hline \end{aligned}$ | S-643 <br> Stock No | Working Load Limit Single Pull (lb)* | $\begin{aligned} & \text { WeightEach } \\ & \text { (Ib) } \end{aligned}$ | Dimensions (in) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | B | C |
| $7 / 8 \times 4$ | 1013780 | 7200 | 2.72 | . 88 | 4.00 | 5.75 |
| 7/8 $\times$ 5-1/2 | 1013806 | 5600 | 3.47 | . 88 | 5.50 | 7.25 |
| $1 \times 4$ | 1013824 | 10800 | 3.69 | 1.00 | 4.00 | 6.00 |
| $1-1 / 8 \times 6$ | 1013842 | 10400 | 6.60 | 1.13 | 6.00 | 8.25 |
| $1-1 / 4 \times 5$ | 1013860 | 17000 | 6.82 | 1.25 | 5.00 | 7.50 |
| $1-3 / 8 \times 6$ | 1013888 | 19000 | 10.12 | 1.38 | 6.00 | 8.75 |

[^5]- Alloy Steel - Quenched and Tempered
- Individually Proof Tested at 2 times Working Load Limit with certification.
- Proof Test certification shipped with each link.
- Sizes $1 / 2^{\prime \prime}, 5 / 8^{\prime \prime}, 3 / 4^{\prime \prime}, 7 / 8^{\prime \prime}, 1^{\prime \prime}, 1-1 / 4^{\prime \prime}$, and $1-3 / 8$ are forged.


## A-341

Alloy Pear Shaped Links


QUIC-CHECK.


C

## A-341 Alloy Pear Shaped Links

| Size (A) (in) | A-341 <br> Stock No | Working Load Limit |  | Weight Each (lb) | Dimensions (in) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | (lb)* | (t) |  | B | C | F |
| 1/2 | 1013575 | 7000 | 3.15 | . 55 | 3.00 | 2.00 | 1.00 |
| 5/8 | 1013584 | 9000 | 4.09 | 1.10 | 3.75 | 2.50 | 1.25 |
| 3/4 | 1013595 | 12300 | 5.59 | 1.76 | 4.50 | 3.00 | 1.50 |
| 7/8 | 1013604 | 15000 | 6.81 | 2.82 | 5.25 | 3.50 | 1.75 |
| 1 | 1013613 | 24360 | 11.0 | 4.22 | 6.00 | 4.00 | 2.00 |
| †† $11 / 8$ | 1013622 | 30600 | 13.9 | 6.25 | 6.50 | 4.50 | 2.25 |
| $11 / 4$ | 1013631 | 36000 | 16.4 | 8.25 | 7.75 | 5.00 | 2.50 |
| $13 / 8$ | 1013640 | 43000 | 19.5 | 11.25 | 8.25 | 5.50 | 2.75 |
| †† 1 1/2 | 1013649 | 54300 | 24.7 | 14.25 | 9.00 | 6.00 | 3.00 |
| $\dagger \dagger 15 / 8$ | 1013658 | 62600 | 28.4 | 18.50 | 9.75 | 6.50 | 3.25 |
| †† $13 / 4$ | 1013667 | 84900 | 38.6 | 22.50 | 10.50 | 7.00 | 3.50 |
| $\dagger \dagger 17 / 8$ | 1013676 | 95800 | 43.5 | 29.00 | 11.25 | 7.50 | 3.75 |
| ††2 | 1013685 | 102600 | 46.6 | 34.00 | 12.00 | 8.00 | 4.00 |
| †† $21 / 4$ | 1013694 | 143100 | 65.0 | 48.00 | 13.50 | 9.00 | 4.50 |
| †† $21 / 2$ | 1013703 | 147300 | 66.9 | 66.00 | 15.00 | 10.00 | 5.00 |
| †† $23 / 4$ | 1013712 | 216900 | 98.6 | 88.00 | 16.50 | 11.00 | 5.50 |
| †† 3 | 1013721 | 228000 | 103 | 114.00 | 18.00 | 12.00 | 6.00 |
| †† $31 / 4$ | 1013730 | 262200 | 119 | 146.00 | 19.50 | 13.00 | 6.50 |
| $\dagger \dagger$ 1/2 | 1013739 | 279000 | 126 | 181.00 | 21.00 | 14.00 | 7.00 |
| $\dagger \dagger 4$ | 1013748 | 373000 | 169 | 271.00 | 24.00 | 16.00 | 8.00 |

*Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to $120^{\circ}$. Minimum Ultimate load is 5 times the Working Load Limit. $\dagger \dagger$ Welded Link.


Quic-CHECK


## G-341 / S-341 Weldless Sling Links

| Size (A)(in) | Stock No. |  | Working Load Limit Single Pull (lb)* | Weight Each (lb) | $\begin{aligned} & \hline \text { Dimensions } \\ & \text { (in) } \\ & \hline \end{aligned}$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | G-341 Galv. | $\begin{aligned} & \text { S-341 } \\ & \text { S.C. } \end{aligned}$ |  |  | B | C | F |
| 3/8 | 1013897 | 1013904 | 1800 | . 23 | 2.25 | 1.50 | . 75 |
| 1/2 | 1013913 | 1013922 | 2900 | . 55 | 3.00 | 2.00 | 1.00 |
| 5/8 | 1013931 | 1013940 | 4200 | 1.06 | 3.75 | 2.50 | 1.25 |
| 3/4 | 1013959 | 1013968 | 6000 | 1.88 | 4.50 | 3.00 | 1.50 |
| 7/8 | 1013977 | 1013986 | 8300 | 2.75 | 5.25 | 3.50 | 1.75 |
| 1 | 1013995 | 1014002 | 10800 | 4.35 | 6.00 | 4.00 | 2.00 |
| $11 / 4$ | 1014011 | 1014020 | 16750 | 7.60 | 7.75 | 5.00 | 2.50 |
| $13 / 8$ | 1014039 | 1014048 | 20500 | 11.30 | 8.25 | 5.50 | 2.75 |

[^6]

G-291

- Forged Steel - Quenched and Tempered.
- Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
- All Bolts Hot Dip galvanized after threading (UNC).
- Furnished with standard Hot Dip galvanized hex nuts.
- Recommended for in-line pull.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these bolts meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


Regular Nut Eye Bolt


G-291 Regular Nut Eye Bolts

| Shank Dia. \& Length (in) | $\begin{gathered} \text { G-291 } \\ \text { Stock No. } \end{gathered}$ | Working Load Limit (lb)* | Weight <br> Per 100 <br> (lb) | Dimensions (in) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | B | C | D | E | F | G | H |
| 3/8 $\times 4-1 / 2$ | 1043338 | 1550 | 29.50 | . 38 | . 75 | 1.50 | . 38 | 2.50 | 4.50 | 6.12 | . 88 |
| 1/2 $\times 3$-1/4 | 1043374 | 2600 | 50.30 | . 50 | 1.00 | 2.00 | . 50 | 1.50 | 3.25 | 5.38 | 1.12 |
| $1 / 2 \times 6$ | 1043392 | 2600 | 66.10 | . 50 | 1.00 | 2.00 | . 50 | 3.00 | 6.00 | 8.12 | 1.12 |
| $1 / 2 \times 8$ | 1043418 | 2600 | 82.00 | . 50 | 1.00 | 2.00 | . 50 | 3.00 | 8.00 | 10.12 | 1.12 |
| $1 / 2 \times 10$ | 1043436 | 2600 | 88.00 | . 50 | 1.00 | 2.00 | . 50 | 3.00 | 10.00 | 12.12 | 1.12 |
| $1 / 2 \times 12$ | 1043454 | 2600 | 114.20 | . 50 | 1.00 | 2.00 | . 50 | 3.00 | 12.00 | 14.12 | 1.12 |
| $5 / 8 \times 4$ | 1043472 | 5200 | 103.10 | . 62 | 1.25 | 2.50 | . 62 | 2.00 | 4.00 | 6.69 | 1.44 |
| $5 / 8 \times 6$ | 1043490 | 5200 | 118.20 | . 62 | 1.25 | 2.50 | 62 | 3.00 | 6.00 | 8.69 | 1.44 |
| $5 / 8 \times 8$ | 1043515 | 5200 | 135.10 | . 62 | 1.25 | 2.50 | . 62 | 3.00 | 8.00 | 10.69 | 1.44 |
| $5 / 8 \times 10$ | 1043533 | 5200 | 153.60 | . 62 | 1.25 | 2.50 | . 62 | 3.00 | 10.00 | 12.69 | 1.44 |
| $5 / 8 \times 12$ | 1043551 | 5200 | 167.10 | . 62 | 1.25 | 2.50 | . 62 | 4.00 | 12.00 | 14.69 | 1.44 |
| 3/4 $\times 4$-1/2 | 1043579 | 7200 | 168.60 | . 75 | 1.50 | 3.00 | . 75 | 2.00 | 4.50 | 7.69 | 1.69 |
| $3 / 4 \times 6$ | 1043597 | 7200 | 184.50 | . 75 | 1.50 | 3.00 | . 75 | 3.00 | 6.00 | 9.19 | 1.69 |
| $3 / 4 \times 8$ | 1043613 | 7200 | 207.90 | . 75 | 1.50 | 3.00 | . 75 | 3.00 | 8.00 | 11.19 | 1.69 |
| $3 / 4 \times 10$ | 1043631 | 7200 | 235.00 | . 75 | 1.50 | 3.00 | . 75 | 3.00 | 10.00 | 13.19 | 1.69 |
| $3 / 4 \times 12$ | 1043659 | 7200 | 257.50 | . 75 | 1.50 | 3.00 | . 75 | 4.00 | 12.00 | 15.19 | 1.69 |
| $3 / 4 \times 15$ | 1043677 | 7200 | 298.00 | . 75 | 1.50 | 3.00 | . 75 | 5.00 | 15.00 | 18.19 | 1.69 |
| $7 / 8 \times 5$ | 1043695 | 10600 | 270.00 | . 88 | 1.75 | 3.50 | . 88 | 2.50 | 5.00 | 8.75 | 2.00 |
| $7 / 8 \times 8$ | 1043711 | 10600 | 308.00 | . 88 | 1.75 | 3.50 | . 88 | 4.00 | 8.00 | 11.75 | 2.00 |
| $7 / 8 \times 12$ | 1043739 | 10600 | 400.00 | . 88 | 1.75 | 3.50 | . 88 | 4.00 | 12.00 | 15.75 | 2.00 |
| $1 \times 6$ | 1043757 | 13300 | 421.00 | 1.00 | 2.00 | 4.00 | 1.00 | 3.00 | 6.00 | 10.31 | 2.31 |
| $1 \times 9$ | 1043775 | 13300 | 468.50 | 1.00 | 2.00 | 4.00 | 1.00 | 4.00 | 9.00 | 13.31 | 2.31 |
| $1 \times 12$ | 1043793 | 13300 | 540.00 | 1.00 | 2.00 | 4.00 | 1.00 | 4.00 | 12.00 | 16.31 | 2.31 |
| $1 \times 18$ | 1043819 | 13300 | 650.00 | 1.00 | 2.00 | 4.00 | 1.00 | 7.00 | 18.00 | 22.31 | 2.31 |
| $1-1 / 4 \times 8$ | 1043837 | 21000 | 750.00 | 1.25 | 2.50 | 5.00 | 1.25 | 4.00 | 8.00 | 13.38 | 2.88 |
| $1-1 / 4 \times 12$ | 1043855 | 21000 | 900.00 | 1.25 | 2.50 | 5.00 | 1.25 | 4.00 | 12.00 | 17.38 | 2.88 |
| $1-1 / 4 \times 20$ | 1043873 | 21000 | 1210.00 | 1.25 | 2.50 | 5.00 | 1.25 | 6.00 | 20.00 | 25.38 | 2.88 |

[^7]

- Forged Steel - Quenched and Tempered.
- Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
- Working Load Limits shown are for in-line pull. For angle loading, see page 200.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductilit , design factor, proof load and temperature requirements. Importantly, these bolts meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- All Bolts Hot Dip galvanized after threading (UNC).
- Furnished with standard Hot Dip galvanized, heavy hex nuts.


G-277
Shoulder Nut Eye Bolts


G-277 Shoulder Nut Eye Bolts

| Shank Diameter \& Length (in) | G-277 <br> Stock No. | Working Load Limit <br> (Ib)* | Weight Per 100 (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | B | C | D | E | F | G | H | J |
| 5/16 x 2-1/4 | 1045050 | 1200 | 12.50 | . 31 | . 62 | 1.12 | . 25 | 1.50 | 2.25 | 3.50 | . 69 | . 56 |
| 5/16 x 4-1/4 | 1045078 | 1200 | 18.80 | . 31 | . 62 | 1.12 | . 25 | 2.50 | 4.25 | 5.50 | . 69 | . 56 |
| 3/8 $\times 2-1 / 2$ | 1045096 | 1550 | 21.40 | . 38 | . 75 | 1.38 | . 31 | 1.50 | 2.50 | 3.97 | . 78 | . 66 |
| 3/8 $\times$ 4-1/2 | 1045112 | 1550 | 25.30 | . 38 | . 75 | 1.38 | . 31 | 2.50 | 4.50 | 5.97 | . 78 | . 66 |
| 1/2 $\times 3-1 / 4$ | 1045130 | 2600 | 42.60 | . 50 | 1.00 | 1.75 | . 38 | 1.50 | 3.25 | 5.12 | 1.00 | . 91 |
| $1 / 2 \times 6$ | 1045158 | 2600 | 56.80 | . 50 | 1.00 | 1.75 | . 38 | 3.00 | 6.00 | 7.88 | 1.00 | . 91 |
| $5 / 8 \times 4$ | 1045176 | 5200 | 68.60 | . 62 | 1.25 | 2.25 | . 50 | 2.00 | 4.00 | 6.44 | 1.31 | 1.12 |
| $5 / 8 \times 6$ | 1045194 | 5200 | 102.40 | . 62 | 1.25 | 2.25 | . 50 | 3.00 | 6.00 | 8.44 | 1.31 | 1.12 |
| $3 / 4 \times 4-1 / 2$ | 1045210 | 7200 | 144.50 | . 75 | 1.50 | 2.75 | . 62 | 2.00 | 4.50 | 7.44 | 1.56 | 1.38 |
| $3 / 4 \times 6$ | 1045238 | 7200 | 167.50 | . 75 | 1.50 | 2.75 | . 62 | 3.00 | 6.00 | 8.94 | 1.56 | 1.38 |
| $7 / 8 \times 5$ | 1045256 | 10600 | 225.00 | . 88 | 1.75 | 3.25 | . 75 | 2.50 | 5.00 | 8.46 | 1.84 | 1.56 |
| $1 \times 6$ | 1045292 | 13300 | 366.30 | 1.00 | 2.00 | 3.75 | . 88 | 3.00 | 6.00 | 9.97 | 2.09 | 1.81 |
| $1 \times 9$ | 1045318 | 13300 | 422.50 | 1.00 | 2.00 | 3.75 | . 88 | 4.00 | 9.00 | 12.97 | 2.09 | 1.81 |
| $1-1 / 4 \times 8$ | 1045336 | 21000 | 650.00 | 1.25 | 2.50 | 4.50 | 1.00 | 4.00 | 8.00 | 12.72 | 2.47 | 2.28 |
| $1-1 / 4 \times 12$ | 1045354 | 21000 | 795.00 | 1.25 | 2.50 | 4.50 | 1.00 | 4.00 | 12.00 | 16.72 | 2.47 | 2.28 |
| 1-1/2 $\times 15$ | 1045372 | 24000 | 1425.00 | 1.50 | 3.00 | 5.50 | 1.25 | 6.00 | 15.00 | 20.75 | 3.00 | 2.75 |

[^8]

S-279 / M-279
Shoulder Type Machinery Eye Bolts

- Forged Steel - Quenched \& Tempered.
- Working Load Limits shown are for in-line pull. For angle loading, see page 200.
- Fatigue rated at $1-1 / 2$ times the Working Load Limit at 20,000 cycles.
- Recommended for in-line pull.
- S-279 threaded UNC.
- M-279 metric threaded.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductilit , design factor, proof load and temperature requirements. Importantly, these bolts meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



## S-279 UNC Shoulder Type Machinery Eye Bolts

| Size <br> (in) | $\begin{gathered} \text { S-279 } \\ \text { Stock No. } \end{gathered}$ | Working Load Limit (lb)* | Weight Per 100 (lb) | Dimensions (in) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $\begin{gathered} \mathrm{A}^{* *} \\ \text { Thread } \end{gathered}$ | B | C | D | E | F | G | H |
| $1 / 4 \times 1$ | 9900182 | 650 | 5.00 | 1/4-20 | 1.02 | 1.13 | . 75 | 2.29 | . 19 | . 53 | . 77 |
| $5 / 16 \times 1-1 / 8$ | 9900191 | 1200 | 9.00 | 5/16-18 | 1.15 | 1.38 | . 88 | 2.74 | . 25 | . 59 | . 95 |
| $3 / 8 \times 1-1 / 4$ | 9900208 | 1550 | 15.00 | 3/8-16 | 1.27 | 1.62 | 1.00 | 3.07 | . 31 | . 69 | 1.05 |
| $1 / 2 \times 1-1 / 2$ | 9900217 | 2600 | 28.00 | 1/2-13 | 1.53 | 1.95 | 1.19 | 3.70 | . 38 | . 91 | 1.27 |
| $5 / 8 \times 1-3 / 4$ | 9900226 | 5200 | 55.00 | 5/8-11 | 1.79 | 2.38 | 1.38 | 4.45 | . 50 | 1.13 | 1.53 |
| $3 / 4 \times 2$ | 9900235 | 7200 | 96.00 | 3/4-10 | 2.05 | 2.76 | 1.50 | 5.07 | . 63 | 1.38 | 1.71 |
| 7/8 $\times 2-1 / 4$ | 9900244 | 10600 | 154.00 | 7/8-9 | 2.31 | 3.25 | 1.75 | 5.87 | . 75 | 1.56 | 2.00 |
| $1 \times 2-1 / 2$ | 9900253 | 13300 | 238.00 | 1-8 | 2.57 | 3.76 | 2.00 | 6.66 | . 88 | 1.81 | 2.30 |
| 1-1/8 x 2-3/4 | 9900257 | 15000 | 320.00 | 1-1/8-7 | 2.75 | 4.19 | 2.25 | 7.20 | . 97 | 2.06 | 2.35 |
| $1-1 / 4 \times 3$ | 9900262 | 21000 | 399.00 | 1-1/4-7 | 3.09 | 4.50 | 2.50 | 7.95 | 1.00 | 2.28 | 2.73 |
| 1-1/2 $\times 3-1 / 2$ | 9900271 | 24000 | 720.00 | 1-1/2-6 | 3.60 | 5.50 | 3.00 | 9.49 | 1.25 | 2.75 | 3.28 |
| $1-3 / 4 \times 3-3 / 4$ | 9900280 | 34000 | 1040.00 | 1-3/4-5 | 3.75 | 6.26 | 3.50 | 10.48 | 1.38 | 3.00 | 3.60 |
| $2 \times 4$ | 9900289 | 42000 | 1880.00 | 2-4-1/2 | 4.00 | 7.62 | 4.00 | 12.31 | 1.81 | 3.38 | 4.50 |
| 2-1/2 $\times 5$ | 9900298 | 65000 | 3250.00 | 2-1/2-4 | 5.00 | 8.76 | 4.50 | 14.88 | 2.12 | 4.25 | 5.50 |

*Ultimate Load is 5 times the Working Load Limit. Maximum Proof Load is 2 times the Working Load Limit. ** All bolts threaded UNC.

M-279 Metric

| Size (mm) | M-279 <br> Stock No. | Working Load Limit (kg)* | Weight Each (kg) | Dimensions (mm) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $\begin{gathered} \mathbf{A}^{* *} \\ \text { Thread } \end{gathered}$ | B | C | D | E | F | G | H |
| M6 x 13 | 1045753 | 200 | . 03 | M6x 1.0 | 13.0 | 28.7 | 19.1 | 47.0 | 4.9 | 13.5 | 19.6 |
| M8 $\times 13$ | 1045789 | 400 | . 05 | M8x 1.25 | 13.0 | 35.1 | 22.4 | 54.6 | 6.4 | 15.0 | 24.1 |
| M10 $\times 17$ | 1045833 | 640 | . 07 | M10 1.5 | 17.0 | 41.1 | 25.4 | 64.3 | 7.9 | 17.5 | 26.5 |
| M12 x 20.5 | 1045869 | 1000 | . 11 | M12 $\times 1.75$ | 20.5 | 49.5 | 30.2 | 77.7 | 9.7 | 23.1 | 32.8 |
| M16 x 27 | 1045913 | 1800 | . 25 | M16 x 2.0 | 27.0 | 60.5 | 35.1 | 96.0 | 12.7 | 28.7 | 38.9 |
| M20 x 30 | 1045995 | 2500 | . 42 | M20 x 2.5 | 30.0 | 70.0 | 38.1 | 108 | 16.0 | 35.1 | 43.4 |
| M $24 \times 36$ | 1046029 | 4000 | 1.05 | M $24 \times 3.0$ | 36.0 | 95.5 | 51.0 | 142 | 22.4 | 46.0 | 58.4 |
| M $27 \times 69.8$ | 1046038 | 5000 | 1.42 | M $27 \times 3.0$ | 69.8 | 107 | 57.1 | 183 | 24.6 | 52.3 | 59.7 |
| M30 $\times 45$ | 1046075 | 6000 | 1.77 | M30 x 3.5 | 45.0 | 114 | 63.5 | 171 | 25.4 | 58.0 | 69.3 |
| M36 x 54 | 1046109 | 8500 | 3.12 | M36 x 4.0 | 54.0 | 140 | 76.0 | 207 | 31.8 | 70.0 | 83.3 |
| M $42 \times 95.2$ | 1046118 | 14000 | 4.58 | M $42 \times 4.5$ | 95.2 | 159 | 88.9 | 266 | 35.0 | 76.2 | 91.4 |
| M48 $\times 102$ | 1046127 | 17300 | 8.71 | M $48 \times 5.0$ | 102 | 194 | 101 | 313 | 46.0 | 85.9 | 114 |
| M64 x 127 | 1046136 | 29500 | 14.74 | M64 x 6.0 | 127 | 223 | 114 | 378 | 53.8 | 108 | 140 |

[^9]
## S-293

Rivet Eye Bolt

- Forged steel - Quenched and Tempered.


S-293 Rivet Eye Bolts


| Shank <br>  <br> Length <br> (in) | S-293 <br> Stock No. | Weight <br> Per 100 <br> (lb) | Dimensions (in) |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | A | B | C | D | E | F | G |
| $3 / 8 \times 2-1 / 2$ | 1043962 | 25.00 | . 38 | 2.50 | 3.38 | 4.13 | . 75 | 1.50 | . 38 |
| $3 / 8 \times 4-1 / 2$ | 1043980 | 27.60 | . 38 | 4.50 | 5.38 | 6.13 | . 75 | 1.50 | . 38 |
| $1 / 2 \times 3-1 / 4$ | 1044024 | 43.80 | . 50 | 3.25 | 4.38 | 5.38 | 1.00 | 2.00 | . 50 |
| $1 / 2 \times 6$ | 1044042 | 62.50 | . 50 | 6.00 | 7.13 | 8.13 | 1.00 | 2.00 | . 50 |
| $5 / 8 \times 4$ | 1044060 | 93.80 | . 62 | 4.00 | 5.50 | 6.75 | 1.25 | 2.50 | . 62 |
| $5 / 8 \times 6$ | 1044088 | 113.00 | . 62 | 6.00 | 7.50 | 8.75 | 1.25 | 2.50 | . 62 |
| $3 / 4 \times 4-1 / 2$ | 1044104 | 143.80 | . 75 | 4.50 | 6.25 | 7.75 | 1.50 | 3.00 | . 75 |
| $3 / 4 \times 6$ | 1044122 | 162.50 | . 75 | 6.00 | 7.75 | 9.25 | 1.50 | 3.00 | . 75 |
| $7 / 8 \times 5$ | 1044140 | 238.00 | . 88 | 5.00 | 7.00 | 8.75 | 1.75 | 3.50 | . 88 |
| $7 / 8 \times 8$ | 1044168 | 291.00 | . 88 | 8.00 | 10.00 | 11.75 | 1.75 | 3.50 | . 88 |
| $1 \times 6$ | 1044186 | 375.00 | 1.00 | 6.00 | 8.38 | 10.38 | 2.00 | 4.00 | 1.00 |
| $1 \times 9$ | 1044202 | 450.00 | 1.00 | 9.00 | 11.38 | 13.38 | 2.00 | 4.00 | 1.00 |
| $1-1 / 4 \times 8$ | 1044220 | 720.00 | 1.25 | 8.00 | 10.88 | 13.38 | 2.50 | 5.00 | 1.25 |
| $1-1 / 4 \times 12$ | 1044248 | 855.00 | 1.25 | 12.00 | 14.88 | 17.38 | 2.50 | 5.00 | 1.25 |



S-276
Shoulder Rivet Eye Bolt

- Forged steel - Quenched and Tempered.


QUIC-CHECK ${ }^{\circ}$
$Q$

## S-276 Shoulder Rivet Eye Bolts



| Shank Dia. \& Length (in) | S-276 <br> Stock No. | Weight Per 100 (lb) | Dimensions (in) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | A | B | C | D | E | F | G | H |
| 5/16 x 2-1/4 | 1045782 | 6.30 | . 31 | 2.25 | 2.94 | 3.50 | . 63 | 1.13 | . 25 | . 56 |
| $5 / 16 \times 4-1 / 4$ | 1045808 | 14.80 | . 31 | 4.25 | 4.94 | 5.50 | . 63 | 1.13 | . 25 | . 56 |
| 3/8 x 2-1/2 | 1045826 | 18.80 | . 38 | 2.50 | 3.28 | 3.97 | . 75 | 1.38 | . 31 | . 66 |
| 3/8 x 4-1/2 | 1045844 | 25.00 | . 38 | 4.50 | 5.28 | 5.97 | . 75 | 1.38 | . 31 | . 66 |
| 1/2 $\times 3-1 / 4$ | 1045862 | 33.00 | . 50 | 3.25 | 4.25 | 5.12 | 1.00 | 1.75 | . 38 | . 91 |
| $1 / 2 \times 6$ | 1045880 | 50.00 | . 50 | 6.00 | 7.00 | 7.88 | 1.00 | 1.75 | . 38 | . 91 |
| $5 / 8 \times 4$ | 1045906 | 68.80 | . 63 | 4.00 | 5.31 | 6.44 | 1.25 | 2.25 | . 50 | 1.12 |
| $5 / 8 \times 6$ | 1045924 | 75.00 | . 63 | 6.00 | 7.31 | 8.44 | 1.25 | 2.25 | . 50 | 1.12 |
| 3/4 $\times 4$-1/2 | 1045942 | 125.00 | . 75 | 4.50 | 6.06 | 7.44 | 1.50 | 2.75 | . 62 | 1.38 |
| $3 / 4 \times 6$ | 1045960 | 150.00 | . 75 | 6.00 | 7.56 | 8.94 | 1.50 | 2.75 | . 62 | 1.38 |
| $7 / 8 \times 5$ | 1045988 | 200.00 | . 88 | 5.00 | 6.84 | 8.46 | 1.75 | 3.25 | . 75 | 1.56 |
| $1 \times 6$ | 1046022 | 298.00 | 1.00 | 6.00 | 8.09 | 9.97 | 2.00 | 3.75 | . 88 | 1.81 |
| $1 \times 9$ | 1046040 | 425.00 | 1.00 | 9.00 | 11.09 | 12.97 | 2.00 | 3.75 | . 88 | 1.81 |
| 1-1/4 $\times 8$ | 1046068 | 654.00 | 1.25 | 8.00 | 10.47 | 12.72 | 2.50 | 4.50 | 1.00 | 2.28 |
| $1-1 / 4 \times 12$ | 1046086 | 712.00 | 1.25 | 12.00 | 14.47 | 16.72 | 2.50 | 4.50 | 1.00 | 2.28 |
| 1-1/2 $\times 15$ | 1046102 | 1425.00 | 1.50 | 15.00 | 18.00 | 20.75 | 3.00 | 5.50 | 1.25 | 2.75 |



S-264 Pad Eye

- Forged Steel — Quenched and Tempered.
- Forged from 1035 Carbon Steel.
- Excellent welding qualities.
- Widely used on farm machinery, trucks, steel hulled marine vessels and material handling equipment.
- Reference American Welding Society specifications for proper welding procedures.


M 1 B
(1)

## S-264 Pad Eyes

| Size No.* | S-264 <br> Stock No. | Weight Per 100 (lb) | Dimensions (in) |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | B | C | D | E | G | H | L |
| * 0 | 1090722 | 2.80 | . 25 | . 19 | . 63 | . 31 | . 63 | . 09 | . 75 |
| * 1 | 1090740 | 6.50 | . 38 | . 25 | . 88 | . 41 | . 88 | . 13 | 1.03 |
| * 1-1/2 | 1090768 | 10.40 | . 63 | . 25 | 1.00 | . 44 | 1.13 | . 16 | 1.31 |
| 2 | 1090786 | 21.10 | . 75 | . 38 | 1.06 | . 50 | 1.50 | . 19 | 1.63 |
| 4 | 1090802 | 52.20 | 1.00 | . 56 | 1.44 | . 78 | 2.13 | . 22 | 2.34 |
| 5 | 1090820 | 82.50 | 1.25 | . 69 | 1.75 | . 81 | 2.63 | . 25 | 2.75 |

*Meets the requirements of Military Specification MS-51930A


- Forged Steel - Quenched and Tempered.
- Hot Dip galvanized.
- Tapped with standard UNC class 2 threads after galvanizing.
- Also available in blank (as forged) item (S-4028) or on request with metric threading ( $\mathrm{M}-400$ ).
- Recommended for In-Line pull.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductilit , design factor, proof load and temperature requirements. Importantly, these products meet other critical
 performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


G-400 Eye Nuts

| Size No. | "S" Stock Size (in) | G-400 <br> Stock No | Std. Tap Size (in) | Working Load Limit <br> (lb)* | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | A | C | D | E | F | J | K | N | T | W |
| 1 | . 25 | 1090438 | 1/4 | 520 | . 09 | 1.25 | . 75 | 1.00 | . 75 | . 50 | . 69 | . 63 | . 38 | 1.72 | . 31 |
| 2 | . 31 | 1090474 | 3/8 | 1250 | . 17 | 1.62 | 1.00 | 1.20 | . 83 | . 56 | . 81 | . 89 | . 50 | 2.09 | . 41 |
| 3A | . 38 | 1090517 | 1/2 | 2250 | . 28 | 2.00 | 1.25 | 1.44 | 1.08 | . 81 | 1.00 | 1.09 | . 62 | 2.55 | . 50 |
| 4 | . 50 | 1090535 | 5/8 | 3600 | . 60 | 2.50 | 1.50 | 1.92 | 1.35 | 1.00 | 1.31 | 1.31 | . 69 | 3.25 | . 69 |
| 5 | . 63 | 1090553 | 3/4 | 5200 | 1.00 | 3.00 | 1.75 | 2.38 | 1.59 | 1.12 | 1.50 | 1.57 | . 88 | 3.89 | . 84 |
| 6 | . 75 | 1090571 | 7/8 | 7200 | 1.65 | 3.50 | 2.00 | 2.63 | 1.96 | 1.38 | 1.88 | 1.77 | . 94 | 4.32 | 1.00 |
| 7 | . 88 | 1090599 | 1 | 10000 | 2.69 | 4.00 | 2.25 | 3.06 | 2.21 | 1.56 | 2.13 | 2.02 | 1.07 | 5.01 | 1.19 |
| 8 | 1.00 | 1090633 | 1-1/4 | 15500 | 4.38 | 4.50 | 2.50 | 3.50 | 2.46 | 1.88 | 2.38 | 2.27 | 1.25 | 5.78 | 1.38 |
| 9 | 1.13 | 1090651 | 1-3/8 | 18500 | 5.00 | 5.00 | 2.75 | 4.00 | 2.69 | 2.00 | 2.56 | 2.53 | 1.38 | 6.51 | 1.50 |
| 10 | 1.25 | 1090679 | 1-1/2 | 22500 | 6.78 | 5.62 | 3.12 | 4.31 | 3.09 | 2.25 | 3.00 | 2.82 | 1.50 | 7.06 | 1.66 |
| 11 | 1.50 | 1090697 | 2 | 40000 | 14.60 | 7.12 | 4.10 | 6.20 | 4.09 | 3.13 | 3.75 | 3.68 | 2.06 | 9.91 | 1.94 |

*Working Load Limit shown is for In-Line pull. Ultimate Load is 5 times the Working Load Limit. Rating based on standard tap size.


- Forged Steel — Quenched and Tempered.
- On request: threaded to customer specification



## S-405 Lifting Eyes

| $\begin{aligned} & \text { Size } \\ & \text { No. } \end{aligned}$ | $\begin{gathered} \text { S-405 } \\ \text { Stock No } \end{gathered}$ | Working Load Limit Threaded (lb) ${ }^{*}$ | Maximum Thread Diam. (in) | Weight Each <br> (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | A | C | D | E | F | H $\dagger$ | $J$ | K | L | N | T | W |
| 1 | 1090269 | 850 | . 31 | . 10 | 1.25 | . 75 | 1.02 | . 66 | . 50 | . 34 | . 69 | . 67 | . 69 | . 42 | 2.46 | . 31 |
| 2 | 1090287 | 1250 | . 38 | . 20 | 1.62 | 1.00 | 1.20 | . 75 | . 56 | . 41 | . 81 | . 92 | . 94 | . 55 | 3.00 | . 41 |
| 3 | 1090303 | 2250 | . 50 | . 50 | 2.00 | 1.25 | 1.44 | 1.00 | . 81 | . 53 | 1.13 | 1.13 | 1.25 | . 68 | 3.69 | . 50 |
| 4 | 1090321 | 3600 | . 63 | . 79 | 2.50 | 1.50 | 1.92 | 1.19 | 1.00 | . 66 | 1.31 | 1.38 | 1.50 | . 80 | 4.59 | . 69 |
| 5 | 1090349 | 5200 | . 75 | 1.25 | 3.00 | 1.75 | 2.28 | 1.38 | 1.12 | . 78 | 1.50 | 1.66 | 1.75 | . 98 | 5.55 | . 84 |
| 6 | 1090367 | 7200 | . 88 | 2.25 | 3.50 | 2.00 | 2.50 | 1.63 | 1.38 | . 91 | 1.88 | 1.91 | 1.88 | 1.06 | 6.16 | 1.00 |
| 7 | 1090385 | 10000 | 1.00 | 3.25 | 4.00 | 2.25 | 2.92 | 1.88 | 1.56 | 1.03 | 2.13 | 2.16 | 2.06 | 1.20 | 7.07 | 1.19 |
| 8 | 1090401 | 12500 | 1.13 | 4.70 | 4.50 | 2.50 | 3.35 | 1.94 | 1.88 | 1.16 | 2.38 | 2.47 | 2.50 | 1.40 | 8.16 | 1.38 |
| 10 | 1090410 | 18000 | 1.50 | 9.33 | 5.62 | 3.12 | 3.81 | 2.75 | 2.25 | 1.53 | 3.00 | 2.98 | 3.21 | 1.69 | 9.96 | 1.66 |

[^10]

- Each base and Bundle Clip adapter has a Product Identification Code (PIC) for material tracability, the name Crosby or CG, and a size forged into it.
- Entire clip galvanized to resist corrosive and rusting action.
- Forged bases and bundle clip adapters.
- All bundle clips are individually bagged or tagged with proper application instructions and warning information.
- Clips have rolled threads.
- Bundle Clip Adapter for Soft Eye (G4460) and for Thimble Eye (G4461) kits available.
- Look for the Red-U-Bolt, your assurance of Genuine Crosby Products.
- Meets or exceeds all requirements of ASME B30.26 including manufacturing I.D. and size requirements. Importantly, these wire rope bundle clips meet material traceability not addressed by ASME B30.26.



## G-460 Soft Eye / G-461 Thimble Eye Bundle Clip

| Rope Size |  | Bundle Clip Style | Stock No. | Dimensions (in) |  |  |  |  |  | Weight each (lb) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | (mm) |  |  | D | F | G | H | K | 0 |  |
| 3/4 | 18-20 | G460 | 1010509 | 1.50 | 1.06 | 2.25 | 2.84 | 3.50 | 4.13 | 2.5 |
| 3/4 | 18-20 | G461 | 1010619 | 1.50 | 1.06 | 2.25 | 2.84 | 3.50 | 2.85 | 2.5 |

## Swivel Hoist Ring



Color coded to distinguish between UNC (Red) and Metric (Silver) thread types.


- Available in UNC and Metric thread sizes.
- UNC threads available in sizes from 800 pounds to 100,000 pounds Working Load Limit, with a design factor of 5 to 1 .
- Metric threads available in sizes from 400 kg to $16,900 \mathrm{~kg}$ and dual rated in both a 4 to 1 and 5 to 1 design factor.
- All Components are Alloy Steel - Quenched and Tempered.
- Designed to be used at full WLL within angular loading range.
- $100 \%$ individually proof tested to 2-1/2 times the Working Load Limit with certification and Statistically Magnetic Particle inspected. (Can be furnished 100\% Magnetic Particle inspected when requested at time of order.)
- Each product has a Product Identification Code (PIC) for material traceability along with a orking Load Limit and the name Crosby or "CG" stamped into it.
- $360^{\circ}$ swivel and $180^{\circ}$ pivot action.
- Fatigue rated to 20,000 cycles at 1-1/2 times the Working Load Limit.
- Individually packaged along with proper application instructions and warning information.
- Bolt is secured with E-clip, threads are grooved. This method allows for easy disassembly and assembly of hoist ring for thorough examination of all components. Replacement kits are available.
- Bolts are individually Proof Tested.
- Multiple Bolt length available to meet specific application requirements
- Zinc Plated (Yellow Chromate) finish for increased corrosion protection thru 30,000 pound size
- Meets or exceeds all the requirements of ASME B30.26 including identification, ductilit, design factor, proof load and temperature requirements. Importantly, these hoist rings meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



HR-125
Swivel Hoist Ring


- Top washer has the following features:
- The Working Load Limit and Recommended Torque value are permanently stamped into each washer.
- Washer is color coded for easy identification: Red - UNC thread.
- Individually Proof Tested to 2-1/2 times Working Load Limit.
- Bolt specification is an Alloy socket head cap screw to ASTM A 574.
- All threads listed are UNC.
- BOLT SIZE IDENTIFICATION: The size of the bolt will be stated as in the drawing above. Illustration shows meaning of each dimension given.
- NOTE: For Special Applications, see page 457.
- Frame 2 and larger are RFID EQUIPPED.


## HR-125 UNC Threads

|  |  |  |  | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Frame Size No. | HR-125 <br> Stock No. | Working Load Limit (Ib) ${ }^{*}$ | Torque in (ft•lbf) | $\begin{gathered} \text { Bolt Size } \\ \text { A } \ddagger \\ \hline \end{gathered}$ | Effective <br> Thread Projection Length B | C | D | Radius E | $\begin{gathered} \text { Diameter } \\ \text { F } \\ \hline \end{gathered}$ | G | H | Weight Each <br> (lb) |
| $1 \dagger$ | 1016887 | 800 | 7 | 5/16-18 $\times 1.50$ | . 58 | 2.72 | . 97 | . 46 | . 34 | 1.87 | 1.12 | . 37 |
| $1 \dagger$ | 1016898 | 1000 | 12 | $3 / 8-16 \times 1.50$ | . 58 | 2.72 | . 97 | . 46 | . 34 | 1.87 | 1.05 | . 39 |
| 2 | 1016909 | 2500 | 28 | $1 / 2-13 \times 2.00$ | . 70 | 4.85 | 1.96 | . 87 | . 75 | 3.35 | 2.29 | 2.33 |
| $2 \dagger$ | 1016912 | 2500 | 28 | $1 / 2-13 \times 2.50$ | 1.20 | 4.85 | 1.96 | . 87 | . 75 | 3.35 | 2.29 | 2.36 |
| 2 | 1016920 | 4000 | 60 | $5 / 8-11 \times 2.00$ | . 70 | 4.85 | 1.96 | . 87 | . 75 | 3.35 | 2.16 | 2.41 |
| $2 \dagger$ | 1016924 | 4000 | 60 | 5/8-11 $\times 2.75$ | 1.45 | 4.85 | 1.96 | . 87 | . 75 | 3.35 | 2.16 | 2.47 |
| 2 | 1016931 | 5000 | 100 | 3/4-10 $\times 2.25$ | . 95 | 4.85 | 1.96 | . 87 | . 75 | 3.35 | 2.04 | 2.52 |
| $2 \dagger$ | 1016935 | 5000 | 100 | $3 / 4-10 \times 2.75$ | 1.45 | 4.85 | 1.96 | . 87 | . 75 | 3.35 | 2.04 | 2.59 |
| 3 | 1016942 | 7000 ** | 100 | $3 / 4-10 \times 2.75$ | . 89 | 6.57 | 2.96 | 1.36 | . 94 | 4.87 | 2.97 | 6.72 |
| $3 \dagger$ | 1016946 | 7000 ** | 100 | $3 / 4-10 \times 3.50$ | 1.64 | 6.57 | 2.96 | 1.36 | . 94 | 4.87 | 2.97 | 6.81 |
| 3 | 1016953 | 8000 | 160 | $7 / 8-9 \times 2.75$ | . 89 | 6.57 | 2.96 | 1.36 | . 94 | 4.87 | 2.84 | 6.84 |
| $3 \dagger$ | 1016957 | 8000 | 160 | $7 / 8-9 \times 3.50$ | 1.64 | 6.57 | 2.96 | 1.36 | . 94 | 4.87 | 2.84 | 6.96 |
| 3 | 1016964 | 10000 | 230 | $1-8 \times 3.00$ | 1.14 | 6.57 | 2.96 | 1.36 | . 94 | 4.87 | 2.72 | 7.09 |
| $3 \dagger$ | 1016969 | 10000 | 230 | $1-8 \times 4.00$ | 2.14 | 6.57 | 2.96 | 1.36 | . 94 | 4.87 | 2.72 | 7.31 |
| 4 | 1016975 | 15000 | 470 | 1-1/4-7x4.50 | 2.21 | 8.72 | 3.71 | 1.75 | 1.19 | 6.18 | 3.93 | 14.51 |
| 5 | 1016986 | 24000 | 800 | 1-1/2-6 6.75 | 3.00 | 12.55 | 4.71 | 2.39 | 1.75 | 8.48 | 5.52 | 37.73 |
| 5 | 1016997 | 30000 | 1100 | $2-4-1 / 2 \times 6.75$ | 3.00 | 12.55 | 4.71 | 2.39 | 1.75 | 8.48 | 5.02 | 40.69 |
| 6 | 1017001 | 50000 | 2100 | 2-1/2-4 8 8.0 | 4.00 | 16.88 | 5.75 | 3.00 | 2.25 | 11.00 | 8.03 | 88.00 |
| 7 | 1017005 | 75000 | 4300 | $3-4 \times 10.5$ | 5.00 | 19.50 | 6.45 | 3.75 | 2.75 | 14.16 | 8.50 | 166.00 |
| 8 | 1017009 | 100000 | 5100 | 3-1/2-4 $\times 13.0$ \# | 7.00 | 22.09 | 7.75 | 4.00 | 3.25 | 15.91 | 9.28 | 265.00 |

[^11]

- Top washer has the following features:
- The Working Load Limit and Recommended Torque value are permanently stamped into each washer.
- Washer is color coded for easy identification: Silver - Metric thread
- Individually Proof Tested to 2-1/2 times Working Load Limit.
- Bolt specification is a Grade 12.9 Alloy socket head cap screw to Din 912. All threads listed are metric (ASME B18.3.1m).
- Designed to be used with ferrous workpiece only.
- BOLT SIZE IDENTIFICATION: The size of the bolt will be stated as in the drawing above. Illustration shows meaning of each dimension given.
- NOTE: For Special Applications, see page 457.
- Frame 2 and larger RFID EQUIPPED.


HR-125M Metric Threads

|  |  | Working Load Limit (kg) |  |  | Dimensions (mm) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Frame Size No. | HR-125M <br> Stock No. | At a 5:1 Design Factor $\dagger$ | At a 4:1 Design Factor $\dagger$ | Torque in ( Nm$)^{*}$ | (A) <br> Bolt Size $\ddagger$ | (B)Effective <br> Thread Projection Length | C | D | Radius E | Diameter F | G | H | Weight Each (kg) |
| 1 | 1016602 | 400 | 500 | 10 | M8X1.25X40 | 16.9 | 69.9 | 24.6 | 11.8 | 8.5 | 47.5 | 29.9 | . 17 |
| 1 | 1016613 | 450 | 550 | 16 | M10X1.50X40 | 16.9 | 69.9 | 24.6 | 11.8 | 8.5 | 47.5 | 28.1 | . 18 |
| 2 | 1016624 | 1050 | 1300 | 38 | M12X1.75X50 | 16.9 | 123 | 49.8 | 22.3 | 17.5 | 85.1 | 60.4 | 1.05 |
| 2 | 1016635 | 1900 | 2400 | 81 | M16X2.00X60 | 26.9 | 123 | 49.8 | 22.3 | 17.5 | 85.1 | 56.3 | 1.11 |
| 2 | 1016644 | 2150 | 2700 | 136 | M20X2.50X65 | 31.9 | 123 | 49.8 | 22.3 | 17.5 | 85.1 | 52.3 | 1.17 |
| 3 | 1016657 | 3000 | 3750 | 136 | M20X2.50X75 | 27.8 | 167 | 75.2 | 34.7 | 25.4 | 124 | 76.6 | 3.09 |
| 3 | 1016668 | 4200 | 5250 | 312 | M24X3.00X80 | 32.8 | 167 | 75.2 | 34.7 | 25.4 | 124 | 70.5 | 3.21 |
| 4 | 1016679 | 7000 | 8750 | 637 | M30X3.50X120 | 61.7 | 222 | 94.2 | 44.5 | 30.5 | 157 | 102 | 6.53 |
| 5 | 1016690 | 11000 | 13750 | 1005 | M36X4.00X150 | 54.0 | 318 | 120 | 60.7 | 44.5 | 215 | 142 | 16.8 |
| 5 | 1016701 | 12500 | 15600 | 1005 | M42X4.50X160 | 64.0 | 318 | 120 | 60.7 | 44.5 | 215 | 136 | 17.4 |
| 5 | 1016712 | 13500 | 16900 | 1350 | M48X5.00X160 | 74.0 | 318 | 120 | 60.7 | 44.5 | 215 | 130 | 18.0 |

[^12]

HR-1000

- Forged bail provides the following:
- Easily readable "Raised Lettering" showing the name Crosby or "CG" and PIC Code for material traceability.
- Greater durability providing the increased "Toughness" desired in potentially abusive field conditions
- Larger opening than standard Hoist Ring bail.
- Top washer is color coded for easy identification (Red for UNC threads and Silver for Metric threads
- The Working Load Limit and Recommended Torque value are permanently stamped into each washer.
- Individually Proof Tested to 2-1/2 times Working Load Limit.
- Available in both UNC Thread and Metric Thread style.
- BOLT SIZE IDENTIFICATION: The size of the bolt will be stated as in the drawing below. Illustration shows meaning of each dimension given.

- NOTE: For Special Applications, see page 457.
- Frame 2 and larger are RFID EQUIPPED.


HR-1000 UNC Threads

| $\begin{aligned} & \text { Frame } \\ & \text { Size } \\ & \text { No. } \end{aligned}$ | $\begin{aligned} & \text { HR-1000 } \\ & \text { Stock No. } \end{aligned}$ | Working Load Limit (Ib)* | Torque in (ft•lbf) | Dimensions (in) |  |  |  |  |  |  |  | Weight Each (lb) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $\begin{gathered} \text { Bolt Size } \\ \text { A } \ddagger \end{gathered}$ | Eff. Thread Projection Length B | C | D | Radius E | F | G | H |  |
| 1 | 1068002 | 800 | 7 | 5/16-18 $\times 1.50$ | . 52 | 3.69 | . 97 | . 62 | . 44 | 2.27 | 1.38 | . 60 |
| 1 | 1068006 | 1000 | 12 | 3/8-16 x 1.50 | . 52 | 3.69 | . 97 | . 62 | . 44 | 2.27 | 1.38 | . 62 |
| 2 | 1068010 | 2500 | 28 | $1 / 2-13 \times 2.25$ | . 69 | 6.26 | 1.96 | 1.25 | . 75 | 4.20 | 2.50 | 3.05 |
| $2 \dagger$ | 1068014 | 2500 | 28 | $1 / 2-13 \times 2.75$ | 1.19 | 6.26 | 1.96 | 1.25 | . 75 | 4.20 | 2.50 | 3.07 |
| 2 | 1068018 | 4000 | 60 | $5 / 8-11 \times 2.25$ | . 69 | 6.26 | 1.96 | 1.25 | . 75 | 4.20 | 2.50 | 3.11 |
| $2 \dagger$ | 1068022 | 4000 | 60 | $5 / 8-11 \times 3.00$ | 1.44 | 6.26 | 1.96 | 1.25 | . 75 | 4.20 | 2.50 | 3.18 |
| 2 | 1068026 | 5000 | 100 | $3 / 4-10 \times 2.50$ | . 94 | 6.26 | 1.96 | 1.25 | . 75 | 4.20 | 2.50 | 3.24 |
| $2 \dagger$ | 1068030 | 5000 | 100 | $3 / 4-10 \times 3.00$ | 1.44 | 6.26 | 1.96 | 1.25 | . 75 | 4.20 | 2.50 | 3.30 |
| 3 | 1068034 | 7000 ** | 100 | $3 / 4-10 \times 3.00$ | . 85 | 8.66 | 2.96 | 1.63 | 1.00 | 6.25 | 3.25 | 10.09 |
| $3 \dagger$ | 1068038 | 7000 ** | 100 | $3 / 4-10 \times 3.50$ | 1.35 | 8.66 | 2.96 | 1.63 | 1.00 | 6.25 | 3.25 | 10.21 |
| 3 | 1068042 | 8000 | 160 | $7 / 8-9 \times 3.00$ | . 85 | 8.66 | 2.96 | 1.63 | 1.00 | 6.24 | 3.25 | 10.21 |
| $3 \dagger$ | 1068046 | 8000 | 160 | $7 / 8-9 \times 3.50$ | 1.35 | 8.66 | 2.96 | 1.63 | 1.00 | 6.24 | 3.25 | 10.40 |
| 3 | 1068050 | 10000 | 230 | $1-8 \times 3.50$ | 1.35 | 8.66 | 2.96 | 1.63 | 1.00 | 6.24 | 3.25 | 10.50 |
| $3 \dagger$ | 1068054 | 10000 | 230 | $1-8 \times 4.50$ | 2.35 | 8.66 | 2.96 | 1.63 | 1.00 | 6.24 | 3.25 | 10.72 |
| 4 | 1068058 | 15000 | 470 | 1-1/4-7 5.00 | 2.09 | 11.21 | 3.71 | 2.00 | 1.25 | 7.82 | 4.00 | 21.90 |
| 4 | 1068062 | 24000 | 800 | 1-1/2-6 $\times 5.50$ | 2.59 | 11.21 | 3.71 | 2.00 | 1.44 | 7.82 | 4.00 | 23.00 |

## HR-1000M Metric Threads

| Frame Size No. | HR-1000M Stock No. | Working Load Limit (kg)* |  | Torque in (Nm) | Dimensions (mm) |  |  |  |  |  |  |  | Weight Each (kg) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | At a 5:1 Design Factor*** | At a 4:1 Design Factor*** |  | $\begin{gathered} \text { Bolt Size } \\ \text { A } \ddagger \ddagger \end{gathered}$ | Eff. <br> Thread Projection Length B | C | D | Radius E | F | G | H |  |
| 1 | 1068307 | 400 | 500 | 10 | M $8 \times 1.25 \times 40$ | 15.2 | 93.7 | 24.6 | 15.7 | 11.2 | 57.7 | 35.1 | . 3 |
| 1 | 1068316 | 450 | 550 | 16 | M10 x $1.50 \times 40$ | 15.2 | 93.7 | 24.6 | 15.7 | 11.2 | 57.7 | 35.1 | . 3 |
| 2 | 1068325 | 1050 | 1300 | 38 | M12 $\times 1.75 \times 55$ | 15.5 | 162 | 49.8 | 31.8 | 19.1 | 107 | 63.5 | 1.5 |
| 2 | 1068334 | 1900 | 2400 | 81 | M16 $\times 2.00 \times 65$ | 25.5 | 162 | 49.8 | 31.8 | 19.1 | 107 | 63.5 | 1.5 |
| 2 | 1068343 | 2150 | 2700 | 136 | $\mathrm{M} 20 \times 2.50 \times 70$ | 30.5 | 162 | 49.8 | 31.8 | 19.1 | 107 | 63.5 | 1.6 |
| 3 | 1068352 | 3000 | 3750 | 136 | $\mathrm{M} 20 \times 2.50 \times 80$ | 25.4 | 220 | 75.2 | 41.4 | 25.4 | 159 | 82.6 | 4.6 |
| 3 | 1068361 | 4200 | 5250 | 312 | $\mathrm{M} 24 \times 3.00 \times 90$ | 35.4 | 220 | 75.2 | 41.4 | 25.4 | 159 | 82.6 | 4.8 |
| 4 | 1068370 | 7000** | 8750 | 637 | M $30 \times 3.50 \times 140$ | 66.2 | 285 | 94.2 | 50.8 | 31.8 | 199 | 102 | 9.7 |
| 4 | 1068389 | 11000 | 13750 | 1005 | M36 x $4.00 \times 130$ | 56.2 | 285 | 94.2 | 50.8 | 31.8 | 199 | 102 | 10.2 |

[^13] times the Working Load Limit based on the 4:1 design factor. $\dagger$ Long Bolts are designed to be used with soft metal (i.e., aluminum) workpiece. While the long bolts may also be used with ferrous metal (i.e.,steel \& iron) workpiece, short bolts are designed for ferrous workpieces only. $\ddagger$ Bolt specification is an Alloy socket head cap screw to ASTM A 574 . $\ddagger \ddagger$ Bolt specification is a Grade 12.9 Alloy socket head cap screw to DIN 912. NOTE: The tightening torque values shown are based upon threads being clean, dry and free of lubrication.


HR-1000CT

- All load bearing components are heat treated, Quenched \& Tempered alloy steel.
- All components, with the exception of the retaining ring, are produced with maximum material hardness of 34 HRc . All primary load bearing components have charpy impact testing. The body, bushing, washer and bail meet impact requirements of 31 ft -lbs min. avg. at $-4^{\circ} \mathrm{F}$. The bolt meets impact requirements of $20 \mathrm{ft}-\mathrm{lbs} \mathrm{min}$. avg. at $-150^{\circ} \mathrm{F}$.
- Individually Mag inspected with certification
- Forged bail provides the following:
- Easily readable raised lettering showing the name Crosby or "CG" and PIC Code for material traceability.
- Greater durability providing the increased "Toughness" desired in potentially abusive field conditions
- Larger opening than standard Hoist Ring bail.

- Top washer is color coded for easy identification (blue for UN threads and grey for Metric threads)
- The Working Load Limit and Recommended Torque value are permanently stamped into each washer.
- Individually Proof Tested to 2 times Working Load Limit ( $90^{\circ}$ and in-line).
- BOLT SIZE IDENTIFICATION: The size of the bolt will be stated as in the drawing above. Illustration shows meaning of each dimension given.
- NOTE: For Special Applications, see page 457.
- Type approval and certification in accordance with DNV O fshore Standard DNV-OS-E101, Drilling Plant, October 2013 and Standard for

Certifiation No. 2.22 Lifting Appliances.

- Frame 2 and larger are RFID EQUIPPED.
- Individually serialized.
- $100 \%$ MPI all primary load bearing components.
- Coating: Thermo-diffusion galvanized.
- Optional bolt sizes available upon request.


HR-1000CT UN Threads

| Frame Size No. | $\begin{array}{\|l} \hline \text { HR-1000CT } \\ \text { Stock No. } \\ \hline \end{array}$ | Working Load Limit (Ib)* | Torque (ftolbf) | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $\begin{gathered} \text { Bolt Size } \\ \text { A } \ddagger \\ \hline \end{gathered}$ | Eff. Thread Projection Length B | C | D | Radius $E$ | $\begin{gathered} \text { Diameter } \\ \mathrm{F} \\ \hline \end{gathered}$ | G | H | Mass Each (lb) |
| 2 | 6608103 | 1900 | 28 | 1/2-13 2.25 | 0.70 | 6.32 | 1.96 | 1.25 | 0.75 | 4.20 | 2.50 | 3 |
| 2 | 6608112 | 1900 | 28 | $1 / 2-13 \times 2.75$ | 1.20 | 6.32 | 1.96 | 1.25 | 0.75 | 4.20 | 2.50 | 3 |
| 2 | 6608121 | 3000 | 60 | 5/8-11 $\times 2.25$ | 0.70 | 6.32 | 1.96 | 1.25 | 0.75 | 4.20 | 2.50 | 3 |
| 3 | 6608130 | 4800 | 100 | $3 / 4-10 \times 3.00$ | 0.85 | 8.59 | 2.96 | 1.63 | 1.00 | 6.25 | 3.25 | 11 |
| 3 | 6608139 | 6200 | 160 | $7 / 8-9 \times 3.00$ | 0.85 | 8.59 | 2.96 | 1.63 | 1.00 | 6.25 | 3.25 | 11 |
| 3 | 6608148 | 8300 | 230 | $1-8 \times 3.50$ | 1.35 | 8.59 | 2.96 | 1.63 | 1.00 | 6.25 | 3.25 | 11 |
| 4 | 6608149 | 12500 | 470 | 1-1/4-7 $\times 5.00$ | 2.10 | 11.31 | 3.71 | 2.00 | 1.44 | 8.13 | 4.00 | 24 |
| 4 | 6607669 | 20000 | 800 | 1-1/2-6x5.50 | 2.60 | 11.31 | 3.71 | 2.00 | 1.44 | 8.13 | 4.00 | 27 |
| 4 | 6607727 | 20000 | 800 | 1-1/2-8 $\times 5.50$ | 2.60 | 11.31 | 3.71 | 2.00 | 1.44 | 8.13 | 4.00 | 27 |
| 5 | 6607670 | 28000 | 1100 | 2-4.5 7.50 | 3.20 | 15.15 | 4.00 | 2.69 | 1.75 | 11.64 | 5.00 | 69 |
| 6 | 6607671 | 45000 | 2100 | 21/2-4×9.50 | 3.73 | 19.93 | 5.75 | 3.00 | 2.75 | 14.47 | 5.62 | 157 |

[^14]

HR-1000MCT

- All load bearing components are heat treated, Quenched \& Tempered alloy steel.
- All components, with the exception of the retaining ring, are produced with maximum material hardness of 34 HRc . All primary load bearing components have charpy impact testing. The body, bushing, washer and bail meet impact requirements of 31 ft -lbs min. avg. at $-4^{\circ} \mathrm{F}$. The bolt meets impact requirements of $20 \mathrm{ft}-\mathrm{lbs} \mathrm{min}$. avg. at $-150^{\circ} \mathrm{F}$.
- Individually Mag inspected with certification
- Forged bail provides the following:
- Easily readable raised lettering showing the name Crosby or "CG" and PIC Code for material traceability.
- Greater durability providing the increased "Toughness" desired in potentially abusive field conditions
- Larger opening than standard Hoist Ring bail.

- Top washer is color coded for easy identification (blue for UNC threads and grey for Metric threads)
- The Working Load Limit and Recommended Torque value are permanently stamped into each washer.
- Individually Proof Tested to 2 times Working Load Limit ( $90^{\circ}$ and in-line).
- BOLT SIZE IDENTIFICATION: The size of the bolt will be stated as in the drawing above. Illustration shows meaning of each dimension given.
- NOTE: For Special Applications, see page 457.
- Type approval and certification in accordance with DNV O fshore Standard DNV-OS-E101, Drilling Plant, October 2013 and Standard for Certifiation No. 2.22 Lifting Appliances.
- Frame 2 and larger are RFID EQUIPPED.
- Individually serialized.
- $100 \%$ MPI all primary load bearing components.
- Coating: Thermo-diffusion galvanized.
- Optional bolt sizes available upon request.



## HR-1000MCT Metric Threads

| Frame Size No. | $\begin{aligned} & \text { HR-1000MCT } \\ & \text { Stock No. } \end{aligned}$ | Working Load Limit $(\mathrm{kg})^{\star}$ |  | Torque (Nm) | Dimensions (mm) |  |  |  |  |  |  |  | Mass Each (kg.) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Design Factor 5:1 | Design Factor 4:1 |  | $\begin{gathered} \text { Bolt Size } \\ \text { A } \ddagger \\ \hline \end{gathered}$ | Eff. Thread Projection Length B | C | D | $\begin{array}{\|c\|} \hline \text { Radius } \\ \hline \end{array}$ | Diameter F | G | H |  |
| 2 | 6630058 | 825 | 1,030 | 38 | M12 $\times 1.75 \times 55$ | 15.6 | 160.6 | 49.7 | 31.8 | 19.1 | 106.7 | 63.5 | . |
| 2 | 6630059 | 1,350 | 1,690 | 81 | M16 x $2.00 \times 65$ | 25.5 | 160.6 | 49.7 | 31.8 | 19.1 | 106.7 | 63.5 | 1 |
| 3 | 6630060 | 2,250 | 2,810 | 136 | M20 x $2.50 \times 80$ | 25.3 | 218.2 | 75.1 | 41.4 | 25.4 | 158.8 | 82.6 | 5 |
| 3 | 6630061 | 3,175 | 3,970 | 312 | $\mathrm{M} 24 \times 3.00 \times 90$ | 35.4 | 218.2 | 75.1 | 41.4 | 25.4 | 158.8 | 82.6 | 5 |
| 4 | 6630062 | 5,450 | 6,810 | 637 | M30 $\times 3.50 \times 140$ | 65.9 | 287.3 | 94.1 | 50.8 | 36.6 | 206.5 | 101.6 | 11 |
| 4 | 6630063 | 7,450 | 9,310 | 1,005 | M36 $\times 4.00 \times 130$ | 56.3 | 287.3 | 94.1 | 50.8 | 36.6 | 206.5 | 101.6 | 12 |
| 5 | 6630064 | 13,250 | 16,560 | 1,350 | M48 x $5.00 \times 180$ | 70.7 | 384.9 | 101.6 | 68.3 | 44.5 | 295.6 | 127.0 | 30 |

*Ultimate Load is 5 times the Working Load Limit. $\ddagger$ Bolt specification is an Alloy socket head cap screw to ASTM A320 Grade L7 or L43.
NOTE: The tightening torque values shown are based upon threads being clean, dry and free of lubrication.


## SS-125UNC

- All components are 316 stainless steel, except bolt retainers, which are made from 15-7 PH (UNS 15700) magnetic stainless steel.
- Available in capacities from 400 lbs . to $50,000 \mathrm{lbs}$.
- Rated at 100 percent at 90 degree angle.
- Each product has a Product Identification Code (PIC) for material traceabilit , along with the Working Load Limit and the name Crosby or "CG" stamped into it.
- Individually proof tested to 2 times the Working Load Limit with certification
- Fatigue Rated to 20,000 cycles at $1-1 / 2$ times the Working Load Limit.
- Washer is color coded for easy identification (Red - UNC thread)
- Bolt specification is 316 Stainless Steel socket head cap screw to ASTM F 837M (316).
- All threads listed are Metric UNC.
- BOLT SIZE IDENTIFICATION: The size of the bolt will be stated as in the drawing above. Illustration shows meaning of each dimension given.
- NOTE: For Special Applications, see page 457.
- Frame 2 and larger are RFID EQUIPPED.



## SS-125UNC Threads

| Frame Size No. | SS-125UNC Stock No. | Working Load Limit (lb)* | Torque (ft-lbs) | Dimensions (in) |  |  |  |  |  |  |  | Weight Each (lb) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Bolt Size A $\ddagger$ | Effective Thread Projection Length B | C | D | Radius E | Diameter F | G | H |  |
| 1 | 1065000 | 400 | 3.5 | 5/16-18 $\times 1.0$ | . 29 | 2.67 | . 85 | . 43 | . 34 | 1.84 | 1.27 | . 30 |
| 1 | 1065004 | 400 | 3.5 | $5 / 16-18 \times 1.25$ | . 54 | 2.67 | . 85 | . 43 | . 34 | 1.84 | 1.27 | . 30 |
| 1 | 1065008 | 500 | 6 | $3 / 8-16 \times 1.25$ | . 54 | 2.67 | . 85 | . 43 | . 34 | 1.84 | 1.27 | . 30 |
| 2 | 1065016 | 1250 | 14 | $1 / 2-13 \times 2.0$ | . 78 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.31 | 2.6 |
| 2 | 1065020 | 1250 | 14 | $1 / 2-13 \times 2.25$ | 1.03 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.31 | 2.6 |
| 2 | 1065024 | 1250 | 14 | 1/2-13 2.5 | 1.28 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.31 | 2.6 |
| 2 | 1065028 | 2000 | 30 | 5/8-11 x 2.0 | . 78 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.18 | 2.6 |
| 2 | 1065032 | 2000 | 30 | $5 / 8-11 \times 2.25$ | 1.03 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.18 | 2.6 |
| 2 | 1065036 | 2000 | 30 | 5/8-11 x 2.5 | 1.28 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.18 | 2.6 |
| 2 | 1065040 | 2500 | 50 | $3 / 4-10 \times 2.25$ | 1.03 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.06 | 3.0 |
| 2 | 1065044 | 2500 | 50 | $3 / 4-10 \times 2.75$ | 1.53 | 4.78 | 1.45 | . 88 | . 69 | 3.52 | 2.06 | 3.0 |
| 3 | 1065048 | 3500 | 50 | $3 / 4-10 \times 2.75$ | 1.04 | 6.52 | 2.20 | 1.40 | . 94 | 5.14 | 3.06 | 7.0 |
| 3 | 1065052 | 3500 | 50 | $3 / 4-10 \times 3.25$ | 1.54 | 6.52 | 2.20 | 1.40 | . 94 | 5.14 | 3.06 | 7.0 |
| 3 | 1065056 | 4000 | 80 | $7 / 8-9 \times 2.75$ | 1.04 | 6.52 | 2.20 | 1.40 | . 94 | 5.14 | 2.93 | 7.0 |
| 3 | 1065060 | 4000 | 80 | $7 / 8-9 \times 3.0$ | 1.29 | 6.52 | 2.20 | 1.40 | . 94 | 5.14 | 2.93 | 7.0 |
| 3 | 1065064 | 5000 | 115 | $1-8 \times 3.0$ | 1.29 | 6.52 | 2.20 | 1.40 | . 94 | 5.14 | 2.81 | 7.5 |
| 3 | 1065068 | 5000 | 115 | $1-8 \times 3.25$ | 1.54 | 6.52 | 2.20 | 1.40 | . 94 | 5.14 | 2.81 | 7.5 |
| 3 | 1065072 | 5000 | 115 | $1-8 \times 4.0$ | 2.29 | 6.52 | 2.20 | 1.40 | . 94 | 5.14 | 2.81 | 7.5 |
| 4 | 1065080 | 7500 | 235 | 1-1/4-7x4.0 | 1.89 | 8.73 | 3.19 | 1.75 | 1.25 | 6.50 | 4.12 | 14.0 |
| 5 | 1065084 | 12000 | 400 | 1-1/2-6 x 5.5 | 2.70 | 12.47 | 4.87 | 2.25 | 1.75 | 8.55 | 6.41 | 34.0 |
| 5 | 1065088 | 15000 | 550 | $2-4.5 \times 5.75$ | 2.96 | 12.47 | 4.87 | 2.25 | 1.75 | 8.55 | 5.91 | 36.0 |
| 6 | 1065092 | 25000 | 1050 | 2-1/2-4 x 8.0 | 4.00 | 16.87 | 6.52 | 3.00 | 2.25 | 11.67 | 8.03 | 88.0 |
| 6 | 1065096 | 25000 | 1050 | 2-1/2-8x8.0 | 4.00 | 16.87 | 6.52 | 3.00 | 2.25 | 11.67 | 8.03 | 88.0 |
| 7 | 1065100 | 37500 | 2150 | $3-4 \times 10.25$ | 5.00 | 19.50 | 8.10 | 3.75 | 2.75 | 14.15 | 8.48 | 166.0 |
| 8 | 1065104 | 50000 | 2550 | 3-1/2-4×13 | 7.00 | 22.09 | 8.60 | 4.00 | 3.25 | 15.90 | 9.28 | 265.0 |

[^15]$\ddagger$ Bolt specification is 316 Stainless Steel socket head cap screw to ASTM F 837 Group 1 (316).


SS-125M

- All components are 316 stainless steel, except bolt retainers, which are made from 15-7 PH (UNS 15700) magnetic stainless steel.
- Available in capacities from 200 kg to 22.300 kg .
- Rated at 100 percent at 90 degree angle.
- Each product has a Product Identification Code (PIC) for material traceabilit , along with the Working Load Limit and the name Crosby or "CG" stamped into it.
- Individually proof tested to 2 times the Working Load Limit with certification
- Fatigue Rated to 20,000 cycles at 1-1/2 times the Working Load Limit.
- Washer is color coded for easy identification (Silver - Metric thread)
- Bolt specification is 316 Stainless Steel socket head cap screw to ASTM F 837M (316).
- All threads listed are Metric (ASME/ANSI B18.3.1M).
- BOLT SIZE IDENTIFICATION: The size of the bolt will be stated as in the drawing above. Illustration shows meaning of each dimension given.
- NOTE: For Special Applications, see page 457.
- Frame 2 and larger are RFID EQUIPPED.


SS-125M Metric Threads

|  |  |  |  | Dimensions (mm) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Frame Size No. | SS-125M Stock No. | Working Load Limit (kg)* | $\begin{aligned} & \text { Torque } \\ & \text { in } \\ & (\mathrm{Nm}) \\ & \hline \end{aligned}$ | Bolt Size A $\ddagger$ | Effective <br> Thread Projection Length B | C | D | Radius E | Diameter F | G | H | Weight Each (kg) |
| 1 | 1065203 | 200 | 4 | M8 $\times 1.25$ | 13 | 68 | 21.6 | 11 | 8.5 | 47 | 32 | . 17 |
| 1 | 1065207 | 250 | 8 | M10 x 1.50 | 18 | 68 | 21.6 | 11 | 8.5 | 47 | 30 | . 17 |
| 2 | 1065211 | 525 | 18 | M12 x 1.75 | 19 | 121 | 37 | 22 | 17.5 | 89 | 60 | 1.1 |
| 2 | 1065215 | 950 | 40 | M16 x 2.00 | 29 | 121 | 37 | 22 | 17.5 | 89 | 56 | 1.1 |
| 2 | 1065219 | 1075 | 68 | M20 x 2.50 | 34 | 121 | 37 | 22 | 17.5 | 89 | 52 | 1.2 |
| 3 | 1065223 | 1500 | 68 | M20 x 2.50 | 32 | 166 | 56 | 36 | 25 | 131 | 78 | 3.0 |
| 3 | 1065227 | 2100 | 108 | M24 x 3.00 | 37 | 166 | 56 | 36 | 25 | 131 | 74 | 3.1 |
| 3 | 1065231 | 2100 | 108 | M30 $\times 3.50$ | 58 | 206 | 56 | 36 | 25 | 131 | 108 | 3.1 |
| 4 | 1065235 | 3500 | 318 | M30 $\times 3.50$ | 42 | 222 | 81 | 45 | 31 | 165 | 106 | 6.3 |
| 4 | 1065239 | 3500 | 318 | M30 $\times 3.50$ | 62 | 222 | 81 | 45 | 31 | 165 | 106 | 6.4 |
| 5 | 1065243 | 5500 | 542 | M36 $\times 4.00$ | 64 | 317 | 124 | 57 | 43 | 217 | 166 | 15.5 |
| 5 | 1065247 | 6250 | 542 | M42 x 4.50 | 82 | 317 | 124 | 57 | 43 | 217 | 160 | 16.0 |
| 5 | 1065251 | 6750 | 542 | $\mathrm{M} 48 \times 5.00$ | 82 | 317 | 124 | 57 | 43 | 217 | 154 | 16.8 |
| 6 | 1065255 | 11150 | 1423 | M64 x 6.00 | 101 | 428 | 165 | 76 | 56 | 296 | 204 | 39.0 |
| 7 | 1065259 | 15750 | 2915 | M72 x 6.00 | 132 | 495 | 206 | 95 | 69 | 359 | 220 | 74.0 |
| 8 | 1065263 | 22300 | 3459 | M90 x 6.00 | 177 | 561 | 216 | 102 | 83 | 404 | 235 | 118.0 |

[^16]

- Designed to simplify the lifting and placement of steel plates used to cover trenches in streets.
- Provides a standard fitting to be used in place of products not designed for trench cover applications.
- Capacities of $5,000,10,000 \& 15,000 \mathrm{lbs}$. for plate thicknesses of $3 / 4$ " to 1-1/2".
- Detailed welding instructions included with every hoist ring.
- Forged bail provides the following:
- Easily readable raised lettering showing the name Crosby or "CG" and PIC code for material traceability.
- More durability provides the increased "Toughness" desired in potentially abusive field conditions
- 180 degree pivot and 360 degree rotation at full capacity.

- Design Factor of 5 to 1 .
- Individually Proof Tested to 2-1/2 times Working Load Limit.
- All sizes are RFID EQUIPPED.


HR-500 Trench Cover Hoist Rings Coil Threads

| $\begin{aligned} & \text { HR-500 } \\ & \text { Stock No. } \end{aligned}$ | Working Load Limit (Ib)* | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Coil <br> Thread Size A | Effective Thread Projection Length B | C | D | Radius E | F | G | H | J |
| 1017907 | 5000 | 5.6 | 1"-3.5 | 1.00 | 5.90 | 5.50 | 1.25 | . 75 | 4.20 | 2.50 | . 77 |
| 1017916 | 10000 | 15.7 | 1-1/4"-3.5 | 1.00 | 8.27 | 7.00 | 1.63 | 1.00 | 6.25 | 3.25 | . 81 |
| 1017925 | 15000 | 29.8 | 1-1/2" -3.5 | 1.50 | 10.63 | 9.13 | 2.00 | 1.25 | 7.82 | 4.00 | . 80 |


HRN-500 Trench Cover Nuts

| HRN-500 <br> Stock No. | Working Load Limit (lb) | Weight Each <br> (lb) | Coil ThreadSize | Dimensions (in) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Nut Diam. K | TrenchCover Hole Diam. L | Nut Thickness M |
| 1063405 | 5000 | 1.2 | 1"-3.5 | 3.00 | 3.12 | . 75 |
| 1063414 | 5000 | 1.4 | 1"-3.5 | 3.00 | 3.12 | . 88 |
| 1063423 | 5000 | 1.6 | 1"-3.5 | 3.00 | 3.12 | 1.00 |
| 1063432 | 10000 | 1.1 | 1-1/4"- 3.5 | 3.00 | 3.12 | . 75 |
| 1063441 | 10000 | 1.3 | 1-1/4"-3.5 | 3.00 | 3.12 | . 88 |
| 1063450 | 10000 | 1.5 | 1-1/4"-3.5 | 3.00 | 3.12 | 1.00 |
| 1063454 | 10000 | 1.9 | 1-1/4"- 3.5 | 3.00 | 3.12 | 1.25 |
| 1063458 | 10000 | 2.3 | 1-1/4"- 3.5 | 3.00 | 3.12 | 1.50 |
| 1063469 | 15000 | 2.0 | 1-1/2"-3.5 | 3.50 | 3.62 | 1.00 |
| 1063478 | 15000 | 2.6 | 1-1/2"-3.5 | 3.50 | 3.62 | 1.25 |
| 1063487 | 15000 | 3.1 | 1-1/2"-3.5 | 3.50 | 3.62 | 1.50 |

## Trench Cover Lifting Ring Tools and Accessories



HR-500HG Hole Gauge
Aids in determining when studs and plate nuts need replacing.

| Coil Thread Size <br> (in) | HR-500HG <br> Stock No. | Weight Each <br> (Ib) |
| :---: | :---: | :---: |
| $1.00-3.5$ | 1064666 | .6 |
| $1.25-3.5$ | 1064675 | .8 |
| $1.50-3.5$ | 1064684 | 1.0 |

HR-500TC Thread Clean-Up Tool
Cleans dirt and other material as from nut threads.

| Coil Thread <br> Size <br> (in) | HR-500TC <br> Stock No. | Weight Each <br> (lb) |
| :---: | :---: | :---: |
| $1.00-3.5$ | 1064639 | 1.2 |
| $1.25-3.5$ | 1064648 | 1.7 |
| $1.50-3.5$ | 1064657 | 1.9 |



HR-500WF Weld Fixture
Holds nut securely in place to ease in initial tack welding.

| Coil Thread <br> Size <br> (in) | HR-500WF <br> Stock No. | Weight Each <br> (Ib) |
| :---: | :---: | :---: |
| $1.00-3.5$ | 1064602 | 1.8 |
| $1.25-3.5$ | 1064611 | 2.1 |
| $1.50-3.5$ | 1064620 | 2.5 |



HR-100 UNC

- Forged bail provides the following:
- Easily readable raised lettering showing the name Crosby or "CG" and PIC code for material traceability.
- More durability provides the increased "Toughness" desired in potentially abusive field conditions
- Larger opening than standard Hoist Ring bails.
- 180 degree pivot action at full capacity.
- Bolts included as part of assembly.
- Design Factor of 5 to 1.
- Individually Proof Tested to 2-1/2 times Working Load Limit.
- UNC Bolt specification is a Grade 8 Alloy socket head cap screw to ASTM A 574.
- Frame 2 and larger are RFID EQUIPPED.


HR-100 Pivot Hoist Rings Coil Threads

| Frame Size No. | $\begin{gathered} \text { HR-100 } \\ \text { Stock No. } \end{gathered}$ | Working Load Limit (Ib)* | Torque in (ft•lbf) | No. of Bolts | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | $\underset{A}{\text { Bolt Size }}$ | Effective Thread Projection Length B | C | $\underset{\mathbf{D}}{\text { Diameter }}$ | $\underset{E}{\text { Radius }}$ | F | G | H | J | K |
| 1 | 1067408 | 2000 | 7 | 2 | . 6 | 5/16-18x 1.25 | . 82 | 3.43 | 2.00 | . 62 | . 44 | 2.27 | 1.38 | 1.00 | - |
| 2 | 1067417 | 2500 | 12 | 2 | 3.1 | $3 / 8-16 \times 1.25$ | . 65 | 6.03 | 2.25 | 1.25 | . 75 | 4.20 | 2.50 | 1.13 | - |
| 2 | 1067426 | 5000 | 28 | 2 | 3.3 | 1/2-13x2.00 | 1.40 | 6.03 | 2.63 | 1.25 | . 75 | 4.20 | 2.50 | 1.50 | - |
| 3 | 1067435 | 12000 | 28 | 4 | 10.5 | 1/2-13 2.75 | 1.65 | 8.27 | 3.13 | 1.63 | 1.00 | 6.25 | 3.25 | 1.63 | 1.25 |
| 4 | 1067444 | 20000 | 60 | 4 | 22.0 | 5/8-11 x 3.25 | 1.65 | 10.63 | 4.47 | 2.00 | 1.25 | 7.82 | 4.00 | 2.06 | 1.25 |

[^17]

- Wide range of capacities available:
- 650 lbs . to $29,000 \mathrm{lbs}$.
- Metric sizes from 0.3 tonnes to 13 tonnes.
- Body components are Alloy Steel - Quenched and Tempered.
- Rated at $100 \%$ of Working Load Limit for angles up to 90 degrees.
- Each product is stamped with a Product Identification Code (PIC) for material traceability, along with a Working Load Limit, and the name Crosby or "CG".
- Hoist Ring body is furnished with Yellow Chromate finish for improved corrosion resistance.
- Utilize standard Crosby Red Pin ${ }^{\circledR}$ Shackles to connect to wire rope or synthetic slings. (sold separately)
- Multiple bolt lengths available to meet specific application requirements

- Individually Proof Tested to 2-1/2 times Working Load Limit.
- All sizes are RFID EQUIPPED.


HR-1200 UNC Side Pull Hoist Rings

| Weight Each (lb) | Working Load Limit (lb)* | $\begin{gathered} \text { HR-1200 } \\ \text { Stock } \\ \text { No. } \\ \hline \end{gathered}$ | Hoist Ring Bolt Torque (ftlbf) | $\begin{gathered} \text { Bolt } \\ \text { Size } \\ \mathbf{A} \end{gathered}$ | Eff.ThreadProj.(in)B | Dimensions (in) |  |  |  |  |  |  | Recommended Shackles |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | C | D | E | F | Dia. G | H | 1 | $\begin{gathered} \hline \text { Red Pin }{ }^{\ominus} \text { Shackles } \\ 209,210,213, \\ 215,2130,2150 \\ \hline \end{gathered}$ |  | Red PinWeb ShacklesS-281 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | Nominal Size (in) | $\begin{gathered} \text { WLL } \\ (\mathrm{t}) \\ \hline \end{gathered}$ | Web Size (in) | $\begin{gathered} \text { WLL } \\ (\mathrm{t}) \\ \hline \end{gathered}$ |
| . 35 | 650 | 1067700 | 7 | 5/16-18x1.50 | . 59 | 1.93 | . 72 | 1.00 | 1.56 | . 80 | . 85 | 1.43 | 1/2, 5/8 | 2, 3-1/4 | 2 | 3-1/4 |
| . 36 | 800 | 1067704 | 12 | 3/8-16x1.50 | . 59 | 1.93 | . 72 | 1.00 | 1.56 | . 80 | . 85 | 1.43 | 1/2, 5/8 | 2, 3-1/4 | 2 | 3-1/4 |
| 1.4 | 2000 | 1067708 | 28 | 1/2-13x2.00 | . 71 | 2.97 | . 97 | 2.00 | 2.13 | . 93 | 1.07 | 1.79 | 5/8, 3/4 | 3-1/4, 4-3/4 | 2, 1.5 | 3-1/4, 4-1/2 |
| 1.4 | 2000 | 1067712 | 28 | 1/2-13x2.50 | 1.21 | 2.97 | . 97 | 2.00 | 2.13 | . 93 | 1.07 | 1.79 | 5/8, 3/4 | 3-1/4, 4-3/4 | 2, 1.5 | 3-1/4, 4-1/2 |
| 1.5 | 3000 | 1067716 | 60 | 5/8-11x2.00 | . 71 | 2.97 | . 97 | 2.00 | 2.13 | . 93 | 1.07 | 1.79 | 5/8, 3/4 | 3-1/4, 4-3/4 | 2, 1.5 | 3-1/4, 4-1/2 |
| 1.5 | 3000 | 1067720 | 60 | 5/8-11x2.75 | 1.46 | 2.97 | . 97 | 2.00 | 2.13 | . 93 | 1.07 | 1.79 | 5/8, 3/4 | 3-1/4, 4-3/4 | 2, 1.5 | 3-1/4, 4-1/2 |
| 4.5 | 5000 | 1067724 | 100 | 3/4-10x2.75 | . 90 | 4.32 | 1.34 | 3.00 | 3.00 | 1.07 | 1.35 | 2.42 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 4.6 | 5000 | 1067728 | 100 | 3/4-10x3.50 | 1.65 | 4.32 | 1.34 | 3.00 | 3.00 | 1.07 | 1.35 | 2.42 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 4.6 | 6500 | 1067732 | 160 | 7/8-9x2.75 | . 90 | 4.32 | 1.34 | 3.00 | 3.00 | 1.07 | 1.35 | 2.42 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 4.8 | 6500 | 1067736 | 160 | 7/8-9x3.50 | 1.65 | 4.32 | 1.34 | 3.00 | 3.00 | 1.07 | 1.35 | 2.42 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 4.8 | 8000 | 1067740 | 230 | $1-8 \times 3.00$ | 1.15 | 4.32 | 1.34 | 3.00 | 3.00 | 1.07 | 1.35 | 2.42 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 5.0 | 8000 | 1067744 | 230 | $1-8 \times 4.00$ | 2.15 | 4.32 | 1.34 | 3.00 | 3.00 | 1.07 | 1.35 | 2.42 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 10.2 | 14000 | 1067748 | 470 | 1-1/4-7x4.5 | 2.22 | 5.59 | 1.57 | 3.75 | 3.91 | 1.47 | 1.92 | 3.42 | 1, 1-1/8, 1-1/4 | 8-1/2, 9-1/2, 12 | 3 | 8-1/2 |
| 23.5 | 17200 | 1067756 | 800 | 1-1/2-6x6.5 | 2.98 | 7.31 | 2.06 | 4.75 | 5.19 | 2.11 | 2.41 | 4.29 | 1-3/8, 1-1/2, 1-3/4 | 13-1/2, 17, 25 | - | - |
| 25.3 | 29000 | 1067764 | 1100 | $2-4.5 \times 6.5$ | 2.98 | 7.31 | 2.06 | 4.75 | 5.19 | 2.11 | 2.41 | 4.29 | 1-3/8, 1-1/2, 1-3/4 | 13-1/2, 17, 25 | - | - |

*Ultimate Load is 5 times the Working Load Limit.
HR-1200M Metric Side Pull Hoist Rings

| Weight Each (kg) | Working Load Limit $(\mathrm{kg})^{*}$ | $\begin{gathered} \text { HR- } \\ \text { 1200M } \\ \text { Stock No. } \end{gathered}$ | Hoist Ring Bolt Torque (Nm) | $\begin{gathered} \text { Bolt } \\ \text { Size } \\ \text { A } \\ \hline \end{gathered}$ | $\begin{array}{\|l} \text { Eff. } \\ \text { Thread } \\ \text { Proj. } \\ \text { (mm) } \\ \hline \end{array}$ | Dimensions (mm) |  |  |  |  |  |  | Recommended Shackles |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | C | D | E | F | G | H | I | $\begin{gathered} \hline \text { Red Pin }{ }^{\ominus} \text { Shackles } \\ 209,210,213, \\ 215,2130,2150 \\ \hline \end{gathered}$ |  | Red PinWeb ShacklesS-281 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \hline \text { Nominal } \\ & \text { Size } \\ & \text { (in) } \\ & \hline \end{aligned}$ | $\begin{gathered} \text { WLL } \\ (\mathrm{t}) \\ \hline \end{gathered}$ | Web Size (in) | $\begin{gathered} \text { WLL } \\ (\mathrm{t}) \\ \hline \end{gathered}$ |
| . 18 | 300 | 1067803 | 10 | M8x1.25x40 | 16.9 | 49.0 | 18.3 | 25.4 | 39.6 | 20.3 | 21.6 | 36.3 | 1/2, 5/8 | 2, 3-1/4 | 2 | 3-1/4 |
| . 18 | 400 | 1067807 | 16 | M10x1.50x40 | 16.9 | 49.0 | 18.3 | 25.4 | 39.6 | 20.3 | 21.6 | 36.3 | 1/2, 5/8 | 2, 3-1/4 | 2 | 3-1/4 |
| . 63 | 1000 | 1067811 | 38 | M12x1.75x50 | 17.2 | 75.4 | 24.6 | 50.8 | 54.1 | 23.6 | 27.2 | 45.5 | 5/8, 3/4 | 3-1/4, 4-3/4 | 2, 1.5 | 3-1/4, 4-1/2 |
| . 68 | 1400 | 1067815 | 81 | M16x2.0x60 | 27.2 | 75.4 | 24.6 | 50.8 | 54.1 | 23.6 | 27.2 | 45.5 | 5/8, 3/4 | 3-1/4, 4-3/4 | 2, 1.5 | 3-1/4, 4-1/2 |
| 2.0 | 2250 | 1067823 | 136 | M20x2.5x75 | 28.1 | 110 | 34.0 | 76.2 | 76.2 | 27.2 | 34.4 | 61.5 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 2.2 | 3500 | 1067827 | 312 | M24x3.0x80 | 33.1 | 110 | 34.0 | 76.2 | 76.2 | 27.2 | 34.4 | 61.5 | 7/8 | 6-1/2 | 2 | 6-1/4 |
| 4.5 | 6250 | 1067831 | 637 | M30x3.5×120 | 65.1 | 142 | 39.9 | 95.3 | 99.3 | 37.3 | 48.8 | 86.9 | 1, 1-1/8,1-1/4 | 8-1/2, 9-1/2, 12 | 3 | 8-1/2 |
| 10.4 | 7750 | 1067835 | 1005 | M36x4.0x150 | 60.6 | 186 | 52.3 | 121 | 132 | 53.6 | 61.2 | 109 | 1-3/8, 1-1/2,1-3/4 | 13-1/2, 17, 25 | - | - |
| 10.7 | 10000 | 1067839 | 1005 | M42x4.5x160 | 70.6 | 186 | 52.3 | 121 | 132 | 53.6 | 61.2 | 109 | 1-3/8, 1-1/2,1-3/4 | 13-1/2, 17, 25 | - | - |
| 11.0 | 13000 | 1067843 | 1350 | M48x5.0x160 | 70.6 | 186 | 52.3 | 121 | 132 | 53.6 | 61.2 | 109 | 1-3/8, 1-1/2,1-3/4 | 13-1/2, 17, 25 | - | - |

[^18]
# Grosby Rig Sate, Rig Smart Tr 



The visible red QUIC-CHECK ${ }^{\circledR}$ mark indicates that the Crosby Slide-Loc ${ }^{\text {TM }}$ is ready for installation but not for lifting.

QUIC-CHECK ${ }^{\circledR}$ $Q$

When the red QUIC-CHECK ${ }^{\circledR}$ mark is under the slide, the Crosby Slide-Loc ${ }^{\text {Tm }}$ is ready for lifting.

## CROSBY'S INNOVATIVE ALTERNATIVE TO STANDARD EYE BOLTS

The new Crosby SL-150 Slide-Loc ${ }^{\text {TM }}$ provides features not found on standard lifting eye bolts. At the center of the new design is the patent pending locking mechanism that slides to lock the bolt for faster installation, then slides back to make ready for lifting - without the need for tools.

- When compared to respective size eye bolts, the Crosby SL-150 Slide-Loc ${ }^{\mathrm{mm}}$ :
- Has a larger eye opening for easy access.
- Utilizes a bail that swivels $360^{\circ}$ to keep load aligned with the sling leg, and maintains full WLL at any angle.
- Fatigue Rated ${ }^{\circledR}$ to 20,000 cycles at $1-1 / 2$ times the WLL.
- The patent pending locking mechanism provides quicker installation, without the need for tools.
- QUIC-CHECK ${ }^{\oplus}$ mark indicates if the Crosby SL-150 Slide-Loc ${ }^{\text {™ }}$ is ready for the lift.
- Forged alloy steel and Quenched and Tempered bail provides toughness in potentially abusive field conditions.

- Meets the Machinery Directive 2006/42/EC guidelines and is marked with CE accordingly.
- Available in capacities from .5 to 3.2 metric tons.
- Bail is Forged Alloy Steel - Quenched and Tempered.
- Bail swivels $360^{\circ}$ degrees.
- Rated at $100 \%$ for 90 degree angle.
- Fatigue rated to 20,000 cycles at 1-1/2 times the Working Load Limit.
- Meets the Machinery Directive 2006/42/EC guidelines and is marked with CE accordingly.
- Bolt specification for metric bolt is Grade 10.9 alloy cap screw to SO 898-1.
- Unique locking mechanism makes the lifting point well suited for quick attachment to load surface. No need for tools.
- Features QUIC-CHECK® markings on bail to assist in knowing when device is ready for lifting.


## SL-150

## Slide-Loc

Lifting Point

## CE Load Raded <br>  <br> QUIC-CHECK ${ }^{\circ}$ <br> 

SL-150 UNC SLIDE-LOC ${ }^{\text {™ }}$ LIFT POINT

| Weight Each <br> (lb) | $\begin{gathered} \text { SL-150 } \\ \text { Stock No. } \end{gathered}$ | Working Load Limit (t)* | Dimensions (in) |  |  |  |  |  |  | Effective Thread Projection Length |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{gathered} \text { Bolt Size } \\ \text { A } \\ \hline \end{gathered}$ | B | C | E | F | H | J | T |
| 0.30 | 1068407 | 0.50 | $3 / 8-16 \times 1$ | 1.40 | 2.09 | 1.10 | 0.33 | 1.11 | 1.77 | 0.60 |
| 0.53 | 1068416 | 0.75 | $1 / 2-13 \times 1-1 / 4$ | 1.67 | 2.47 | 1.30 | 0.41 | 1.30 | 2.13 | 0.79 |
| 1.10 | 1068425 | 1.50 | $5 / 8-11 \times 1-5 / 8$ | 2.17 | 2.98 | 1.46 | 0.52 | 1.46 | 2.50 | 1.01 |
| 2.05 | 1068434 | 2.30 | 3/4-10 $\times 2$ | 2.71 | 3.59 | 1.72 | 0.63 | 1.72 | 2.98 | 1.26 |
| 2.16 | 1068443 | 2.30 | 7/8-9x2 | 2.71 | 3.61 | 1.72 | 0.63 | 1.72 | 2.98 | 1.23 |
| 3.73 | 1068452 | 3.20 | $1-8 \times 2-1 / 2$ | 3.25 | 4.33 | 2.08 | 0.76 | 1.93 | 3.59 | 1.59 |

*Ultimate load is 4 times the Working Load Limit.

## SL-150 METRIC SLIDE-LOC™ LIFT POINT

| Weight Each (kg) | $\begin{aligned} & \text { SL-150M } \\ & \text { Stock No. } \end{aligned}$ | Working Load Limit$(t)^{*}$ | Dimensions (mm) |  |  |  |  |  |  | Effective Thread Projection Length |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{gathered} \text { Bolt Size } \\ \text { A } \\ \hline \end{gathered}$ | B | C | E | F | H | J | T |
| . 14 | 1068515 | 0.50 | M10X1.5 X 25 | 35.5 | 53.0 | 28.0 | 8.5 | 27.8 | 45.0 | 14.6 |
| . 23 | 1068524 | 0.75 | M12x1.75x30 | 42.5 | 62.6 | 33.0 | 10.5 | 32.9 | 54.0 | 18.3 |
| . 50 | 1068533 | 1.50 | M16x2x40 | 55.0 | 75.7 | 37.0 | 13.2 | 37.0 | 63.4 | 24.5 |
| . 94 | 1068542 | 2.30 | M20x2.5×50 | 68.8 | 91.1 | 43.9 | 16.0 | 43.6 | 75.6 | 31.0 |
| 1.60 | 1068551 | 3.20 | M24x3x60 | 82.5 | 110.0 | 52.8 | 19.2 | 52.8 | 91.2 | 37.0 |

*Ultimate load is 4 times the Working Load Limit.


S-265
Weld-On Pivot Link

- Forged Steel — Quenched and Tempered.
- Excellent welding qualities.
- Widely used on farm machinery, trucks, steel hulled marine vessels and material handling equipment.
- Reference American Welding Society specifications for proper welding procedures.


SEE APPLICATION AND WARNING INFORMATION On Pages $208-209$ Para Español: www.thecrosbygroup.com


## S-265 Weld-On Pivot Link

| Working Load Limit (t) |  | $\begin{gathered} \text { S-265 } \\ \text { Stock No } \end{gathered}$ | Weight Each <br> (lb) | Dimensions <br> (in) |  |  |  |  |  |  | Minimum Fillet Weld Size (in) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Design Factor $5: 1$ | Design Factor 4:1 |  |  | A | B | C | D | F | G | H |  |
| 1 | 1.2 | 1290740 | . 88 | 1.57 | 1.42 | 3.27 | 1.38 | . 51 | 2.60 | 1.65 | 3/32 |
| 2.5 | 3.2 | 1290768 | 1.32 | 1.77 | 1.73 | 3.90 | 1.65 | . 71 | 3.19 | 1.89 | 3/32 |
| 4.2 | 5.3 | 1290786 | 2.65 | 2.17 | 2.38 | 4.84 | 1.93 | . 87 | 3.90 | 2.24 | 1/4 |
| 6.4 | 8 | 1290802 | 5.29 | 2.76 | 2.52 | 5.67 | 2.52 | 1.02 | 4.80 | 2.64 | 1/4 |
| 12 | 15 | 1290820 | 13.01 | 3.82 | 3.54 | 7.60 | 3.39 | 1.34 | 6.50 | 3.70 | 5/16 |



- Turnbuckle assembly combinations include: Eye and Eye, Hook and Hook, Hook and Eye, Jaw and Jaw \& Jaw and Eye.
- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Crosby's Quenched and Tempered end fittings and normalized bodies ave enhanced impact properties for greater toughness at all temperatures.
- Hot Dip galvanized.
- Hooks are forged with a greater cross sectional area that results in a stronger hook with better fatigue properties.
- Modified UNJ thread on end fitings for improved fatigue properties. Body has UNC thread
- Turnbuckle eyes are forged elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckle sizes $1 / 4^{\prime \prime}$ through $2-1 / 2^{\prime \prime}$, a shackle one size smaller can be reeved through eye.
- Forged jaw ends are fitted with bolts and nuts on size $1 / 4^{\prime \prime}-5 / 8^{\prime \prime}$, and pins and cotter on sizes $3 / 4^{\prime \prime}$ through $2-3 / 4^{\prime \prime}$
- TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.
- Lock Nuts available for all sizes.
- Typical hardness levels, tensile strengths and ductility properties are available for all sizes.
- Turnbuckles can be furnished proof tested or magnaflux inspected with certificates if requested at time of ord
- Meets or exceeds all the requirements of ASME B30.26 including identification, ductilit , design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements, including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


Meets the performance requirements of Federal Specifications FF- -791b, Type 1 Form 1 - CLASS 5, and ASTM F-1145, except for those provisions required of the contractor. For additional information, see page 452.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Hot Dip galvanized steel.
- Hooks are forged with a greater cross sectional area that results in a stronger hook with better fatigue properties.
- TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.
- Modified UNJ thread on end fittings for improved fatigue properties
- Body has UNC threads.
- Lock Nuts available for all sizes (see page 198).
- Comprehensive end fitting data provided on page 194.
- Fatigue Rated.
- Meets or exceeds all requirements of ASME B30.26 including identificatio , ductility, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


HG-223 Hook \& Hook

| Thread Dia. \& Take Up (in) | HG-223 <br> Stock No. | Working Load Limit (Ib)* | Weight Each (lb) | $\begin{aligned} & \text { Dimensions } \\ & \text { (in) } \end{aligned}$ |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | D | $\begin{gathered} \mathrm{E} \\ \text { Closed } \\ \hline \end{gathered}$ | F | $\begin{gathered} \text { J } \\ \text { Open } \end{gathered}$ | $\begin{gathered} \text { K } \\ \text { Closed } \end{gathered}$ | $\begin{gathered} \text { M } \\ \text { Open } \\ \hline \end{gathered}$ |  | BB |
| $\dagger 1 / 4 \times 4$ | 1030011 | 400 | . 33 | . 25 | . 44 | 1.67 | 1.27 | 9.79 | 7.38 | 12.20 | 8.20 | 4.07 |
| †5/16 $\times 4-1 / 2$ | 1030039 | 700 | . 52 | . 31 | . 50 | 2.00 | 1.50 | 11.58 | 8.58 | 14.08 | 9.58 | 4.58 |
| $\dagger 3 / 8 \times 6$ | 1030057 | 1000 | . 83 | . 38 | . 56 | 2.28 | 1.77 | 15.23 | 10.62 | 17.84 | 11.84 | 6.10 |
| $1 / 2 \times 6$ | 1030075 | 1500 | 1.88 | . 50 | . 65 | 3.53 | 2.28 | 17.98 | 13.20 | 20.76 | 14.76 | 6.03 |
| $1 / 2 \times 12$ | 1030119 | 1500 | 2.77 | . 50 | . 65 | 3.51 | 2.28 | 30.27 | 19.49 | 33.05 | 21.05 | 12.36 |
| $5 / 8 \times 6$ | 1030137 | 2250 | 3.21 | . 63 | . 90 | 4.24 | 2.81 | 19.50 | 14.50 | 22.50 | 16.50 | 6.03 |
| $5 / 8 \times 12$ | 1030173 | 2250 | 4.58 | . 63 | . 90 | 4.23 | 2.81 | 31.84 | 20.84 | 34.84 | 22.84 | 12.39 |
| $3 / 4 \times 6$ | 1030191 | 3000 | 4.20 | . 75 | . 98 | 5.07 | 3.33 | 21.19 | 15.98 | 24.40 | 18.40 | 6.13 |
| $3 / 4 \times 12$ | 1030235 | 3000 | 6.92 | . 75 | . 98 | 5.04 | 3.33 | 33.59 | 22.38 | 36.80 | 24.80 | 12.59 |
| $3 / 4 \times 18$ | 1030253 | 3000 | 8.65 | . 75 | . 98 | 5.07 | 3.33 | 45.59 | 28.38 | 48.80 | 30.80 | 18.53 |
| $7 / 8 \times 12$ | 1030271 | 4000 | 9.85 | . 88 | 1.13 | 5.82 | 3.78 | 34.89 | 23.52 | 38.26 | 26.26 | 12.16 |
| $1 \times 12$ | 1030333 | 5000 | 14.8 | 1.00 | 1.25 | 6.56 | 4.25 | 36.59 | 25.06 | 40.12 | 28.12 | 12.18 |

[^19]Meets the performance requirements of Federal Specifications FF- -791b, Type 1 Form 1-CLASS 6, and ASTM F-1145, except for those provisions required of the contractor. For additional information, see page 452.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Hot Dip galvanized steel.
- Turnbuckle eyes are forged elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckles sizes $1 / 4^{\prime \prime}$ through $1^{\prime \prime}$, a shackle one size smaller can be reeved through eye.
- Turnbuckle hooks are forged with a greater cross sectional area that results in a stronger hook with better fatigue properties.
- TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.
- Modified UNJ thread on end fittings for improved fatigue propertie
- Body has UNC threads.
- Lock Nuts available for all sizes (see page 198).
- Comprehensive end fitting data provided on pages 194 \& 195.
- Fatigue Rated.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductilit , design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


HG-225 Hook \& Eye

| Thread Dia. \& Take Up (in) | HG-225 <br> Stock No. | Working Load Limit (Ib)* | Weight Each (b) | Dimensions (in) |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | D | $\underset{\text { Closed }}{\mathrm{E}}$ | F | $\underset{\text { Open }}{\text { J }}$ | $\begin{gathered} \text { K } \\ \text { Closed } \end{gathered}$ | M Open | $\stackrel{N}{\mathrm{~N}} \mathrm{Closed}$ | R | S |  | BB |
| † 1/4 $\times 4$ | 1030636 | 400 | . 31 | . 25 | . 44 | 1.67 | 1.27 | 11.66 | 7.66 | 12.29 | 8.29 | . 81 | . 34 | 1.76 | 4.07 |
| †5/16 $\times 4-1 / 2$ | 1030654 | 700 | . 50 | . 31 | . 50 | 2.00 | 1.50 | 13.50 | 9.00 | 14.28 | 9.78 | . 95 | . 44 | 2.20 | 4.58 |
| † $3 / 8 \times 6$ | 1030672 | 1000 | . 79 | . 38 | . 56 | 2.28 | 1.76 | 17.09 | 11.09 | 18.04 | 12.04 | 1.13 | . 53 | 2.48 | 6.10 |
| $1 / 2 \times 6$ | 1030690 | 1500 | 1.80 | . 50 | . 65 | 3.53 | 2.28 | 19.57 | 13.57 | 20.79 | 14.79 | 1.41 | . 71 | 3.56 | 6.03 |
| $1 / 2 \times 12$ | 1030734 | 1500 | 2.70 | . 50 | . 65 | 3.51 | 2.28 | 31.86 | 19.86 | 33.08 | 21.08 | 1.41 | . 71 | 3.54 | 12.36 |
| $5 / 8 \times 6$ | 1030752 | 2250 | 2.98 | . 63 | . 90 | 4.24 | 2.81 | 21.11 | 15.11 | 22.61 | 16.61 | 1.80 | . 88 | 4.35 | 6.03 |
| $5 / 8 \times 12$ | 1030798 | 2250 | 4.35 | . 63 | . 90 | 4.23 | 2.81 | 33.45 | 21.45 | 34.95 | 22.95 | 1.80 | . 88 | 4.34 | 12.39 |
| $3 / 4 \times 6$ | 1030814 | 3000 | 4.21 | . 75 | . 98 | 5.07 | 3.33 | 22.61 | 16.61 | 24.45 | 18.45 | 2.09 | 1.00 | 5.12 | 6.13 |
| $3 / 4 \times 12$ | 1030850 | 3000 | 6.52 | . 75 | . 98 | 5.04 | 3.33 | 35.01 | 23.01 | 36.85 | 24.85 | 2.09 | 1.00 | 5.09 | 12.59 |
| $3 / 4 \times 18$ | 1030878 | 3000 | 8.24 | . 75 | . 98 | 5.07 | 3.33 | 47.01 | 29.01 | 48.85 | 30.85 | 2.09 | 1.00 | 5.12 | 18.53 |
| $7 / 8 \times 12$ | 1030896 | 4000 | 9.34 | . 88 | 1.13 | 5.82 | 3.78 | 36.11 | 24.11 | 38.23 | 26.23 | 2.38 | 1.25 | 5.79 | 12.16 |
| $1 \times 12$ | 1030958 | 5000 | 13.9 | 1.00 | 1.25 | 6.56 | 4.25 | 37.65 | 25.65 | 40.06 | 28.06 | 3.00 | 1.43 | 6.50 | 12.18 |

[^20]
## Eye \& Eye Turnbuckles



Meets the performance requirements of Federal Specifications FF- -791b, Type 1 Form 1 -CLASS 4, and ASTM F-1145, except for those provisions required of the contractor. For additional information, see page 452.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Hot Dip galvanized steel.
- Turnbuckle eyes are forged elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckle sizes $1 / 4^{\prime \prime}$ through 2-1/2", a shackle one size smaller can be reeved through eye.
- Modified UNJ thread on end fittings for improved fatigue properties. Body has UNC thread
- TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.
- Lock Nuts available for all sizes (see page 198).
- Comprehensive end fitting data provided on page 195.
- Fatigue Rated.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductilit, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.


HG-226 Eye \& Eye

| Thread Dia. \& Take Up (in) | HG-226 <br> Stock No. | Working Load Limit (Ib)* | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | $\begin{gathered} \text { J } \\ \text { Open } \end{gathered}$ | Closed | M Open | N Closed | R | S |  | BB |
| † 1/4 $\times 4$ | 1031252 | 500 | . 29 | . 25 | 11.94 | 7.94 | 12.38 | 8.38 | . 81 | . 34 | 1.76 | 4.07 |
| †5/16 x 4-1/2 | 1031270 | 800 | . 48 | . 31 | 13.92 | 9.42 | 14.48 | 9.98 | . 95 | . 44 | 2.20 | 4.58 |
| $\dagger 3 / 8 \times 6$ | 1031298 | 1200 | . 75 | . 38 | 17.56 | 11.56 | 18.24 | 12.24 | 1.13 | . 53 | 2.48 | 6.10 |
| $1 / 2 \times 6$ | 1031314 | 2200 | 1.72 | . 50 | 19.94 | 13.94 | 20.82 | 14.82 | 1.41 | . 71 | 3.56 | 6.03 |
| $1 / 2 \times 12$ | 1031350 | 2200 | 2.63 | . 50 | 32.23 | 20.23 | 33.11 | 21.11 | 1.41 | . 71 | 3.54 | 12.36 |
| $5 / 8 \times 6$ | 1031378 | 3500 | 2.75 | . 63 | 21.72 | 15.72 | 22.72 | 16.72 | 1.80 | . 88 | 4.35 | 6.03 |
| $5 / 8 \times 12$ | 1031412 | 3500 | 4.12 | . 63 | 34.06 | 22.06 | 35.06 | 23.06 | 1.80 | . 88 | 4.34 | 12.39 |
| $3 / 4 \times 6$ | 1031430 | 5200 | 4.22 | . 75 | 23.24 | 17.24 | 24.50 | 18.50 | 2.09 | 1.00 | 5.12 | 6.13 |
| $3 / 4 \times 12$ | 1031476 | 5200 | 6.12 | . 75 | 35.64 | 23.64 | 36.90 | 24.90 | 2.09 | 1.00 | 5.09 | 12.59 |
| $3 / 4 \times 18$ | 1031494 | 5200 | 7.83 | . 75 | 47.64 | 29.64 | 48.90 | 30.90 | 2.09 | 1.00 | 5.12 | 18.53 |
| $7 / 8 \times 12$ | 1031519 | 7200 | 8.83 | . 88 | 36.70 | 24.70 | 38.20 | 26.20 | 2.38 | 1.25 | 5.79 | 12.16 |
| $7 / 8 \times 18$ | 1031537 | 7200 | 11.5 | . 88 | 49.17 | 31.17 | 50.67 | 32.67 | 2.38 | 1.25 | 5.79 | 18.63 |
| $1 \times 6$ | 1031555 | 10000 | 9.62 | 1.00 | 26.24 | 20.24 | 28.00 | 22.00 | 3.00 | 1.43 | 6.50 | 6.18 |
| $1 \times 12$ | 1031573 | 10000 | 13.0 | 1.00 | 38.24 | 26.24 | 40.00 | 28.00 | 3.00 | 1.43 | 6.50 | 12.18 |
| $1 \times 18$ | 1031591 | 10000 | 16.3 | 1.00 | 50.24 | 32.24 | 52.00 | 34.00 | 3.00 | 1.43 | 6.50 | 18.18 |
| $1 \times 24$ | 1031617 | 10000 | 20.2 | 1.00 | 62.84 | 38.84 | 64.60 | 40.60 | 3.00 | 1.43 | 6.47 | 24.84 |
| $1-1 / 4 \times 12$ | 1031635 | 15200 | 19.9 | 1.25 | 42.14 | 30.14 | 44.38 | 32.38 | 3.59 | 1.82 | 8.49 | 12.06 |
| $1-1 / 4 \times 18$ | 1031653 | 15200 | 23.8 | 1.25 | 54.14 | 36.14 | 56.38 | 38.38 | 3.59 | 1.82 | 8.49 | 18.06 |
| $1-1 / 4 \times 24$ | 1031671 | 15200 | 27.8 | 1.25 | 66.70 | 42.70 | 68.94 | 44.94 | 3.59 | 1.82 | 8.49 | 24.62 |
| $1-1 / 2 \times 12$ | 1031699 | 21400 | 28.7 | 1.50 | 44.24 | 32.24 | 46.74 | 34.74 | 4.09 | 2.12 | 9.46 | 12.32 |
| 1-1/2 $\times 18$ | 1031715 | 21400 | 34.1 | 1.50 | 56.24 | 38.24 | 58.74 | 40.74 | 4.09 | 2.12 | 9.46 | 18.32 |
| $1-1 / 2 \times 24$ | 1031733 | 21400 | 39.6 | 1.50 | 68.86 | 44.86 | 71.36 | 47.36 | 4.09 | 2.12 | 9.46 | 24.94 |
| $1-3 / 4 \times 18$ | 1031779 | 28000 | 50.7 | 1.75 | 57.38 | 39.38 | 60.38 | 42.38 | 4.65 | 2.38 | 9.97 | 18.37 |
| $1-3 / 4 \times 24$ | 1031797 | 28000 | 58.2 | 1.75 | 69.38 | 45.38 | 72.38 | 48.38 | 4.65 | 2.38 | 9.97 | 24.37 |
| $2 \times 24$ | 1031813 | 37000 | 83.5 | 2.00 | 75.68 | 51.68 | 79.18 | 55.18 | 5.81 | 2.69 | 13.03 | 24.48 |
| 2-1/2 x 24 | 1031831 | 60000 | 149 | 2.50 | 79.18 | 55.18 | 83.18 | 59.18 | 6.49 | 3.12 | 13.76 | 24.60 |
| 2-3/4 $\times 24$ | 1031859 | 75000 | 174 | 2.75 | 81.34 | 57.34 | 85.84 | 61.84 | 7.00 | 3.25 | 15.09 | 24.65 |

[^21]

Meets the performance requirements of Federal Specifications FF--791b, Type 1 Form 1 - CLASS 8, and ASTM F-1145, except for those provisions required of the contractor. For additional information, see page 452.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Hot Dip galvanized steel.
- Turnbuckles eyes are forged and elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckles size $1 / 4^{\prime \prime}$ through $2-1 / 2^{\prime \prime}$, a shackle one size smaller can be reeved through eye.
- Forged jaw ends are fitted with bolts and nuts for $1 / 4^{\prime \prime}$ through $5 / 8^{\prime \prime}$, and pins and cotters on $3 / 4^{\prime \prime}$ through 2-3/4" sizes.
- Modified UNJ thread on end fittings for improved fatigue properties
- Body has UNC threads.
- TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.
- Lock Nuts available for all sizes (see page 198).
- Comprehensive End fitting data on pages 195 \& 196
- Fatigue Rated.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductilit , design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



## HG-227 Jaw \& Eye

| Thread Dia. \& Take Up (in) | $\begin{gathered} \text { HG-227 } \\ \text { Stock } \\ \text { No. } \\ \hline \end{gathered}$ | Working Load Limit (Ib)* | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | B | $\begin{gathered} \text { E } \\ \text { Closed } \end{gathered}$ | G | J Open | K Closed | M Open | N Closed | R | S |  | BB |
| $\dagger 1 / 4 \times 4$ | 1031877 | 500 | . 33 | . 25 | . 45 | 1.66 | . 64 | 11.57 | 7.57 | 12.28 | 8.28 | . 81 | . 34 | 1.76 | 4.07 |
| $\dagger 5 / 16 \times 4-1 / 2$ | 1031895 | 800 | . 52 | . 31 | . 50 | 2.02 | . 87 | 13.50 | 9.00 | 14.30 | 9.80 | . 95 | . 44 | 2.20 | 4.58 |
| $\dagger 3 / 8 \times 6$ | 1031911 | 1200 | . 80 | . 38 | . 53 | 2.11 | . 85 | 16.91 | 10.91 | 17.87 | 11.87 | 1.13 | . 53 | 2.48 | 6.10 |
| $1 / 2 \times 6$ | 1031939 | 2200 | 1.77 | . 50 | . 64 | 3.22 | 1.07 | 19.30 | 13.30 | 20.48 | 14.48 | 1.41 | . 71 | 3.56 | 6.03 |
| $1 / 2 \times 9$ | 1031957 | 2200 | 2.25 | . 50 | . 64 | 3.20 | 1.07 | 25.59 | 16.59 | 26.77 | 17.77 | 1.41 | . 71 | 3.54 | 9.36 |
| $1 / 2 \times 12$ | 1031975 | 2200 | 2.67 | . 50 | . 64 | 3.20 | 1.07 | 31.59 | 19.59 | 32.77 | 20.77 | 1.41 | . 71 | 3.54 | 12.36 |
| $5 / 8 \times 6$ | 1031993 | 3500 | 2.98 | . 63 | . 79 | 3.90 | 1.32 | 20.73 | 14.73 | 22.27 | 16.27 | 1.80 | . 88 | 4.35 | 6.03 |
| $5 / 8 \times 9$ | 1032019 | 3500 | 3.72 | . 63 | . 79 | 3.89 | 1.32 | 27.07 | 18.07 | 28.61 | 19.61 | 1.80 | . 88 | 4.34 | 9.39 |
| $5 / 8 \times 12$ | 1032037 | 3500 | 4.35 | . 63 | . 79 | 3.89 | 1.32 | 33.07 | 21.07 | 34.61 | 22.61 | 1.80 | . 88 | 4.34 | 12.39 |
| $3 / 4 \times 6$ | 1032055 | 5200 | 4.51 | . 75 | . 97 | 4.71 | 1.52 | 22.17 | 16.17 | 24.09 | 18.09 | 2.09 | 1.00 | 5.12 | 6.13 |
| $3 / 4 \times 9$ | 1032073 | 5200 | 5.56 | . 75 | . 97 | 4.68 | 1.52 | 28.57 | 19.57 | 30.49 | 21.49 | 2.09 | 1.00 | 5.09 | 9.59 |
| $3 / 4 \times 12$ | 1032091 | 5200 | 6.42 | . 75 | . 97 | 4.68 | 1.52 | 34.57 | 22.57 | 36.49 | 24.49 | 2.09 | 1.00 | 5.09 | 12.59 |
| $3 / 4 \times 18$ | 1032117 | 5200 | 8.14 | . 75 | . 97 | 4.71 | 1.52 | 46.57 | 28.57 | 48.49 | 30.49 | 2.09 | 1.00 | 5.12 | 18.53 |
| $7 / 8 \times 12$ | 1032135 | 7200 | 9.10 | . 88 | 1.16 | 5.50 | 1.77 | 35.68 | 23.68 | 37.91 | 25.91 | 2.38 | 1.25 | 5.79 | 12.16 |
| $7 / 8 \times 18$ | 1032153 | 7200 | 11.6 | . 88 | 1.16 | 5.50 | 1.77 | 48.15 | 30.15 | 50.38 | 32.38 | 2.38 | 1.25 | 5.79 | 18.63 |
| $1 \times 6$ | 1032171 | 10000 | 10.0 | 1.00 | 1.34 | 6.09 | 2.05 | 25.03 | 19.03 | 27.59 | 21.59 | 3.00 | 1.43 | 6.50 | 6.18 |
| $1 \times 12$ | 1032199 | 10000 | 13.4 | 1.00 | 1.34 | 6.09 | 2.05 | 37.03 | 25.03 | 39.59 | 27.59 | 3.00 | 1.43 | 6.50 | 12.18 |
| $1 \times 18$ | 1032215 | 10000 | 16.7 | 1.00 | 1.34 | 6.09 | 2.05 | 49.03 | 31.03 | 51.59 | 33.59 | 3.00 | 1.43 | 6.50 | 18.18 |
| $1 \times 24$ | 1032233 | 10000 | 20.6 | 1.00 | 1.34 | 6.06 | 2.05 | 61.63 | 37.63 | 64.19 | 40.19 | 3.00 | 1.43 | 6.47 | 24.84 |
| 1-1/4 $\times 12$ | 1032251 | 15200 | 20.9 | 1.25 | 1.84 | 8.09 | 2.82 | 40.76 | 28.76 | 43.98 | 31.98 | 3.59 | 1.82 | 8.49 | 12.06 |
| $1-1 / 4 \times 18$ | 1032279 | 15200 | 24.8 | 1.25 | 1.84 | 8.09 | 2.82 | 52.76 | 34.76 | 55.98 | 37.98 | 3.59 | 1.82 | 8.49 | 18.06 |
| $1-1 / 4 \times 24$ | 1032297 | 15200 | 28.8 | 1.25 | 1.84 | 8.09 | 2.82 | 65.32 | 41.32 | 68.54 | 44.54 | 3.59 | 1.82 | 8.49 | 24.62 |
| $1-1 / 2 \times 12$ | 1032313 | 21400 | 30.6 | 1.50 | 2.06 | 8.93 | 2.81 | 42.50 | 30.50 | 46.21 | 34.21 | 4.09 | 2.12 | 9.46 | 12.32 |
| $1-1 / 2 \times 18$ | 1032331 | 21400 | 36.0 | 1.50 | 2.06 | 8.93 | 2.81 | 54.50 | 36.50 | 58.21 | 40.21 | 4.09 | 2.12 | 9.46 | 18.32 |
| $1-1 / 2 \times 24$ | 1032359 | 21400 | 41.5 | 1.50 | 2.06 | 8.93 | 2.81 | 67.12 | 43.12 | 70.83 | 46.83 | 4.09 | 2.12 | 9.46 | 24.94 |
| $1-3 / 4 \times 18$ | 1032395 | 28000 | 52.1 | 1.75 | 2.60 | 9.36 | 3.35 | 55.37 | 37.37 | 59.77 | 41.77 | 4.65 | 2.38 | 9.97 | 18.37 |
| $1-3 / 4 \times 24$ | 1032411 | 28000 | 59.7 | 1.75 | 2.60 | 9.36 | 3.35 | 67.37 | 43.37 | 71.77 | 47.77 | 4.65 | 2.38 | 9.97 | 24.37 |
| $2 \times 24$ | 1032439 | 37000 | 89.9 | 2.00 | 2.62 | 11.80 | 3.74 | 72.66 | 48.66 | 77.95 | 53.95 | 5.81 | 2.69 | 13.03 | 24.48 |
| 2-1/2 $\times 24$ | 1032457 | 60000 | 158 | 2.50 | 3.06 | 13.26 | 4.44 | 76.08 | 52.08 | 82.68 | 58.68 | 6.49 | 3.12 | 13.76 | 24.60 |
| $2-3 / 4 \times 24$ | 1032475 | 75000 | 187 | 2.75 | 3.69 | 14.92 | 4.19 | 78.05 | 54.05 | 85.67 | 61.67 | 7.00 | 3.25 | 15.09 | 24.65 |

[^22]

Meets the performance requirements of Federal Specifications FF- -791b, Type 1 Form 1-CLASS 7, and ASTM F-1145, except for those provisions required of the contractor. For additional information, see page 452.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Hot Dip galvanized steel.
- TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.
- Forged jaw ends are fitted with bolts and nuts for $1 / 4^{\prime \prime}$ through $5 / 8^{\prime \prime}$, and pins and cotters on $3 / 4^{\prime \prime}$ through 2-3/4" sizes.
- Modified UNJ thread on end fittings for improved fatigue propertie
- Body has UNC threads.
- Lock Nuts available for all sizes (see page 198).
- Comprehensive end fitting data provided on page 196.
- Fatigue Rated.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductilit, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.

"Bix Pancur Poived
HG-228 Jaw \& Jaw

| Thread Dia. \& Take Up (in) | HG-228 Stock No. | Working Load Limit (lb)* | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | B | $\begin{gathered} \text { E } \\ \text { Closed } \end{gathered}$ | G | $\underset{\text { Open }}{\mathbf{J}}$ | $\begin{gathered} \mathbf{K} \\ \text { Closed } \end{gathered}$ | M Open | $\begin{gathered} \mathrm{N} \\ \text { Closed } \end{gathered}$ | BB |
| $\dagger 1 / 4 \times 4$ | 1032493 | 500 | . 37 | . 25 | . 45 | 1.66 | . 64 | 11.19 | 7.19 | 12.18 | 8.18 | 4.07 |
| †5/16 x 4-1/2 | 1032518 | 800 | . 56 | . 31 | . 50 | 2.02 | . 87 | 13.07 | 8.57 | 14.12 | 9.62 | 4.58 |
| $\dagger 3 / 8 \times 6$ | 1032536 | 1200 | . 85 | . 38 | . 53 | 2.11 | . 85 | 16.25 | 10.25 | 17.50 | 11.50 | 6.10 |
| $1 / 2 \times 6$ | 1032554 | 2200 | 1.82 | . 50 | . 64 | 3.22 | 1.07 | 18.65 | 12.65 | 20.14 | 14.14 | 6.03 |
| $1 / 2 \times 9$ | 1032572 | 2200 | 2.29 | . 50 | . 64 | 3.20 | 1.07 | 24.94 | 15.94 | 26.43 | 17.43 | 9.36 |
| 1/2 $\times 12$ | 1032590 | 2200 | 2.71 | . 50 | . 64 | 3.20 | 1.07 | 30.94 | 18.94 | 32.43 | 20.43 | 12.36 |
| $5 / 8 \times 6$ | 1032616 | 3500 | 3.21 | . 63 | . 79 | 3.90 | 1.32 | 19.74 | 13.74 | 21.82 | 15.82 | 6.03 |
| $5 / 8 \times 9$ | 1032634 | 3500 | 3.95 | . 63 | . 79 | 3.89 | 1.32 | 26.08 | 17.08 | 28.16 | 19.16 | 9.39 |
| $5 / 8 \times 12$ | 1032652 | 3500 | 4.58 | . 63 | . 79 | 3.89 | 1.32 | 32.08 | 20.08 | 34.16 | 22.16 | 12.39 |
| $3 / 4 \times 6$ | 1032670 | 5200 | 4.80 | . 75 | . 97 | 4.71 | 1.52 | 21.09 | 15.09 | 23.68 | 17.68 | 6.13 |
| $3 / 4 \times 9$ | 1032698 | 5200 | 5.85 | . 75 | . 97 | 4.68 | 1.52 | 27.49 | 18.49 | 30.08 | 21.08 | 9.59 |
| $3 / 4 \times 12$ | 1032714 | 5200 | 6.72 | . 75 | . 97 | 4.68 | 1.52 | 33.49 | 21.49 | 36.08 | 24.08 | 12.59 |
| $3 / 4 \times 18$ | 1032732 | 5200 | 8.45 | . 75 | . 97 | 4.71 | 1.52 | 45.49 | 27.49 | 48.08 | 30.08 | 18.53 |
| $7 / 8 \times 12$ | 1032750 | 7200 | 9.37 | . 88 | 1.16 | 5.50 | 1.77 | 34.65 | 22.65 | 37.62 | 25.62 | 12.16 |
| $7 / 8 \times 18$ | 1032778 | 7200 | 11.8 | . 88 | 1.16 | 5.50 | 1.77 | 47.12 | 29.12 | 50.09 | 32.09 | 18.63 |
| $1 \times 6$ | 1032796 | 10000 | 10.4 | 1.00 | 1.34 | 6.09 | 2.05 | 23.82 | 17.82 | 27.18 | 21.18 | 6.18 |
| $1 \times 12$ | 1032812 | 10000 | 13.8 | 1.00 | 1.34 | 6.09 | 2.05 | 35.82 | 23.82 | 39.18 | 27.18 | 12.18 |
| $1 \times 18$ | 1032830 | 10000 | 17.1 | 1.00 | 1.34 | 6.09 | 2.05 | 47.82 | 29.82 | 51.18 | 33.18 | 18.18 |
| $1 \times 24$ | 1032858 | 10000 | 21.0 | 1.00 | 1.34 | 6.06 | 2.05 | 60.42 | 36.42 | 63.78 | 39.78 | 24.84 |
| 1-1/4 $\times 12$ | 1032876 | 15200 | 21.9 | 1.25 | 1.84 | 8.09 | 2.82 | 39.37 | 27.37 | 43.58 | 31.58 | 12.06 |
| $1-1 / 4 \times 18$ | 1032894 | 15200 | 25.9 | 1.25 | 1.84 | 8.09 | 2.82 | 51.37 | 33.37 | 55.58 | 37.58 | 18.06 |
| $1-1 / 4 \times 24$ | 1032910 | 15200 | 29.8 | 1.25 | 1.84 | 8.09 | 2.82 | 63.93 | 39.93 | 68.14 | 44.14 | 24.62 |
| $1-1 / 2 \times 12$ | 1032938 | 21400 | 32.6 | 1.50 | 2.06 | 8.93 | 2.81 | 40.76 | 28.76 | 45.68 | 33.68 | 12.32 |
| $1-1 / 2 \times 18$ | 1032956 | 21400 | 38.0 | 1.50 | 2.06 | 8.93 | 2.81 | 52.76 | 34.76 | 57.68 | 39.68 | 18.32 |
| $1-1 / 2 \times 24$ | 1032974 | 21400 | 43.5 | 1.50 | 2.06 | 8.93 | 2.81 | 65.38 | 41.38 | 70.30 | 46.30 | 24.94 |
| $1-3 / 4 \times 18$ | 1033018 | 28000 | 53.5 | 1.75 | 2.60 | 9.36 | 3.35 | 53.35 | 35.35 | 59.16 | 41.16 | 18.37 |
| $1-3 / 4 \times 24$ | 1033036 | 28000 | 61.1 | 1.75 | 2.60 | 9.36 | 3.35 | 65.35 | 41.35 | 71.16 | 47.16 | 24.37 |
| $2 \times 24$ | 1033054 | 37000 | 96.3 | 2.00 | 2.62 | 11.80 | 3.74 | 69.64 | 45.64 | 76.72 | 52.72 | 24.48 |
| 2-1/2 x 24 | 1033072 | 60000 | 167 | 2.50 | 3.06 | 13.26 | 4.44 | 72.97 | 48.97 | 82.18 | 58.18 | 24.60 |
| 2-3/4 $\times 24$ | 1033090 | 75000 | 199 | 2.75 | 3.69 | 14.92 | 4.19 | 74.75 | 50.75 | 85.50 | 61.50 | 24.65 |

[^23]

- Quenched and Tempered or Normalized.
- Hot Dip galvanized steel.
- Hooks are forged with a greater cross sectional area that results in a stronger hook with better fatigue properties.
- Modified UNJ thread for improved fatigue properties.
- Fatigue Rated.


HG-4037 Hook End Fittings

| Shank <br>  <br> Take Up <br> (in) | RH Hook Stock No. | LH Hook Stock No. | Working Load Limit (lb) | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | A | B | C | D | F | G | H | 1 | L |
| * 1/4 x 4 | 1070012 | 1070539 | 400 | . 09 | . 25 | . 25 | . 41 | . 44 | 1.27 | . 50 | 2.59 | 3.44 | 4.10 |
| * $5 / 16 \times 4-1 / 2$ | 1070030 | 1070557 | 700 | . 15 | . 31 | . 31 | . 50 | . 50 | 1.50 | . 56 | 3.00 | 4.01 | 4.79 |
| * $3 / 8 \times 6$ | 1070058 | 1070575 | 1000 | . 27 | . 38 | . 38 | . 61 | . 56 | 1.76 | . 62 | 3.88 | 5.00 | 5.92 |
| $1 / 2 \times 6$ | 1070076 | 1070593 | 1500 | . 59 | . 50 | . 50 | . 78 | . 65 | 2.28 | . 82 | 4.19 | 6.19 | 7.38 |
| $1 / 2 \times 12$ | 1070110 | 1070637 | 1500 | . 75 | . 50 | . 50 | . 78 | . 65 | 2.28 | . 82 | 7.19 | 9.19 | 10.38 |
| $5 / 8 \times 6$ | 1070138 | 1070655 | 2250 | 1.05 | . 63 | . 63 | 1.00 | . 90 | 2.81 | 1.00 | 4.44 | 6.75 | 8.25 |
| $5 / 8 \times 12$ | 1070174 | 1070691 | 2250 | 1.31 | . 63 | . 63 | 1.00 | . 84 | 2.81 | 1.00 | 7.44 | 9.75 | 11.25 |
| $3 / 4 \times 6$ | 1070192 | 1070717 | 3000 | 1.35 | . 75 | . 75 | 1.21 | . 98 | 3.33 | 1.13 | 4.56 | 7.43 | 9.20 |
| $3 / 4 \times 12$ | 1070236 | 1070753 | 3000 | 2.13 | . 75 | . 75 | 1.21 | . 98 | 3.33 | 1.13 | 7.56 | 10.43 | 12.20 |
| $3 / 4 \times 18$ | 1070254 | 1070771 | 3000 | 2.51 | . 75 | . 75 | 1.21 | . 98 | 3.33 | 1.13 | 10.56 | 13.43 | 15.20 |
| $7 / 8 \times 12$ | 1070272 | 1070799 | 4000 | 3.12 | . 88 | . 88 | 1.37 | 1.13 | 3.78 | 1.26 | 7.81 | 11.13 | 13.13 |
| $7 / 8 \times 18$ | 1070290 | 1070815 | 4000 | 3.62 | . 88 | . 88 | 1.37 | 1.13 | 3.78 | 1.26 | 10.81 | 14.13 | 16.13 |
| $1 \times 6$ | 1070316 | 1070833 | 5000 | 3.96 | 1.00 | 1.00 | 1.53 | 1.25 | 4.25 | 1.38 | 5.06 | 8.84 | 11.06 |
| $1 \times 12$ | 1070334 | 1070851 | 5000 | 4.72 | 1.00 | 1.00 | 1.53 | 1.25 | 4.25 | 1.38 | 8.06 | 11.84 | 14.06 |

* Mechanical Galvanized

- Quenched and Tempered or Normalized.
- Hot Dip galvanized steel.
- Turnbuckle eyes are forged elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckle sizes $1 / 4^{\prime \prime}$ through 2-1/2", a shackle one size smaller can be reeved through eye.
- Modified UNJ thread for improved fatigue properties.
- Fatigue Rated.

HG -4037
Eye End Fitting

## HG-4037 Eye End Fittings

| Shank <br>  <br> Take Up <br> (in) | RH Eye Stock No. | LH Eye Stock No. | Working Load Limit (lb) | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | A | H | R | S | U | V | W |
| * 1/4 $\times 4$ | 1071057 | 1071672 | 500 | . 07 | . 25 | 2.59 | . 81 | . 34 | . 22 | . 78 | 4.19 |
| * $5 / 16 \times 41 / 2$ | 1071075 | 1071690 | 800 | . 13 | . 31 | 3.00 | . 95 | . 44 | . 28 | 1.00 | 4.99 |
| * 3/8 $\times 6$ | 1071093 | 1071716 | 1200 | . 23 | . 38 | 3.88 | 1.13 | . 53 | . 34 | 1.21 | 6.12 |
| $1 / 2 \times 6$ | 1071119 | 1071734 | 2200 | . 51 | . 50 | 4.19 | 1.41 | . 71 | . 44 | 1.59 | 7.41 |
| $1 / 2 \times 9$ | 1071137 | 1071752 | 2200 | . 59 | . 50 | 5.69 | 1.41 | . 71 | . 44 | 1.59 | 8.91 |
| 1/2 $\times 12$ | 1071155 | 1071770 | 2200 | . 68 | . 50 | 7.19 | 1.41 | . 71 | . 44 | 1.59 | 10.41 |
| $5 / 8 \times 6$ | 1071173 | 1071798 | 3500 | . 82 | . 63 | 4.44 | 1.80 | . 88 | . 50 | 1.88 | 8.36 |
| $5 / 8 \times 9$ | 1071191 | 1071814 | 3500 | . 95 | . 63 | 5.94 | 1.80 | . 88 | . 50 | 1.88 | 9.86 |
| $5 / 8 \times 12$ | 1071217 | 1071832 | 3500 | 1.08 | . 63 | 7.44 | 1.80 | . 88 | . 50 | 1.88 | 11.36 |
| $3 / 4 \times 6$ | 1071235 | 1071850 | 5200 | 1.36 | . 75 | 4.56 | 2.09 | 1.00 | . 63 | 2.26 | 9.25 |
| $3 / 4 \times 9$ | 1071253 | 1071878 | 5200 | 1.55 | . 75 | 6.06 | 2.09 | 1.00 | . 63 | 2.26 | 10.75 |
| $3 / 4 \times 12$ | 1071271 | 1071896 | 5200 | 1.73 | . 75 | 7.56 | 2.09 | 1.00 | . 63 | 2.26 | 12.25 |
| $3 / 4 \times 18$ | 1071299 | 1071912 | 5200 | 2.10 | . 75 | 10.56 | 2.09 | 1.00 | . 63 | 2.26 | 15.25 |
| $7 / 8 \times 12$ | 1071315 | 1071930 | 7200 | 2.61 | . 88 | 7.81 | 2.38 | 1.25 | . 75 | 2.75 | 13.10 |
| $7 / 8 \times 18$ | 1071333 | 1071958 | 7200 | 3.12 | . 88 | 10.81 | 2.38 | 1.25 | . 75 | 2.75 | 16.10 |
| $1 \times 6$ | 1071351 | 1071976 | 10000 | 3.15 | 1.00 | 5.06 | 3.00 | 1.43 | . 88 | 3.19 | 11.00 |
| $1 \times 12$ | 1071379 | 1071994 | 10000 | 3.81 | 1.00 | 8.06 | 3.00 | 1.43 | . 88 | 3.19 | 14.00 |
| $1 \times 18$ | 1071397 | 1072010 | 10000 | 4.48 | 1.00 | 11.06 | 3.00 | 1.43 | . 88 | 3.19 | 17.00 |
| $1 \times 24$ | 1071413 | 1072038 | 10000 | 5.15 | 1.00 | 14.06 | 3.00 | 1.43 | . 88 | 3.19 | 20.00 |
| 1-1/4 $\times 12$ | 1071431 | 1072056 | 15200 | 7.07 | 1.25 | 8.38 | 3.59 | 1.82 | 1.12 | 4.06 | 16.19 |
| $1-1 / 4 \times 18$ | 1071459 | 1072074 | 15200 | 8.12 | 1.25 | 11.38 | 3.59 | 1.82 | 1.12 | 4.06 | 19.19 |
| $1-1 / 4 \times 24$ | 1071477 | 1072092 | 15200 | 9.16 | 1.25 | 14.38 | 3.59 | 1.82 | 1.12 | 4.06 | 22.19. |
| 1-1/2 12 | 1071495 | 1072118 | 21400 | 10.3 | 1.50 | 8.75 | 4.09 | 2.12 | 1.25 | 4.62 | 17.37 |
| 1-1/2 18 | 1071510 | 1072136 | 21400 | 11.8 | 1.50 | 11.75 | 4.09 | 2.12 | 1.25 | 4.62 | 20.37 |
| $1-1 / 2 \times 24$ | 1071538 | 1072154 | 21400 | 13.3 | 1.50 | 14.75 | 4.09 | 2.12 | 1.25 | 4.62 | 23.37 |
| $1-3 / 4 \times 18$ | 1071574 | 1072190 | 28000 | 17.5 | 1.75 | 12.16 | 4.65 | 2.38 | 1.50 | 5.38 | 21.19 |
| $1-3 / 4 \times 24$ | 1071592 | 1072216 | 28000 | 19.5 | 1.75 | 15.16 | 4.65 | 2.38 | 1.50 | 5.38 | 24.19 |
| $2 \times 24$ | 1071618 | 1072234 | 37000 | 28.9 | 2.00 | 15.59 | 5.81 | 2.69 | 1.75 | 6.19 | 27.59 |
| 2-1/2 x 24 | 1071636 | 1072252 | 60000 | 46.4 | 2.50 | 17.56 | 6.50 | 3.12 | 2.00 | 7.12 | 29.59 |
| $2-3 / 4 \times 24$ | 1071654 | 1072270 | 75000 | 60.2 | 2.75 | 17.69 | 7.00 | 3.25 | 2.25 | 7.75 | 30.92 |

* Mechanical Galvanized


## Turnbuckles - Jaw End Fittings

## HG-4037 Jaw End Fittings

- Quenched and Tempered or Normalized.
- Hot dip galvanized steel.
- Forged jaw ends are fitted with bolts and nuts on sizes $1 / 4^{\prime \prime}$ through $5 / 8^{\prime \prime}$, and pins and cotters on sizes $3 / 4^{\prime \prime}$ through $2-3 / 4^{\prime \prime}$.
- Modified UNJ thread for improved fatigue properties.
- Fatigue Rated.


HG-4037 Jaw End Fittings

| Shank <br>  <br> Take Up (in) | RH Jaw Stock No. | LH Jaw Stock No. | Working Load Limit (lb) | Weight Each (lb) | Dimensions (in) |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | A | B | C | D | F | H | I Nom. | L Nom. | Y | MM | $\begin{aligned} & \hline \text { OO } \\ & \text { Bolt } \\ & \text { Pin } \\ & \hline \end{aligned}$ |
| * 1/4 $\times 4$ | 1072298 | 1072911 | 500 | . 11 | . 25 | . 45 | . 91 | . 30 | . 63 | 2.59 | 3.72 | 4.09 | 1.13 | 1.41 | 25 |
| * $5 / 16 \times 41 / 2$ | 1072314 | 1072939 | 800 | . 17 | . 31 | . 50 | 1.02 | . 30 | . 69 | 3.00 | 4.41 | 4.81 | 1.39 | 1.41 | . 25 |
| * $3 / 8 \times 6$ | 1072332 | 1072957 | 1200 | . 28 | . 38 | . 53 | 1.15 | . 36 | . 81 | 3.88 | 5.28 | 5.75 | 1.47 | 1.58 | . 31 |
| $1 / 2 \times 6$ | 1072350 | 1072975 | 2200 | . 56 | . 50 | . 64 | 1.36 | 42 | 1.00 | 4.19 | 6.51 | 7.07 | 1.81 | 1.87 | . 37 |
| $1 / 2 \times 9$ | 1072378 | 1072993 | 2200 | . 63 | . 50 | . 64 | 1.36 | . 42 | 1.00 | 5.69 | 8.01 | 8.57 | 1.81 | 1.87 | . 37 |
| $1 / 2 \times 12$ | 1072396 | 1073019 | 2200 | . 72 | . 50 | . 64 | 1.36 | . 42 | 1.00 | 7.19 | 9.51 | 10.07 | 1.81 | 1.87 | . 37 |
| $5 / 8 \times 6$ | 1072412 | 1073037 | 3500 | 1.05 | . 63 | . 79 | 1.75 | . 55 | 1.31 | 4.31 | 7.12 | 7.91 | 2.36 | 2.44 | . 50 |
| $5 / 8 \times 9$ | 1072430 | 1073055 | 3500 | 1.18 | . 63 | . 79 | 1.75 | . 55 | 1.31 | 5.81 | 8.62 | 9.41 | 2.36 | 2.44 | . 50 |
| $5 / 8 \times 12$ | 1072458 | 1073073 | 3500 | 1.31 | . 63 | . 79 | 1.75 | . 55 | 1.31 | 7.31 | 10.12 | 10.91 | 2.36 | 2.44 | . 50 |
| $3 / 4 \times 6$ | 1072476 | 1073091 | 5200 | 1.65 | . 75 | . 97 | 2.09 | . 69 | 1.63 | 4.56 | 7.86 | 8.84 | 2.81 | 2.56 | . 63 |
| $3 / 4 \times 9$ | 1072494 | 1073117 | 5200 | 1.84 | . 75 | . 97 | 2.09 | . 69 | 1.63 | 6.06 | 9.36 | 10.34 | 2.81 | 2.56 | . 63 |
| $3 / 4 \times 12$ | 1072519 | 1073135 | 5200 | 2.03 | . 75 | . 97 | 2.09 | . 69 | 1.63 | 7.56 | 10.86 | 11.84 | 2.81 | 2.56 | . 63 |
| $3 / 4 \times 18$ | 1072537 | 1073153 | 5200 | 2.41 | . 75 | . 97 | 2.09 | . 69 | 1.63 | 10.56 | 13.86 | 14.84 | 2.81 | 2.56 | . 63 |
| $7 / 8 \times 12$ | 1072555 | 1073171 | 7200 | 2.88 | . 88 | 1.16 | 2.56 | . 81 | 1.88 | 7.81 | 11.70 | 12.81 | 3.25 | 3.09 | . 75 |
| $7 / 8 \times 18$ | 1072573 | 1073199 | 7200 | 3.25 | . 88 | 1.16 | 2.56 | . 81 | 1.88 | 10.81 | 14.70 | 15.81 | 3.25 | 3.09 | . 75 |
| $1 \times 6$ | 1072591 | 1073215 | 10000 | 3.56 | 1.00 | 1.34 | 2.76 | . 94 | 2.12 | 5.06 | 9.35 | 10.59 | 3.73 | 3.44 | . 88 |
| $1 \times 12$ | 1072617 | 1073233 | 10000 | 4.22 | 1.00 | 1.34 | 2.76 | . 94 | 2.12 | 8.06 | 12.35 | 13.59 | 3.73 | 3.44 | . 88 |
| $1 \times 18$ | 1072635 | 1073251 | 10000 | 4.89 | 1.00 | 1.34 | 2.76 | . 94 | 2.12 | 11.06 | 15.35 | 16.59 | 3.73 | 3.44 | . 88 |
| $1 \times 24$ | 1072653 | 1073279 | 10000 | 5.56 | 1.00 | 1.34 | 2.76 | . 94 | 2.12 | 14.06 | 18.35 | 19.59 | 3.73 | 3.44 | . 88 |
| 1-1/4 $\times 12$ | 1072671 | 1073297 | 15200 | 8.10 | 1.25 | 1.84 | 3.72 | 1.19 | 2.63 | 8.38 | 14.25 | 15.79 | 4.92 | 4.53 | 1.13 |
| $1-1 / 4 \times 18$ | 1072699 | 1073313 | 15200 | 9.14 | 1.25 | 1.84 | 3.72 | 1.19 | 2.63 | 11.38 | 17.25 | 18.79 | 4.92 | 4.53 | 1.13 |
| $1-1 / 4 \times 24$ | 1072715 | 1073331 | 15200 | 10.2 | 1.25 | 1.84 | 3.72 | 1.19 | 2.63 | 14.38 | 20.25 | 21.79 | 4.92 | 4.53 | 1.13 |
| 1-1/2 12 | 1072733 | 1073359 | 21400 | 12.3 | 1.50 | 2.06 | 4.16 | 1.47 | 3.12 | 8.75 | 15.07 | 16.84 | 5.27 | 5.13 | 1.38 |
| $1-1 / 2 \times 18$ | 1072751 | 1073377 | 21400 | 13.8 | 1.50 | 2.06 | 4.16 | 1.47 | 3.12 | 11.75 | 18.07 | 19.84 | 5.27 | 5.13 | 1.38 |
| $1-1 / 2 \times 24$ | 1072779 | 1073395 | 21400 | 15.3 | 1.50 | 2.06 | 4.16 | 1.47 | 3.12 | 14.75 | 21.07 | 22.84 | 5.27 | 5.13 | 1.38 |
| $1-3 / 4 \times 18$ | 1072813 | 1073439 | 28000 | 18.9 | 1.75 | 2.60 | 4.66 | 1.72 | 3.50 | 12.16 | 18.49 | 20.58 | 6.25 | 6.00 | 1.63 |
| $1-3 / 4 \times 24$ | 1072831 | 1073457 | 28000 | 21.0 | 1.75 | 2.60 | 4.66 | 1.72 | 3.50 | 15.16 | 21.49 | 23.58 | 6.25 | 6.00 | 1.63 |
| $2 \times 24$ | 1072859 | 1073475 | 37000 | 35.3 | 2.00 | 2.62 | 5.61 | 2.09 | 4.19 | 15.59 | 23.82 | 26.36 | 7.28 | 6.88 | 2.00 |
| 2-1/2 $\times 24$ | 1072877 | 1073493 | 60000 | 55.8 | 2.50 | 3.06 | 5.84 | 2.38 | 5.62 | 17.20 | 25.61 | 29.09 | 9.04 | 7.50 | 2.25 |
| $2-3 / 4 \times 24$ | 1072895 | 1073518 | 75000 | 72.4 | 2.75 | 3.69 | 6.57 | 2.88 | 6.12 | 17.35 | 26.75 | 30.75 | 9.56 | 8.38 | 2.75 |

[^24]
## HG-2510 BODY

- Heat treat by normalizing.
- Hot Dip galvanized.
- UNC threads
- Fatigue Rated.
- Meets the performance requirements of Federal Specifications FF- -791b,Type 1, Form 1 - Class 2, except for those provisions required by the contractor.

min Penngme Proved
HG-2510 Body

| Shank Dia. \& |  | Working Load | Weight | Dimensions (in) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (in) | Stock No. | (lb) | (lb) | AA | BB | CC | DD | EE | GG | HH | JJ |
| * 5/16 x 4-1/2 | 1033919 | 800 | . 22 | 5.59 | 4.58 | . 51 | . 82 | . 38 | . 56 | . 44 | . 19 |
| * $3 / 8 \times 6$ | 1033937 | 1200 | . 29 | 7.29 | 6.10 | . 60 | . 88 | . 38 | . 63 | . 50 | . 19 |
| 1/2 $\times 6$ | 1033955 | 2200 | . 70 | 7.70 | 6.03 | . 84 | 1.19 | . 68 | . 81 | . 63 | . 28 |
| † 1/2 $\times 9$ | 1033973 | 2200 | 1.03 | 11.03 | 9.36 | . 84 | 1.19 | . 68 | . 81 | . 63 | . 28 |
| $\dagger 1 / 2 \times 12$ | 1033991 | 2200 | 1.27 | 14.03 | 12.36 | . 84 | 1.19 | . 68 | . 81 | . 63 | . 28 |
| $5 / 8 \times 6$ | 1034017 | 3500 | 1.11 | 8.02 | 6.03 | 1.00 | 1.43 | . 83 | 1.00 | . 75 | . 34 |
| $\dagger 5 / 8 \times 9$ | 1034035 | 3500 | 1.59 | 11.38 | 9.39 | 1.00 | 1.43 | . 83 | 1.00 | . 75 | . 34 |
| $\dagger 5 / 8 \times 12$ | 1034053 | 3500 | 1.96 | 14.38 | 12.39 | 1.00 | 1.43 | . 83 | 1.00 | . 75 | . 34 |
| $3 / 4 \times 6$ | 1034071 | 5200 | 1.50 | 8.26 | 6.13 | 1.07 | 1.74 | . 94 | 1.13 | . 94 | . 40 |
| † $3 / 4 \times 9$ | 1034099 | 5200 | 2.17 | 11.72 | 9.59 | 1.07 | 1.74 | . 94 | 1.13 | . 94 | . 40 |
| $\dagger 3 / 4 \times 12$ | 1034115 | 5200 | 2.66 | 14.72 | 12.59 | 1.07 | 1.74 | . 94 | 1.13 | . 94 | . 40 |
| $\dagger 3 / 4 \times 18$ | 1034133 | 5200 | 3.63 | 20.66 | 18.53 | 1.07 | 1.74 | . 94 | 1.13 | . 94 | . 40 |
| $7 / 8 \times 12$ | 1034179 | 7200 | 3.61 | 14.62 | 12.16 | 1.23 | 2.00 | 1.13 | 1.31 | 1.06 | . 47 |
| $\dagger 7 / 8 \times 18$ | 1034197 | 7200 | 5.27 | 21.09 | 18.63 | 1.23 | 2.00 | 1.13 | 1.31 | 1.06 | . 47 |
| $1 \times 6$ | 1034213 | 10000 | 3.32 | 9.00 | 6.18 | 1.41 | 2.45 | 1.25 | 1.50 | 1.25 | . 60 |
| $1 \times 12$ | 1034231 | 10000 | 5.34 | 15.00 | 12.18 | 1.41 | 2.45 | 1.25 | 1.50 | 1.25 | . 60 |
| $\dagger 1 \times 18$ | 1034259 | 10000 | 7.35 | 21.00 | 18.18 | 1.41 | 2.45 | 1.25 | 1.50 | 1.25 | . 60 |
| $\dagger 1 \times 24$ | 1034277 | 10000 | 9.85 | 27.66 | 24.84 | 1.41 | 2.45 | 1.25 | 1.50 | 1.25 | . 60 |
| $1-1 / 4 \times 12$ | 1034339 | 15200 | 5.72 | 15.40 | 12.06 | 1.67 | 2.62 | 1.25 | 1.88 | 1.50 | . 56 |
| $1-1 / 4 \times 18$ | 1034357 | 15200 | 7.58 | 21.40 | 18.06 | 1.67 | 2.62 | 1.25 | 1.88 | 1.50 | . 56 |
| $\dagger 1-1 / 4 \times 24$ | 1034375 | 15200 | 9.45 | 27.96 | 24.62 | 1.67 | 2.62 | 1.25 | 1.88 | 1.50 | . 56 |
| 1-1/2 $\times 12$ | 1034437 | 21400 | 8.01 | 15.82 | 12.32 | 1.75 | 2.99 | 1.50 | 2.25 | 1.75 | . 62 |
| 1-1/2 18 | 1034455 | 21400 | 10.4 | 21.82 | 18.32 | 1.75 | 2.99 | 1.50 | 2.25 | 1.75 | . 62 |
| † 1-1/2 $\times 24$ | 1034473 | 21400 | 12.9 | 28.45 | 24.94 | 1.75 | 2.99 | 1.50 | 2.25 | 1.75 | . 62 |
| $1-3 / 4 \times 18$ | 1034552 | 28000 | 15.7 | 22.44 | 18.37 | 2.04 | 3.62 | 1.75 | 2.62 | 2.12 | . 75 |
| $1-3 / 4 \times 24$ | 1034570 | 28000 | 19.2 | 28.44 | 24.37 | 2.04 | 3.62 | 1.75 | 2.62 | 2.12 | . 75 |
| $2 \times 24$ | 1034632 | 37000 | 25.8 | 29.13 | 24.48 | 2.33 | 4.14 | 2.00 | 3.00 | 2.38 | . 88 |
| 2-1/2 x 24 | 1034678 | 60000 | 55.9 | 31.66 | 24.60 | 3.53 | 5.62 | 2.75 | 3.88 | 3.12 | 1.25 |
| $2-3 / 4 \times 24$ | 1034696 | 75000 | 54.0 | 31.66 | 24.65 | 3.51 | 5.62 | 2.75 | 3.88 | 4.48 | 1.25 |

* Mechanical Galvanized
$\dagger$ Contains Center Rib for additional body support.


## Stub End Turnbuckles

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Complete assembly is self-colored.
- Reference American Welding Society Specifications for proper welding procedures
- Meets the performance requirements of Federal Specifications FF--791b, Type 1 Form 1 - CLASS 3, and ASTM F-1145, except for those provisions required of the contractor.

HS - 251
Stub End Turnbuckles


HS-251 Stub End Turnbuckles

| Thread Diameter (in) | HS-251 <br> Stock No. | Working Load Limit <br> (lb) | Weight Each <br> (lb) | Dimensions (in) |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | A | R | S | T | U | W |
| $3 / 8 \times 6$ | 1033143 | 1200 | . 75 | . 38 | 6.00 | 7.13 | . 56 | 4.44 | 16.00 |
| $1 / 2 \times 6$ | 1033161 | 2200 | 1.25 | . 50 | 6.00 | 7.50 | . 75 | 4.25 | 16.00 |
| $5 / 8 \times 6$ | 1033223 | 3500 | 2.11 | . 63 | 6.00 | 7.88 | . 94 | 4.06 | 16.00 |
| $3 / 4 \times 6$ | 1033287 | 5200 | 3.27 | . 75 | 6.00 | 8.25 | 1.13 | 4.38 | 17.00 |
| $7 / 8 \times 6$ | 1033367 | 7200 | 4.78 | . 88 | 6.00 | 8.63 | 1.31 | 4.69 | 18.00 |
| $1 \times 6$ | 1033429 | 10000 | 6.36 | 1.00 | 6.00 | 9.00 | 1.50 | 5.00 | 19.00 |
| $1 \times 12$ | 1033447 | 10000 | 8.80 | 1.00 | 12.00 | 15.00 | 1.50 | 5.00 | 25.00 |
| $1-1 / 8 \times 6$ | 1033508 | 12400 | 8.88 | 1.13 | 6.00 | 9.13 | 1.56 | 4.94 | 19.00 |
| $1-1 / 4 \times 6$ | 1033526 | 15200 | 10.18 | 1.25 | 6.00 | 9.13 | 1.56 | 5.44 | 20.00 |
| 1-1/4 $\times 12$ | 1033544 | 15200 | 13.60 | 1.25 | 12.00 | 15.12 | 1.56 | 5.44 | 26.00 |
| 1-1/2 $\times 12$ | 1033642 | 21400 | 20.44 | 1.50 | 12.00 | 15.75 | 1.88 | 5.38 | 26.50 |



HG -4060/
HG -4061
Lock Nuts

HG-4060 / HG-4061 Lock Nuts

| Shank Dia. \& Take Up (in) | Right Hand HG-4060 Stock No. | Left Hand <br> HG-4061 <br> Stock No. | Weight Per 100 <br> (lb) | Dimensions <br> (in) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | 0 | P | Q |
| 1/4 | 1075115 | 1075491 | . 80 | 44 | . 50 | . 16 |
| 5/16 | 1075133 | 1075516 | 1.30 | . 50 | . 56 | . 19 |
| 3/8 | 1075151 | 1075534 | 2.00 | . 56 | . 64 | . 22 |
| 1/2 | 1075197 | 1075570 | 4.00 | . 75 | . 86 | . 31 |
| 5/8 | 1075213 | 1075598 | 7.00 | . 94 | 1.06 | . 38 |
| 3/4 | 1075231 | 1075614 | 11.00 | 1.13 | 1.26 | . 42 |
| 7/8 | 1075259 | 1075632 | 16.30 | 1.31 | 1.50 | . 48 |
| 1 | 1075277 | 1075650 | 23.80 | 1.50 | 1.69 | . 55 |
| 1-1/8 | 1075295 | 1075678 | 32.00 | 1.50 | 1.69 | . 55 |
| 1-1/4 | 1075311 | 1075696 | 62.50 | 1.88 | 2.13 | . 72 |
| 1-1/2 | 1075357 | 1075730 | 72.00 | 2.25 | 2.53 | . 84 |
| 1-3/4 | 1075393 | 1075776 | 112.00 | 2.75 | 3.18 | 1.00 |
| 2 | 1075419 | 1075794 | 150.00 | 3.12 | 3.61 | 1.12 |
| 2-1/2 | 1075455 | 1075838 | 330.00 | 3.88 | 4.47 | 1.50 |
| 2-3/4 | 1075473 | 1075856 | 425.00 | 4.25 | 4.91 | 1.62 |

## Grosluy. Wire Rope Lubricant

Vitalife ${ }^{\circledR}$ products are the preferred wire rope lubricants in the industry because of their ability to penetrate into wire rope and displace water and contaminants, thus reducing wear and corrosion throughout the rope.

- Available in a variety of container sizes.
- Provides inner strand preservation and lubricity.
- Allows for easy visual inspection of the ropes.
- Reduces the friction between the strands of the wire rope, thus extending rope life.
- Adheres to surface of strands, forming an outer film which provides excellent corrosive protection
- Non-tacky (will not attract dust)
- Vitalife ${ }^{\circledR}$ in aerosol form is a regulated dangerous good. See MSDS sheet for shipping instructions.
- Vitalife ${ }^{\circledR}$ Bio-Lube has been developed especially for environmentally friendly applications.
- Vitalife ${ }^{\circledR} 500$ has been developed exclusively for ski lifts and tramways.


| Vitalife ${ }^{\circledR}$ Type | Container Size | Vitalife ${ }^{\text {® }}$ <br> Stock No. | Weight Each (kg) |
| :---: | :---: | :---: | :---: |
| Vitalife ${ }^{\circledR} 400$ <br> (Standard) | 12 Ounce | 1038946 | 1.00 |
|  | 5 Gallon | 1038955 | 41.0 |
|  | 55 Gallon | 1038964 | 420 |
| Vitalife ${ }^{\circledR} 410$ <br> BIO-LUBE <br> (Environmentally Friendly) | 12 Ounce | 1039004 | 1.00 |
|  | 5 Gallon | 1039013 | 41.0 |
|  | 55 Gallon | 1039022 | 420 |
| Vitalife ${ }^{\ominus} 500$ <br> (Ski Lifts and Tramways) | 5 Gallon | 1038973 | 41.0 |
|  | 55 Gallon | 1038982 | 420 |

## VSP Vitalife ${ }^{\circledR}$ Spray Applicators

- Designed and manufactured to work in the rugged field conditions of the construction industry.

| Description | VSP <br> Stock <br> No. | Weight <br> Each <br> (lb) |
| :---: | :---: | :---: |
| 4 Gallon Backpack <br> Sprayer | 1039092 | 11.8 |



- All applicator seals are specially designed to work with Vitalife ${ }^{\circledR} 400$ and BIO-LUBE products.

WARNINGS \& APPLICATION INSTRUCTIONS


## Important Safety Information -

 Read \& Follow
## Inspection/Maintenance Safety:

- Always inspect eye bolt before use.
- Never use eye bolt that shows signs of wear or damage.
- Never use eye bolt if eye or shank is bent or elongated.
- Always be sure threads on shank and receiving holes are clean.
- Never machine, grind, or cut eye bolt.
- Do not leave threaded end of macinery eye bolt in aluminum loads for long periods of time as it may cause corrosion.


## Assembly Safety:

- Never exceed load limits specified in Table I \& Table 2.
- Never use regular nut eye bolts for angular lifts.
- Always use shoulder nut eye bolts (or machinery eye bolts) for angular lifts.
- For angular lifts, adjust working load as follows:

| ANGLE FROM "IN-LINE" | ADJUSTED WORKING LOAD LIMIT |
| :---: | :---: |
| 5 degrees | $100 \%$ of rated working load |
| 15 degrees | $80 \%$ of rated working load |
| 30 degrees | $65 \%$ of rated working load |
| 45 degrees | $30 \%$ of rated working load |
| 90 degrees | $25 \%$ of rated working load |

- Never undercut eye bolt to seat shoulder against the load.
- Always countersink receiving hole or use washers with sufficient I.D. to seat shoulder.
- Always screw eye bolt down completely for proper seating.
- Always tighten nuts securely against the load.

| Table 1 (In-Line Load) |  |
| :---: | :---: |
| Size <br> (in) | Working Load Limit <br> (Ib) |
| $1 / 4$ | 650 |
| $5 / 16$ | 1,200 |
| $3 / 8$ | 1,550 |
| $1 / 2$ | 2,600 |
| $5 / 8$ | 5,200 |
| $3 / 4$ | 7,200 |
| $7 / 8$ | 10,600 |
| 1 | 13,300 |
| $1-1 / 8$ | 15,000 |
| $1-1 / 4$ | 21,000 |
| $1-1 / 2$ | 24,000 |
| $1-3 / 4$ | 34,000 |
| 2 | 42,000 |
| $2-1 / 2$ | 65,000 |

## A WARNING

- Load may slip or fall if proper eye bolt assembly and lifting procedures are not used.
- A falling load can seriously injure or kill.
- Read and understand these instructions, and follow all eye bolt safety information presented here.
- Read, understand, and follow information in diagrams and charts below before using eye bolt assemblies.


## Shoulder Nut Eye Bolt Installation for Angular Loading

 exceed this distance between the bottom of the load and the last thread of the eye bolt.

Place washers or spacers between nut and load so that when the nut is tightened securely, the shoulder is secured flush against the load surface.

Figure 1

| Table 2 (In-Line Load) |  |
| :---: | :---: |
| Metric Size | Working Load Limit - kg |
| m 6 | 200 |
| m 8 | 400 |
| m 10 | 640 |
| m 12 | 1000 |
| m 16 | 1800 |
| m 20 | 2500 |
| m 24 | 4000 |
| m 27 | 5000 |
| m 30 | 6000 |
| m 36 | 8500 |
| m 42 | 14000 |
| m 48 | 17300 |
| m 64 | 29500 |

# Important - Read and understand these instructions before using eye bolts. <br> Regular Nut \& Shoulder Nut Eye Bolt - Installation for In-Line Loading 




One eye bolt diameter or less

## Operating Safety

- Always stand clear of load.
- Always lift load with steady, even pull - do not jerk.
- Always apply load to eye bolt in the plane of the eye - not at an angle.

- Never exceed the capacity of the eye bolt-see Table $1 \& 2$.
- When using lifting slings of two or more legs, make sure the loads in the legs are calculated using the angle from the vertical sling angle to the leg and properly size the shoulder nut or machinery eye bolt for the angular load.


Machinery Eye Bolt - Installation for In-Line \& Angular Loading
These eye bolts are primarily intended to be installed into tapped holes.

1. After the loads on the eye bolts have been calculated, select the proper size eye bolt for the job.

For angular lifts, adjust working load as follows:

| Direction of Pull <br> (from In-Line) | Adjusted <br> Working Load |
| :---: | :---: |
| 45 degrees | $30 \%$ of rated working load |
| 90 degrees | $25 \%$ of rated working load |

2. Drill and tap the load to the correct sizes to a minimum depth of one-half the eye bolt size beyond the shank length of the machinery eye bolt.
3. Thread the eye bolt into the load until the shoulder is flush and securely tightened against the load.
4. If the plane of the machinery eye bolt is not aligned with the sling line, estimate the amount of unthreading rotation necessary to align the plane of the eye properly.
5. Remove the machinery eye bolt from the load and add shims (washers) of proper thickness to adjust the angle of the plane of the eye to match the sling line. Use Table 3 to estimate the required shim thickness for the amount of unthreading rotation required.

| Table 3 |  |  |  |
| :---: | :---: | :---: | :---: |
| Eye Bolt <br> Size <br> (in) | Shim Thickness <br> Required to <br> Change Rotation <br> 90 <br> (in) | Eye Bolt <br> Size <br> (mm) | Shim Thickness <br> Required to change <br> Rotation $90^{\circ}$ <br> $(\mathrm{mm})$ |
| $1 / 4$ | .0125 | M 6 | .25 |
| $5 / 16$ | .0139 | M 8 | .31 |
| $3 / 8$ | .0156 | M 10 | .38 |
| $1 / 2$ | .0192 | M 12 | .44 |
| $5 / 8$ | .0227 | M 16 | .50 |
| $3 / 4$ | .0250 | M 20 | .62 |
| $7 / 8$ | .0278 | M 24 | .75 |
| 1 | .0312 | M 27 | .75 |
| $1-1 / 8$ | .0357 | M 30 | .88 |
| $1-1 / 4$ | .0357 | M 36 | 1.00 |
| $1-1 / 2$ | .0417 | M 42 | 1.13 |
| $1-3 / 4$ | .0500 | M 48 | 1.25 |
| 2 | .0556 | M 64 | 1.50 |
| $2-1 / 2$ | .0625 | - | - |



[^25]

HR-100

## Pivot Hoist Ring

Application / Assembly Instructions

- Use pivot hoist ring only with ferrous metal (steel, iron) workpiece. Do not leave threaded end of hoist ring in aluminium for long periods of time due to corrosion.
- After determining the loads on each pivot hoist ring, select the proper size using the Working Load Limit (WLL) ratings in Table 1 for UNC threads.
- Drill and tap the workpiece to the correct size to a minimum depth of one-half the threaded bolt diameter plus the effective thread projection length (see Table 1, on next page). To select proper bolt and thread sizes see Table 1 on next page.
- Install the pivot hoist ring to recommended torque with a torque wrench making sure the pivot hoist ring body meets the load (workpiece) surface. See rated load limit and bolt torque requirements imprinted on top of the pivot hoist ring body (see Table 1, on next page).
- Never use spacers between the pivot hoist ring body and workpiece surface.
- Always select proper load rated lifting device for use with pivot hoist ring.
- Attach lifting device ensuring free fit to pivot hoist ring bail (lifting ring) (Figure 1).
- Apply partial load and check proper pivot. Ensure load alignment is in the direction of pivot (Figure 4). There should be no interference between load (workpiece) and pivot hoist ring bail (Figure 2).


Figure 1


Figure 2


Figure 3


Figure 4

## Operating Safety

- Never exceed the capacity (WLL) of the pivot hoist ring, See Table 1 for UNC threads.
- When using lifting slings of two or more legs, make sure the forces in the legs are calculated using the angle from the horizontal sling angle to the leg and select the proper size pivot hoist ring. When using a multi-leg lifting sling, the pivot hoist ring must be mounted so that the pivot direction is inline with the load applied.

| Table 1 <br> HR-100 Pivot Hoist Rings** |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | Dimensions (in) |  |
| Working Load Limit* (lb) | $\begin{gathered} \text { Torque } \\ \text { in } \\ \text { (ft•lbf) } \dagger \end{gathered}$ | No. of Bolts | Bolt <br> Size† $\dagger$ | Effective Thread Projection Length |
| 2,000 | 7 | 2 | 5/16-18 | 0.82 |
| 2,500 | 12 | 2 | 3/8-16 | 0.65 |
| 5,000 | 28 | 2 | 1/2-13 | 1.40 |
| 12,000 | 28 | 4 | 1/2-13 | 1.65 |
| 20,000 | 60 | 4 | 5/8-11 | 1.65 |

* Ultimate load is 5 times the working load limit. Individually proof tested to 2-1/2 times the working load limit.
$\dagger$ Tightening torque values shown are based upon threads being clean, dry and free of lubrication.
** Designed to be used with ferrous workpiece only.
$\dagger \dagger$ Only use Crosby high strength replacement bolts. Do not use any other bolts.

After slings have been properly attached to the hoist ring, apply force slowly. Watch the load and be prepared to stop applying force if the load starts buckling.

Do not reeve slings from one bail to from one bail to
another. This will another. This will
alter the load and angle of loading on the hoist ring.

Buckling may occur if the load is not stiff enough to resist the compressive forces which result from the angular loading.


WRONG



## Trench Cover Hoist Ring Application / Assembly Instructions

- Use trench cover hoist ring only with ferrous metal (steel, iron) workpiece.
- After determining the loads on each trench cover hoist ring, select the proper size using the Working Load Limit (WLL) ratings in Table 1 (see next page). For proper nut selection, reference trench cover nut welding guidelines (see next page). Nut thickness must equal workpiece thickness.
- For proper welding of nut, reference Nut Welding Guidelines on the following page.
- Always make sure the nut is free of dirt or contaminants before installation of the Trench Cover Hoist Ring. A clean out tool is available from Crosby.
- To install, spin base down flush with workpiece surface and tap one of the lugs on the base with a hammer to tighten; repeat procedure before each use.
- Never use spacers between the trench cover hoist ring base and workpiece surface.
- Always select proper load rated lifting device for use with trench cover hoist ring.
- Attach lifting device ensuring free fit to trench cover hoist ring bail (lifting ring) (Figure 1).
- Apply partial load and check proper rotation and alignment. There should be no interference between load (workpiece) and trench cover hoist ring bail (Figure 2).
- Always ensure free movement of bail. The bail should pivot 180 degrees and swivel 360 degrees (Figure 4).


## A. WARNING

- Load may slip or fall if proper Trench Cover Hoist and lifting procedures are not used.
- A falling load can seriously injure or death.
- Do not use with damaged slings or chain. For inspection criteria see ASME B30.9.
- Never apply load except in line with the pivot direction.
- Use only genuine Crosby parts as replacements.
- Read and understand these warnings and application instructions.


## Trench Cover Hoist Ring Inspection / Maintenance

- Always inspect trench cover hoist ring parts before use (Figure 3). Be sure threads on shank and receiving hole are clean, not damaged or worn, and fit properly. A thread gauge is available from Crosby.
- Never use trench cover hoist ring that shows signs of corrosion, wear or damage.
- Never use trench cover hoist ring if bail is bent or elongated.
- Do not use parts showing cracks, nicks or gouges. Always make sure there are no spacers (washers) used between trench cover hoist ring body and the workpiece surface. Remove any spacers (washers) and retighten before use.
- Always be sure total workpiece surface is in contact with the trench cover hoist ring body mating surface.
- Drilled and tapped hole in the weld-in nut must be 90 degrees to load (workpiece) surface. A welding fixture is available from Crosby.
- A visual periodic inspection of the nut to workpiece weld should be performed. Check the weld visually, or use a suitable NDE (Non-Destructive Examination) method if required.

Figure3



Figure 4

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Figure 2

## Operating Safety

- Never exceed the capacity (WLL) of the trench cover hoist ring, see Table 1.
- When using lifting slings of two or more legs, make sure the forces in the legs are calculated using the angle from the horizontal sling angle to the leg and select the proper size trench cover hoist ring.

| Table 1 <br> HR-500 Trench Cover Hoist Rings** |  |  |  |
| :---: | :---: | :---: | :---: |
|  | Dimensions <br> (in) |  |  |
| Working Load <br> Limit <br> (lb)* | Coil <br> Thread <br> Size <br> A | Effective Thread <br> Projection <br> Length <br> B | Weight <br> Each <br> (Ib) |
| 5,000 | 1 1"-3.5 | 1.000 | 8.0 |
| 10,000 | $1-1 / 4^{\prime \prime}-3.5$ | 1.000 | 16.0 |
| 15,000 | $1-1 / 2^{\prime \prime}-3.5$ | 1.000 | 28.0 |

* Ultimate load is 5 times the working load limit. Individually proof tested to 2-1/2 times the working load limit
** Designed to be used with ferrous workpiece only.


## Trench Cover Nut Welding Guidelines

1. Select the correct size trench cover hoist ring to be used. Be sure to calculate the maximum load that will be applied to the trench cover hoist ring. The nut thickness should be equal to the workpiece thickness.
2. Cut a hole in the workpiece per Table 2 below.
3. Insert the trench cover nut into the hole. The trench cover nut should have $1 / 16$ " clearance around its outer edge. The surface of the trench cover nut must be parallel and even with the surface of the workpiece (See Figure 5).
4. A welding fixture is available from Crosby for this.
5. Welding is to be performed by a qualified welder using a qualified procedure in accordance with American Welding Society and/or American Society of Mechanical Engineers requirements.

| Table 2 <br> HR-500 Weld-In Nuts |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Dimensions (in) |  |  |  |
| Working Load Limit <br> (lb) | Coil <br> Thread Size | Nut Diameter K | Trench Cover Hole Diameter L | Nut Thickness = Workpiece Thickness M |
| 5,000 | 1"-3.5 | 3 | 3-1/8 | 3/4 |
| 5,000 | 1"-3.5 | 3 | 3-1/8 | 7/8 |
| 5,000 | 1"-3.5 | 3 | 3-1/8 | 1 |
| 10,000 | 1-1/4" - 3.5 | 3 | 3-1/8 | 3/4 |
| 10,000 | 1-1/4" - 3.5 | 3 | 3-1/8 | 7/8 |
| 10,000 | 1-1/4" - 3.5 | 3 | 3-1/8 | 1 |
| 10,000 | 1-1/4" - 3.5 | 3 | 3-1/8 | 1-1/4 |
| 10,000 | 1-1/4" - 3.5 | 3 | 3-1/8 | 1-1/2 |
| 15,000 | 1-1/2" - 3.5 | 3-1/2 | 3-5/8 | 1 |
| 15,000 | 1-1/2" - 3.5 | 3-1/2 | 3-5/8 | 1-1/4 |
| 15,000 | 1-1/2" -3.5 | 3-1/2 | 3-5/8 | 1-1/2 |


6. When welding to low or medium carbon cover steel, the following suggestions should be included in the qualified procedure.
A. Before welding, all weld surfaces must be clean and free from rust, grease, paint, slag and any other contaminants.
B. Weld material is to have a minimum tensile strength of $70,000 \mathrm{PSI}$ (such as AWS A5. 1E-7018). Observe the electrode manufacturer's recommendations.
C. Completely fill internal bevel created between trench cover nut and the workpiece.
D. Do not rapidly cool the weld.
E. The surface of the weld must be ground sufficiently so that the trench cover hoist ring will fit flush against the workpiece.
F. Using the same procedure, weld the opposite side.
G. A thorough inspection of the weld should be performed. No cracks, pitting, inclusions, notches or undercuts are allowed. If doubt exists, use a suitable NDE method, such as magnetic particle or liquid penetrant to verify.
$H$. If repair is required, grind out the defect and re-weld using the original qualified procedure.

NOTE: For welding to other grades of steel, a qualified weld procedure must be developed.

Figure 5


## WARNINGS \& APPLICATION INSTRUCTIONS



## HR-1200

## Hoist Ring Application / Assembly Instruction

The Crosby side pull swivel hoist ring is designed to accept standard Crosby fittings to facilitate wider slings and quick attachment. In order to use the larger fittings, the load rating on the (shackle) fitting may be greater than the hoist ring frame. Never exceed the Working Load Limit of the hoist ring frame.

- Use swivel hoist ring only with a ferrous metal (steel, iron) or nonferrous (i.e., aluminum) loads (workpiece). Do not leave threaded end of hoist ring in aluminum loads for long time periods due to corrosion.
- After determining the loads on each hoist ring, select the proper size hoist ring using the Working Load Limit ratings in Table 1 for UNC threads and Table 2 for Metric threads (on next page.)
- For Subsea or Metric environment application, use the HR-1200 CT Series hoist ring only.
- Drill and tap the workpiece to the correct size to a minimum depth of one-half the threaded shank diameter plus the threaded shank length.
- Install hoist ring to recommended torque with a torque wrench making sure the bushing flange is fully supported by the load (workpiece) surface. See rated load limit and bolt torque requirements imprinted on hoist ring body (See Table 1 or Table 2).
- Never use spacers between bushing flange and mounting surface.
- Always select proper lifting device for use with Swivel Hoist Ring (See Tables $1 \& 2$ on next page).
- Attach lifting device ensuring free fit to hoist shackle (See Figure 3).
- Apply partial load and check proper rotation and alignment of shackle. There should be no interference between load (workpiece) and hoist shackle (See Figure 1 and Figure 3).
- The Hoist ring should rotate into normal operating position, with shackle aligned with load as shown in Figure 3. If shackle is oriented as shown in Figure 4, DO NOT LIFT.
- Special Note: when a Hoist Ring is installed with a retention nut, the nut must have full thread engagement and must meet one of the following standards to develop the Working Load Limit (WLL).

1. ASTM A-563 (A) Grade D Hex Thick
2. (B) Grade DH Standard Hex
3. SAE Grade 8 - Standard Hex

## Hoist Ring Inspection / Maintenance

- Always inspect hoist ring before use.
- Regularly inspect hoist ring parts (Figure 2).
- For hoist rings used in frequent load cycles or on pulsating loads, the bolt threads should be periodically inspected by magnetic particle or dye penetrant.
- Do not use part showing cracks, nicks or gouges.
- Repair minor nicks or gouges to hoist frame by lightly grinding until surfaces are smooth. Do not reduce original dimension more than $10 \%$. Do not repair by welding.
- Loads may slip or fall if proper Hoist Ring assembly and lifting procedures are not followed.
- A falling load may cause serious injury or death.
- Install hoist ring bolt to torque requirements listed in tables.
- The side pull hoist ring frame will be only one part of a lifting system with several components (i.e., shackles and slings). Never exceed the Working Load Limit of the hoist ring frame.
- Do not use damaged slings or chain. For inspection criteria, see ASME B30.9.
- Read and understand these instructions before using hoist ring.
- Use only genuine Crosby parts as replacements.


Figure 1


Figure 3


Figure 2


- Never use hoist ring that shows signs of corrosion, wear or damage.
- Never use hoist ring if components are bent or elongated.
- Always be sure threads on bolt and receiving tapped holes are clean, undamaged, and fit properly.
- Always check with torque wrench before using an already installed hoist ring.
- Always make sure there are no spacers (washers) used between bushing flange and the mounting surface. Remove any spacers (washers) and retorque before use.
- Always ensure free movement of shackle. The shackle should pivot $90^{\circ}$ and the hoist ring should swivel $360^{\circ}$ (See Figure 3).
- Always be sure total workpiece surface is in contact with hoist ring bushing mating surface. Drilled and tapped hole must be $90^{\circ}$ to load (workpiece) surface.


## OPERATING SAFETY

- Never exceed the capacity of the hoist ring, see Table 1 for UNC threads and Table 2 for Metric threads.
- When using lifting slings of two or more legs, make sure the forces in the legs are calculated using the angle from the horizontal sling angle to the leg and select the proper size swivel hoist ring to allow for the angular forces.


HR1200 Threads

| Frame Size | Working Load Limit * <br> (lb) | Hoist Ring Bolt Torque in (ft•lbf) $\dagger$ | Bolt Size $\ddagger$ (in) | Effective Thread Projection Length (in) | Recommended Shackles |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | Red Pin ${ }^{\ominus}$ Shackles $209,210,213$ $215,2130,2150$ | $\begin{gathered} \text { Red Pin }{ }^{\circledR} \\ \text { Web Shackles } \\ \text { S-281 } \end{gathered}$ |
| 1 | $\begin{aligned} & \text { 650t+ } \\ & 800+1 \end{aligned}$ | $\begin{gathered} 7 \\ 12 \\ \hline \end{gathered}$ | $\begin{aligned} & 5 / 16-18 \times 1.5 \\ & 3 / 8-18 \times 1.5 \\ & \hline \end{aligned}$ | $\begin{array}{r} .59 \\ .59 \end{array}$ | $\begin{gathered} 1 / 2^{\prime \prime}-(2) \\ 5 / 8^{\prime \prime}-(3-1 / 4) \end{gathered}$ | $2 "$ - (3-1/4) |
| 2 | $\begin{gathered} 2000 \\ 2000 \dagger \dagger \\ 3000 \\ 3000+\dagger \end{gathered}$ | $\begin{aligned} & 28 \\ & 28 \\ & 60 \\ & 60 \\ & \hline \end{aligned}$ | $\begin{array}{r} 1 / 2-13 \times 2.0 \\ 1 / 2-13 \times 2.5 \\ 5 / 8-11 \times 2.0 \\ 5 / 8-11 \times 2.75 \\ \hline \end{array}$ | $\begin{array}{r} .71 \\ 1.21 \\ .71 \\ 1.46 \\ \hline \end{array}$ | $\begin{aligned} & 5 / 8 "-(3-1 / 4) \\ & 3 / 4 "-(4-3 / 4) \end{aligned}$ | $\begin{gathered} 2 "-(3-1 / 4) \\ 1-1 / 2 "-(4-1 / 2) \end{gathered}$ |
| 3 | $\begin{gathered} 5000 \\ 5000 \dagger \dagger \\ 6500 \\ 6500 \dagger \dagger \\ 8000 \\ 8000 \dagger \dagger \\ \hline \end{gathered}$ | $\begin{aligned} & 100 \\ & 100 \\ & 160 \\ & 160 \\ & 230 \\ & 230 \\ & \hline \end{aligned}$ | $\begin{gathered} 3 / 4-10 \times 2.75 \\ 3 / 4-10 \times 3.5 \\ 7 / 8-9 \times 2.5 \\ 7 / 8-9 \times 3.5 \\ 1-8 \times 3.0 \\ 1-8 \times 4.0 \\ \hline \end{gathered}$ | $\begin{array}{r} 1.46 \\ 1.63 \\ .90 \\ 1.68 \\ 1.15 \\ 2.15 \\ \hline \end{array}$ | 7/8" - (6-1/2) | 2" - (6-1/4) |
| 4 | 14000 | 470 | 1-1/4-7x 4.5 | 2.22 | $\begin{gathered} 1 "-(8-1 / 2) \\ 1-1 / 8 "-(9-1 / 2) \\ 1-1 / 4 "-(12) \\ \hline \end{gathered}$ | 3" - (8-1/2) |
| 5 | $\begin{aligned} & 17200 \\ & 29000 \\ & \hline \end{aligned}$ | $\begin{gathered} 800 \\ 1100 \end{gathered}$ | $\begin{array}{r} 1-1 / 2-6 \times 6.5 \\ 2-4-1 / 2 \times 6.5 \end{array}$ | $\begin{array}{r} 2.88 \\ 2.98 \\ \hline \end{array}$ | $\begin{gathered} 1-3 / 8 "-(13-1 / 2) \\ 1-1 / 2^{\prime \prime}-(17) \\ 1-3 / 4 "-(25) \\ \hline \end{gathered}$ | - |

HR1200M UNC Metric Threads
TABLE 2

| Frame Size | Working Load Limit * (kg) | Hoist Ring Bolt Torque in $\mathrm{Nm} \dagger$ | Bolt Size $\ddagger$ (mm) | Effective Thread Projection Length (mm) | Recommended Shackles |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | $\begin{gathered} \text { Red Pin }{ }^{\ominus} \text { Shackles } \\ 209,210,213 \\ 215,2130,2150 \end{gathered}$ | Red Pin ${ }^{\text {® }}$ Web Shackles S-281 |
| 1 | $\begin{array}{r} 300 \\ 400 \\ \hline \end{array}$ | $\begin{aligned} & 10 \\ & 16 \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { M8 } \times 1.25 \times 40 \\ & \text { M10 } \times 1.5 \times 40 \\ & \hline \end{aligned}$ | $\begin{array}{r} 16.9 \\ 16.9 \\ \hline \end{array}$ | $\begin{gathered} 1 / 2 "-(2) \\ 5 / 8^{\prime \prime}-(3-1 / 4) \\ \hline \end{gathered}$ | 2" - (3-1/4) |
| 2 | $\begin{array}{r} 1000 \\ 1400 \\ \hline \end{array}$ | $\begin{aligned} & 38 \\ & 81 \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { M12 } \times 1.75 \times 50 \\ & \text { M16 } \times 2.00 \times 60 \\ & \hline \end{aligned}$ | $\begin{aligned} & 17.2 \\ & 27.2 \end{aligned}$ | $\begin{aligned} & 5 / 8 "-(3-1 / 4) \\ & 3 / 4 "-(4-3 / 4) \\ & \hline \end{aligned}$ | $\begin{gathered} 2^{\prime \prime}-(3-1 / 4) \\ 1-1 / 2 "-(4-1 / 2) \\ \hline \end{gathered}$ |
| 3 | $\begin{aligned} & 2250 \\ & 3500 \end{aligned}$ | $\begin{aligned} & 136 \\ & 312 \end{aligned}$ | $\begin{aligned} & \text { M20 } \times 2.50 \times 75 \\ & \text { M24 } 3.00 \times 80 \end{aligned}$ | $\begin{aligned} & 28.1 \\ & 33.1 \end{aligned}$ | 7/8" - (6-1/2) | $2 "$ - (6-1/4) |
| 4 | 6250 | 637 | M30 $\times 3.5 \times 120$ | 65.1 | $\begin{gathered} 1 "-(8-1 / 2) \\ 1-1 / 8 "-(9-1 / 2) \\ 1-1 / 4 "-(12) \end{gathered}$ | $3 "$ - (8-1/2) |
| 5 | 7750 10000 13000 | $\begin{aligned} & 1005 \\ & 1005 \\ & 1350 \end{aligned}$ | M36 $\times 4.0 \times 150$ M $42 \times 4.5 \times 160$ <br> M $48 \times 5.0 \times 160$ | $\begin{aligned} & 60.6 \\ & 70.6 \\ & 70.6 \end{aligned}$ | $\begin{gathered} 1-3 / 8 "-(13-1 / 2) \\ 1-1 / 2^{\prime \prime}-(17) \\ 1-3 / 4 "-(25) \end{gathered}$ | - |

[^26]CROSBY ${ }^{\text {® }}$ WELD-ON PIVOTING LINK WARNING \& APPLICATION INSTRUCTIONS


S-265

- Loads may disengage from link if proper welding, assembly, and lifting procedures are not used.
- A falling load may cause serious injury or death.
- Do not use with damaged slings or chain. For sling inspection criteria see ASME B30.9.
- Read and understand these instructions before welding on, or using the pivoting link.


## Important Safety Information Read and Follow

- Use weld-on pivoting link only with ferrous metal (steel) workpiece.
- After determining the loads on each weld-on pivoting link, select the proper size using the Working Load Limit (WLL) ratings in Table 1 on next page.
- Always make sure the weld-on pivoting link and mounting surface is free of dirt or contaminants before installation.
- Never use spacers between the weld-on pivot link and mounting surface.
- Always select proper load rated lifting device for use with weld-on pivoting link.
- Attach lifting device ensuring free movement of weld-on pivoting link bail (Figure 1).
- Apply partial load and check proper alignment. There should be no interference between load (workpiece) and weld-on pivoting link (Figure 2).
- Always ensure free movement of bail. The bail should pivot 180 degrees (Figure 4).
- The support structure that the pivot link is attached to must be of suitable size, composition and quality to support the anticipated loads of all operating positions. The required support structure thickness for a given application is dependent on variables such as unsupported length and material strength, and should be determined by a qualified individual.
- Never repair, alter, rework or reshape the pivoting link bail by welding, heating, burning or bending.


## Weld-on Pivoting Link Inspection / Maintenance

- Always inspect weld-on pivoting link before use.
- Regularly inspect weld-on pivoting link parts (Figure 3).
- Never use weld-on pivoting link that shows signs of corrosion, wear or damage.
- Never use weld-on pivoting link if bail is bent or elongated.
- Do not use part showing cracks, nicks or gouges.
- Always make sure there are no spacers used between weld-on pivoting link and the mounting surface.
- Always be sure workpiece surface is in total contact with the weld-on pivoting link base mating surface.
- Always inspect the weld-on pivoting link bail and base for wear.
- A visual periodic inspection of the weld should be performed. Check the weld visually, or use a suitable NDE method if required.


## Operating Safety

- Never exceed the capacity (WLL) of the weld-on pivoting link (Table 1, next page).
- Always apply load within $90^{\circ}$ of inline, at any pivot angle (Figure 4 \& 5).
-When using lifting slings of two or more legs, make sure the forces in the legs are calculated using the angle from the horizontal sling angle to the leg and select the proper size link.



Figure 1


Figure 2


Figure 3


Figure 4


Figure 5

## Weld-on Pivoting Link Welding Guidelines

1. Select the correct size weld-on pivoting link to be used. Be sure to calculate the maximum load that will be applied to the weld-on pivoting link.
2. Place the weld-on pivoting link onto the mounting surface. The bottom of the link base must be parallel and even with the mounting surface.
3. Welding is to be performed by a qualified welder using a qualified procedure in accordance with American Welding Society and/or American Society of Mechanical Engineers requirements. Always follow your country or local mandatory regulations or codes.
4. The following welding recommendations should be included in the qualified procedure for welding to low or medium carbon plate steel. For welding to other grades of steel, a qualified weld procedure must be developed.
A. Saddle material is equivalent to SAE/AISI 1024, EN S355J2, or DIN 1.0570.
B. Weld material is to have a minimum tensile strength of 70,000 PSI (such as AWS A5.1 E-7018). Observe the electrode manufacturer's recommendations. Completely fill internal fillet created between weld-on pivoting link base and mounting surface.
C. Before welding, all weld surfaces must be clean and free from rust, grease, paint, slag and any other contaminants.
D. Fillet weld leg size should be minimum shown in Table 1. Weld profiles to be in accordance with AWS. Weld size is measured by length of leg.
E. Welding should be carried out in a minimum of two passes to ensure adequate root penetration at the base of the pivoting link.
F. Weld full length of "D" dimension on both sides of link base (Figure 5).
G. Do not weld close to the bail. After welding, ensure bail pivots full $180^{\circ}$ without interfering with the weld.
H. Do not rapidly cool the weld.
I. The ends of the weld must be ground sufficiently so that the weld-on pivoting link will fit flush against the mounting surface.
J. A thorough inspection of the weld should be performed. No cracks, pitting, inclusions, notches or undercuts are allowed. If doubt exists, use a suitable NDE method, such as magnetic particle or liquid penetrant to verify.
K. If repair is required, grind out the defect and re-weld using the original qualified procedure.


Figure 5

| Table 1 <br> S-265 Weld-on Pivoting Links* |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Working Load Limit <br> (t) |  | Dimensions (in) |  |  |  |  |  |  |  | Weight Each (lb) |
| Stock Number | Design Factor 5:1 | Design Factor 4:1 | A | B | C | D | F | G | H | Minimum <br> Fillet <br> Weld <br> Size |  |
| 1290740 | 1 | 1.2 | 1.57 | 1.42 | 3.27 | 1.38 | 0.51 | 2.60 | 1.65 | 3/32 | . 88 |
| 1290768 | 2.5 | 3.2 | 1.77 | 1.73 | 3.90 | 1.65 | 0.71 | 3.19 | 1.89 | 3/32 | 1.32 |
| 1290786 | 4 | 5 | 2.17 | 1.97 | 4.84 | 1.93 | 0.87 | 3.90 | 2.24 | 1/4 | 2.65 |
| 1290802 | 6.4 | 8 | 2.76 | 2.52 | 5.67 | 2.52 | 1.02 | 4.80 | 2.64 | 1/4 | 5.29 |
| 1290820 | 12 | 15 | 3.82 | 3.54 | 7.60 | 3.39 | 1.34 | 6.50 | 3.70 | 5/16 | 13.01 |

[^27]

## Hoist Ring Application Assembly Safety

Use swivel hoist ring only with a ferrous metal (steel, iron) or soft metal (i.e., aluminum) load (workpiece). Do not leave threaded end of hoist ring in aluminum loads for long time periods due to corrosion.
For subsea or marine environment applications, use the HR-1000CT series Hoist Ring only.

- After determining the loads on each hoist ring, select the proper size hoist ring using the Working Load Limit ratings in Tables 1, 2, and 5 for UNC threads and Tables 3, 4 and 6 for Metric threads (on next page).
- Drill and tap the workpiece to the correct size to a minimum depth of one-half the threaded shank diameter plus the threaded shank length. See rated load limit and bolt torque requirements imprinted on top of the swivel trunnion (See Table 1 through Table 6 on next page).
- When a hoist ring is used in a side load application, ensure equal loading on the pins by aligning the bail as shown in (Fig. 3).
- Always be sure total hoist ring bushing mating surface is in contact with the (workpiece) surface. Drilled and tapped hole must be 90 degrees to load (workpiece) surface.
- Install hoist ring to recommended torque with a torque wrench making sure the bushing flange meets the load (workpiece) surface.
- Never use spacers between bushing flange and mounting surface.
- Always select proper load rated lifting device for use with Swivel Hoist Ring.
- Attach lifting device ensuring free fit to hoist ring bail (lifting ring) (Fig. 1).
- Apply partial load and check proper rotation and alignment. There should be no interference between load (workpiece) and hoist ring bail (Fig. 2).
- Special Note: When a Hoist Ring is installed with a retention nut, the nut must have a full thread engagement and must meet one of the following standards to develop the Working Load Limit (WLL).

UNC NUTS

1. ASTM A-563

Grade D
(Heavy Hex or Hex Thick)
Grade DH
Grade DH3
2. ASTM A-194

Grade 2H
Grade 4
Grade 7
3. FNL

Grade 9
4. SAE J995 Grade 8

## Hoist Ring Inspection / Maintenance

- Always inspect hoist ring before use.
- Regularly inspect hoist ring parts.
- Never use hoist ring that shows signs of corrosion, wear or damage.
- Never use hoist ring if bail is bent or elongated.
- Always be sure threads on shank and receiving hole are clean, not damaged, and fit properly.


## METRIC NUTS

1. ASTM A-563M

Class 10S
2. ISO 898-2
(EN 20898-2/DIN 267-4)
Class 10
Class 12

| Table 1 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Working Load Limit* 5:1 <br> (lb) | Hoist Ring Bolt Torque (ft•lbf) $\dagger$ | HR-125 |  | HR-1000 |  |
|  |  | Bolt Size $\ddagger$ (in) | Effective <br> Thread Projection Length (in) | Bolt Size $\ddagger$ <br> (in) | Effective <br> Thread Projection Length (in) |
| 800 † $\dagger$ | 7 | 5/16-18 $\times 1.50$ | . 58 | 5/16-18 $\times 1.50$ | . 52 |
| 1000 †† | 12 | $3 / 8-16 \times 1.50$ | . 58 | $3 / 8-16 \times 1.50$ | . 52 |
| 2500 | 28 | $1 / 2-13 \times 2.00$ | . 70 | 1/2-13 x 2.25 | . 69 |
| 2500 †† | 28 | $1 / 2-13 \times 2.50$ | 1.20 | 1/2-13 x 2.75 | 1.19 |
| 4000 | 60 | $5 / 8-11 \times 2.00$ | . 70 | $5 / 8-11 \times 2.25$ | 69 |
| $4000 \dagger \dagger$ | 60 | $5 / 8-11 \times 2.75$ | 1.45 | 5/8-11 x 3.00 | 1.44 |
| 5000 | 100 | $3 / 4-10 \times 2.25$ | . 95 | $3 / 4-10 \times 2.50$ | . 94 |
| 5000 †† | 100 | $3 / 4-10 \times 2.75$ | 1.45 | $3 / 4-10 \times 3.00$ | 1.44 |
| $7000 \Omega$ | 100 | $3 / 4-10 \times 2.75$ | . 89 | $3 / 4-10 \times 3.00$ | 85 |
| $7000 \dagger \dagger \Omega$ | 100 | $3 / 4-10 \times 3.50$ | 1.64 | $3 / 4-10 \times 3.50$ | 1.35 |
| 8000 | 160 | $7 / 8-9 \times 2.75$ | . 89 | $7 / 8-9 \times 3.00$ | 85 |
| 8000 †† | 160 | $7 / 8-9 \times 3.50$ | 1.64 | $7 / 8-9 \times 3.50$ | 1.35 |
| 10000 | 230 | $1-8 \times 3.00$ | 1.14 | $1-8 \times 3.50$ | 1.35 |
| 10000 † $\dagger$ | 230 | $1-8 \times 4.00$ | 2.14 | $1-8 \times 4.50$ | 2.35 |
| 15000 | 470 | 1-1/4-7x4.50 | 2.21 | 1-1/4-7x5.00 | 2.09 |
| 24000 | 800 | 1-1/2-6 $\times 6.75$ | 2.97 | 1-1/2-6 x 5.50 | 2.59 |
| 30000 | 1100 | 2-4-1/2 x 6.75 | 2.97 | - | - |
| 50000 | 2100 | 2-1/2-4 x 8.00 | 4.00 | - | - |
| 75000 | 4300 | 3-4 x 10.50 | 5.00 | - | - |
| 100000 | 5100 | $3-1 / 2-4 \times 13.00$ | 7.00 | - | - |

$\Omega$ Ultimate Load is 4.5 times Working Load Limit for 7000\# Hoist Ring when tested in $90^{\circ}$ orientation. All sizes are individually proof tested to 2-1/2 times the Working Load Limit. *, $\dagger, \dagger \dagger, \ddagger($ See footnotes at bottom of Table 5).


| Table 3 |  |  |  |
| :---: | :---: | :---: | :---: |
| HR-1000CT |  |  |  |
| Working Load Limit <br> $5: 1$ (lb) **** | Hoist Ring Bolt <br> Torque in (ft•lbf) $\dagger$ | Bolt Size <br> (in) $\Delta$ | Effective Thread <br> Projection <br> Length (in) |
| 1900 | 28 | $1 / 2-13 \times 2.25$ | .70 |
| 1900 | 28 | $1 / 2-13 \times 2.75$ | 1.20 |
| 3000 | 60 | $5 / 8-11 \times 2.25$ | .70 |
| 4800 | 100 | $3 / 4-10 \times 3.00$ | .85 |
| 6200 | 160 | $7 / 8-9 \times 3.00$ | .85 |
| 8300 | 230 | $1-8 \times 3.50$ | 1.35 |
| 12500 | 470 | $11 / 4-7 \times 5.00$ | 2.10 |
| 20000 | 800 | $11 / 2-6 \times 5.50$ | 2.60 |
| 20000 | 800 | $11 / 2-8 \times 5.50$ | 2.60 |
| 28000 | 1100 | $2-4.5 \times 7.50$ | 3.20 |
| 45000 | 2100 | $21 / 2-4 \times 9.50$ | 3.73 |


| Table 4 |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Working Load Limit (kg)*** |  | Hoist Ring Bolt Torque in (Nm) $\dagger$ | HR-125M |  | HR-1000M |  |
| Design Factor 5:1 | $\begin{gathered} \text { HR-125M } \\ \text { Design 4:1 } \\ \hline \end{gathered}$ |  | Bolt Size $\ddagger \ddagger(\mathrm{mm})$ | HR-125M Effective Thread Projection Length (mm) | Bolt Size $\ddagger \ddagger$ (mm) | HR-1000M Effective Thread Projection Length (mm) |
| 400 | 500 | 10 | M $8 \times 1.25 \times 40$ | 16.9 | M $8 \times 1.25 \times 40$ | 15.2 |
| 450 | 550 | 16 | M $10 \times 1.50 \times 40$ | 16.9 | M $10 \times 1.50 \times 40$ | 15.2 |
| 1050 | 1300 | 38 | M $12 \times 1.75 \times 50$ | 17.2 | M $12 \times 1.75 \times 55$ | 15.5 |
| 1900 | 2400 | 81 | M $16 \times 2.00 \times 60$ | 27.2 | M $16 \times 2.00 \times 65$ | 25.5 |
| 2150 | 2700 | 136 | M $20 \times 2.50 \times 65$ | 31.2 | M $20 \times 2.50 \times 70$ | 30.5 |
| 3000 | 3750 | 136 | M $20 \times 2.50 \times 75$ | 28.1 | M $20 \times 2.50 \times 80$ | 25.4 |
| 4200 | 5250 | 312 | M $24 \times 3.00 \times 80$ | 33.1 | M $24 \times 3.00 \times 90$ | 35.4 |
| 7000 | 8750 | 637 | M $30 \times 3.50 \times 120$ | 65.1 | M $30 \times 3.50 \times 140$ | 66.2 |
| 11000 | 13750 | 1005 | M $36 \times 4.00 \times 150$ | 60.6 | M $36 \times 4.00 \times 150$ | 56.2 |
| 12500 | 15600 | 1005 | M $42 \times 4.50 \times 160$ | 70.6 | - | - |
| 13500 | 16900 | 1350 | M $48 \times 5.00 \times 160$ | 101 | - | - |
| 22300 | 27900 | 2847 | M $64 \times 6.00 \times 204$ | 101 | - | - |
| 31500 | 39400 | 5830 | M $72 \times 6.00 \times 265$ | 132 | - | - |
| 44600 | 55800 | 6914 | M $90 \times 6.00 \times 330$ | 177 | - | - |

See Footnotes on next page.
$\dagger$ Tightening torque values shown are based upon threads being clean, dry and free of lubrication.
Footnotes below relate to tables 1-4

* Ultimate load is 5 times the Working Load Limit. Individually proof tested to 2-1/2 times the Working Load Limit.
** Ultimate load is 4 times the Working Load Limit. Individually proof tested to 2-1/2 times the Working Load Limit.
*** Individually proof tested to 2-1/2 times the Working Load Limit based on 4:1 design factor
**** Ultimate load is 5 times the Working Load Limit. Individually proof tested to 2 times the Working Load Limit.
$\dagger \dagger$ Long bolts are designed to be used with soft metal (i.e., aluminum) workpiece. While the long bolts may also be used with ferrous metal (i.e., steel \& iron) workpieces, short bolts are designed for ferrous workpieces only.
$\ddagger$ Bolt specification is a Alloy socket head cap screw to ASTM A574. All threads are UNC .
$\ddagger \ddagger$ Bolt specification is a Grade 12.9 Alloy socket head cap screw to DIN 912. All threads are metric (ASME/ANSI B18.3.1m)
$\Delta$ Bolt specification is a Grade L7 or L43 Alloy socket head cap screw to ASTM A320. All threads are UNC.
$\ddagger \ddagger \ddagger$ Tighten bolt to specified torque, then tighten nut to specified torque.
All Swivel Hoist Rings are individually proof tested.

| Table 5 |  |  |  |
| :---: | :---: | :---: | :---: |
| SS-125 $¥ \mp$ |  |  |  |
| Working Load Limit <br> (lb) $¥$ | Torque in (ft•lbf) $\dagger$ | Bolt Size <br> (in) § | Effective Thread Projection (in) |
| 400 | 3.5 | 5/16-18 x 1 | . 29 |
| 400 | 3.5 | 5/16-18 $\times 1.25$ | . 54 |
| 500 | 6 | 3/8-16 x 1.25 | . 54 |
| 1250 | 14 | 1/2-13x2 | . 78 |
| 1250 | 14 | $1 / 2-13 \times 2.25$ | 1.03 |
| 1250 | 14 | $1 / 2-13 \times 2.5$ | 1.28 |
| 2000 | 30 | 5/8-11 $\times 2$ | . 78 |
| 2000 | 30 | 5/8-11 x 2.25 | 1.03 |
| 2000 | 30 | 5/8-11 x 2.5 | 1.28 |
| 2500 | 50 | $3 / 4-10 \times 2.25$ | 1.03 |
| 2500 | 50 | $3 / 4-10 \times 2.75$ | 1.53 |
| 3500 | 50 | $3 / 4-10 \times 2.75$ | 1.04 |
| 3500 | 50 | $3 / 4-10 \times 3.25$ | 1.54 |
| 4000 | 80 | 7/8-9 $\times 2.75$ | 1.04 |
| 4000 | 80 | $7 / 8-9 \times 3$ | 1.29 |
| 5000 | 115 | $1-8 \times 3$ | 1.29 |
| 5000 | 115 | $1-8 \times 3.25$ | 1.54 |
| 5000 | 115 | $1-8 \times 4$ | 2.29 |
| 7500 | 235 | 1-1/4-7x 4 | 1.89 |
| 12000 | 400 | 1-1/2-6 5.5 | 2.70 |
| 15000 | 550 | 2-4-1/2 x 5.75 | 2.96 |
| 25000 | 1050 | 2-1/2-4 $\times 8$ | 4.00 |
| 25000 | 1050 | 2-1/2-8x8 | 4.00 |
| 37500 | 2150 | 3-4 x 10.25 | 5.00 |
| 50000 | 2550 | 3-1/2-4×13 | 7.00 |


| Table 6 |  |  |  |
| :---: | :---: | :---: | :---: |
| SS-125M ¥¥ |  |  |  |
| SS-125M ¥¥ <br> Working Load <br> Limit <br> (kg) $¥$ | Torque in <br> Lbs. $\dagger$ | Bolt Size <br> (mm) §§ | Effective Thread <br> Projection <br> $(\mathrm{mm})$ |
| 200 | 4 | $\mathrm{M} 8 \times 1.25 \times 30$ | 13 |
| 250 | 8 | $\mathrm{M} 10 \times 1.50 \times 35$ | 18 |
| 525 | 18 | $\mathrm{M} 12 \times 1.75 \times 50$ | 19 |
| 950 | 40 | $\mathrm{M} 16 \times 2.00 \times 60$ | 29 |
| 1075 | 68 | $\mathrm{M} 20 \times 2.50 \times 65$ | 34 |
| 1500 | 68 | $\mathrm{M} 20 \times 2.50 \times 75$ | 32 |
| 2100 | 108 | $\mathrm{M} 24 \times 3.00 \times 80$ | 37 |
| 2100 | 108 | $\mathrm{M} 30 \times 3.50 \times 110$ | 58 |
| 3500 | 318 | $\mathrm{M} 30 \times 3.50 \times 95$ | 42 |
| 3500 | 318 | $\mathrm{M} 30 \times 3.50 \times 115$ | 62 |
| 5500 | 542 | $\mathrm{M} 36 \times 4.00 \times 135$ | 64 |
| 6250 | 542 | $\mathrm{M} 42 \times 4.50 \times 155$ | 82 |
| 6750 | 746 | $\mathrm{M} 48 \times 5.00 \times 155$ | 82 |
| 11150 | 1423 | $\mathrm{M} 64 \times 6.00 \times 205$ | 101 |
| 15750 | 2915 | $\mathrm{M} 72 \times 6.00 \times 265$ | 132 |
| 22300 | 3459 | $\mathrm{M} 90 \times 6.00 \times 330$ | 177 |

## Footnotes below relate to Tables 5 and 6

$\neq$ Ultimate load is 5 times the Working Load Limit. Individually proof tested to 2 times the Working Load Limit.
$\nexists \neq$ All components are 316 Stainless Steel, except Bolt Retainers, which are made from15-7 PH (UNS 15700) magnetic stainless steel.
§ Bolt specification is 316 Stainless Steel socket head cap screw to ASTM F837 Group 1 (316).
$\S \S$ Bolt specification is 316 Stainless Steel socket head cap screw to ASTM F837M (316). All threads are Metric (ASME/ANSI B18.3.1M).

# CROSBY® ${ }^{\circledR}$ THIMBLE EYE BUNDLE CLIPS <br> WARNING \& APPLICATION INSTRUCTIONS 



The Bundle Clip is utilized in a choker hitch application to maintain the shape of bundled packages after a load is placed. The Bundle Clip is attached to live line of choker hitch, but it is never to be used as a button or ferrule to carry a load in the primary load path.

Certain conditions (such as extreme variation of the choke size) or improper installation may cause the eye of the choke hitch to disengage from the Bundle Clip and allow the eye to seat away from or below the Bundle Clip (see Figure 3). If this occurs, the Bundle Clip must be removed and installed in the proper position.

The Bundle Clip is sized to provide a grip to the live rope without reducing the efficiency of a choker hitch. This grip is adequate to keep the bundle clip in position.
These instructions are for use with thimble eyes formed with RRL or RLL wire rope, $6 \times 19$ or $6 \times 36$ Class, FC or IWRC; IPS or XIP, XXIP, and a Crosby Thimble. For other classes of wire rope not mentioned above, we recommend contacting Crosby Engineering.

## For Soft Eye applications see the Crosby G-460 Soft Eye Bundle Clip.

For OSHA (Construction) applications, see OSHA 1926.251.

1. The eye of the sling must be in the choked position (around live line). Choker hitch applications should comply with the requirements of ASME B30.9 Slings. Install the choker hitch to provide a minimum choke angle of 120 degrees (See Figure 1). Refer to ASME B30.9 for required de-rating of the sling if choke angle is less than 120 degrees.
2. Before installing Bundle Clip, apply
 initial load by lifting the bundle and clearing the support, producing a tight choke. Repeat as necessary until the bundle package is in the most compact position (See figure 2, Loaded).
Keep hands and feet from under load.


Figure 2

## WARNING \& APPLICATION INSTRUCTIONS



The Bundle Clip is utilized in a choker hitch application to maintain the shape of bundled packages after a load is placed. The Bundle Clip is attached to live line of choker hitch, but it is never to be used as a button or ferrule to carry a load in the primary load path.
Certain conditions (such as extreme variation of the choke size) or improper installation may cause the eye of the choke hitch to disengage from the Bundle Clip and allow the eye to seat away from or below the Bundle Clip (see Figure 3). If this occurs, the Bundle Clip must be removed and installed in the proper position.

The Bundle Clip is sized to provide a grip to the live rope without reducing the efficiency of a choker hitch. This grip is adequate to keep the bundle clip in position. The eye may pull free of the Bundle Clip if not positioned properly.

These instructions are for use with soft eyes (no thimble) formed with RRL or RLL wire rope, $6 \times 19$ or $6 \times 36$ Class, FC or IWRC; IPS or XIP, XXIP. For other classes of wire rope not mentioned above, we recommend contacting Crosby Engineering.
For Thimble Eye applications see the Crosby G-461 Thimble Eye Bundle Clip.
For OSHA (Construction) applications, see OSHA 1926.251.

1. The eye of the sling must be in the choked position (around live line). Choker hitch applications should comply with the requirements of ASME B30.9 Slings. Install the choker hitch to provide a minimum choke angle of 120 degrees (See Figure 1). Refer to ASME B30.9 for required de-rating of the sling if choke angle is less than 120 degrees.
2. Before installing Bundle Clip, apply
 initial load by lifting the bundle and clearing the support, producing a tight choke. Repeat as necessary until the bundle package is in the most compact position (See figure 2, Loaded).
Keep hands and feet from under load.


## WARNING

- Failure to read, understand, and follow these instructions may cause death or serious injury.
- A falling load may seriously injure or kill.
- Read and understand these instructions before using clips.
- Failure to properly position the Bundle Clip may allow the load to slip and fall.
- Do not use the Bundle Clip to form the choke hitch (See Figure 3).
- Match the same size clip to the same size wire rope.
- Install Bundle Clip only as instructed.
- Do not use with plastic coated wire rope.
- Do not use for lifting personnel.

3. After initial loading, install the Bundle Clip in proper orientation, with curved portion (Bundle Clip tip) over the eye of the sling. Insert U-bolt through the Bundle Clip. Properly position the clip base over the U-bolt and install nuts (See Figure 3). Use torque wrench to tighten evenly, alternating from one nut to the other until the curved portion bottoms out on the clip base, and the recommended torque is reached (See Table 1).


Figure 3

| Table 1-Recommended Torque |  |  |
| :---: | :---: | :---: |
| Clip Size | Rope Size <br> (in) | Torque <br> (ft•lbf) |
| $5 / 8$ | $5 / 8$ | 95 |
| $3 / 4$ | $3 / 4$ | 130 |
| $7 / 8$ | $7 / 8$ | 225 |

4. Before each lift, check to ensure that the choke eye has not slipped from the Bundle Clip tip. Repeat Step 3 if necessary.
5. When disconnecting, the load should be clear of the stable support (See figure 2, Loaded). Remove Bundle Clip. Stay clear of the load as the bundle is lowered and the load is removed from the sling.

In accordance with good rigging and maintenance, the wire rope sling should be inspected periodically for wear, abuse, and general adequacy.

Figure 2


SL-150 \& SL-150M Slide-Loc Lifting Point

## LIFTING POINT

 APPLICATION / ASSEMBLY INSTRUCTIONS- Lifting Points incorporate a red indented area on each forged bail that provides a quick indicator to determine whether the Lifting Point is in the installation position or the lifting position. If the QUIC-CHECK mark is visible, product is in installation mode and shall not be used for lifting.
- To check, look for indented surface (red) on bail. A visible QUIC-CHECK mark (Figure 2) means the slide lock and bolt are engaged for installation. When Lifitng Point is properly installed, move slide lock to lifting position (Figure 1).
- Use Lifting Points only with a ferrous metal (i.e., steel, iron) or soft metal (e.g., aluminum) load (workpiece). Do not leave threaded end of Lifting Point in aluminum loads for long time periods due to corrosion.
-When using lifting slings of two or more legs, make sure the forces in the legs are calculated using the angle from the horizontal sling angle to the leg and select the proper size swivel hoist ring to allow for the angular forces.
- After determining the loads on each Lifting Point, select the proper size Lifting Point using the Working Load Limit ratings in Table 1 for UNC threads and Table 2 for Metric threads.
- Never exceed rated capacity of Lifting Point. See Table 1 for UNC threads, and Table 2 for metric threads.
- Drill and tap the workpiece to the correct size to a minimum depth of one-half the threaded shank diameter plus the threaded shank length.
- Install Lifting Point by hand so that the bushing flange is held tight to the mounting surface by the bolt. The bushing flange should engage the entire mounting surface.
- Never use spacers between bushing flange and mounting surface.
- Always select proper load rated lifting device for use with Lifting Points.
- Attach lifting device ensuring free fit to Lifting Point bail. (Figure 6)
- Never lift load if Red QUIC-CHECK indicator is visible. (Figure 2)
- Apply partial load and check proper rotation and alignment. The Lifting Point bail should be in-line with the direction of the load.



Figure 1
Figure 2

- Do not load in a direction perpendicular to the bail. (Figure 5)
- Special Note: When a Lifting Point is installed with a retention nut, the nut must have a full thread engagement and must meet one of the following standards to develop the Working Load Limit (WLL):

1. ASTM A-563
A. Grade D Hex Thick
B. Grade DH Standard Hex
2. SAE Grade 10.9 - Standard Hex

## To place the Lifting Point:

- Move the slide lock into the installation position, such that the four flats on the bolt head are engaged. (Figure 2)
- Thread the bolt of the Lifting Point into the hole of your workpiece making sure that the entire length of exposed bolt thread is engaged. If the hole on your workpiece is not threaded, ensure that the Lifting Point is secured with a nut on the opposite side of your workpiece and that that nut thread is fully engaged.
- Before applying any load, ensure that the slide lock has been moved back into the lifting position and that the bail is free to rotate. (Figure 1)
- The Lifting Point can be loaded in any direction shown in Figure 4.
- Do not swivel the Lifting Point while supporting a load. The Lifting Point is a positioning device and is not intended to swivel under load.


## To remove Lifting Point

- Move the slide lock into the installation position, such that the four flats on the bolt head flats are engaged. (Figure 2)
- Unthread the Lifting Point from your workpiece.

Lifting Point Inspection / Maintenance

- Perform regular daily inspections as recommended.
- Always inspect Lifting Point before use.
- Regularly inspect Lifting Point parts. (Figure 3)
- Never use Lifting Point that shows signs of corrosion, wear or damage.

| Table 1 |  |  |
| :---: | :---: | :---: |
| Working Load Limit <br> 4:1 <br> (t) | UNC Bolt Size <br> (in) | Effective Thread <br> Projection Length <br> (in) |
| .5 | $3 / 8$ | .61 |
| .75 | $1 / 2$ | .80 |
| 1.50 | $5 / 8$ | 1.01 |
| 2.30 | $3 / 4$ | 1.28 |
| 2.30 | $7 / 8$ | 1.63 |
| 3.20 | 1 | 1.93 |

- Never use Lifting Point if bail is bent or elongated.
- Always be sure threads on shank and receiving hole are clean, not damaged, and fit properly.
- Never use spacers (washers) between bushing flange and the mounting surface.
- Always ensure free movement of bail. The bail should swivel 360 degrees. (Figure 3)
- Always be sure total workpiece surface is in contact with Lifting Point bushing mating surface. Drilled and tapped hole must be 90 degrees to load (workpiece) surface.


Figure 3


Figure 4


Figure 5


Figure 6



[^0]:    *Ultimate Load is 5 times the Working Load Limit. Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to 120 degrees. Applications with wire rope and synthetic sling generally require a design factor of 5 . **Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9. †Offshore Container Master Links Proof Tested to 2.5 times the Working Load Limit with 70 percent fixtures. $\dagger \dagger$ Welded Master Link.

[^1]:    For use with chain slings, refer to page 243 for sling ratings and page 240 for proper master link selection.

[^2]:    * Ultimate Load is 5 times the Working Load Limit. The maximum individual sublink working load limit is $75 \%$ of the assembly working load limit except for $2-1 / 2$ "and $2-3 / 4$ ", which are $100 \%$ of assembly working load limit. Applications with wire rope and synthetic sling generally require a design factor of 5 . **Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9.

[^3]:    For use with chain slings, refer to page 244 for sling ratings and page 240 for proper master link selection.

[^4]:    *Minimum Ultimate Load is 5 times the Working Load Limit.

[^5]:    *Ultimate Load is 6 times the Working Load Limit.

[^6]:    *Ultimate Load is 6 times the Working Load Limit. Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to $120^{\circ}$.

[^7]:    *Ultimate Load is 5 times the Working Load Limit. Working Load Limit shown is for in-line pull. Maximum Proof Load is 2 times the Working Load Limit.

[^8]:    *Ultimate Load is 5 times the Working Load Limit. Maximum Proof Load is 2 times the Working Load Limit.

[^9]:    *Ultimate Load is 5 times the Working Load Limit. Maximum Proof Load is 2 times the Working Load Limit. ** On Request: Special threading or as forged bolts for customer conversion.

[^10]:    *Ultimate Load is 5 times the Working Load Limit. Rating based on UNC thread size shown in Max Thread Diameter column. $\dagger$ Dimension before machining (as forged).

[^11]:    *Ultimate Load is 5 times the Working Load Limit.
    ** Ultimate Load is 4.5 times the Working Load Limit for 7000 \# Hoist Ring when tested in 90 degree orientation.
    $\dagger$ Long Bolts are designed to be used with soft metal (i.e., aluminum) workpiece. While the long bolts may also be used with ferrous metal (i.e.,steel \& iron) workpiece, short bolts are designed for ferrous workpieces only.
    $\ddagger$ Bolt specification is an Alloy socket head cap screw to ASTM A 574.
    \# Hex head bolt used on Frame 8 (100,000lb.) Hoist Ring.

[^12]:    *The tightening torque values shown are based upon threads being clean, dry and free of lubrication.
    $\dagger$ Individually proof loaded to 2-1/2 times the Working Load Limit based on the 4:1 design factor.
    $\ddagger$ Bolt specification is a Grade 12.9 Alloy socket head cap screw to Din 912. All threads are metric (ASME/ANSI B18.3.1m).

[^13]:    *Ultimate Load is 5 times the Working Load Limit. ** Ultimate Load is 4.5 times the Working Load Limit for 7000 \# Hoist Ring when tested in 90 degree orientation. *** Individually proof loaded to 2-1/2

[^14]:    *Ultimate Load is 5 times the Working Load Limit. $\ddagger$ Bolt specification is an Alloy socket head cap screw to ASTM A320 Grade L7 or L43.
    NOTE: The tightening torque values shown are based upon threads being clean, dry and free of lubrication.

[^15]:    *Ultimate Load is 5 times the Working Load Limit.

[^16]:    *Ultimate Load is 5 times the Working Load Limit. $\ddagger$ Bolt specification is 316 Stainless Steel socket head cap screw to ASTM F 837M Group 1 (316).

[^17]:    *Ultimate Load is 5 times the Working Load Limit.

[^18]:    *Ultimate Load is 5 times the Working Load Limit.

[^19]:    *Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

[^20]:    *Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. $\dagger$ Mechanical Galvanized

[^21]:    *Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

[^22]:    *Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

[^23]:    *Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

[^24]:    * Mechanical Galvanized

[^25]:    Minimum tap depth is basic shank length plus one-half the nomina eye bolt diameter

[^26]:    Designed to be used with Ferrous workpiece only.

    * Ultimate load is 5 times the Working Load Limit. Individually proof tested to 2-1/2 times the Working Load Limit.
    $\dagger$ Tightening torque values shown are based upon threads being clean, dry and free of lubrication.
    $\dagger \dagger$ Long bolts are designed to be used with soft metal (i.e., aluminum) workpiece. While the long bolts may also be used with ferrous metal (i.e., steel \& iron) workpieces, short bolts are designed for ferrous workpieces only.
    $\ddagger \quad$ Bolt specification is a Grade 8 Alloy socket head cap screw to ASTM A574. All threads are UNC - 3A.
    $\ddagger \ddagger$ Bolt specification is a Grade 12.9 Alloy socket head cap to DIN 912. All threads are metric (ASME/ANSI B18.3.1m).

[^27]:    * Designed to be used with ferrous workpiece only

