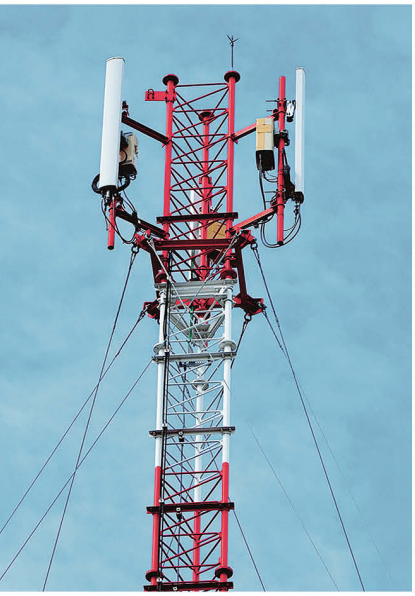

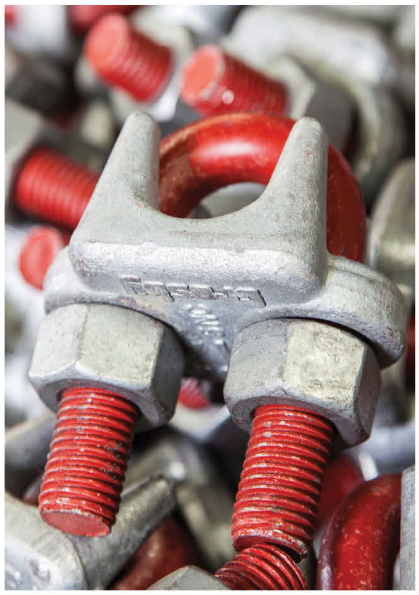

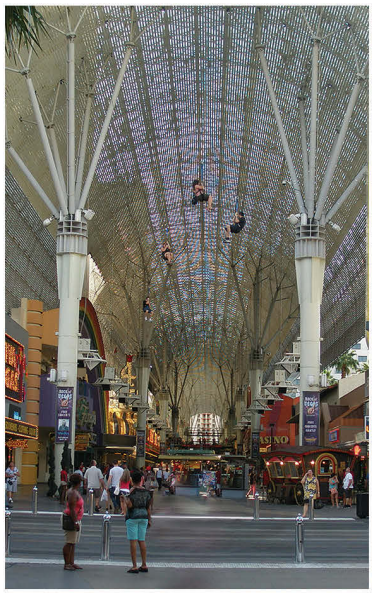

WIRE ROPE END FITTINGS

With Product Warning and Application Information

G-450

Crosby® "There is No Equal"

The Market Leader: Yesterday Today and Tomorrow

G-429

Wire Rope End Fittings

FORGED FOR CRITICAL APPLICATIONS

The proper performance of forged clips depends on proper manufacturing practices that include good forging techniques and accurate machining. Forged clips provide a greater rope bearing surface and more consistent strength than malleable cast iron clips. Fist Grip clips provide a saddle for both the "live" and the "dead" end. Fewer forged clips are required for each termination than with malleable cast iron clips. Forged clips reduce the possibility of hidden defects that are sometimes present in malleable cast iron clips. Malleable cast iron clips should only be used in non-critical applications. ANSI, OSHA, and ASTM recommend only forged clips for critical applications.

THE COMPETITION

Ask: *Is the clip forged?*

Ask: *Is an adequate cradle provided in the clip base for the wire rope?*

Malleable cast iron clips are sometimes improperly used as replacements for forged clips.

Crosby®

Crosby provides forged "Red" U-Bolt® Clips and forged Fist Grip clips which meet or exceed Federal Specification Number FF-C-450 and are considered the industry standard.

FULL LINE

The proper application of forged clips requires that the correct type, size, number, and installation instructions be used (See APPLICATION INFORMATION below for more information). Availability of a full range of sizes of forged U-bolt clips and forged Fist Grip clips are essential for design flexibility.

THE COMPETITION

Ask: *Do they have both Fist Grip and U-bolt clips available?*

Ask: *Do they have a full range of forged wire rope clip sizes?*

No competitor has the full line of forged U-Bolt clips and Fist Grip clips that Crosby has.

Crosby®

Only Crosby provides forged "Red" U-Bolt® Clips from 3.18mm to 88.9mm* and forged Fist Grip clips from 4.76mm through 38.1mm.

* The 88.9mm base is a steel casting.

IDENTIFICATION

The clip's size, manufacturer's logo, and a traceability code should be clearly embossed in the forging of the clip. These three elements are essential in developing total confidence in the product.

THE COMPETITION

Ask: *Is the manufacturer's name and size of clip clearly marked?*

Ask: *Do they have a traceability system that is actively used in the manufacturing process?*

Most do not have a traceability system.

Crosby®

Crosby clearly embosses its logo, the size, and the Product Identification Code (PIC) into all Crosby "Red" U-bolt® Clip bases and Fist Grip clips. Crosby's traceability system is actively used throughout the manufacturing of forged clips. The material analysis for each heat of steel is verified within our own laboratory.

APPLICATION INFORMATION

Detailed application information will assist you in the proper installation of wire rope clips. This information is most effective when provided at the point of application, as well as in supporting brochures and engineering information. The manufacturer must provide this specific information. Generic information will not provide all the needed application instructions. A formal application and warning system that attracts the attention of the user, clearly informs the user of the factors involved in the task, and informs the user with the proper application procedures as needed.

THE COMPETITION

Ask: *Does each clip have the application and warning information?*

Most competitors do not have application and warnings information with each clip.

Crosby®

Crosby provides detailed application and warning information for all forged clips. Each clip is individually bagged or tagged with the application and warning information. Testing and evaluation of special applications can be performed upon special request.

Remember: "When buying Crosby, you're buying more than product, you're buying Quality."

Crosby® VALUE ADDED

- **Full Line:** Crosby provides both forged “Red” U-Bolt® Clips and forged Fist Grip Clips.
- **Forged:** Crosby “Red” U-Bolt® Clips have forged bases on all sizes, except 3-1/2" (the 3-1/2" base is a steel casting). The entire clip is galvanized to resist corrosive and rusting action. Clip sizes 1/8" through 1-1/2" have U-Bolts with rolled threads which enhance the strength of the material and fatigue properties.
- **Forged:** Fist Grip Clips are forged, and the entire clip is galvanized. The double saddle design eliminates the possibility of incorrect installation. Designed as an integral part of the clip, the bolts are opposite one another (see G-429 example below). As result, the nuts can be installed in such a way as to enable the operator to swing the wrench in a full arc for ease of installation.
- **Application Information:** Application and warning information is available for both Crosby “Red” U-Bolt® Clips and Fist Grip Clips. The Crosby Warning System is designed to attract the attention of the user, clearly inform the user of the factors involved in the task, and provide the user with proper application procedures. Each Crosby “Red” U-Bolt® Clip and Fist Grip Clip is either bagged or tagged with appropriate application and warning information, thus ensuring that the information is available at the point of application for each and every clip during installation.
- **Material Analysis:** Crosby can provide certified material (mill) analysis for each production lot, traceable by the Product Identification Code (PIC). Crosby, through its own laboratory, verifies the analysis of each heat of steel.
- **Testing:** Crosby periodically audits the termination efficiencies of the “Red” U-Bolt Clips and Fist Grip Clips. Upon special request, Crosby will determine the efficiencies of clip assemblies when applied to special rope constructions and special applications.

Forged Wire Rope Clips

G-450
Red-U-Bolt®,Clip

Crosby Clips, all sizes 1/4" and larger, meet the performance requirements of Federal Specification FF-C-450 TYPE 1 CLASS 1, except for those provisions required of the contractor. For additional information, see page 452.

- Each base has a Product Identification Code (PIC) for material traceability, the name CROSBY or CG, and a size forged into it.
- Based on the catalog breaking strength of wire rope, Crosby wire rope clips have an efficiency rating of 80% for 1/8" - 7/8" sizes, and 90% for sizes 1" through 3-1/2".
- Entire Clip is Galvanized to resist corrosive and rusting action.
- Sizes 1/8" through 2-1/2" and 3" have forged bases.
- All Clips are individually bagged or tagged with proper application instructions and warning information.
- Clip sizes up through 1-1/2" have rolled threads.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these wire rope clips meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- Look for the Red-U-Bolt®, your assurance of Genuine Crosby Clips.

SEE APPLICATION AND WARNING INFORMATION
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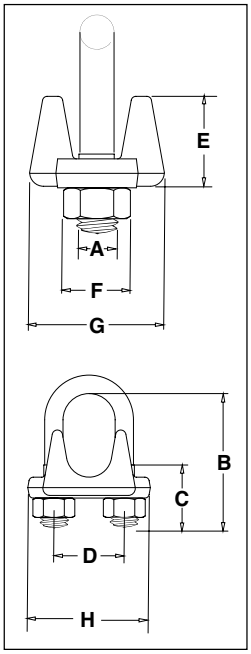
G-450 Crosby Clips



Rope Size (in.)	Rope Size (mm)	G-450 Stock No.	Std. Package Qty.	Weight Per 100 (lbs.)	Dimensions (in.) A	B	C	D	E	F	G	H
1/8	3-4*	1010015	100	6	.22	.72	.44	.47	.37	.38	.81	.99
3/16*	5*	1010033	100	10	.25	.97	.56	.59	.50	.44	.94	1.18
1/4	6-7	1010051	100	19	.31	1.03	.50	.75	.66	.56	1.19	1.43
5/16	8	1010079	100	28	.38	1.38	.75	.88	.73	.69	1.31	1.66
3/8	9-10	1010097	100	48	.44	1.50	.75	1.00	.91	.75	1.63	1.94
7/16	11	1010113	50	78	.50	1.88	1.00	1.19	1.13	.88	1.91	2.28
1/2	12-13	1010131	50	80	.50	1.88	1.00	1.19	1.13	.88	1.91	2.28
9/16	14-15	1010159	50	109	.56	2.25	1.25	1.31	1.34	.94	2.06	2.50
5/8	16	1010177	50	110	.56	2.25	1.25	1.31	1.34	.94	2.06	2.50
3/4	18-20	1010195	25	142	.62	2.75	1.44	1.50	1.39	1.06	2.25	2.84
7/8	22	1010211	25	212	.75	3.12	1.62	1.75	1.58	1.25	2.44	3.16
1	24-26	1010239	10	252	.75	3.50	1.81	1.88	1.77	1.25	2.63	3.47
1-1/8	28-30	1010257	10	283	.75	3.88	2.00	2.00	1.91	1.25	2.81	3.59
1-1/4	32-34	1010275	10	438	.88	4.44	2.22	2.34	2.17	1.44	3.13	4.13
1-3/8	36	1010293	10	442	.88	4.44	2.22	2.34	2.31	1.44	3.13	4.19
1-1/2	38	1010319	10	544	.88	4.94	2.38	2.59	2.44	1.44	3.41	4.44
1-5/8	41-42	1010337	Bulk	704	1.00	5.31	2.62	2.75	2.66	1.63	3.63	4.75
1-3/4	44-46	1010355	Bulk	934	1.13	5.75	2.75	3.06	2.92	1.81	3.81	5.24
2	48-52	1010373	Bulk	1300	1.25	6.44	3.00	3.38	3.03	2.00	4.44	5.88
2-1/4	56-58	1010391	Bulk	1600	1.25	7.13	3.19	3.88	3.19	2.00	4.56	6.38
2-1/2	62-65	1010417	Bulk	1900	1.25	7.69	3.44	4.13	3.69	2.00	4.69	6.63
** 2-3/4	** 68-72	1010435	Bulk	2300	1.25	8.31	3.56	4.38	4.88	2.00	5.00	6.88
3	75-78	1010453	Bulk	3100	1.50	9.19	3.88	4.75	4.44	2.38	5.31	7.61
** 3-1/2	** 85-90	1010426	Bulk	4000	1.50	10.75	4.50	5.50	6.00	2.38	6.19	8.38

* Electro-plated U-Bolt and Nuts. ** 2-3/4" and 3-1/2" base is made of cast steel.

SS-450
Stainless Steel
Wire Rope Clips

- Each base has a Product Identification Code (PIC) for material traceability, the name CROSBY or "CG", and a size forged into it.
- Entire clip is made from 316 Stainless Steel to resist corrosive and rusting action.
- All components are Electro-Polished.
- All Clips are individually bagged or tagged with proper application instructions and warning information.

SS-450 Stainless Steel Wire Rope Clips

Rope Size (in.)	Rope Size (mm)	SS-450 Stock No.	Std. Package Qty.	Weight Per 100 (lbs.)	Dimensions (in.) A	B	C	D	E	F	G	H
1/8	3-4	1011250	Bulk	6	.22	.72	.44	.47	.41	.38	.81	.94
3/16	5	1011261	Bulk	10	.25	.97	.56	.59	.50	.44	.94	1.16
1/4	6-7	1011272	Bulk	20	.31	1.03	.50	.75	.66	.56	1.19	1.44
3/8	9-10	1011283	Bulk	47	.44	1.50	.75	1.00	.91	.75	1.63	1.94
1/2	12-13	1011305	Bulk	77	.50	1.88	1.00	1.19	1.13	.88	1.91	2.28
5/8	16	1011327	Bulk	106	.56	2.38	1.25	1.31	1.34	.94	2.06	2.50

Fist Grip® Wire Rope Clips

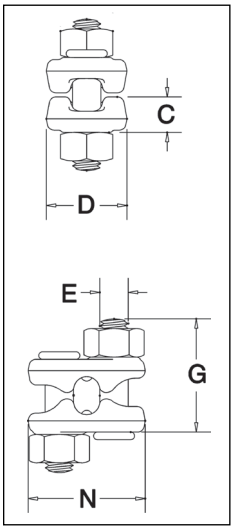
G-429
Fist Grip®, Clip
3/16" - 5/8"

Fist Grip® wire clips meet or exceed the performance requirements of Federal Specification FF-C-450 Type III, Class 1, except for those provisions required of the contractor. For additional information, see page 452.

- Entire clip is Galvanized to resist corrosive and rusting action.
- Based on the catalog breaking strength of wire rope, Crosby wire rope clips have an efficiency rating of 80% for 3/16" - 7/8" sizes, and 90% for sizes 1" through 1-1/2".
- Bolts are an integral part of the saddle. Nuts can be installed in such a way as to enable the operator to swing the wrench in a full arc for fast installation.
- All sizes have forged steel saddles.
- All Clips are individually bagged or tagged with proper application instructions and warning information.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these wire rope clips meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- Assembled with standard heavy hex nuts.

G-429
Fist Grip®, Clip
3/4" - 1-1/2"

3/16" - 5/8"



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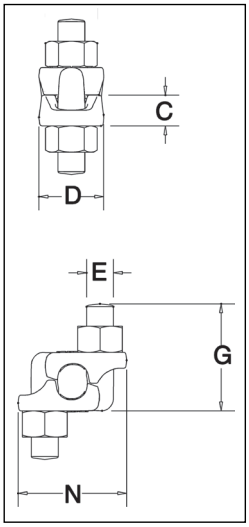
3/4" - 1-1/2"



G-429 Fist Grip® Clips

Rope Size (in.)*	Rope Size (mm)	G-429 Stock No.	Std. Package Qty.	Weight Per 100 (lbs.)	Dimensions (in.) C	D	E	G	N
3/16 - 1/4	5-7	1010471	100	23	.40	.94	.38	1.41	1.44
5/16	8	1010499	100	28	.47	1.06	.38	1.50	1.54
3/8	10	1010514	50	40	.51	1.06	.44	1.84	1.78
7/16 - 1/2	11-13	1010532	50	62	.59	1.25	.50	2.21	2.15
9/16 - 5/8	14-16	1010550	50	103	.72	1.50	.63	2.72	2.57
3/4	18-20	1010578	25	175	.86	1.81	.75	2.94	2.67
7/8	22	1010596	25	225	.97	2.12	.75	3.31	2.86
1	24-26	1010612	10	300	1.13	2.25	.75	3.72	3.06
1-1/8	28-30	1010630	10	400	1.28	2.38	.88	4.22	3.44
1-1/4	32-34	1010658	10	400	1.34	2.50	.88	4.25	3.56
1-3/8 - 1-1/2	36-40	1010676	Bulk	700	1.56	3.00	1.00	5.56	4.12

* Sizes through 5/8" incorporate New Style Design.

YouTube

WIRE ROPE CLIPS TRAINING VIDEO
CROSBY G-450 & G-429

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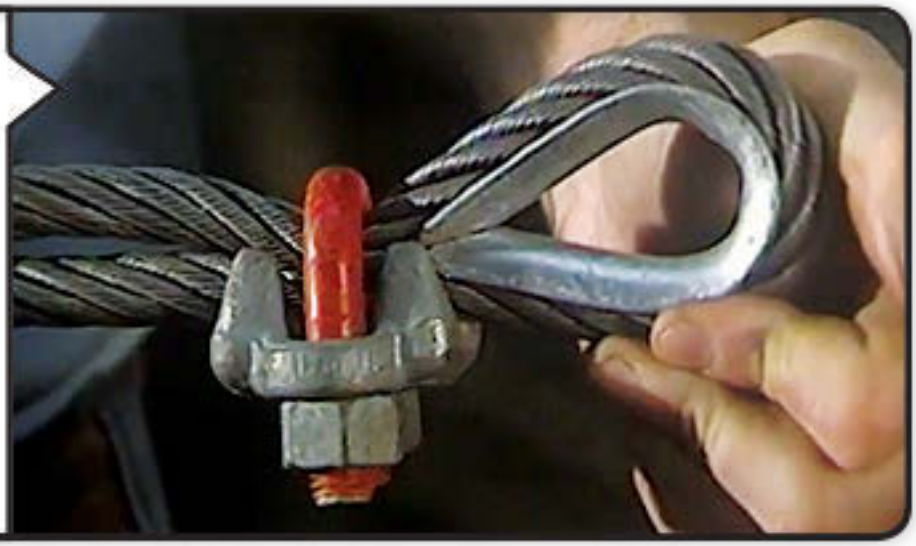
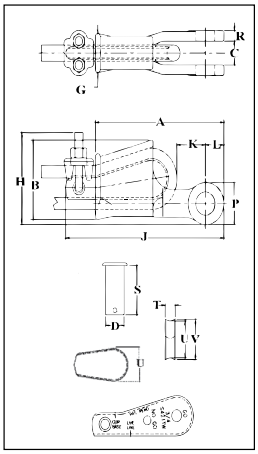


S-421T Wedge Sockets

S-421T

Wedge sockets meet the performance requirements of Federal Specification RR-S-550E, Type C, except those provisions required of the contractor. For additional information, see page 452.

- Wedge socket terminations have an efficiency rating of 80% based on the catalog strength of XXIP wire rope.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these sockets meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- Type Approval and certification in accordance with ABS 2007 Steel Vessel Rules. 1-1-17.7, and ABS Guide for Certification of Cranes.
- Basket is cast steel and individually magnetic particle inspected.
- Pin diameter and jaw opening allows wedge and socket to be used in conjunction with closed swage and spelter sockets.
- Secures the tail or "dead end" of the wire rope to the wedge, thus eliminates loss or "Punch out" of the wedge.
- Eliminates the need for an extra piece of rope, and is easily installed.
- The TERMINATOR™ wedge eliminates the potential breaking off of the tail due to fatigue.
- The tail, which is secured by the base of the clip and the wedge, is left undeformed and available for reuse.
- Incorporates Crosby's patented QUIC-CHECK® "Go" and "No-Go" feature cast into the wedge. The proper size rope is determined when the following criteria are met:
  1) The wire rope should pass thru the "Go" hole in the wedge.
  2) The wire rope should NOT pass thru the "No-Go" hole in the wedge.
- Utilizes standard Crosby Red-U-Bolt® wire rope clip.
- The 9-10mm through 28mm standard S-421 wedge socket can be retrofitted with the new style TERMINATOR wedge.
- **Available with Bolt, Nut, and Cotter Pin.**
- U.S. patent 5,553,360, Canada patent 2,217,004 and foreign equivalents.
- Meets the performance requirements of EN 13411-6: 2003.



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TYPE APPROVED

QUIC-CHECK®

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S-421T WEDGE SOCKETS (Assembly includes Socket, Wedge, Pin and Wire Rope Clip)

Wire Rope Dia. (in.)	Wire Rope Dia. (mm)	S-421T Stock No.	API 2C S-421T Stock No.	Weight Each (lbs.)	S-421TW Stock No. Wedge Only	Wedge Only Weight Each (lbs.)	API 2C S-421TW Stock No. Wedge Only	Optional G-4082 API 2C Bolt, Nut & Cotter G-4082 Stock No.	Optional G-4082 API 2C Bolt, Nut & Cotter Weight Each (lbs.)	API 2C S-421TW Stock No. Wedge Only	Optional G-4082 Bolt, Nut & Cotter G-4082 Stock No.	Optional G-4082 Bolt, Nut & Cotter Weight Each (lbs.)
3/8	9-10	1035000	1035005	3.18	1035555	.50	1092230	1092227	.38	1092230	1092227	.38
1/2	11-13	1035009	1035014	6.15	1035564	1.05	1092248	1092236	.69	1092248	1092236	.69
5/8	14-16	1035018	1035023	9.70	1035573	1.79	1092257	1092254	1.15	1092257	1092254	1.15
3/4	18-19	1035027	1035032	14.50	1035582	2.60	1092293	1092281	1.91	1092293	1092281	1.91
7/8	20-22	1035036	1035041	21.50	1035591	4.00	1092319	1092307	3.23	1092319	1092307	3.23
1	24-26	1035045	1035050	30.75	1035600	5.37	1092337	1092325	5.40	1092337	1092325	5.40
1-1/8	28	1035054	1035059	45.30	1035609	7.30	1092364	1092343	7.50	1092364	1092343	7.50
1-1/4	30-32	1035063	1035068	64.90	1035618	10.60	1092375	1092372	10.34	1092375	1092372	10.34

Wire Rope Dia. (in.)	Wire Rope Dia. (mm)	S-421T Stock No.	API 2C S-421T Stock No.	Dimensions (in.) A	B	C +/- .09	D	G	H	J*	K*	L	P	R	S	T	U	V
3/8	9-10	1035000	1035005	5.69	2.72	.81	.81	1.38	3.06	7.80	1.88	.88	1.56	.44	2.13	.44	1.25	1.38
1/2	11-13	1035009	1035014	6.88	3.47	1.00	1.00	1.62	3.76	8.91	1.26	1.06	1.94	.50	2.56	.53	1.75	1.88
5/8	14-16	1035018	1035023	8.25	4.30	1.25	1.19	2.12	4.47	10.75	1.99	1.22	2.25	.56	3.25	.69	2.00	2.19
3/4	18-19	1035027	1035032	9.88	5.12	1.50	1.38	2.44	5.28	12.36	2.41	1.40	2.63	.66	3.63	.78	2.34	2.56
7/8	20-22	1035036	1035041	11.25	5.85	1.75	1.63	2.69	6.16	14.37	2.48	1.67	3.13	.75	4.31	.88	2.69	2.94
1	24-26	1035045	1035050	12.81	6.32	2.00	2.00	2.94	6.96	16.29	3.04	2.00	3.75	.88	4.70	1.03	2.88	3.28
1-1/8	28	1035054	1035059	14.38	6.92	2.25	2.25	3.31	7.62	18.34	2.56	2.25	4.25	1.00	5.44	1.10	3.25	3.56
1-1/4	30-32	1035063	1035068	16.34	8.73	2.62	2.50	3.56	9.39	20.48	2.94	2.34	4.50	1.06	6.13	1.19	4.62	4.94

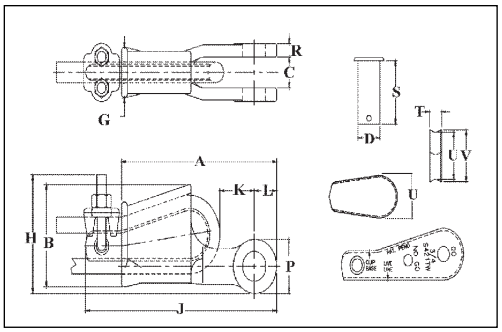
* Nominal **NOTE:** For intermediate wire rope sizes, use next larger size socket. The S-423T Super TERMINATOR wedge is designed to be assembled only into the Crosby S-421T TERMINATOR socket body. **IMPORTANT:** The S-423TW for sizes 5/8" through 1-1/8" (14mm through 28mm) will fit respective size standard Crosby S-421T basket. The 1-1/4" (30-32mm) S-423TW will only fit the Crosby S-421T 1-1/4" basket marked with TERMINATOR.

US-422T Utility Wedge Sockets

US-422T

Most sizes now incorporate the Crosby TERMINATOR design and may vary in shape from above product shown.

- Basket is cast steel and individually magnetic particle inspected.
- Wedge socket terminations have an efficiency rating of 80% based on the catalog strength of XXIP wire rope.
- Wedges are color coded for easy identification.
  - Blue - largest wire line size for socket.
  - Black - mid size wire line for socket.
    - 7/16" on US4
    - 9/16" on US5
  - Orange - smallest wire line size for socket.
- Cast into each socket is the name "McKissick", "Crosby" or "CG", its model number and its wire line range.
- By simply changing out the wedge, each socket can be utilized for various wire line sizes (Ensure correct wedge is used for wire rope size).
- Cast into each wedge is the model number of the socket and the wire line size for which the wedge is to be used.
- Load pin is forged and headed on one end.
- Incorporates Crosby's patented QUIC-CHECK® "Go" and "No-Go" feature cast into the wedge. The proper size rope is determined when the following criteria are met:
  1) The wire rope should pass thru the "Go" hole in the wedge.
  2) The wire rope should NOT pass thru the "No-Go" hole in the wedge.
- US-422T wedge sockets contain a hammer pad (lip) to assist in proper securement of termination.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these sockets meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- UWO-422T Wedges are to be used only with the US-422T Wedge Socket Assemblies.



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QUIC-CHECK®

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US-422T Utility Wedge Sockets

Model No.	Wire Rope Size (in.)	Wire Rope Size (mm)	US-422T Stock No.	API 2C US-422T Stock No.	Weight Each (lbs.)	Wedge Only Stock No.	Weight Each (lbs.)	Dimensions (in.) A	B	C +/- .09	D	G	H	J	K	L	P	R	S	T	U	V
US4T	3/8	10	1044300	1044305	4.6	1047310	.6	6.81	3.55	1.00	1.00	1.63	2.81	8.43	1.38	1.06	1.94	.50	2.53	.44	1.91	2.14
US4T	7/16	11	1044309	1044314	4.6	1047301	.6	6.81	3.55	1.00	1.00	1.63	2.81	8.73	1.08	1.06	1.94	.50	2.53	.53	1.76	1.88
US4T	1/2	13	1044318	1044323	4.6	1047329	.6	6.81	3.55	1.00	1.00	1.63	2.81	8.73	1.02	1.06	1.94	.50	2.53	.53	1.76	1.88
US5T	1/2	13	1044327	1044332	8.5	1047338	1.0	9.19	4.23	1.41	1.25	2.13	3.31	11.19	1.84	1.50	3.00	.63	3.25	.75	1.92	2.16
US5T	9/16	14	1044336	1044341	8.5	1047347	1.0	9.19	4.23	1.41	1.25	2.13	3.31	11.47	2.40	1.50	3.00	.63	3.25	.69	2.00	2.18
US5T	5/8	16	1044345	1044350	8.5	1047356	1.0	9.19	4.23	1.41	1.25	2.13	3.31	11.47	2.34	1.50	3.00	.63	3.25	.69	2.00	2.18
US6T	5/8	16	1044354	1044359	9.4	1047365	1.4	9.45	4.70	1.50	1.25	2.24	3.63	11.91	2.48	1.50	3.00	.56	3.25	.88	2.38	2.75
US6T	3/4	19	1044363	1044368	9.4	1047374	1.4	9.45	4.70	1.50	1.25	2.24	3.63	11.81	2.03	1.50	3.00	.56	3.25	.88	2.13	2.63
US8AT	5/8	16	1044372	1044377	19.8	1047383	4.3	10.59	5.68	1.81	1.63	2.38	5.53	13.19	1.91	1.53	2.88	.75	4.13	.69	3.26	3.50
US8AT	3/4	19	1044381	1044386	20.4	1047392	4.8	10.59	5.68	1.81	1.63	2.38	5.84	13.54	2.38	1.53	2.88	.75	4.13	.78	3.12	3.38
US7*	7/8	22	1038580	—	16.5	1046674	2.6	11.26	5.11	1.31	1.25	2.69	—	—	2.56	1.63	3.26	.66	3.25	1.06	2.12	2.56
US7*	1	25	1038589	—	16.5	1046683	2.6	11.26	5.11	1.31	1.25	2.69	—	—	2.56	1.63	3.26	.66	3.25	1.06	1.88	2.38
US8T	7/8	22	1044404	1044409	31.5	1047425	7.6	12.77	6.96	1.81	1.63	3.06	7.20	16.02	2.87	1.65	3.12	.75	4.13	.88	3.88	4.18
US8T	1	25	1044417	1044422	32.5	1047431	8.6	12.77	6.96	1.81	1.63	3.06	7.31	16.41	2.32	1.65	3.12	.75	4.13	1.03	3.76	4.06
US10T	1-1/8	28	1044426	1044431	55.4	1047440	12.5	15.94	8.62	1.81	1.63	3.57	9.15	19.72	3.26	2.19	4.38	.75	4.13	1.09	4.76	5.06
US10T	1-1/4	32	1044435	1044440	58.0	1047459	15.0	15.94	8.62	1.81	1.63	3.57	9.39	20.22	2.83	2.19	4.38	.75	4.13	1.19	4.62	4.94
US11T	1-1/8	28	1044444	1044449	60.6	1047468	12.5	16.34	8.73	2.62	2.50	3.56	9.15	19.97	3.37	2.34	4.50	1.06	6.13	1.09	4.76	5.06
US11T	1-1/4	32	1044453	1044458	64.9	1047477	15.0	16.34	8.73	2.62	2.50	3.56	9.39	20.48	2.94	2.34	4.50	1.06	6.13	1.19	4.62	4.94

* Non-TERMINATOR Style.

The Crosby S-423T Super TERMINATOR is the first wedge socket designed to take advantage of the performance properties associated with high performance, high strength, compacted strand, rotation resistant wire rope.

The Crosby Super TERMINATOR offers several advantages over traditional methods of wedge socket terminations:

- The innovative design will significantly increase the termination efficiency over existing wedge sockets available today.
- Terminations on most ropes have a minimum efficiency rating of 80% of the rope's catalog breaking strength.
- Design eliminates the difficulty of properly seating the wedge with high performance, high strength, compacted strand, rotation resistant wire rope into a wedge socket termination.
- Proper application of the Super TERMINATOR eliminates the "first load" requirement of conventional wedge socket terminations.
- US Patent 8,375,527 B1.

Additional Features:

- Wire rope sizes available: 5/8" -1 1/4", 14mm- 32mm
- Available as a complete assembly, or as a wedge kit that can be retrofitted onto existing Crosby S-421T TERMINATOR wedge sockets.
- Wedge accessories provided with a zinc finish.
- Meets or exceeds all ASME B30.26 requirements including: identification, ductility, design factor, proof load, and temperature requirements. Importantly, they meet other critical performance criteria not addressed by ASME B30.26 including: fatigue life, impact properties and material traceability.
- Available with bolt, nut and cotter (S-423TB)

The Super TERMINATOR by Crosby. The first wedge socket termination designed specifically for high performance wire rope.

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Crosby®

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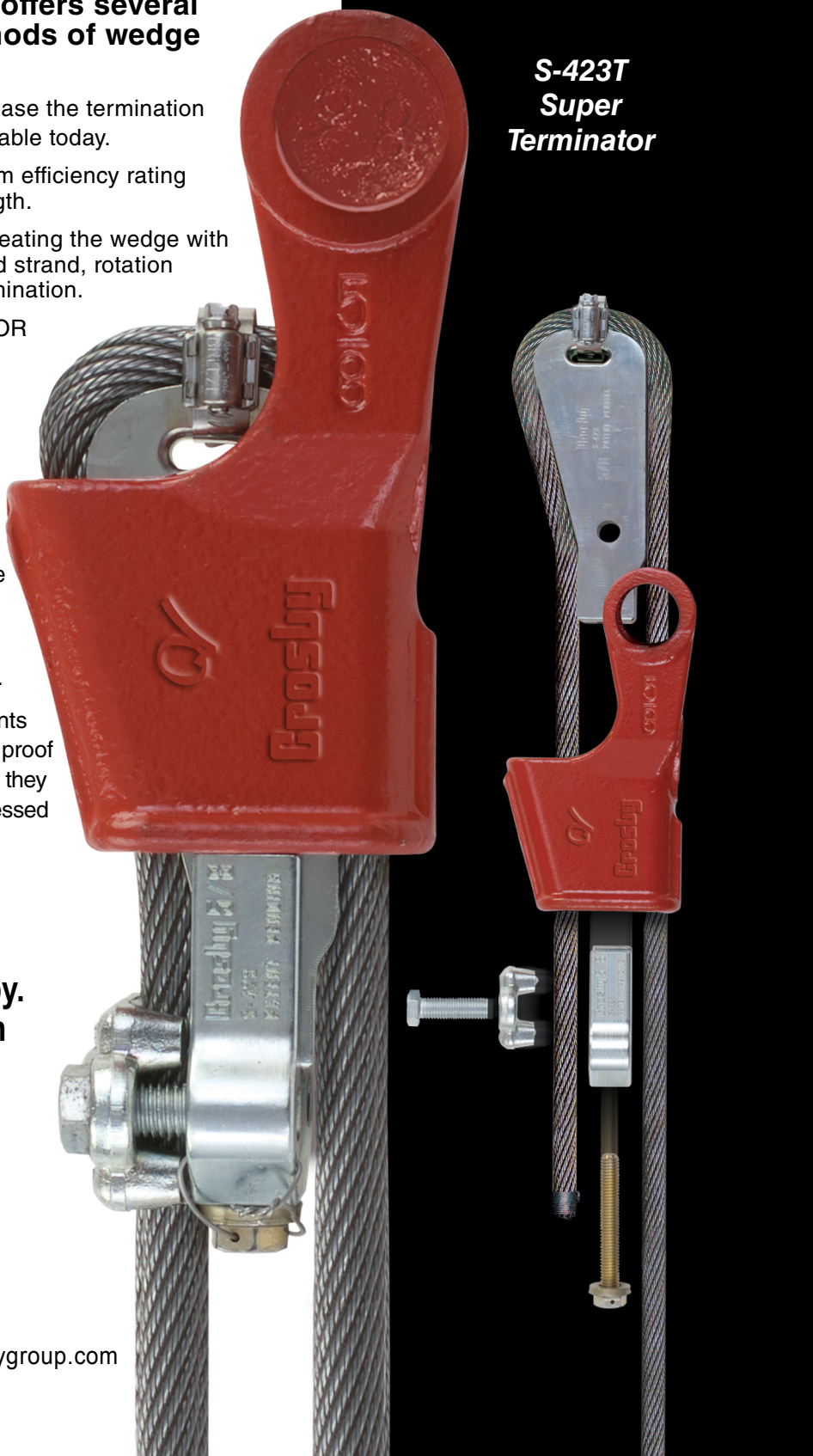
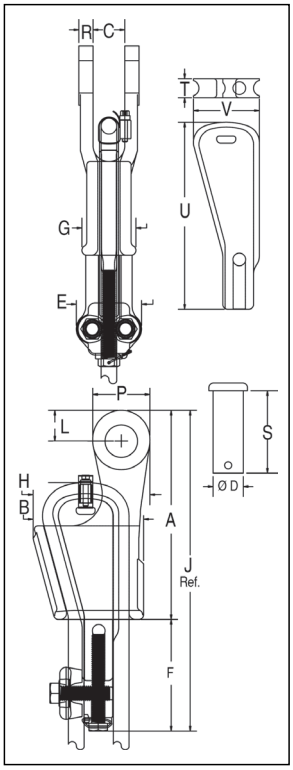


S-423T Super Terminator

S-423T

Wedge sockets meet the performance requirements of Federal Specification RR-S-550E, Type C, except those provisions required of the contractor. Meets the performance requirements of EN13411-6:2003. For additional information, see page 452 of General Catalog.

- The 423T wedge socket terminations have a minimum efficiency rating on most high performance, high strength, compacted strand, rotation resistant wire ropes of 80% based on the catalog breaking strength of the various ropes.**
- Design eliminates the difficulty of properly seating the wedge with high performance wire rope into a wedge socket termination.
- Proper application of the Super TERMINATOR eliminates the "first load" requirement of conventional wedge socket terminations.
- S-423TW Wedge Kit can be retrofitted onto existing Crosby S-421T TERMINATOR wedge sockets.
- Wedge and accessories provided with a zinc finish.
- Meets the performance requirements of EN13411-6:2003.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these sockets meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- US Patent 8,375,527 B1.
- Basket is cast steel and individually magnetic particle inspected.
- Pin diameter and jaw opening allows wedge and socket to be used in conjunction with closed swage and spelter sockets.
- Secures the tail or "dead end" of the wire rope to the wedge, thus eliminates loss or "punch out" of the wedge.
- Eliminates the need for an extra piece of rope, and is easily installed.
- The TERMINATOR® wedge eliminates the potential breaking off of the tail due to fatigue.
- The tail, which is secured by the base of the clip and the tension device, is left undeformed and available for reuse.
- **Available with Bolt, Nut, and Cotter Pin.**



Scan this QR code with your smart device to view our Super Terminator video.

Due to the unique construction of various ropes, Crosby cannot make a broad general statement that all current and future design of ropes, when properly assembled with the Super TERMINATOR, will achieve a minimum 80% termination efficiency. Contact wire rope manufacturer or Crosby engineering (918-834-4611) to determine efficiency rating for a specific rope.

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S-423T WEDGE SOCKETS

Assembly includes Socket, Wedge, Pin, Wire Rope Clip, Tensioner, Bolts and Secondary Retention Wire.

Wire Rope Dia.		S-423T Assembly with Round Pin and Cotter Pin				S-423TB Assembly with Bolt, Nut and Cotter Pin				S-423TW** Wedge Kit		
				S-423T Weight Each				S-423TB Weight Each			S423TW Weight Each	
(in.)	(mm)	S-423T Stock No.	API 2C S-423T Stock No.	(lbs.)	(kg)	S-423TB Stock No.	API 2C S-423TB Stock No.	(lbs.)	(kg)	S-423TW Stock No.	(lbs.)	(kg)
5/8	14- 16	1035123	1035128	12.7	5.8	1035218	1035223	13.1	5.9	1034018	5.2	2.4
3/4	18-19	1035132	1035137	19.4	8.8	1035227	1035232	19.1	8.7	1034027	7.2	3.3
7/8	20-22	1035141	1035146	28.8	13.1	1035236	1035241	27.8	12.6	1034036	10.3	4.7
1	24-26	1035150	1035155	39.2	17.8	1035245	1035250	37.3	16.9	1034045	11.9	5.4
1-1/8	28	1035169	1035174	57.1	25.9	1035254	1035259	57.9	25.9	1034054	19.9	9.0
1-1/4	30-32	1035178	1035183	88.6	40.2	1035272	1035277	88.1	39.9	1034063	33.8	15.3

**Kit contains Wedge, Wire Rope Clip and Bolts, Tensioner Bolt and Secondary Retention Wire.

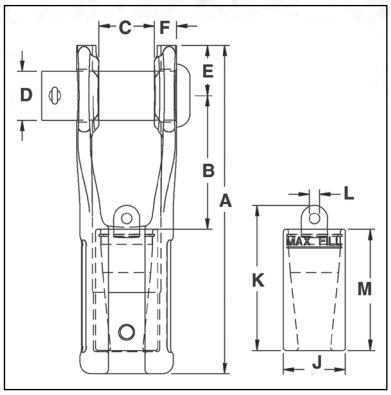
Wire Rope Dia.		S-423T Stock No.	Dimensions (in.)															
(in.)	(mm)		A	B	C	D	E	F	G	H	J*	L	P	R	S	T	U	V
5/8	14-16	1035123	8.25	4.50	1.25	1.19	3.00	4.06	2.13	4.61	12.31	1.22	2.25	.56	3.25	.75	6.88	2.60
3/4	18-19	1035132	9.88	5.20	1.50	1.38	3.25	4.81	2.44	5.37	14.69	1.40	2.62	.66	3.63	.88	7.65	3.02
7/8	20-22	1035141	11.25	5.88	1.75	1.63	3.81	5.73	2.69	6.16	16.98	1.67	3.13	.75	4.31	1.00	9.47	3.47
1	24-26	1035150	12.81	6.56	2.00	2.00	3.81	5.73	2.94	7.05	18.54	2.01	3.75	.88	4.70	1.13	10.41	3.82
1-1/8	28	1035169	14.38	6.94	2.25	2.25	4.00	6.85	3.38	7.81	21.23	2.26	4.25	1.00	5.44	1.25	11.83	4.22
1-1/4	30-32	1035178	16.34	8.63	2.62	2.50	4.50	7.76	3.57	9.38	24.10	2.34	4.50	1.06	6.62	1.38	13.87	5.82

* Nominal **NOTE: For intermediate wire rope sizes, use next larger size socket.** The S-423T Super TERMINATOR wedge is designed to be assembled only into the Crosby S-421T TERMINATOR socket body. **IMPORTANT:** The S-423TW for sizes 5/8" through 1-1/8" will fit respective size standard Crosby S-421T basket. The 1-1/4" S-423TW will only fit the Crosby S-421T 1-1/4" basket marked with TERMINATOR.

Button Spelter Sockets

SB-427 Button Spelter Socket

- Available in six sizes from 1/2" to 1-1/2", (13mm - 38mm).
- Button Spelter terminations have a 100% efficiency rating, based on the catalog strength of the wire rope.
- Designed for use with mobile cranes. Can be used to terminate high performance, rotation resistant ropes, and standard 6 strand ropes.
- Easy to install assembly utilizes Crosby WIRELOCK® socketing compound.
- Sockets and buttons are re-usable.
- Replacement buttons and sockets are available.
- Locking feature available to prevent rotation of rope.
- Button contains cap with eye that can be attached to, and used to pull, rope during reeving process.
- Manufactured to the requirements of API-2C.



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SB-427 Button Spelter Sockets

Wire Rope Size		SB-427 Stock No.	Ultimate Load (t)	Weight Each (lbs.)	Socket Only Stock No.	Button Only Stock No.	Dimensions (in.)										Tolerance +/-
(in.)	(mm)						A	B	C	D	E	F	J	K	L	M	C
1/2 - 5/8	13-16	1052005	27	6.1	1052107	1052309	7.94	3.23	1.28	1.19	1.22	.57	1.50	3.50	.25	2.93	.06
5/8 - 3/4	16-19	1052014	45	10.3	1052116	1052318	9.44	3.88	1.53	1.38	1.44	.66	1.75	4.28	.38	3.43	.06
3/4 - 7/8	19-22	1052023	57	17.1	1052125	1052327	10.81	4.41	1.78	1.62	1.69	.75	2.06	4.78	.38	3.96	.06
7/8 - 1	22-26	1052032	82	29.2	1052134	1052336	12.88	5.48	2.03	2.00	2.00	.89	2.44	5.62	.62	4.52	.09
1-1/8 - 1-1/4	28-32	1052041	136	46.0	1052143	1052345	14.90	5.68	2.53	2.25	2.50	1.11	2.94	7.08	.75	5.72	.09
1-3/8 - 1-1/2	35-38	1052050	161	78.0	1052152	1052354	18.06	7.17	3.03	2.75	2.75	1.24	3.62	8.08	.75	6.76	.09

SB-427TB (Bolt, Nut and Cotter Pin)

Wire Rope Size		SB-427TB Stock No.	Ultimate Load (t)	Weight Each (lbs.)	Socket Only Stock No.	Button Only Stock No.	Dimensions (in.)										Tolerance +/-
(in.)	(mm)						A	B	C	D	E	F	J	K	L	M	C
1/2 - 5/8	13-16	1052406	27	6.1	1052107	1052309	7.94	3.23	1.28	1.19	1.22	.57	1.50	3.50	.25	2.93	.06
5/8 - 3/4	16-19	1052415	45	10.3	1052116	1052318	9.44	3.88	1.53	1.38	1.44	.66	1.75	4.28	.38	3.43	.06
3/4 - 7/8	19-22	1052424	57	17.1	1052125	1052327	10.81	4.41	1.78	1.62	1.69	.75	2.06	4.78	.38	3.96	.06
7/8 - 1	22-26	1052433	82	29.2	1052134	1052336	12.88	5.48	2.03	2.00	2.00	.89	2.44	5.62	.62	4.52	.09
1-1/8 - 1-1/4	28-32	1052442	136	46.0	1052143	1052345	14.90	5.68	2.53	2.25	2.50	1.11	2.94	7.08	.75	5.72	.09
1-3/8 - 1-1/2	35-38	1052451	161	78.0	1052152	1052354	18.06	7.17	3.03	2.75	2.75	1.24	3.62	8.08	.75	6.76	.09

Wirelock® Requirements

Wire Rope Size		WIRELOCK Required (cc)	WIRELOCK Stock No.	WIRELOCK Kit Size (cc)
(in.)	(mm)			
1/2 - 5/8	13-16	35	1039602	100
5/8 - 3/4	16-19	60	1039602	100
3/4 - 7/8	19-22	100	1039602	100
7/8 - 1	22-26	140	1039602*	100
1-1/8 - 1-1/4	28-32	250	1039604	250
1-3/8 - 1-1/2	35-38	420	1039606	500

* 2 kits required.

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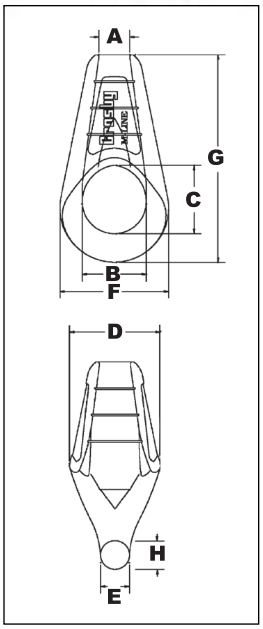
Mooring Spelter Sockets

G-517 Mooring Spelter Socket

- Wide range of sizes available:
  - 1-1/4" thru 4" Wireline
- "M-Line" socket terminations have a 100% efficiency rating, based on the catalog strength of the wire rope. Ratings are based on recommended use with 6 x 7, 6 x 19, or 6 x 37 IPS or XIP (EIP), XXIP (EEIP), RRL, FC, or IWRC wire rope. Strand constructed with minimal number of wires (e.g. 1 x 7) requires special consideration that socket basket length be five (5) times the strand diameter or fifty (50) times the wire diameter, whichever is the greater.
- Galvanized finish.
- Designed for today's higher strength classes of wire rope.
- Design of bail allows for easy connection to shackles and other connecting links.
- Socket design utilizes features to keep cone from rotating.
- Type approved and Certification in accordance with DNV's Rules for Certifications of Lifting Appliances, 2011 - DNV's Offshore Standard DNV-OS-E101, Drilling Plant, October 2009.



All Cast Mooring Sockets are Individually Magnetic Particle Inspected and Ultrasonic Inspected.

"TA" TYPE APPROVED

G-517 "M-Line" Mooring Sockets

Wire Rope Size		Ultimate Load	G-517	Weight Each	Dimensions (in.)							
(in.)	(mm)	(t)	Stock No.	(lbs.)	A	B	C	D	E	F	G	H
1-1/4 - 1-3/8	32-35	113	1004943	17	1.63	3.09	3.63	4.45	1.44	5.13	10.89	1.53
1-1/2 - 1-5/8	38-41	136	1004961	30	1.95	3.69	4.32	5.43	1.60	6.31	13.00	1.81
1-3/4 - 1-7/8	44-48	181	1004989	43	2.23	4.16	4.53	6.30	1.84	7.22	14.11	2.09
2 - 2-1/8	50-54	227	1005002	57	2.50	4.75	5.26	7.02	2.09	8.25	16.02	2.24
2-1/4 - 2-3/8	57-60	277	1005020	76	2.78	5.25	5.78	7.72	2.31	9.16	17.90	2.62
2-1/2 - 2-5/8	64-67	363	1005048	106	3.05	5.88	6.71	8.53	2.69	10.13	19.89	2.66
2-3/4 - 2-7/8	70-73	454	1005066	138	3.33	6.50	7.13	9.35	3.00	11.09	21.63	2.98
3 - 3-1/8	76-79	544	1005084	193	3.50	7.25	7.74	10.30	3.25	12.31	23.50	3.24
3-1/4 - 3-3/8	82-86	635	1005105	229	3.81	7.62	8.80	10.94	3.50	13.13	25.75	3.43
3-1/2 - 3-5/8	88-92	735	1005123	279	4.15	8.00	9.06	11.72	3.69	13.96	27.70	4.12
3-3/4 - 4	95-102	907	1005141	384	4.39	8.75	10.50	12.91	3.69	15.88	30.13	4.46

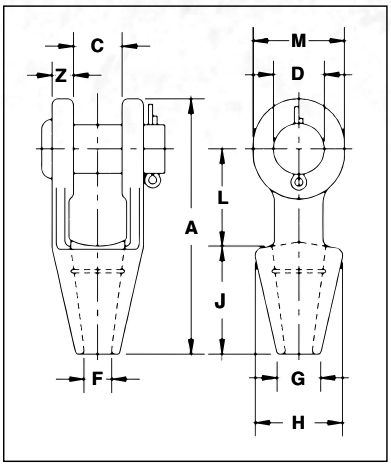
Open Spelter Sockets

G-416 / S-416
Open Grooved Sockets meet the performance requirements of Federal Specification RR-S-550E, Type A, except for those provisions required of the contractor. For additional information, see page 452.

- Forged Steel Sockets through 1-1/2", cast alloy steel 1-5/8" through 4".
- Spelter socket terminations have an efficiency rating of 100%, based on the catalog strength of wire rope.
- Ratings are based on the recommended use with 6 x 7, 6 x 19 or 6 x 37, IPS or XIP (EIP) , XXIP (EEIP), RRL, FC or IWRC wire rope.
- Strand constructed with minimal number of wires (e.g. 1 x 7) requires special consideration that socket basket length be five (5) times the strand diameter or fifty (50) times the wire diameter, whichever is the greater.

NOTICE: All cast steel sockets 1-5/8" and larger are magnetic particle inspected and ultrasonic inspected. Proof testing available on special order.

Drawing illustrates one groove used on sockets 1/4" through 3/4". Sizes 7/8" through 1-1/2" use 2 grooves. Sizes 1-5/8" and larger use 3 grooves.



G-416 / S-416 Open Spelter Sockets

Rope Dia.		Structural Strand Dia.	Ultimate Load	Stock No.		Weight Each	Dimensions (in.)										Tolerance +/-
(in.)	(mm)	(in.)	(t)	G-416 Galv.	S-416 S.C.	(lbs.)	A	C	D	F	G	H	J	L	M	N	C
1/4	6-7	—	4.5	1039619	1039628	1.10	4.56	.75	.69	.38	.69	1.56	2.25	1.56	1.31	.36	.06
5/16-3/8	8-10	—	12	1039637	1039646	1.30	4.84	.81	.81	.50	.81	1.69	2.25	1.75	1.50	.44	.06
7/16-1/2	11-13	—	20	1039655	1039664	2.25	5.56	1.00	1.00	.56	.94	1.88	2.50	2.00	1.88	.50	.06
9/16-5/8	14-16	1/2	27	1039673	1039682	3.60	6.75	1.25	1.19	.69	1.13	2.25	3.00	2.50	2.25	.56	.06
3/4	18	9/16-5/8	43	1039691	1039708	5.83	7.94	1.50	1.38	.81	1.25	2.62	3.50	3.00	2.62	.62	.06
7/8	20-22	11/16-3/4	55	1039717	1039726	9.65	9.25	1.75	1.63	.94	1.50	3.25	4.00	3.50	3.13	.80	.06
1	24-26	13/16-7/8	78	1039735	1039744	15.50	10.56	2.00	2.00	1.13	1.75	3.75	4.50	4.00	3.75	.88	.06
1-1/8	28-30	15/16-1	92	1039753	1039762	21.50	11.81	2.25	2.25	1.25	2.00	4.12	5.00	4.62	4.12	1.00	.12
1-1/4 - 1-3/8	32-35	1-1/16 - 1-1/8	136	1039771	1039780	31.00	13.19	2.50	2.50	1.50	2.25	4.75	5.50	5.00	4.75	1.13	.12
1-1/2	38	1-3/16 - 1-1/4	170	1039799	1039806	47.25	15.12	3.00	2.75	1.63	2.75	5.25	6.00	6.00	5.38	1.19	.12
* 1-5/8	* 40-42	1-5/16 - 1-3/8	188	1039815	1039824	55.00	16.25	3.00	3.00	1.75	3.00	5.50	6.50	6.50	5.75	1.31	.12
* 1-3/4 - 1-7/8	* 44-48	1-7/16 - 1-5/8	268	1039833	1039842	82.00	18.25	3.50	3.50	2.00	3.13	6.38	7.50	7.00	6.50	1.56	.12
* 2 - 2-1/8	* 50-54	1-11/16 - 1-3/4	291	1039851	1039860	129.00	21.50	4.00	3.75	2.25	3.75	7.38	8.50	9.00	7.00	1.81	.12
* 2-1/4 - 2-3/8	* 56-60	1-13/16 - 1-7/8	360	1039879	1039888	167.00	23.50	4.50	4.25	2.50	4.00	8.25	9.00	10.00	7.75	2.13	.12
* 2-1/2 - 2-5/8	* 64-67	1-15/16 - 2-1/8	424	1041633	1041642	252.00	25.50	5.00	4.75	2.88	4.50	9.25	9.75	10.75	8.50	2.38	.12
* 2-3/4 - 2-7/8	* 70-73	2-3/16 - 2-7/16	511	1041651	1041660	315.00	27.25	5.25	5.00	3.12	4.88	10.50	11.00	11.00	9.00	2.88	.25
* 3 - 3-1/8	* 75-80	2-1/2 - 2-5/8	563	1041679	1041688	380.00	29.00	5.75	5.25	3.38	5.25	11.12	12.00	11.25	9.50	3.00	.25
* 3-1/4 - 3-3/8	* 82-86	2-3/4 - 2-7/8	722	1041697	1041704	434.00	30.88	6.25	5.50	3.62	5.75	11.88	13.00	11.75	10.00	3.12	.25
* 3-1/2 - 3-5/8	* 88-92	3 - 3-1/8	779	1041713	1041722	563.00	33.25	6.75	6.00	3.88	6.50	12.38	14.00	12.50	10.75	3.25	.25
* 3-3/4 - 4	* 94-102	—	875	1041731	1041740	783.00	36.25	7.50	7.00	4.25	7.25	13.62	15.00	13.50	12.50	3.50	.25

* Cast Alloy Steel. ***NOTE: AVAILABLE WITH BOLT NUT AND COTTER. CONTACT CROSBY FOR MORE INFORMATION.***

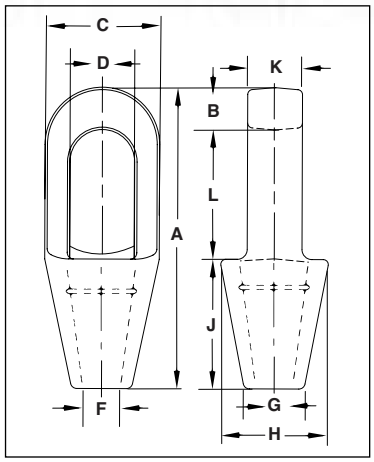
Closed Spelter Sockets

G-417 / S-417
Closed Grooved Sockets meet the performance requirements of Federal Specification RR-S-550E, Type A, except for those provisions required of the contractor. For additional information, see page 452..

- Forged Steel Sockets through 1-1/2", cast alloy steel 1-5/8" through 4".
- Spelter socket terminations have an efficiency rating of 100%, based on the catalog strength of wire rope.
- Ratings are based on recommended use with 6 x 7, 6 x 19, or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC, or IWRC wire rope.
- Strand constructed with minimal number of wires (e.g. 1 x 7) requires special consideration that socket basket length be five (5) times the strand diameter or fifty (50) times the wire diameter, whichever is the greater.

NOTICE: All cast steel sockets 1-5/8" and larger are magnetic particle inspected and ultrasonic inspected. Proof testing available on special order.

Drawing illustrates one groove used on sockets 1/4" through 3/4". Sizes 7/8" through 1-1/2" use 2 grooves. Sizes 1-5/8" and larger use 3 grooves.



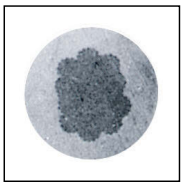
G-417 / S-417 Closed Spelter Sockets

Rope Dia. (in.)	Rope Dia. (mm)	Structural Strand Dia. (in.)	Ultimate Load (t)	Stock No. G-417 Galv.	Stock No. S-417 S.C.	Weight Each (lbs.)	Dimensions (in.) A	B	C	D*	F	G	H	J	K	L
1/4	6-7	—	4.50	1039897	1039904	.50	4.50	.50	1.50	.88	.38	.69	1.56	2.25	.50	1.75
5/16 - 3/8	8-10	—	12.0	1039913	1039922	.75	4.94	.62	1.69	.97	.50	.81	1.69	2.25	.69	2.06
7/16 - 1/2	11-13	—	20.0	1039931	1039940	1.50	5.50	.69	2.00	1.16	.56	.94	2.00	2.50	.88	2.31
9/16 - 5/8	14-16	1/2	30.8	1039959	1039968	2.50	6.31	.81	2.63	1.41	.69	1.12	2.38	3.00	1.00	2.50
3/4	18	9/16 - 5/8	43.5	1039977	1039986	4.25	7.62	1.06	3.00	1.66	.88	1.25	2.75	3.50	1.25	3.06
7/8	20-22	11/16 - 3/4	65.3	1039995	1040000	7.25	8.75	1.25	3.63	1.94	1.00	1.50	3.25	4.00	1.50	3.50
1	24-26	13/16 - 7/8	81.6	1040019	1040028	10.50	9.88	1.38	4.13	2.30	1.13	1.75	3.75	4.50	1.75	4.00
1-1/8	28-30	15/16 -1	100	1040037	1040046	14.25	11.00	1.50	4.50	2.56	1.25	2.00	4.13	5.00	2.00	4.50
1-1/4 -1-3/8	32-35	1-1/16 -1-1/8	136	1040055	1040064	19.75	12.12	1.63	5.00	2.81	1.50	2.25	4.75	5.50	2.25	5.00
1-1/2	38	1-3/16 - 1-1/4	170	1040073	1040082	29.20	13.94	1.94	5.38	3.19	1.63	2.75	5.25	6.00	2.50	6.00
† 1-5/8	† 40-42	1-5/16 - 1-3/8	188	1040091	1040108	36.00	15.13	2.13	5.75	3.25	1.75	3.00	5.50	6.50	2.75	6.50
† 1-3/4 - 1-7/8	† 44-48	1-7/16 - 1-5/8	268	1040117	1040126	57.25	17.25	2.19	6.75	3.75	2.00	3.13	6.38	7.50	3.00	7.56
† 2 - 2-1/8	† 50-54	1-11/16 - 1-3/4	309	1040135	1040144	79.00	19.87	2.44	7.63	4.38	2.25	3.75	7.38	8.50	3.25	8.81
† 2-1/4 - 2-3/8	† 56-60	1-13/16 - 1-7/8	360	1040153	1040162	105.00	21.50	2.75	8.50	5.00	2.63	4.13	8.25	9.00	3.63	9.75
† 2-1/2 - 2-5/8	† 64-67	1-15/16 - 2-1/8	424	1041759	1041768	140.00	23.50	3.12	9.50	5.50	2.88	4.50	9.25	9.75	4.00	10.62
† 2-3/4 - 2-7/8	† 70-73	2-3/16 - 2-7/16	549	1041777	1041786	220.00	25.38	3.12	10.75	6.25	3.12	4.88	10.19	11.00	4.88	11.25
† 3 - 3-1/8	† 75-80	2-1/2 - 2-5/8	656	1041795	1041802	276.00	27.12	3.37	11.50	6.75	3.38	5.25	11.50	12.00	5.25	11.75
† 3-1/4 - 3-3/8	† 82-86	2-3/4 - 2-7/8	750	1041811	1041820	313.00	29.25	4.00	12.25	7.25	3.62	5.75	12.25	13.00	5.75	12.25
† 3-1/2 - 3-5/8	† 88-92	3 - 3-1/8	820	1041839	1041848	400.00	31.00	4.00	13.00	7.75	3.88	6.31	13.00	14.00	6.25	13.00
† 3-3/4 - 4	† 94 - 102	—	1005	1041857	1041866	542.00	33.25	4.25	14.25	8.50	4.25	7.25	14.25	15.00	7.00	14.00

* Diameter of pin must not exceed pin used on companion 416 socket. Reference adjacent page "D" dimension. † Cast Alloy Steel.

National Steel Swaging Sleeves

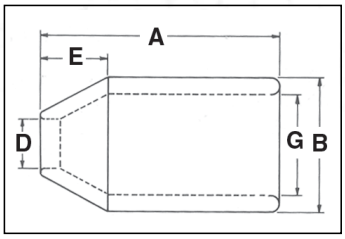
S-505
Swaging Sleeve



Cross Section of Swaged Sleeve

Scan this QR code with your smart device to view our QUIC-PASS Swaging System video.

- For Flemish eye wire rope splicing.
- Designed for low temperature toughness.
- Resists cracking when swaged (equals or exceeds stainless steel sleeves).
- Special processed low carbon steel.
- "COLD TUFF"® for better swageability.
- Can be stamped for identification after swaging without concern for fractures when following these directions.
  - Use round corner stamps to a maximum depth of 0.015 in. (1/64). The area for stamping should be on the side of the sleeve in the plane of the sling eye, and no less than 0.250 in. (1/4) from either end of the sleeve.
- Standard Steel Sleeve terminations have efficiency ratings as follows based on the catalog strength of wire rope.



NOTE: See Page 45 for dimensional information.

S-505 Termination Efficiency		
Size (in.)	Type of Wire Rope *	
	IWRC	FC
1/4 - 1	96%	93%
1-1/8 - 2	92%	89%
2-1/4 and Larger	90%	87%

***** NOTE: S-505 Standard Sleeves are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type lay, construction or grade of wire rope, it is recommended that the termination be destructive and documented to prove the adequacy of the assembly to be manufactured.***

National *QUIC-PASS*® Swaging System

"The Next Generation in Swaging Systems"

QUIC-PASS®

The ***QUIC-PASS***® swaging system allows "Flemish style" wire rope terminations to be swaged in only two passes.

This is accomplished while maintaining currently published efficiency ratings and utilizing National Swage S-505 Standard "COLD TUFF"® Steel Sleeves.

- *Allows the swaging process to be completed in just two passes. Resulting in a 50-75% reduction in the number of passes required with conventional swaging systems.*
- *Allows the dies to close completely with each pass, resulting in...*
  - *An increase in overall swaging process efficiencies (the job can be performed quicker).*
  - *A reduction in the complexity of swaging (the concern for excess flashing between dies has been eliminated).*
  - *A reduction in training time needed for operators (more user friendly).*
- *The finished sleeve has a "Hex" appearance that provides a QUIC-CHECK® look to determine if the termination has been swaged and provides a flat surface that allows for ease of I.D. stamping on the finished sleeve.*

For additional swaging information, please refer to the Wire Rope End Terminations User's Manual.

S-505 COLD TUFF® Standard Steel Sleeves

S-505 Standard Steel Sleeve Specifications												Swager / Die Data		
	Rope Size				Before Swage Dimensions (in.)					Maximum After Swage Dimensions (in.)		Standard Round Dies		QUIC-PASS Dies
S-505 Stock No.	(in.)	(mm)	Weight Per 100 (lbs.)	Pkg. Qty.	A	B	D	E	G	Standard Die	QUIC-PASS Die	Die Description	Standard Die Stock No.	QUIC-PASS Die Stock No.
1041063	1/4	6-7	5	250	1.00	.66	.31	.28	.47	.57	.565	1/4 Taper	1197528	1923530
1041090	5/16	8	14	200	1.50	.91	.44	.44	.62	.75	.769	3/8 Taper	1192364	1923551
1041107	3/8	9-10	14	100	1.50	.91	.47	.39	.66	.75	.769	3/8 Taper	1192364	1923551
1041125	7/16	11	33	50	2.00	1.22	.55	.65	.85	1.01	1.016	1/2 Taper	1192408	1923572
1041143	1/2	13	29	50	2.00	1.22	.63	.56	.91	1.01	1.016	1/2 Taper	1192408	1923572
1041161	9/16	14	64	25	2.75	1.47	.69	.63	1.03	1.24	1.247	5/8 Taper	1192444	1923593
1041189	5/8	16	56	25	2.75	1.47	.75	.63	1.09	1.24	1.247	5/8 Taper	1192444	1923593
1041205	3/4	18-19	88	20	3.19	1.72	.91	.84	1.28	1.46	1.475	3/4 Taper	1192462	1923614
1041223	7/8	22	131	10	3.56	2.03	1.03	1.00	1.53	1.68	1.738	7/8 Taper	1192480	1923635
1041241	1	25-26	195	10	4.00	2.28	1.16	1.13	1.72	1.93	1.955	1 Taper	1192505	1923656
1041269	1-1/8	28-29	260	Bulk	4.81	2.50	1.28	1.25	1.94	2.13	2.170	1-1/8 Open 1st Stage 2nd Stage	1192523 1192541	1923677
1041287	1-1/4	31-32	355	Bulk	5.19	2.78	1.44	1.41	2.16	2.32	2.405	1-1/4 Open 1st Stage 2nd Stage	1192621 1192587	1923698
1041303	1-3/8	34-35	423	Bulk	5.81	3.00	1.56	1.56	2.38	2.52	2.610	1-3/8 Open 1st Stage 2nd Stage	1192667 1192621	1923717
1041321	1-1/2	37-38	499	Bulk	6.25	3.25	1.69	1.69	2.63	2.71	2.835	1-1/2 Open 1st Stage 2nd Stage	1192649 1192667	1923736

S-505 COLD TUFF® Standard Steel Sleeves

S-505 Standard Steel Sleeve Specifications											Swager / Die Data					
	Rope Size				Before Swage Dimensions (in.)							Stock No.				
												500 Tons 1000 Tons 1500 Tons	Front Load		Side Load	
S-505 Stock No.	(in.)	(mm)	Weight Per 100 (lbs.)	Pkg. Qty.	A	B	D	E	G	Maximum After Swage Dimensions (in.)	Die Description	5x7	1500 Ton 6x12	3000 Ton 6x12	1500 Ton 6x12	3000 Ton 6x12
1041349	1-3/4	44-45	805	Bulk	7.25	3.84	1.94	1.97	3.13	3.10	1-3/4 Open 1st Stage 2nd Stage	1192685 1192701	—	—	—	—
1041367	2	50-52	1132	Bulk	8.50	4.38	2.25	2.25	3.63	3.56	2 Open 1st Stage 2nd Stage	1192729 1192747	—	—	—	—
1041385	2-1/4	56-57	1936	Bulk	9.56	5.03	2.50	2.53	4.03	4.12	2-1/4 Open 1st Stage 2nd Stage	1192765 1192783	1191089 1191043	1191089 1191043	—	1195085 1195067
1041401	2-1/2	62-64	2352	Bulk	10.50	5.50	2.75	2.81	4.50	4.50	2-1/2 Open 1st Stage 2nd Stage	—	1191061 1191089	1191061 1191089	1195370 1195469	1195076 1195085
1041429	2-3/4	68-70	2800	Bulk	11.50	5.75	3.00	3.09	4.75	4.70	2-3/4 Open 1st Stage 2nd Stage	—	1191034 1191052	1191034 1191052	1195389 1195478	1195094 1195101
1041447	3	75-76	2940	Bulk	12.00	6.00	3.25	3.38	5.00	4.96	3 Open 1st Stage 2nd Stage	—	1193201 1193229	1193201 1193229	1195398 1195487	1195110 1195129
1041483	3-1/2	87-89	4640	Bulk	14.00	7.00	3.88	3.94	5.84	5.77	3-1/2 Open 1st Stage 2nd Stage	—	1193247 1193265	1193247 1193265	—	1195138 1195147
1041492	3-3/4	93-95	5500	Bulk	15.00	7.50	4.06	4.25	6.31	6.23	3-3/4 Open 1st Stage 2nd Stage	—	—	1191114 1191132	—	1195263 1195272
1041508	4	100-105	6800	Bulk	16.00	8.13	4.38	4.50	6.81	6.69	4 Open 1st Stage 2nd Stage	—	—	1191150 1191178	—	1195156 1195165
1041526	4-1/2	112-114	10000	Bulk	18.00	9.13	4.88	5.06	7.66	7.45	4-1/2 Open 1st Stage 2nd Stage	—	—	1191187 1191203	—	1195174 1195183

Intermediate Metric Die Chart

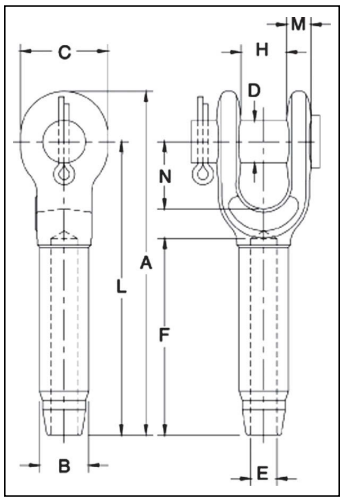
Sleeve and Swaging Die Requirements for Intermediate Sizes of Metric Wire Rope							
S-505 Stock No.	S-505 Sleeve Size	Metric Wire Rope Size (mm)	Standard Round Dies				Maximum After Swage Dimension (in.)
			1st Stage Die		2nd Stage Die		
1041143	1/2	12	1190881	5 x 7 Double Cavity	—		.990
1041223	7/8	20	1190901	5 x 7 Double Cavity	—		1.620
1041241	1	24	1190921	5 x 7 Double Cavity	—		1.880
1041321	1-1/2	36	1192649	5 x 7	1190941	5 x 7	2.630
1041349	1-3/4	40	1192685	5 x 7	1190961	5 x 7	2.950
1041367	2	48	1192729	5 x 7	1190971	5 x 7	3.460
1041401	2-1/2	60	1192809	5 x 7	1190981	5 x 7	4.370
1041401	2-1/2	60	1191061	6 x 12	1190991	6 x 12	4.370
1041487	3	72	1193201	6 x 12	1191001	6 x 12	4.810
1041483	3-1/2	80	1193247	6 x 12	1191101	6 x 12	5.450
1041483	3-1/2	84	1193247	6 x 12	1191121	6 x 12	5.550

QUIC-PASS® system not available for these metric rope sizes.

Open Swage Sockets

S-501 Open Swage Sockets

- Forged from special bar quality carbon steel, suitable for cold forming.
- Swage Socket terminations have an efficiency rating of 100% based on the catalog strength of wire rope.
- Hardness controlled by spheroidize annealing.
- Stamp for identification after swaging without concern for fractures (as per directions in Wire Rope End Terminations User's Manual).
- Swage sockets incorporate a reduced machined area of the shank which is equivalent to the proper "After Swage" dimension. Before swaging, this provides for an obvious visual difference in the shank diameter. After swaging, a uniform shank diameter is created allowing for a QUIC-CHECK® and permanent visual inspection opportunity.
  - Designed to quickly determine whether the socket has been through the swaging operation and assist in field inspections, it does not eliminate the need to perform standard production inspections which include gauging for the proper "After Swage" dimensions or proof loading.



NOTE: S-501 Swage Sockets are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type lay, construction or grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured. In accordance with ASME B30.9, all slings terminated with swage sockets shall be proof loaded.*

QUIC-CHECK®

S-501 Open Swage Sockets

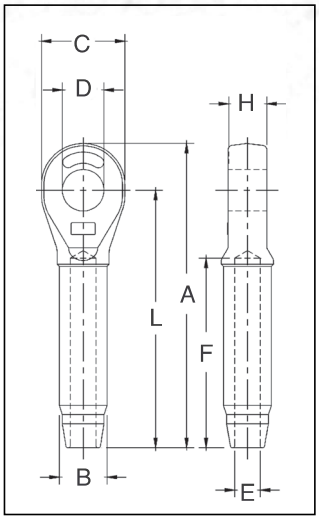
S-501 and S-501B Open Socket Specifications																			Swager / Die Data			
		Rope Size				Before Swage Dimensions (in.)										Tolerance +/-	Max. After Swage Dim. (in.)		Stock No.		Side Load	
S-501 Stock No.	S-501B Stock No. †	(in.)	(mm)	Wt. Each (lbs.)	Ultimate Load** (t)	A	B	C	D	E	F	H	L	M	N	H		Die Description	500 1000 1500 Ton 5 x 7	1500 3000 Ton 6 x 12	1500 Ton 6 x 12	3000 Ton 6 x 12
1039021	1054001	1/4	6	.52	5.4	4.78	.50	1.38	.69	.27	2.19	.69	4.00	.38	1.47	.06	.46	1/4 Socket	1192845	-	-	-
1039049	1054010	5/16	8	1.12	11.8	6.30	.78	1.62	.81	.34	3.25	.80	5.34	.48	1.67	.06	.71	5/16-3/8 Socket	1192863	-	-	-
1039067	1054029	3/8	9-10	1.30	13.6	6.30	.78	1.62	.81	.41	3.25	.80	5.34	.48	1.67	.06	.71	5/16-3/8 Socket	1192863	-	-	-
1039085	1054038	7/16	11-12	2.08	18.1	7.82	1.01	2.00	1.00	.49	4.31	1.00	6.69	.56	1.96	.06	.91	7/16-1/2 Socket	1192881	-	-	-
1039101	1054047	1/2	13	2.08	21.3	7.82	1.01	2.00	1.00	.55	4.31	1.00	6.69	.56	1.96	.06	.91	7/16-1/2 Socket	1192881	-	-	-
1039129	1054056	9/16	14	4.67	31.8	9.54	1.27	2.38	1.19	.61	5.38	1.25	8.13	.68	2.21	.06	1.16	9/16-5/8 Socket	1192907	-	-	-
1039147	1054065	5/8	16	4.51	34.9	9.54	1.27	2.38	1.19	.68	5.38	1.25	8.13	.68	2.21	.06	1.16	9/16-5/8 Socket	1192907	-	-	-
1039165	1054074	3/4	18-20	7.97	43.5	11.61	1.56	2.75	1.38	.80	6.44	1.50	10.00	.80	2.69	.06	1.42	3/4 Socket	1192925	-	-	-
1039183	1054083	7/8	22	11.52	51.5	13.37	1.72	3.13	1.63	.94	7.50	1.75	11.63	.94	3.20	.07	1.55	7/8 Socket	1192943	-	-	-
1039209	1054092	1	24-26	17.80	71.4	15.47	2.00	3.69	2.00	1.07	8.63	2.00	13.38	1.07	3.68	.08	1.80	1 Socket	1192961	-	-	-
1039227	1054104	1-1/8	28	25.25	83.3	17.35	2.25	4.12	2.25	1.19	9.63	2.25	15.00	1.19	4.18	.10	2.05	1-1/8 Socket	1192989	-	-	-
1039245	1054113	1-1/4	32	35.56	109	19.20	2.53	4.59	2.50	1.34	10.69	2.50	16.50	1.27	4.68	.10	2.30	1-1/4 Socket	1193005	-	-	-
1039263	1054122	1-3/8	34-36	43.75	136	21.10	2.81	5.25	2.50	1.46	11.88	2.41	18.13	1.46	5.25	.10	2.56	1-3/8 Socket	1193023	-	-	-
1039281	1054131	1-1/2	38-40	58.50	181	23.17	3.08	5.50	2.75	1.59	12.81	3.00	19.75	1.70	5.70	.10	2.81	1-1/2 Socket	1193041	1191267	1195355	1195192
1039307	1054140	1-3/4	44	88.75	228	26.70	3.40	6.25	3.50	1.87	15.06	3.50	23.00	2.11	6.67	.10	3.06	1-3/4 Socket	1193069	1191276	1195367	1195209
1042767	1054159	2	48-52	146.2	272	31.15	3.94	7.80	3.75	2.12	17.06	4.00	26.75	1.81	8.19	.10	3.56	2 Socket	1193087	1191294	1195379	1195218

*Maximum Proof Load shall not exceed 50% of XXIP rope catalog breaking strength. ** The Ultimate Loads of 3/4" through 1 1/4" sizes have been increased to meet the requirements for 8 strand 2160 Grade pendants. **† Assembly with bolt, nut and cotter pin.**

Closed Swage Sockets

S-502 Closed Swage Sockets

- Forged from special bar quality carbon steel, suitable for cold forming.
- Swage Socket terminations have an efficiency rating of 100% based on the catalog strength of wire rope.
- Hardness controlled by spheroidize annealing.
- Stamp for identification after swaging without concern for fractures (as per directions in Wire Rope End Terminations User's Manual).
- Swage sockets incorporate a reduced machined area of the shank which is equivalent to the proper "After Swage" dimension. Before swaging, this provides for an obvious visual difference in the shank diameter. After swaging, a uniform shank diameter is created allowing for a **QUIC-CHECK®** and permanent visual inspection opportunity.
  - Designed to quickly determine whether the socket has been through the swaging operation and assist in field inspections, it does not eliminate the need to perform standard production inspections which include gauging for the proper "After Swage" dimensions or proof loading.



NOTE: S-502 Swage Sockets are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type lay, construction or grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured. In accordance with ASME B30.9, all slings terminated with swage sockets shall be proof loaded.*

QUIC-CHECK®

S-502 Closed Swage Sockets

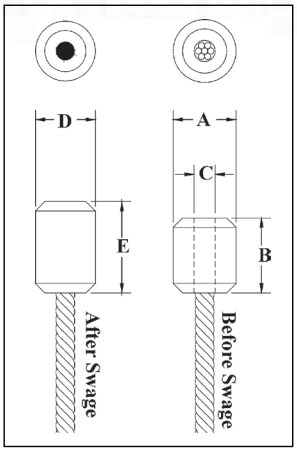
S-502 Closed Socket Specifications														Swager / Die Data			
	Rope Size				Before Swage Dimensions (in.)										Stock No.		Side Load	
S-502 Stock No.	(in.)	(mm)	Wt. Each (lbs.)	Ultimate Load** (t)	A	B	C	D	E	F	H	L	Max. After Swage Dim. (in.)	Die Description	500 1000 1500 Ton 5 x 7	1500 3000 Ton 6 x 12	1500 Ton 6 x 12	3000 Ton 6 x 12
1039325	1/4	6	.33	5.4	4.28	.50	1.38	.76	.27	2.19	.50	3.50	.46	1/4 Socket	1192845	-	-	-
1039343	5/16	8	.75	11.8	5.42	.77	1.62	.88	.34	3.25	.68	4.50	.71	5/16-3/8 Socket	1192863	-	-	-
1039361	3/8	9-10	.72	13.6	5.42	.78	1.62	.88	.41	3.25	.68	4.50	.71	5/16-3/8 Socket	1192863	-	-	-
1039389	7/16	11-12	1.42	18.1	6.88	1.01	2.00	1.07	.49	4.31	.87	5.75	.91	7/16-1/2 Socket	1192881	-	-	-
1039405	1/2	13	1.42	21.3	6.88	1.01	2.00	1.07	.55	4.31	.87	5.75	.91	7/16-1/2 Socket	1192881	-	-	-
1039423	9/16	14	2.92	31.8	8.59	1.27	2.38	1.28	.61	5.38	1.14	7.25	1.16	9/16-5/8 Socket	1192907	-	-	-
1039441	5/8	16	2.85	34.9	8.59	1.27	2.38	1.28	.68	5.38	1.14	7.25	1.16	9/16-5/8 Socket	1192907	-	-	-
1039469	3/4	18-20	5.00	43.5	10.25	1.56	2.88	1.49	.80	6.44	1.33	8.63	1.42	3/4 Socket	1192925	-	-	-
1039487	7/8	22	6.80	51.5	11.87	1.72	3.12	1.73	.94	7.50	1.53	10.09	1.55	7/8 Socket	1192943	-	-	-
1039502	1	24-26	10.40	71.4	13.56	2.00	3.62	2.11	1.07	8.63	1.78	11.50	1.80	1 Socket	1192961	-	-	-
1039520	1-1/8	28	14.82	83.3	15.03	2.25	4.00	2.37	1.19	9.75	2.03	12.75	2.05	1-1/8 Socket	1192989	-	-	-
1039548	1-1/4	32	21.57	109	16.94	2.53	4.50	2.62	1.34	10.81	2.25	14.38	2.30	1-1/4 Socket	1193005	-	-	-
1039566	1-3/8	34-36	28.54	136	18.59	2.81	5.00	2.62	1.46	11.88	2.29	15.75	2.56	1-3/8 Socket	1193023	-	-	-
1039584	1-1/2	38-40	38.06	181	20.13	3.08	5.38	2.87	1.59	12.81	2.56	17.00	2.81	1-1/2 Socket	1193041	1191267	1195355	1195192
1039600	1-3/4	44	51.00	228	23.56	3.40	6.25	3.63	1.87	15.06	3.08	20.00	3.06	1-3/4 Socket	1193069	1191276	1195367	1195209
1042589	2	48-52	89.25	272	27.13	3.94	7.25	3.88	2.12	17.06	3.31	23.00	3.56	2 Socket	1193087	1191294	1195379	1195218

* Maximum Proof Load shall not exceed 50% of XXIP rope catalog breaking strength. **The Ultimate Loads of 3/4" through 1 1/4" sizes have been increased to meet the requirements for 8 strand 2160 Grade pendants.

National Swage Buttons

S-409
Swage Buttons

- Swage Button terminations have an efficiency rating of 98% based on the catalog strength of wire rope.
- Special processed, low carbon steel.
- COLD TUFF® for better swageability.
- Stamp for identification after swaging without concern for fractures (as per directions in the Wire Rope End Terminations User's Manual).



NOTE: S-409 Buttons are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type lay, construction or grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured.

S-409 COLD TUFF® Buttons

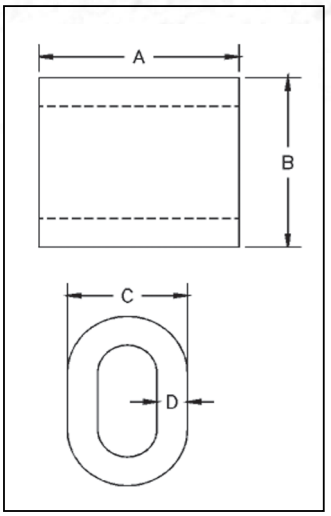
S-409 Steel Swage Button Specifications										Swager / Die Data	
		Rope Size			Before Swage Dimensions (in.)			After Swage Dimensions (in.)			
S-409 Stock No.	Size No.	(in.)	(mm)	Weight Per 100 (lbs.)	A	B	C	D Maximum After Swage Dimensions	E Length*	Die Description	Stock No. 500 Tons 1000 Tons 1500 Tons 5 x 7
1040171	1 SB	1/8	3	2	.42	.50	.14	.40	.61	1/8 - 1/4 Button	1191621
1040215	3 SB	3/16	5	4	.56	.70	.20	.52	.84	1/4 1st Stage	1197528
1040251	5 SB	1/4	6-7	8	.68	1.06	.31	.58	1.41	1/8 - 1/4 Button	1191621
1040297	7 SB	5/16	8	16	.88	1.13	.36	.77	1.33	3/8 1st Stage	1192364
1040313	8 SB	3/8	9-10	15	.88	1.48	.42	.77	1.69	3/8 1st stage	1192364
1040331	9 SB	7/16	11	30	1.13	1.63	.48	1.03	1.94	1/2 1st Stage	1192408
1040359	10 SB	1/2	13	50	1.31	1.89	.55	1.16	2.17	5/8 Socket	1192907
1040377	11 SB	9/16	14	70	1.44	2.02	.61	1.29	2.41	9/16 -5/8 Button	1191665
1040395	12 SB	5/8	16	100	1.56	2.42	.67	1.42	2.89	3/4 Socket	1192925
1040411	13 SB	3/4	18-20	131	1.68	2.74	.80	1.55	3.25	3/4 1st Stage	1192462
1040439	14 SB	7/8	22	220	2.00	3.27	.94	1.80	3.86	7/8 1st Stage	1192480
1040457	15 SB	1	25-26	310	2.25	3.67	1.06	2.05	4.36	1 1st Stage	1192505
1040475	16 SB	1-1/8	28-29	450	2.56	4.05	1.19	2.30	4.81	1-1/8 1st Stage	1192523
1040493	17 SB	1-1/4	31-32	650	2.81	4.57	1.33	2.56	5.42	1-3/8 Socket	1193023

* NOTE: Length is measured from outside end of termination.

National Swage Duplex Sleeves

S-506
Duplex Sleeves

- For turnback wire rope splicing.
- Special processed low carbon steel.
- Turnback terminations have efficiency ratings of 94% based on the catalog strength of wire rope.
- Designed for lower temperature toughness.
- Resists cracking when swaged (equals or exceeds stainless steel sleeves).
- COLD TUFF® for better swageability.
- Stamp for identification after swaging without concern for fractures (as per directions in the Wire Rope End Termination User's Manual).



NOTE: S-506 Sleeves are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type lay, construction or grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured.

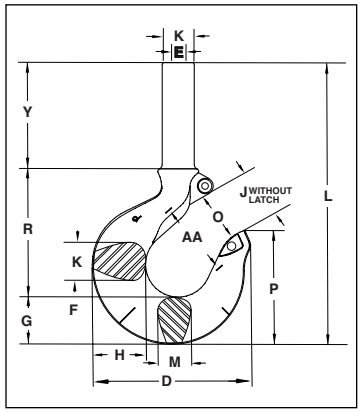
S-506 COLD TUFF® Duplex Non-Tapered Sleeves

S-506 Steel Duplex Non-Tapered Sleeve Specifications										Swager / Die Data	
S-506 Stock No.	Rope Size (in.)	Rope Size (mm)	Weight Per 100 (lbs.)	Pkg. Qty.	Before Swage Dimensions (in.) A	B	C	D	Max. After Swage Dimensions (in.)	Die Description	Stock No. 500 Tons 1000 Tons 1500 Tons 5 x 7
1039334	5/16	8	17	200	1.25	1.06	.81	.19	.77	3/8 1st Stage	1192364
1039352	3/8	9-10	13	100	1.25	1.12	.81	.14	.77	3/8 1st Stage	1192364
1039370	7/16	11	31	50	1.63	1.41	1.02	.19	1.03	1/2 1st Stage	1192408
1039398	1/2	13	27	50	1.63	1.44	1.02	.16	1.03	1/2 1st Stage	1192408
1039414	9/16	14	63	25	2.25	1.72	1.23	.23	1.29	5/8 1st Stage	1192444
1039432	5/8	16	54	25	2.25	1.84	1.28	.20	1.29	5/8 1st Stage	1192444
1039450	3/4	18-20	91	10	2.63	2.16	1.52	.23	1.55	3/4 1st Stage	1192462
1039478	7/8	22	126	10	2.88	2.50	1.75	.27	1.80	7/8 1st Stage	1192480
1039496	1	25-26	187	10	3.06	2.84	2.00	.33	2.05	1 1st Stage	1192505
1039539	1-1/4	30-32	384	Bulk	4.06	3.50	2.50	.38	2.56	1-3/8 Socket	1193023

Shank Hooks For Swaging

S-319SWG
Shank Hook

- Wide range of sizes available:
  - Working Load Limit: 0.4-14 Ton
  - Wire Rope sizes: 3/16" through 1-1/8".
- Swage shank hook terminations have an efficiency rating of 95% based on the catalog strength of wire rope.
- Quenched and Tempered. Heat treat process allows for ease of swaging.
- Forged Carbon Steel.
- Design Factor of 5 to 1.
- Black Oxide finish on body (Shank is uncoated).
- Utilizes standard Crosby 319N shank hooks with interlocking hook tip. Each hook has a pre-drilled cam which can be equipped with a latch.
- Utilizes standard National Swage swaging dies.
- All hooks incorporate Crosby's patented **QUIC-CHECK®** markings (Angle Indicators and Throat Deformation Indicators). See page 113 for detailed information.



"QT" QUENCHED & TEMPERED®

QUIC-CHECK®

SEE APPLICATION AND WARNING INFORMATION
Pages 61-62
Para Español: www.thecrosbygroup.com

NOTE: For use with 6 X 19 or 6 X 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC, or IWRC wire rope.

Before using any Crosby fitting with any other type lay, construction or grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured. Refer to swage socket or swage button instructions in the National Swage Swaging Products and Procedures Brochure for proper swaging techniques.

S-319SWG Shank Hooks for Swaging

Wire Rope Size (in.)	Wire Rope Size (mm)	Hook ID Code†	Working Load Limit (Tons)*	S-319SWG Stock No.	Weight Each (lbs.)	Required Swaging Die: Die Description	Required Swaging Die: Die Stock No.	Maximum After Swage Diameter (in.)
3/16	5	DC	0.4	1053002	.55	1/8" Button	1191621	.40
1/4	6-7	FC	0.7	1053011	.77	1/4" Socket	1192845	.46
5/16	8	GC	1.1	1053020	1.26	1/4" Button	1191621	.58
5/16	8	HC	1.1	1053039	1.83	3/8" Socket	1192863	.71
3/8	9-10	HC	1.6	1053048	1.80	3/8" Socket	1192863	.71
7/16	11	IC	2.1	1053057	3.63	1/2" Socket	1192881	.91
1/2	12-13	IC	2.8	1053066	3.58	1/2" Socket	1192881	.91
9/16	14-15	JC	3.5	1053075	7.37	5/8" Socket	1192907	1.16
5/8	16	JC	4.3	1053084	7.30	5/8" Socket	1192907	1.16
3/4	18	KC	6.2	1053093	12.73	3/4" Socket	1192925	1.42
7/8	20-22	LC	8.3	1053100	17.58	7/8" Socket	1192949	1.55
1	24-26	NC	11.0	1053119	31.46	1" Socket	1192961	1.80
1-1/8	28-30	OC **	14.0	1053128	53.73	1-1/8" Socket	1192989	2.05

* Minimum Ultimate Load is 5 times the Working Load Limit. ** ID Code "O" is original 319 style hook. † See tables on pages 123 - 125 for correct latch per Hook ID Code.

Wire Rope Size (in.)	Wire Rope Size (mm)	S-319SWG Stock No.	Dimensions (in.) B	D	E	F	G	H	J	K	L	M	O	P	R	Y	AA**
3/16	5	1053002	.44	2.86	.20	.63	.73	.81	.93	.63	5.18	.63	.93	1.96	2.39	2.00	1.50
1/4	6-7	1053011	.50	3.15	.27	.69	.84	.94	.97	.71	5.72	.71	.97	2.22	2.63	2.25	2.00
5/16	8	1053020	.65	3.59	.34	.75	1.00	1.16	1.06	.88	6.39	.88	1.06	2.44	2.80	2.50	2.00
5/16	8	1053039	.77	3.99	.34	.81	1.14	1.31	1.19	.94	7.18	.94	1.16	2.78	3.21	2.75	2.00
3/8	9-10	1053048	.77	3.99	.41	.81	1.14	1.31	1.19	.94	7.18	.94	1.16	2.78	3.21	2.75	2.00
7/16	11	1053057	.98	4.84	.48	1.00	1.44	1.63	1.50	1.31	8.70	1.13	1.41	3.47	3.92	3.25	2.50
1/2	12-13	1053066	.98	4.84	.55	1.00	1.44	1.63	1.50	1.31	8.70	1.13	1.41	3.47	3.92	3.25	2.50
9/16	14-15	1053075	1.25	6.27	.61	1.25	1.82	2.06	1.78	1.66	10.51	1.44	1.69	4.59	4.86	3.75	3.00
5/8	16	1053084	1.25	6.27	.67	1.25	1.82	2.06	1.78	1.66	10.51	1.44	1.69	4.59	4.86	3.75	3.00
3/4	18	1053093	1.55	7.54	.80	1.50	2.26	2.63	2.41	1.88	12.63	1.63	2.22	5.25	6.00	4.25	4.00
7/8	20-22	1053100	1.70	8.33	.94	1.63	2.60	2.94	2.62	2.19	13.60	1.94	2.41	5.69	6.51	4.38	4.00
1	24-26	1053119	1.98	10.38	1.06	2.13	3.01	3.50	3.41	2.69	16.80	2.38	3.19	6.88	8.30	5.38	4.00
1-1/8	28-30	1053128	2.25	13.63	1.19	2.50	3.62	4.62	4.00	3.00	23.09	3.00	3.25	8.78	9.43	9.75	6.50

** Deformaiton Indicators

Crosby®

"The Standard" in Cell Tower Securment

When it comes to the securment of cell towers, Crosby® sets the industry standard with superior products, in-depth training, and time-tested expertise. For years, we have fulfilled the unique needs of each and every cell tower company that we've partnered with.

Turnbuckle Fittings

Wire Rope End Fittings

www.celltower.thecrosbygroup.com

National offers the highest quality and most complete line of Hydraulic Swaging Machines specifically designed to be used to swage fittings on wire rope.

Three capacities to fit your requirements: 500 Tons • 1000 Tons • 1500 Tons

1500 Ton Hydraulic Swaging Machine
Approximate weight 34,500 lbs. Overall height 8 ft. 6 in. Fast advance and retract speed. Automatic slow, precision swaging speed.

The following features of National Hydraulic Swaging Machines offer a number of advantages for high production sling shops:

- A dual hydraulic system which combines the use of high speed and low pressure to bring dies into position; and the low speed and high pressure necessary for ideal swaging control.
- Adjustable tonnage control, so tonnage can be set to match die block Working Load Limit.
- Four column wide stance which provides the operator ample working clearance between columns and a large area for in-process sling storage.
- Vertical swage action which gives an equalized press on the fitting to produce uniform high quality.
- Self locating spring locks snap the shoe-type dies into place for quick set-up and change.
- The National four column wide stance Hydraulic Swaging Machines, each equipped with an up-acting ram, have two side cylinders for fast approach and return of the main ram. They come in three swaging capacities.
  - 500 Ton (4450 kN)
  - 1000 Ton (8900 kN)
  - 1500 Ton (13350 kN)

Scan this QR code with your smart device to view our National 4 Post Hydraulic Swaging Machine Video.

Swaging Machine Capacity Chart for Swage, Sleeves, Ferrules and Buttons

Hydraulic Swaging Machine Size	Swaging Method	Die Size (in.)	Largest Fitting Allowed to be Swaged (in.)		
			S-505 Sleeve	S-506 Sleeve	S-409 Buttons
500 Ton	Full Die	2-1/2 x 5 Mark Series 4 x 7 5 x 7	1-1/2	1-1/4*	7/8
1000 Ton	Full Die	4 x 7 5 x 7	2-1/2	1-1/4*	1-1/4*
1500 Ton	Full Die	5 x 7 6 x 12	3-1/2	1-1/4*	1-1/4*

* Largest size fitting available.

Swaging Machine Capacity Chart for S-501 and S-502 Swage Sockets

Hydraulic Swaging Machine Size	Swaging Method	Die Size (in.)	Largest Fitting Allowed to be Swaged (in.)
500 Ton	Full Shank	2-1/2 x 5 Mark Series 4 x 7 5 x 7	3/4
	Progressive	4 x 7 5 x 7	1-1/4
1000 Ton	Full Shank	4 x 7 5 x 7	1
	Progressive	4 x 7 5 x 7	1-1/2
1500 Ton	Full Shank	5 x 7 6 x 12	1-1/4
	Progressive	5 x 7 6 x 12	2

NOTE: For special applications or conditions, contact Crosby National at (501) 982-3112.

SEE APPLICATION AND WARNING INFORMATION
On Pages 65-72
Para Español: www.thecrosbygroup.com

RESIN FOR SPELTER SOCKETS NOT AVAILABLE IN CANADA

Note: For use on 416, 417, 427 and 517 spelter sockets only.

- 100% termination efficiency.
- Temperature operating range is -65° F to +240° F (-54°C to +116°C).
- Ideal for on-site applications.
- No hazardous molten metal.
- Improved fatigue life.
- Pouring temperature without booster pack is 48° F to 110° F (6.67°C to 43.3°C).
- One booster pack if pouring temperature is 35° F to 48° F (1.67°C to 8.89°C).
- Two booster packs if pouring temperature is 27° F to 35° F (-2.78°C to +1.67°C).
- Refer to Crosby® Wire Rope End Terminations Manual for more information.

APPROVALS:

Lloyds Register of Shipping

Det Norske Veritas (DNV)

United States Coast Guard

Registro Italiano Navale

Germanischer Lloyd

United States Navy

American Bureau of Shipping

ISO 17.558

DNV-OS-E304

NATO Numbers:

100cc	8030-21-902-1823
250cc	8030-21-902-1824
500cc	8030-21-902-1825
1000cc	8030-21-902-1826

Witnessed and tested by American Bureau of Shipping. (ABS)

Approximate U.S. Measurements:

250cc's Kit 1 Cup

WIRELOCK® W416-7 Socket Compound

W416-7 Kits				Booster Pak Stock No.
Kit Size	Kit Per Case	Stock No.	Weight Each (lbs.)	
100	20	1039602	.62	1039603
250	12	1039604	1.25	1039605
500	12	1039606	2.54	1039607
1000	12	1039608	4.59	1039609
2000	12	1039610	9.00	1039611

Guide to amount WIRELOCK® Required

Wire Rope Size		WIRELOCK® Required (cc)	Wire Rope Size		WIRELOCK® Required (cc)
(in.)	(mm)		(in.)	(mm)	
1/4	6-7	9	1-3/4	44	700
5/16	8	17	1-7/8	48	700
3/8	9-10	17	2	51	1265
7/16	11	35	2-1/8	54	1265
1/2	13	35	2-1/4	56	1410
9/16	14	52	2-3/8	60	1410
5/8	16	52	2-1/2	64	1830
3/4	20	86	2-5/8	67	1830
7/8	22	125	2-3/4	70	2250
1	26	160	3	76	3160
1-1/8	28	210	3-1/4	82	3795
1-1/4	32	350	3-1/2	88	4920
1-3/8	36	350	3-3/4	94	5980
1-1/2	40	420	4	102	7730
1-5/8	42	495	—	—	—

Wirelock is a hazardous material regulated by US DOT, ICAO/IATA and IMO for transportation.

SEE APPLICATION AND WARNING INFORMATION
On Pages 63-64
Para Español: www.thecrosbygroup.com

CROSBY® SPELTER BUTTON SB-427B
APPLICATION INSTRUCTIONS

Scope

This procedure is provided to give instructions for installation of wire rope into the Crosby® SB-427B Spelter Button using WIRELOCK® socketing material, or zinc socketing material. **Additionally, instructions regarding the reuse of spelter buttons are included.** The spelter button is part of a socket assembly that includes a socket basket, pin, cotter pin and button. If there are any questions regarding these instructions, please contact The Crosby Group LLC at (918) 834-4611 and request technical assistance.

NOTE: Many high performance ropes require special attention to prevent rope damage during cutting, seizing and brooming in preparation for the speltering operation. Attention to the special instructions is required to ensure proper termination efficiency. Consult rope manufacturer for specific details.

Installation

Install button on the rope so that the live end of the rope extends out of small inside diameter of the button. Broomed end of rope should be pulled into button and placed completely to the "MAX FILL" line marked on the button to ensure correct length of engagement with socketing material.

Socketing using WIRELOCK® Resin Material

Seizing, cleaning, brooming and preparation of wire rope and pouring of WIRELOCK® is to be carried out per instructions provided in the *Wire Rope End Terminations User's Manual,* and *WIRELOCK® Warnings and Application Instructions* located on the WIRELOCK® Product or in the Crosby General Catalog.

Socketing Using Zinc Spelter Material

Seizing, cleaning, brooming and preparation of the wire rope, and pouring of zinc is to be carried out in accordance with recommendations of the Crosby® *Wire Rope End Terminations Manual* or other approved procedures.

Note: Before operation of the wire rope assembly, it is recommended that all poured sockets, whether with zinc or resin, be proof loaded to seat the cone.

Reuse Of Crosby® Spelter Buttons

The following are general guidelines for the reuse of a Crosby® SB-427B Button. The use and inspection of used buttons are the responsibility of the user.

Procedure For Removing Spelter Cone

- Cut the rope close (½") to the nose end of the button and press the cone out of the button.
- For metallurgical, medical and environmental reasons, we do not recommend the use of heat to remove the spelter cone.
  - However, if this is the only means available for removing the zinc cone, care should be taken not to exceed 850˚F (450˚C) surface temperature. The preferred method would be a slow heat in a temperature controlled oven. If a torch (rosebud) is used, the heated area shall be monitored with a Tempil stick or a temperature indicator to prevent localized heating from exceeding the 850˚F (450˚C) limit.
  - To remove a WIRELOCK® cone, heat the surface of the button to 350˚F (177˚C) (do not exceed the 850 ˚F (450˚C) limit for any localized hot spot). Leave for 5-10 minutes, then drive the cone out with a hammer and drift.

Selection Of Buttons For Reuse

- Use only buttons that:
  - Do not show discoloration from excessive heating.
  - Do not show any signs of welding.
  - Select only buttons that have been cleaned and have passed a Magnetic Particle Inspection by a qualified technician (level II ASNT-SNT-TC-1A-88) per ASTM E709. Acceptance criteria shall be per ASTM E125, Types II-VIII, Degree 1. No cracks are acceptable.
  - Select only buttons that do not show any signs of overloading or wear.
  - Select buttons that are free from nicks, gouges and abrasions. Indications may be repaired by lightly grinding until surfaces are smooth, provided they do not reduce the dimensions by more then 10% of the nominal catalog dimension.
  - Select buttons that are not distorted, bent or deformed.

NOTE: Buttons having any of the indications as outlined above shall not be reused.

CROSBY® CLIPS

WARNINGS & APPLICATION INSTRUCTIONS

G-450
(Red-U-Bolt®)

SS-450
(316 Stainless Steel)

⚠WARNING

- **Failure to read, understand, and follow these instructions may cause death or serious injury.**
- **Read and understand these instructions before using clips.**
- **Match the same size clip to the same size wire rope.**
- **Prepare wire rope end termination only as instructed.**
- **Do not use with plastic coated wire rope.**
- **Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and retighten nuts to recommended torque (See Table 1).**

Efficiency ratings for wire rope end terminations are based upon the minimum breaking force of wire rope. The efficiency rating of a properly prepared loop or thimble-eye termination for clip sizes 1/8" through 7/8" is 80%, and for sizes 1" through 3-1/2" is 90%.

The number of clips shown (see Table 1) is based upon using RRL or RLL wire rope, 6 x 19 or 6 x 37 Class, FC or IWRC; IPS or XIP, XXIP. If Seale construction or similar large outer wire type construction in the 6 x 19 Class is to be used for sizes 1 inch and larger, add one additional clip. If a pulley (sheave) is used for turning back the wire rope, add one additional clip.

The number of clips shown also applies to rotation-resistant RRL wire rope, 8 x 19 Class, IPS, XIP, XXIP sizes 1-1/2 inch and smaller; and to rotation-resistant RRL wire rope, 19 x 7 Class, IPS, XIP, XXIP sizes 1-1/2 inch and smaller.

For other classes of wire rope not mentioned above, we recommend contacting Crosby Engineering at the address or telephone number on the back cover to ensure the desired efficiency rating.

The style of wire rope termination used for any application is the obligation of the user.

For OSHA (Construction) applications, see OSHA 1926.251.

1. Refer to Table 1 following these instructions. Turn back specified amount of rope from thimble or loop.

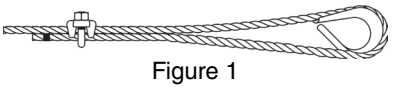


Figure 1

Apply first clip one base width from dead end of rope. Use torque wrench to tighten nuts evenly, alternating from one nut to the other until reaching the recommended torque. (See Figure1)

2. When two clips are required, apply the second clip as near the loop or thimble as possible. Use torque wrench to tighten nuts evenly, alternating until reaching the recommended torque. When more than two clips are required, apply the second clip as near the loop or thimble as possible, turn nuts on second clip firmly, but do not tighten. (See Figure 2)

Figure 2

3. When three or more clips are required, space additional clips equally between first two – take up rope slack – use torque wrench to tighten nuts on each clip evenly, alternating from one nut to the other until reaching recommended torque. (See Figure 3)

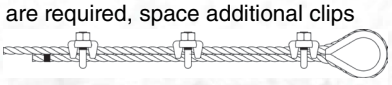


Figure 3

4. If a pulley (sheave) is used in place of a thimble, add one additional Fist Grip. Fist Grip spacing should be as shown. (See Figure 4)

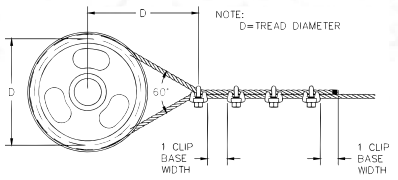


Figure 4

5. WIRE ROPE SPLICING PROCEDURES:

The preferred method of splicing two wire ropes together is to use inter-locking turnback eyes with thimbles, using the recommended number of clips on each eye (See Figure 5).

Figure 5

An alternate method is to use twice the number of clips as used for a turnback termination. The rope ends are placed parallel to each other, overlapping by twice the turnback amount shown in the application instructions. The minimum number of clips should be installed on each dead end (See Figure 6). Spacing, installation torque, and other instructions still apply.

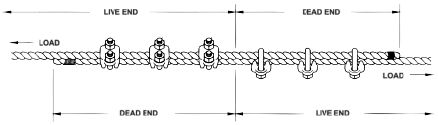


Figure 6

6. IMPORTANT

Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and use torque wrench to retighten nuts to recommended torque.

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

Table 1

Clip Size/ Rope Size		Minimum No. of Clips	Amount of Rope to Turn Back in inches	*Torque in Ft. Lbs.
(in.)	(in.)			
1/8	1/8	2	3-1/4	4.5
3/16	3/16	2	3-3/4	7.5
1/4	1/4	2	4-3/4	15
5/16	5/16	2	5-1/4	30
3/8	3/8	2	6-1/2	45
7/16	7/16	2	7	65
1/2	1/2	3	11-1/2	65
9/16	9/16	3	12	95
5/8	5/8	3	12	95
3/4	3/4	4	18	130
7/8	7/8	4	19	225
1	1	5	26	225
1-1/8	1-1/8	6	34	225
1-1/4	1-1/4	7	44	360
1-3/8	1-3/8	7	44	360
1-1/2	1-1/2	8	54	360
1-5/8	1-5/8	8	58	430
1-3/4	1-3/4	8	61	590
2	2	8	71	750
2-1/4	2-1/4	8	73	750
2-1/2	2-1/2	9	84	750
2-3/4	2-3/4	10	100	750
3	3	10	106	1200
3-1/2	3-1/2	12	149	1200
If a pulley (sheave) is used for turning back the wire rope, add one additional clip. See Figure 4.				
If a greater number of clips are used than shown in the table, the amount of turnback should be increased proportionately.				
*The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.				

CROSBY® FIST GRIP® CLIPS

WARNINGS & APPLICATION INSTRUCTIONS

New Style Fist Grip®
3/16" - 5/8"

Fist Grip® Clips
3/4" - 1-1/2"

⚠ WARNING

- **Failure to read, understand, and follow these instructions may cause death or serious injury.**
- **Read and understand these instructions before using clips.**
- **Match the same size clip to the same size wire rope.**
- **Do not mismatch Crosby clips with other manufacturer's clips.**
- **Prepare wire rope end termination only as instructed.**
- **Do not use with plastic coated wire rope.**
- **Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and retighten nuts to recommended torque (See Table 1).**

Efficiency ratings for wire rope end terminations are based upon the minimum breaking force of wire rope. The efficiency rating of a properly prepared loop or thimble-eye termination for clip sizes 1/8" through 7/8" is 80%, and for sizes 1" through 3-1/2" is 90%.

The number of clips shown (see Table 1) is based upon using RRL or RLL wire rope, 6 x 19 or 6 x 37 Class, FC or IWRC; IPS or XIP, XXIP. If Seale construction or similar large outer wire type construction in the 6 x 19 Class is to be used for sizes 1 inch and larger, add one additional clip. If a pulley (sheave) is used for turning back the wire rope, add one additional clip.

The number of clips shown also applies to rotation-resistant RRL wire rope, 8 x 19 Class, IPS, XIP, XXIP sizes 1-1/2 inch and smaller; and to rotation-resistant RRL wire rope, 19 x 7 Class, IPS, XIP, XXIP sizes 1-1/2 inch and smaller.

For other classes of wire rope not mentioned above, we recommend contacting Crosby Engineering at the address or telephone number on the back cover to ensure the desired efficiency rating.

The style of wire rope termination used for any application is the obligation of the user.

For OSHA (Construction) applications, see OSHA 1926.251.

1. Refer to Table 1 in following these instructions. Turn back specified amount of rope from thimble or loop.

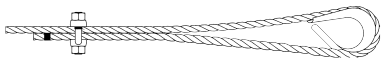


Figure 1

Apply first clip one base width from dead end of rope. Use torque wrench to tighten nuts evenly, alternating from one nut to the other until reaching the recommended torque. (See Figure1)

2. When two clips are required, apply the second clip as near the loop or thimble as possible. Use torque wrench to tighten nuts evenly, alternating until reaching the recommended torque. When more than two clips are required, apply the second clip as near the loop or thimble as possible, turn nuts on second clip firmly, but do not tighten. (See Figure 2)

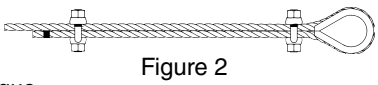


Figure 2

3. When three or more clips are required, space additional clips equally between first two – take up rope slack – use torque wrench to tighten nuts on each clip evenly, alternating from one nut to the other until reaching recommended torque. (See Figure 3)

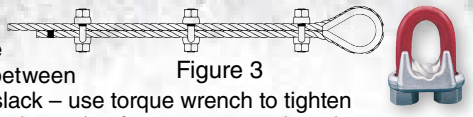
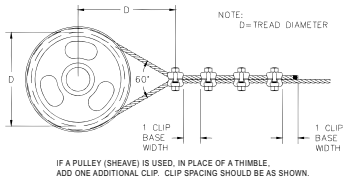


Figure 3

4. If a pulley (sheave) is used in place of a thimble, add one additional Fist Grip. Fist Grip spacing should be as shown. (See Figure 4)

Figure 4



5. WIRE ROPE SPLICING PROCEDURES:

The preferred method of splicing two wire ropes together is to use inter-locking turnback eyes with thimbles, using the recommended number of clips on each eye (See Figure 5).

Figure 5

An alternate method is to use twice the number of clips as used for a turnback termination. The rope ends are placed parallel to each other, overlapping by twice the turnback amount shown in the application instructions. The minimum number of clips should be installed on each dead end (See Figure 6). Spacing, installation torque, and other instructions still apply.

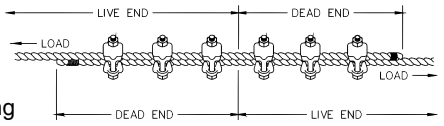


Figure 6

6. IMPORTANT

Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and use torque wrench to retighten nuts to recommended torque.

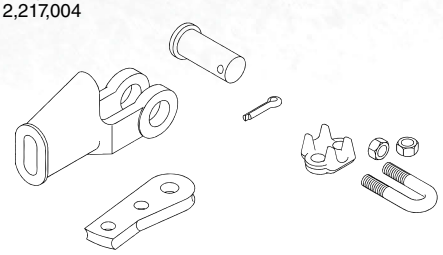
In accordance with good rigging and maintenance practices, the wire rope end termination should be inspected periodically for wear, abuse, and general adequacy.

Table 1

Clip Size/ Rope Size (in.)	Clip Size/ Rope Size (mm)	Minimum No. of Clips	Amount of Rope to Turn Back in Inches	*Torque in Ft.Lbs.
3/16	5-7	2	4	30
1/4	5-7	2	4	30
5/16	8	2	5	30
3/8	10	2	5-1/4	45
7/16	11-13	2	6-1/2	65
1/2	11-13	3	11	65
9/16	14-16	3	12-3/4	130
5/8	14-16	3	13-1/2	130
3/4	18-20	3	16	225
7/8	22	4	26	225
1	24-26	5	37	225
1-1/8	28-30	5	41	360
1-1/4	32-34	6	55	360
1-3/8	36-40	6	62	500
1-1/2	36-40	7	78	500
If a pulley (sheave) is used for turning back the wire rope, add one additional clip. See Figure 4.				
If a greater number of clips are used than shown in the table, the amount of turnback should be increased proportionately.				
*The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.				

CROSBY TERMINATOR
WARNINGS & APPLICATION INSTRUCTIONS

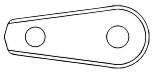
Extended Wedge Socket Assembly U.S. Patent No. 5,553,360 and Canada Patent No. 2,217,004



S-421T / US-422T
CROSBY "TERMINATOR"

NOTE: The design of the basket for the S-421T 1-1/4" TERMINATOR® Wedge Socket does not allow proper fit to the old style Crosby S-421W wedge (see Fig. 1). **Do not assemble or use.** The design of the basket for each US-422T TERMINATOR Wedge Socket does not allow proper fit to the old style UWO-422 wedge (See Fig. 1). **Do not assemble or use.** All S-421T and US-422T TERMINATOR baskets are marked with a capital "T" or TERMINATOR.

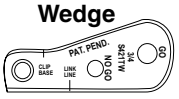
Non TERMINATOR Wedge



S-421W
UWO-422

Figure 1

TERMINATOR Wedge



S-421TW
UWO-422T

QUIC-CHECK® "Go" and "No-Go" features cast into wedge. The proper size wire rope determined when the following criteria are met:

QUIC-CHECK® is in

1. The wire rope shall pass thru the "Go" hole in the wedge.
2. The wire rope shall NOT pass thru the "No-Go" hole in the wedge.

Important Safety Information – Read and Follow Inspection/Maintenance Safety

- Always inspect socket, wedge and pin before using.
- Do not use part showing cracks.
- Do not use modified or substitute parts.
- Repair minor nicks or gouges to socket or pin by lightly grinding until surfaces are smooth. Do not reduce original dimension more than 10%. Do not repair by welding.
- Inspect permanent assemblies annually, or more often in severe operating conditions.
- Do not mix and match wedges or pins between models or sizes.
- Always select the proper wedge and socket for the wire rope size.

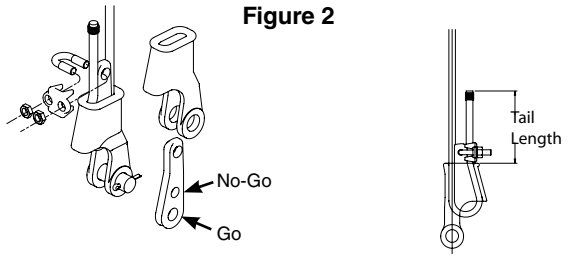
Assembly Safety

- Use only with standard 6 to 8 strand wire rope of designated size. For intermediate size rope, use next larger size socket. For example: When using 9/16" diameter wire rope use a 5/8" size Wedge Socket Assembly. Welding of the tail on standard wire rope is not recommended. Seizing of the tail is preferred following the recommended practices of the wire rope manufacturer. The tail length of the dead end should be a minimum of 6 rope diameters but not less than 6" (See Figure 2).
- **To use with Rotation Resistant wire rope** (special wire rope constructions with 8 or more outer strands) ensure that the dead end is welded, brazed or seized before inserting the wire rope into the wedge socket to prevent core slippage or loss of rope lay. Seizing of the tail is preferred following the recommended practices of the wire rope manufacturer. The tail length of the dead end should be a minimum of 20 rope diameters but not less than 6" (See Figure 2).
- Properly match socket, wedge and clip (See Table 1) to wire rope size.
- Align live end of rope, with center line of pin.(See Figure 2)
- Secure dead end section of rope. (See Figure 2)
- Tighten nuts on clip to recommended torque. (See Table 1)
- Do not attach dead end to live end or install wedge backwards (See Fig. 3).
- Use a hammer to seat Wedge and Rope as deep into socket as possible before applying first load.

⚠WARNING

- **Loads may slip or fall if the Wedge Socket is not properly installed.**
- **Load misapplied in direct contact with the wedge can dislodge the wedge and cause loss of load.**
- **A falling load can seriously injure or kill.**
- **Read and understand these instructions before installing the Wedge Socket.**
- **Do not side load the Wedge Socket.**
- **Apply first load to fully seat the Wedge and Wire Rope in the socket. This load should be of equal or greater weight than loads expected in use.**
- **Do not interchange wedges between S-421T and US422T or between sizes.**
- **Do not assemble an old style 1-1/4" (30-32mm) S-421W wedge into an S-421T 1-1/4" (30-32mm) TERMINATOR basket.**
- **Do not assemble an old style UWO-422 wedge into a US-422T TERMINATOR basket.**

Figure 2



*Tail Length	
Standard 6 to 8 Strand Wire Rope	**Rotation Resistant Wire Rope**
A minimum of 6 rope diameters, but not less than 6"	A minimum of 20 rope diameters, but not less than 6"

TABLE 1

Rope Size (in.)	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4
Clip Size (in.)	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4
* Torque Ft./lbs.	45	65	95	130	225	225	225	360

* The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.

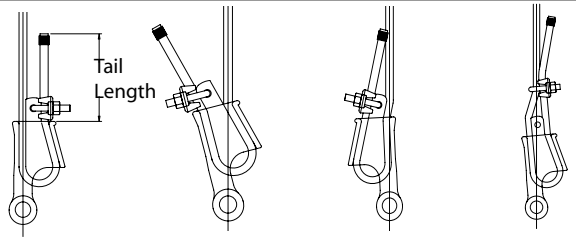


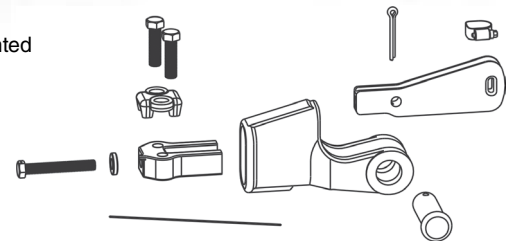
Figure 3

Operating Safety

- Apply first load to fully seat the Wedge and Wire Rope in the socket. This load should be of equal or greater weight than loads expected in use.
- Efficiency rating of the Wedge Socket termination is based upon the catalog breaking strength of Wire Rope. The efficiency of a properly assembled Wedge Socket is 80%.
- During use, do not strike the dead end section or wedge with any other elements of the rigging (Called two blocking).
- Do not allow a direct load to contact the wedge.

SUPER TERMINATOR WEDGE SOCKET
WARNINGS & APPLICATION INSTRUCTIONS

Patented



S-423T "SUPER TERMINATOR"

The intended purpose of the SUPER TERMINATOR is to offer a Wedge Socket termination, which when assembled properly with high performance, high strength, compacted strand, rotation resistant wire rope will achieve an 80% termination efficiency. Due to the unique construction of these ropes, Crosby cannot make a broad general statement that all current and future designed ropes, when properly assembled with a SUPER TERMINATOR , will achieve a minimum 80% termination efficiency. (To determine the efficiency rating for a specific rope, contact Crosby Engineering at 918-834-4611.)

The SUPER TERMINATOR may be purchased as a complete Wedge Socket assembly or the Wedge assembly may be purchased for retrofit onto your Crosby S-421T wedge socket basket.

The Crosby S-423T SUPER TERMINATOR Wedge is designed to be assembled only into the Crosby S-421T socket basket. For the 1-1/4" S-423T, assemble only on to S-421T basket marked TERMINATOR .

Important Safety Information - Read and Understand

Inspection/Maintenance Safety

- Always inspect socket, wedge and pin before using.
- Do not use part showing cracks.
- Do not use modified or substitute parts.
- Repair minor nicks or gouges to socket or pin by lightly grinding until surfaces are smooth. Do not reduce original dimension more than 10%. Do not repair by welding.
- Inspect permanent assemblies annually, or more often in severe operating conditions.
- Do not mix and match wedges or pins between models or sizes.
- Always select the proper wedge and socket for the wire rope size.

Assembly Safety

- Properly match socket and wedge assembly to wire rope size.
- Ensure the dead end is properly seized before inserting the wire rope into the wedge socket basket. High performance, high strength, compacted strand, rotation resistant wire ropes are sensitive to seizing methods. For specific seizing procedures, contact the wire rope manufacturer.
- The tail length of the dead end should be a minimum of 20 rope diameters but not less than 10" (See Fig. 1).
- Mount wedge socket basket in vice.
- Insert live end of wire rope into wedge basket, aligning live end of rope with center line of pin. Make a loop and return. (See Figure 2).
- Pull on live line to remove excess out of loop, leaving enough room to properly insert wedge into basket. (See Figure 3).
- Secure rope to SUPER TERMINATOR Wedge with clamp (See Figure 4).
- Pull Wedge and rope into basket until tensioner bolt, with washers properly applied, can engage threads in nose of wedge. Auxillary power may be required to fully pull wedge and rope into basket. (See Figure 5).
- Use torque wrench to tighten tensioner bolt to recommended torque value, properly seating wedge and rope into basket. Reference Table 1 for recommended Torque in Ft Lbs.
- Secure dead end section of rope with clip base. Tighten bolts to recommended torque values (See Table 1).
- Properly install wire to securely lock tensioner bolt to tensioner. (See Figure 6).
- Do not attach dead end to live end or install wedge backwards. (See Figure 7).

Operating Safety

- Proper application of the Super TERMINATOR eliminates the "first load" requirement of conventional wedge socket terminations.
- Efficiency rating of the Wedge Socket termination is based upon the catalog breaking strength of Wire Rope. The efficiency of a properly assembled Super Terminator on most high performance, high strength, compacted strand, rotation resistant ropes will achieve 80% of catalog breaking strength of rope, depending on the unique construction of these ropes. (To determine the efficiency rating for a specific rope, contact Crosby Engineering at 918-834-4611.)
- During use, do not strike the dead end section or wedge with any other elements of the rigging (Called two blocking).
- The SUPER TERMINATOR wedge socket may also be used with standard 6 to 8 strand and rotation resistant wire rope (special wire rope constructions with 8 or more strands).
- Do not allow direct load to contact the wedge.

⚠ WARNING

- **Loads may slip or fall if the Wedge Socket is not properly installed.**
- **A falling load can seriously injure or kill.**
- **Load misapplied in direct contact with the wedge can dislodge the wedge and cause loss of load.**
- **Read and understand these instructions before installing the Wedge Socket.**
- **Do not side load the Wedge Socket.**
- **Apply recommended torque to tensioner and clip bolts, and properly install wire to securely lock tensioner bolt to tensioner.**
- **Do not assemble the S-423 Wedge in any brand or model socket basket other than the Crosby S-421T TERMINATOR.**
- **The size is marked on the socket basket and wedge, do not interchange wedge between sizes.**

Figure 1

Tail Length
A minimum of 20 rope diameters, but not less than 10"

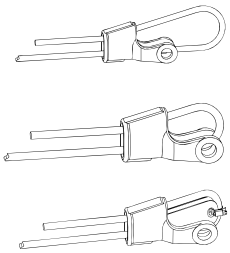


Figure 2

Figure 3

Figure 4

TABLE 1
S-423T Torque Value Table

Wedge Size (in.)	Tensioner Bolt Torque Ft./lbs*	Clip Bolts Torque Ft./lbs*
5/8	110	95
3/4	150	130
7/8	380	225
1	380	225
1-1/8	600	225
1-1/4	900	360

* The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.

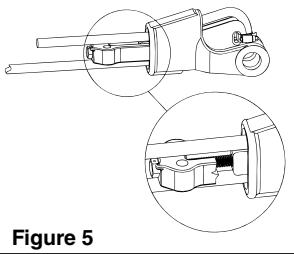


Figure 5

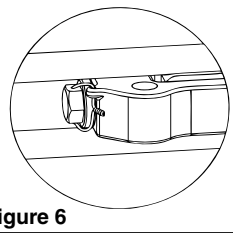
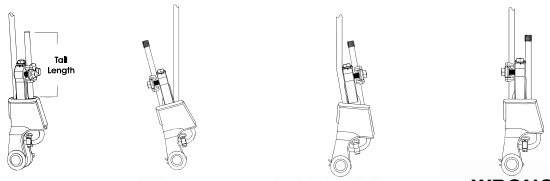


Figure 6

Figure 7



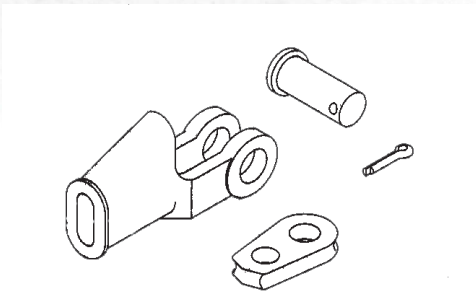
RIGHT

WRONG
Rope Backward

WRONG
Wedge Backward

WRONG
Tail Clipped to Live Line

WEDGE SOCKET
WARNINGS & APPLICATION INSTRUCTIONS



S-421 / US-422

⚠WARNING

- **Loads may slip or fall if the Wedge Socket is not properly installed.**
- **Load misapplied in direct contact with the wedge can dislodge the wedge and cause loss of load.**
- **A falling load can seriously injure or kill.**
- **Read and understand these instructions before installing the Wedge Socket.**
- **Do not side load the Wedge Socket.**
- **Do not interchange Crosby wedge socket, wedge or pin with non Crosby Wedge socket, wedge or pin.**
- **Apply first load to fully seat the Wedge and Wire Rope in the socket. This load should be of equal or greater weight than loads expected in use.**
- **Do not interchange wedge between S-421 and US-422 or between sizes.**

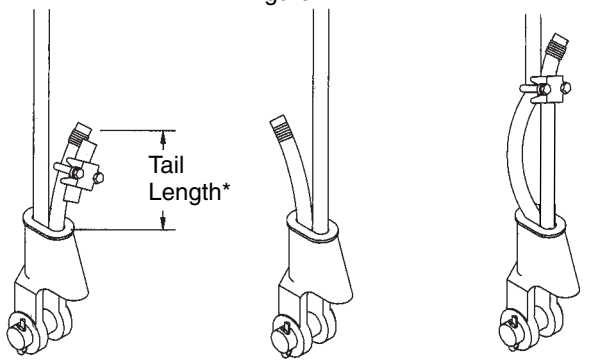
Important Safety Information - Read and Follow Inspection/Maintenance Safety

- Always inspect socket, wedge and pin before using.
- Do not use part showing cracks.
- Do not modify or substitute parts.
- Repair minor nicks or gouges to socket or pin by lightly grinding until surface are smooth. Do not reduce original dimension more than 10%. Do not repair by welding.
- Inspect permanent assemblies annually, or more often in severe operating conditions.
- Do not mix and match wedges or pins between models or sizes.
- Always select the wedge and socket for the wire rope size.

Assembly Safety

- Use only with standard 6 to 8 strand wire rope of designated size. For intermediate size rope, use next larger size socket. For example: When using 9/16" diameter wire rope use a 5/8" size Wedge Socket Assembly. Welding of the tail on standard wire rope is not recommended. Seizing of the tail is preferred following the recommended practices of the wire rope manufacturer. The tail length of the dead end should be a minimum of 6 rope diameters but not less than 6".
- Align live end of rope, with center line of pin. (See Figure 1)
- Secure dead end section of rope. (See Figure 1)
- DO NOT ATTACH DEAD END TO LIVE END. (See Figure 1)
- Use a hammer to seat Wedge and Rope as deep into socket as possible before applying first load.
- To use with Rotation Resistant wire rope (special wire rope constructions with 8 or more outer strands) ensure that the dead end is welded, brazed or seized before inserting the wire rope into wedge socket to prevent core slippage or loss of rope lay. The tail length of the dead end should be a minimum of 20 rope diameters but not less than 6". (Figure 1)

Figure 1



RIGHT **WRONG** **WRONG**

*Tail Length
Standard 6 to 8 strand wire rope
A minimum of 6 rope diameters, but not less than 6".
(i.e. - For 1" rope: Tail Length = 1" x 6 = 6")

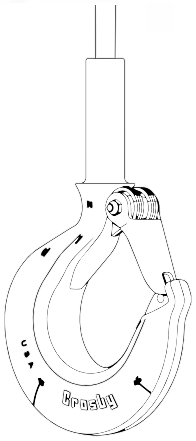
Rotation Resistant Wire Rope
A minimum of 20 rope diameters, but not less than 6"
(i.e. - For 1" rope: Tail Length = 1" x 20 = 20")

Operating Safety

- Apply first load to fully seat the Wedge and Wire Rope in the socket. This load should be of equal or greater weight than loads expected in use.
- Efficiency rating of the Wedge Socket termination is based upon the catalog breaking strength of Wire Rope. The efficiency of properly assembled Wedge Socket is 80%.
- During use, do not strike the dead end section with any other elements of the rigging (Called two-blocking).
- Do not allow a direct load to contact the wedge.

rev. 4

CROSBY® SHANK HOOKS FOR SWAGING
WARNINGS & APPLICATION INSTRUCTIONS

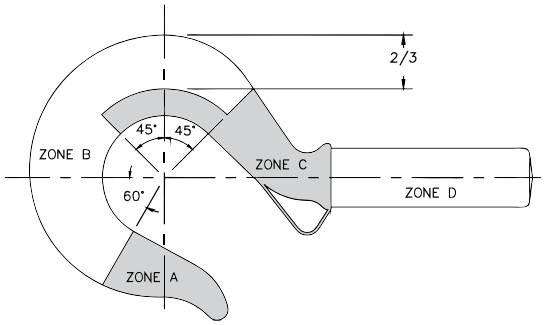


S-319SWG

- S-319SWG hooks are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type lay, construction of grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured.
- Use only Crosby shank hooks designed exclusively for swaging.
- A visual periodic inspection for cracks, nicks, wear gouges and deformation as part of a comprehensive documented inspection program should be conducted by trained personnel in compliance with the schedule in ANSI B30.10.
- For hooks used in frequent load cycles or pulsating loads, the hook should be periodically inspected by magnetic particle or dye penetrant.
- Never use a hook whose throat opening has been increased, or whose tip has been bent more than 10 degrees out of plane from the hook body, or is in any other way distorted or bent.
- Note: A latch will not work properly on a hook with a bent or worn tip.
- Never use a hook that is worn beyond the limits shown in Figure 1.
- Remove from service any hook with a crack, nick, or gouge. Hooks with a nick or gouge shall be repaired by grinding lengthwise, following the contour of the hook, provided that the reduced dimension is within the limits shown in Figure 1. Contact Crosby Engineering to evaluate any crack.

⚠ WARNING

- **Loads may disengage from hook if proper procedures are not followed.**
- **A falling load may cause serious injury or death.**
- **See OSHA Rule 1926.1431(g)(1)(i)(A) and 1926.1501(g)(4)(iv)(B) for personnel hoisting by cranes or derricks. A Crosby 319 hook with a PL Latch attached (when secured with bolt, nut and pin) may be used for lifting personnel. A Crosby S-319N hook with an S-4320 Latch attached (when secured with cotter pin or bolt, nut and pin) may be used for lifting personnel.**
- **Hook must always support the load. The load must never be supported by the latch.**
- **Never exceed the Working Load Limit (WLL) of the wire rope and hook system.**
- **Read and understand "National Swage Swaging Products and Procedures" manual before swaging the hook.**



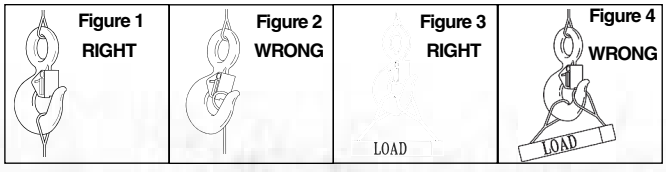
ZONE A: REPAIR NOT REQUIRED
ZONE B: 10% OF ORIGINAL DIMENSION
ZONE C: 5% OF ORIGINAL DIMENSION
ZONE D: DO NOT GRIND BEYOND THE AFTER SWAGE DIMENSION

Figure 1

Warning and Application Instructions For Crosby® Hook Latch Kit

Important Safety Information – Read & Follow

- Always inspect hook and latch before using.
- Never use a latch that is distorted or bent.
- Always make sure spring will force the latch against the tip of the hook.
- Always make sure hook supports the load. The latch must never support the load. (See Figures 1 & 2)
- When placing two (2) sling legs in hooks, make sure the angle between the legs is less the 90° and if the hook or load is tilted, nothing bears against the bottom of this latch. (See Figures 3 & 4)
- Latches are intended to retain loose sling or devices under slack conditions.
- Latches are not intended to be an anti-fouling device.



⚠ WARNING

- **Loads may disengage from hook if proper procedures are not followed.**
- **A falling load may cause serious injury or death.**
- **See OSHA Rule 1926.1431(g)(1)(i)(A) and 1926.1501(g)(4)(iv)(B) for personnel hoisting for cranes and derricks. Only a Crosby or McKissick hook with a PL Latch attached and secured with bolt, nut and cotter (or Crosby Toggle Pin) or a Crosby hook with a S-4320 Latch attached and secured with a cotter pin, or a Crosby SHUR-LOC® hook in the locked position may be used for any personnel hoisting. A hook with a Crosby SS-4055 latch attached shall NOT be used for personnel lifting.**
- **Hook must always support the load. The load must never be supported by the latch.**
- **Read and understand these instructions before using hook and latch.**

rev. 3

- Never repair, alter, rework, or reshape a hook by welding, heating, burning, or bending.
- Never side load, back load, or tip load a hook. (See Figure 2).
- The use of a latch may be mandatory by regulations or safety codes; e.g., OSHA, MSHA, ANSI/ASME B30, insurance, etc. (Note: When using latches, see instructions in *Understanding: The Crosby Group Product Warnings* for further information.)
- Always make sure the hook supports the load (See Figure 3). The latch must never support the load (See Figure 4).
- When placing two (2) sling legs in hook, make sure the angle from the vertical to the outermost leg is not greater than 45 degrees, and the included angle between the legs does not exceed 90 degrees* (See Figure 5).

  * For angles greater than 90 degrees, or more than two (2) legs, a master link or bolt type anchor shackle should be used to attach the legs of the sling to the hook.

- See ANSI/ASME B30.10 “Hooks” for additional information.
- In accordance with ANSI B30.9, all slings terminated by swaging shall be proof tested.
- S-319SWG hooks are designed to be a component of a system, and therefore rated based on the working limit of the system of which they are attached.
- The frame code on each S-319SWG hook is to facilitate proper latch selection only, and has no reference to the working load limit of the hook.

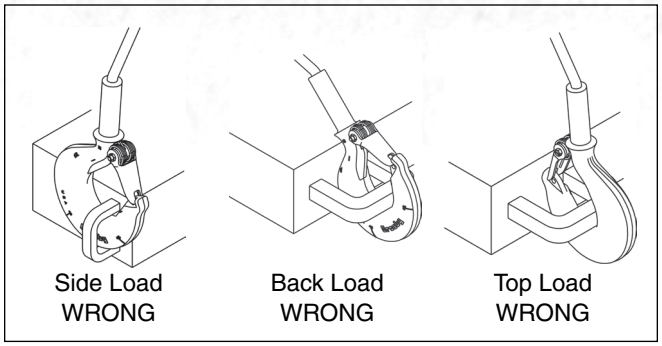


Figure 2

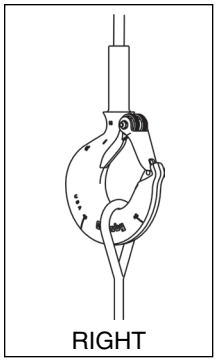


Figure 3

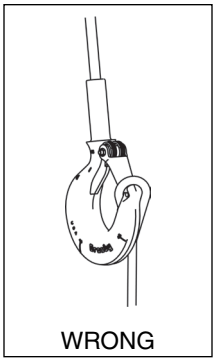


Figure 4

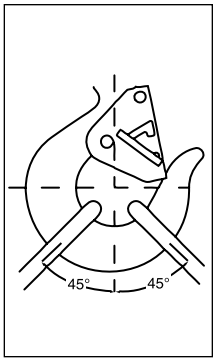


Figure 5

Wire Rope Size (in.)	Hook Frame I.D. Code†	Required Swaging Die		Maximum After Swage Dimensions
		Stock No.	Description	
3/16	DC	1191621	1/8” Swage Button Die	0.40
1/4	FC	1192845	1/4” Swage Socket Die	0.46
5/16	GC	1191621	1/4” Swage Button Die	0.58
5/16	HC	1192863	3/8” Swage Socket Die	0.71
3/8	HC	1192863	3/8” Swage Socket Die	0.71
7/16	IC	1192881	1/2” Swage Socket Die	0.91
1/2	IC	1192881	1/2” Swage Socket Die	0.91
9/16	JC	1192907	5/8” Swage Socket Die	1.16
5/8	JC	1192907	5/8” Swage Socket Die	1.16
3/4	KC	1192925	3/4” Swage Socket Die	1.42
7/8	LC	1192949	7/8” Swage Socket Die	1.55
1	NC	1192961	1” Swage Socket Die	1.80
1-1/8	OC**	1192989	1-1/8” Swage Socket Die	2.05

** S319C Style Hook † See tables on pages 119 - 121 for correct latch per Hook ID Code.

WIRELOCK®

WARNINGS & APPLICATION INSTRUCTIONS

⚠ WARNING

- **Incorrect use of WIRELOCK® can result in an unsafe termination which may lead to serious injury, death, or property damage.**
- **Do not use WIRELOCK® with stainless steel rope in salt water environment applications.**
- **Use only soft annealed iron wire for seizing.**
- **Do not use any other wire (copper, brass, stainless, etc.) for seizing.**
- **Never use an assembly until the WIRELOCK® has gelled and cured.**
- **Remove any non-metallic coating from the broomed area.**
- **Non Crosby sockets with large grooves need to have those grooves filled before use with WIRELOCK®.**
- **Read, understand, and follow these instructions and those on product containers before using WIRELOCK®.**

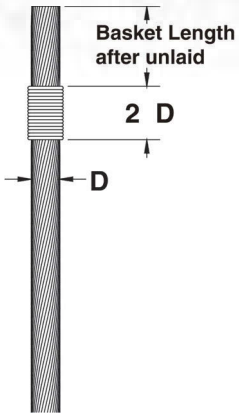
The following simplified, step-by-step instructions should be used only as a guide for experienced, trained users. For full information, consult ***Wire Rope End Terminations Manual, API (American Petroleum Institute) Recommended Practice 9B, ISO Standards, Wire Rope Manufacturers Catalogs,*** **and** ***Wire Rope Sling Users Manual.***

STEP 1 – SOCKET SELECTION

1. **WIRELOCK®** is recommended for use with Crosby 416-417 Spelter Sockets. Structural strand requires a socket with the basket length approximately 5 times the strand diameter or fifty (50) times the wire diameter, whichever is greater, to achieve 100% efficiency. Consult the Wire Rope End Terminations Manual for proper selection of Wire Rope or Structural Strand sockets.
2. For use with sockets other than Crosby 416-417 consult the socket manufacturer or Crosby Engineering.
3. Sockets used with **WIRELOCK®** shall comply with Federal or International (CEN, ISO) Standards.
4. **WIRELOCK®**, as with all socketing media, depends upon the wedging action of the cone within the socket basket to develop full efficiency. A rough finish inside the socket may increase the load at which seating will occur. Seating is required to develop the wedging action.

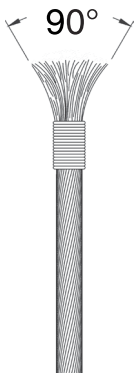
STEP 2 – MEASURE AND SEIZE

The rope ends to be socketed should be of sufficient length so that the end of the unlaid wires (from the strands) will be at the top of the socket basket. Seizing should be placed at a distance from the end equal to the length of the basket of the socket.



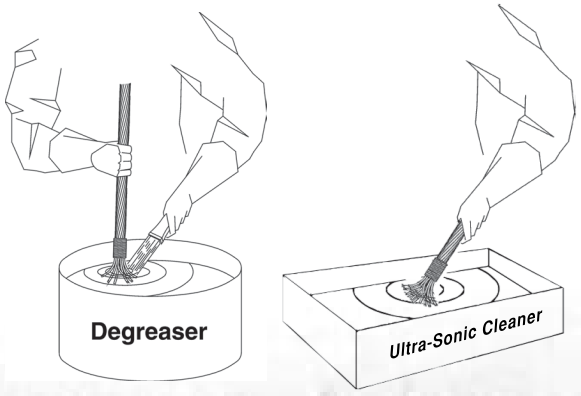
STEP 3 – BROOMING

1. Unlay the individual strands and fully broom out the wires of the wire rope and IWRC as far as the seizing. The wires should be separated but not straightened.
2. Cut out any fiber core.
3. Unlay the individual wires from each strand, including the IWRC, completely, down to the seizing.
4. Remove any plastic material from broomed area.



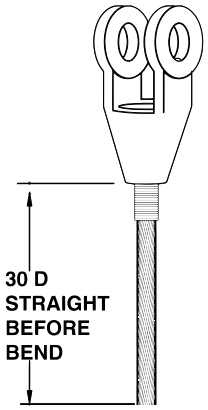
STEP 4 – CLEANING

1. The method of cleaning will depend on the lubriant and/or coating on the wire.
2. The methods and materials used for cleaning should comply with the current EPA regulations.
3. Consult your Wire Rope supplier or Wire Rope manufacturer for recommended material and methods. Follow the solvent supplier's recommendations for cleaning the broomed end.



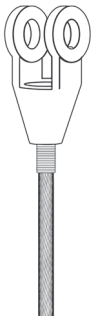
STEP 5 – POSITIONING OF SOCKET

1. Position socket over the broom until it reaches the seizing on the wire rope. The wires should be LEVEL with the top of the socket basket.
2. Clamp rope and socket vertically ensuring alignment of their axes.
3. **CAUTION: DO NOT USE OVERSIZED SOCKETS FOR WIRE ROPE.**



STEP 6 – SEAL SOCKET

Seal the base of the socket with putty or plasticine to prevent leakage of the **WIRELOCK®**.



STEP 7 – WIRELOCK® KITS

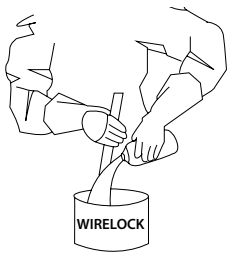
1. **WIRELOCK®** kits are pre-measured and consist of two (2) containers – one (1) with resin and one (1) with granular compound.
2. Use the complete kit – **NEVER MIX LESS THAN THE TOTAL CONTENTS OF BOTH CONTAINERS.**
3. Each kit has a shelf life clearly marked on each container and this must be observed. **NEVER USE OUT-OF-DATE KITS.**

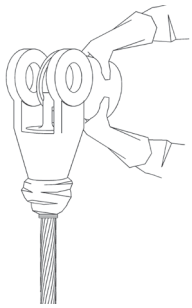
⚠ CAUTION

- **WIRELOCK® resin, in liquid state, is flammable.**
- **Chemicals used in this product can give off toxic fumes and can burn eyes and skin.**
- **Never use out-of-date material.**
- **Use only in well-ventilated work areas.**
- **Never breathe fumes directly or for extended time.**
- **Always wear safety glasses to protect eyes.**
- **Always wear gloves to protect hands.**
- **Avoid direct contact with skin anywhere.**

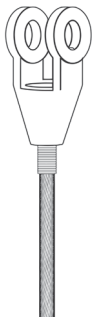
STEP 8 – MIXING AND POURING

1. Mix and pour **WIRELOCK®** within the temperature range of 48 degrees to 110 degrees F. Booster kits are available for reduced temperatures.
2. Wirelock is set up to gel in 20 minutes@65 F. For every 18 F rise in temperature the gel time willl halve. At 83 F the gel time will be 10 ninutes and at 101 F it will be 5 minutes. To give extra working time of pot life it is worth considering refrigerating the kits for two hours prior to mixing and pouring. The socket should also be as cool as possible - out of direct sunlight, as an example.
3. Pour all the resin into a container containing all the granular compound and mix thoroughly for two (2) minutes with a flat paddle.
4. The **WIRELOCK®** will turn a green blue color. If it does not turn a green blue after mixing, DO NOT USE.
5. Immediately after mixing, slowly pour the mixture down one side of the socket until the socket basket is full.
6. Check for leakage at nose of socket, add putty if required.





STEP 9 – CURING



1. **WIRELOCK®** will gel in approximately 15 minutes, in a temperature range 64 degrees F (18 degrees C) to 75 degrees F (24 degrees C).
2. The socket must remain undisturbed in the vertical position for an additional ten (10) minutes after gel is complete.
3. The socket will be ready for service 60 minutes after gelling.
4. Never heat sockets to accelerate gel or curing.

STEP 10 – RE-LUBRICATION

Re-lubricate wire rope as required.

STEP 11 – PROOF LOADING

Whenever possible, the assembly should be proof loaded. In accordance with ASME B30.9.

ALTERNATE SEIZING AND BROOMING METHOD

Reference the ***Wire Rope End Terminations User's Manual*** from Crosby for an alternative socketing method.

NATIONAL SWAGING MACHINE AND DIE WARNING, USE, MAINTENANCE AND APPLICATION INFORMATION

National Four Post Swaging Machine

⚠WARNING

- **Misuse of swaging machine can result in serious injury or death.**
- **READ, UNDERSTAND, AND FOLLOW all the information in this warning document and the instructions shown in "Wire Rope End Terminations User's Manual" before operating the swaging machine.**
- **Swaging machine operators must be trained in accordance with the information supplied by The Crosby Group LLC. THE SWAGING MACHINE OWNER IS RESPONSIBLE FOR THE TRAINING AND THE SAFE OPERATION OF THE SWAGING MACHINE.**
- **Do not swage oversize parts.**
- **Only swage parts of the proper design, material and hardness.**
- **If misused, dies and/or die holders may break. PROTECT YOURSELF AND OTHERS: Always stay away from the sides of the swaging machine during swaging operations and alert others in your work area.**
- **Do not shim between dies.**
- **Do not shim die or die holder unless swaging aluminum sleeves.**
- **Do not use die holders that are damaged or have loose side rails or side plates.**
- **Tie rod nuts must be secured to the tie rods with a secondary retention system.**
- **Keep head, hands, and body away from moving swaging machine and die parts.**
- **Consult die manufacturer for correct use of their product.**
- **Adjust swaging machine tonnage to the Working Load Limit (WLL) tonnage shown on the die block being used. If the Working Load Limit is not legible, refer to Die height & width and corresponding Working Load Limit (See Table 1). Failure to do so can result in serious injury or death.**

Operation Safety

- NEVER use dies that are cracked, worn or abraded (galled).
- NEVER use dies that have an oversized cavity.
- ALWAYS use a matched set of dies.
- When swaging steel fittings,DO NOT SHIM DIES. Dies for steel fittings must be free to float and align one to the other.
- When swaging aluminum fittings, THE STEEL DIES MUST BE SHIMMED. Shim the side of the die to ensure the proper cavity alignment for flash removal.
- NEVER shim between the dies.
- When Swaging Crosby National fittings, use only the proper capacity swaging machine for the size of fitting used (See Swaging Capacity Chart). If the swaging machine capacity exceeds the die block Working Load Limit rating, adjust the swaging machine tonnage to the Working Load Limit shown on the die block being used. See Table 1 for die block Working Load Limit.
- Always use the correct size and type of die for the size wire rope fitting used.
- Make sure that the manufacturer's die retention locking pin, bolt, or other device is engaged and has secured the die before swaging. Make sure that the dies are straight, parallel, and perpendicular to each other before and during the swaging procedure.
- Always lubricate die faces and cavities with light weight oil.
- Progressive swaging of fittings must be done in accordance with procedure shown in *"Wire Rope End Terminations User's Manual"*. Only open channel dies are to be used.
- Stop swaging when the cavity side of both dies touch. Observe the die closure from above and slightly to the side. The best position is to stand 45 degrees to either side of the front.
- Make sure part is swaged to the recommended after swage dimensions (See *"Wire Rope End Terminations User's Manual"*, Die Guide, or Die Chart).
- If a swage fitting other than a Crosby National is used, determine adequacy of the termination by a destructive pull test.
- All swage sockets must be swaged with socket head adjacent to the socket relief (largest radius) on the die.
- For special applications or conditions, contact Crosby National (501)962-3112.

TABLE 1

Die Size (Height x Width)	Working Load Limit (WLL)*
2" x 3-1/2"	200 Ton Mark Series
2-1/2" x 4"	200 Ton National
2-1/2" x 5"	500 Ton Mark Series
4" x 7"	1,200 Ton Mark Series
5" x 7"	1,500 Ton National
6" x 12"	3,000 Ton National

* Note: These Working Load Limits are for Crosby® National Die Blocks only. The Working Load Limits of die blocks from other manufacturers may vary.

Inspection Maintenance Safety

- Make sure the swager is in good operating condition and that all gauges, indicators and controls are working properly.
- Make sure all bolts and nuts are in place and tightened to recommended torque as shown in Table A, on page 67 for new style swaging machines, and Table B on page 68 for current swaging machines.
- Load block or die base plate surfaces must be to manufacturers specifications for thickness and flatness to provide complete support of the die during swaging.
- Make sure die holder side rails are not bent, loose or damaged.
- Clean dies and die holder surfaces. Keep free of metal shavings, slag, grit, sand, floor dry, etc.
- Lubricate the four guide bushings daily with light oil.
- Inspect the rods for corrosion. Use #000 emery cloth or steel wool to maintain a high polish surface.
- Do not increase the hydraulic system pressure above the factory preset pressure of: 6500 psi for 500 ton, 1000 ton and 1500 ton swaging machines – 5000 psi for 3000 ton swaging machine.
- Under ordinary operating conditions, drain and clean reservoir every two (2) years.
- Make certain that the hydraulic reservoir is full when the swager is in the full open position.
- Filters inside of the reservoir should be cleaned every time the reservoir is drained and cleaned. The Racine "tell-tale" suction filter should be cleaned every six (6) months.

Die Working Load Limit Pressure Adjustment on Lower Cylinder National 500 Ton through 1500 Ton Swaging Machines

Follow this procedure to adjust swaging tonnage (pressure) on your swaging machine.

1. Install the die holder(s) or die adapter with the dies to be used.
2. Bring the dies together (without a part in the dies) until they just touch.
3. Turn the tonnage control valve, which is located on the control panel left of the tonnage gauge, counter-clockwise about (6) six turns or until knob no longer turns.
4. Now (without a part in the dies) apply pressure to the dies by pressing the foot pedal marked "up".
   A. If the tonnage is lower than desired Working Load Limit, turn the valve clockwise while continuing to press the foot pedal marked "up" until desired Working Load Limit is reached.
   B. If tonnage is higher than desired Working Load Limit, release pressure by pressing the pedal marked "down". Then repeat steps 2 through 4.

Swaging Machine Capacity Chart for Swage Sleeves, Ferrules and Buttons

Hydraulic Swaging Machine Size	Swaging Method	Die Size (in.)	Largest Fitting Allowed to be Swaged (in.)*		
			S-505 Sleeve	S-506 Sleeve	S-409 Buttons
500 Ton	Full Die	Mark Series 2-1/2 x 5 4 x 5 5 x 7	1-1/2	1-1/4*	7/8
1000 Ton	Full Die	4 x 7 5 x 7	2-1/2	1-1/4*	1-1/4*
1500 Ton	Full Die	5 x 7 6 x 12	3-1/2	1-1/4*	1-1/4*
3000 Ton	Full Die	6 x 12	4-1/2*	1-1/4*	1-1/4*

* Largest size fitting available.

Die Working Load Limit Pressure Adjustment on 3000 Ton Swaging Machine

For reducing tonnage, use selector switch on front of control panel to select lower tonnage (approximately 1500 Tons) or 3000 Ton.

WARNING ALWAYS USE 5 X 7 OR 6 X 12 DIES AT 1500 TON SETTING.

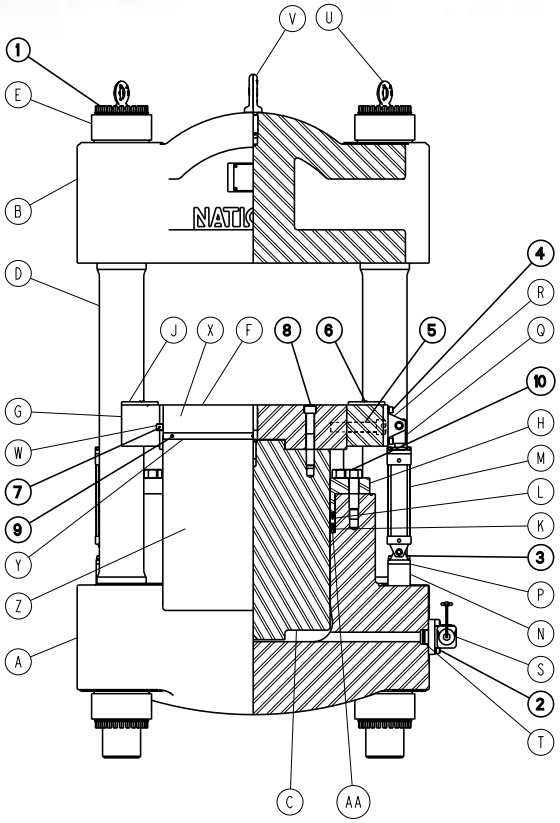
WARNING USE ONLY 6 X 12 DIES ON TONNAGE THAT EXCEEDS 1500 TONS.

Swaging Machine Capacity Chart for S-501 and S-502 Swage Socket

Hydraulic Swaging Machine Size	Swaging Method	Die Size (in.)	Largest Fitting Allowed to be Swaged (in.)*
500 Tons	Full Shank	Mark Series 2-1/2 x 5 4 x 7 5 x 7	3/4
	Progressive	4 x 7 5 x 7	1-1/4
1000 Tons	Full Shank	4 x 7 5 x 7	1
	Progressive	4 x 7	1-1/2
1500 Tons	Full Shank	5 x 7 6 x 12	1-1/4
	Progressive	5 x 7 6 x 12	2
3000 Tons	Full Shank	6 x 12	2
	Progressive	6 x 12	2

* Largest size fitting available.

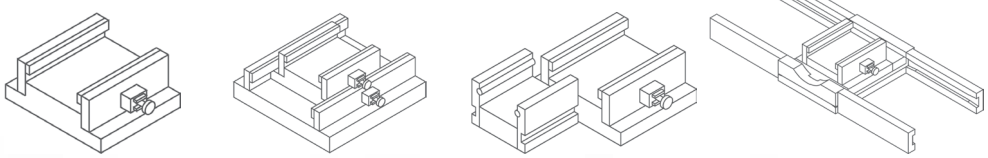
"NEW STYLE" NATIONAL HYDRAULIC SWAGING MACHINE TORQUE MAINTENANCE INFORMATION



Item	No. Req'd.	Description
A	1	Cylinder
B	1	Housing Cap
C	1	Piston
D	4	Tie Rod
E	8	Tie Rod Nut
F	1	Platen
G	2	Guide
H	1	Gland
J	4	Bushing
K	1	Mono Seal
L	1	Seal Spacer
M	2	Side Cylinder
N	2	Side Cylinder Mount
P	2	Lower Bracket
Q	2	Knuckle
R	2	Upper Bracket
S	1	Check Valve
T	1	Check Valve Seal
U	4	Tie Rod Eyebolt
V	1	Cap Eyebolt
W	4	Key
X	2	Bumper
Y	2	Bumper Strip
Z	2	Rubber Skirt
AA	1	Bottom of Seal Cavity

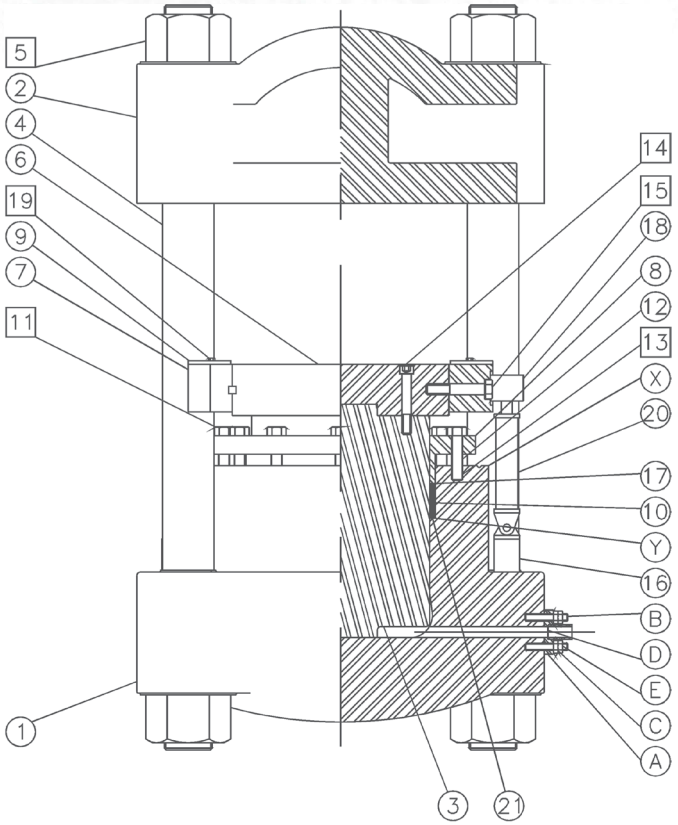
Table A

Item No.	No. Req'd.	Description	Torque in Ft-Lbs			
			500 Ton Swaging Machine	1000 Ton Swaging Machine	1500 Ton Swaging Machine	Maintenance Schedule
1	Varies	Tie Rod Nut Jack-Bolts	105	N/A	260	Weekly
2	4	Check Valve Bolts	100	100	100	Weekly
3	8	Lower Bracket Bolts	100	100	100	Weekly
4	8	Upper Bracket Bolts	100	100	100	Weekly
5	4	Guide Bolts	250	250	250	Weekly
6	8	Bushing Screws	15	15	15	Weekly
7	4	Key Screws	4	4	4	Weekly
8	4	Platen Bolts	525	600	700	Monthly
9	6	Bumper Apron Screws	4	4	4	Monthly
10	12	Gland Bolts	700	800	800	Monthly



	Bolt Size Thread Form	Torque in ft./ lbs.
Die Holder Bolt Torque	1/4 20 UNC	13
	5/16 18 UNC	15
	5/8 11 UNC	211
	7/8 9 UNC	583

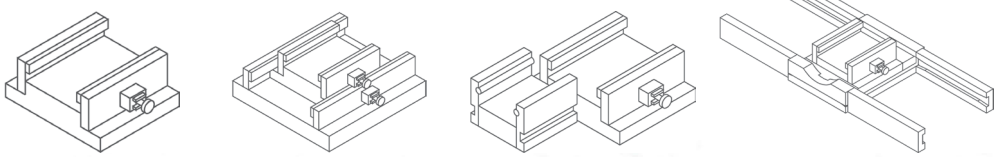
NATIONAL HYDRAULIC SWAGING MACHINE
TORQUE MAINTENANCE INFORMATION



Item	No. Req'd.	Description
1	1	Cylinder
2	1	Housing Cap
3	1	Piston
4	4	Tie Rod
5	8	Nut
6	1	Platen
7	2	Guide
8	1	Gland
9	4	Bushing
10	1	Packing Set
11	12	Packing Gland Nut
12	4	Packing Gland Spacer
13	12	Stud
14	4	Cap Screw
15	4	Cap Screw
16	2	Lower Bracket
17	1	Upper Bronze Ring
18	2	Upper Bracket
19	8	Machine Screw
20	2	Side Cylinder
21	1	Lower Bronze Ring
A	1	Block
B	4	Stud
C	4	Nut
D	1	Copper "O" Ring
E	4	Lock Nut
X	1	Top of Cylinder
Y	1	Bottom of Packing Cavity

Table B

Item No.	Description	Torque in Ft. Lbs. 500 Ton Swaging Machine	800 Ton Swaging Machine	1000 Ton Swaging Machine	1500 Ton Swaging Machine	Maintenance Schedule
5	Tie Rod Nuts	2000	2250	2500	2500	Weekly
14	Piston Bolts	525	600	600	700	Monthly
11	Packing Gland Nuts (over spacers only) "all others hand tighten"	200	200	200	200	Weekly
15	Platen Guide Bolts	250	250	250	250	Weekly
13	Packing Gland Bolts	700	800	800	800	6 Months
	Side Cylinder Bolts	100	N/A	100	150	Weekly
19	Guide Bushing Bolts	15	15	15	15	Weekly
	80 M Piston Pump Pistons	96 to 125 all Swaging Machines				



	Bolt Size Thread Form	Torque in ft./ lbs.
Die Holder Bolt Torque	1/4 20 UNC	13
	5/16 18 UNC	15
	5/8 11 UNC	211
	7/8 9 UNC	583

DIE INFORMATION

CAUTION ⚠

- **Improper die selection could result in significant loss of efficiency in the termination.**

National dies and die holders are made solely for swaging properly designed fittings on wire rope, and any other uses are prohibited.

The swaging operation results in a high degree of cold metal flow. The movement that occurs between the fitting and the dies will cause wear of the dies. Therefore, to prolong the life of the dies, it is important to always lubricate die faces and cavities between each pass with a light weight oil or high pressure grease.

When scores appear in the die cavities, the dies should be removed from service.

NEVER EXCEED THE WORKING LOAD LIMIT OF DIES OR DIE HOLDERS.

All National Standard dies 1/4" through 1" include an open channel die cavity and a tapered die cavity in the same die block.

Dies for S-505 Standard Steel Sleeves (Flemish Eyes)

Die sizes for 1/4" through 1"

Swaging 1/4" through 1" Standard Steel S-505 sleeves on Flemish Eye terminations requires the use of the taper cavity only. Refer to page 24 of the *Wire Rope End Termination User's Manual* for proper die selection.

Die sizes for 1-1/8" and above

Swaging 1-1/8" and larger Standard Steel S-505 sleeves on Flemish Eye terminations requires using 2 sets of open channel dies (1st stage and 2nd stage) for each size. Beginning with the 1st stage die and finishing with the 2nd stage die will achieve proper after swage dimensions. Dies for S-505 Sleeves 1-1/8" and larger are single cavity with open channel. Refer to page 24 of the *Wire Rope End Termination User's Manual* for proper die selection.

Using S-505 Sleeves with Metric Ropes

Although Crosby National S-505 Standard Steel sleeves are designed to be used with most metric ropes, there are selected "intermediate" sizes of metric ropes that when swaged in standard National dies utilizing Crosby National S-505 sleeves do not achieve required after swage dimensions and efficiencies. To ensure all 505 sleeves achieve the required efficiency when used with metric ropes, Crosby provides special National swaging dies to be used in conjunction with selected size metric ropes. These new dies will produce the required efficiencies and after swage dimensions.

The table found on page 46 of this catalog or page 25 of the *Wire Rope End Termination User's Manual* identifies the new dies that are required to properly swage the selected intermediate size wire ropes not covered in the standard product offering found on page 45 of this catalog or page 24 of the manual.

Dies for 6mm through 26mm (except 12mm, 20mm and 24mm)

Swaging on 6mm through 26mm metric ropes for Flemish Eye slings requires the selection of the proper S-505 Standard Steel sleeve and the use of the tapered cavity only. Refer to page 24 of the *Wire Rope End Termination User's Manual* for proper sleeve and die selection.

Dies for 12mm, 20mm and 24mm

Swaging on 12mm, 20mm and 24mm metric ropes for Flemish Eye slings requires the selection of the proper S-505 Standard Steel sleeve and the use of both the open cavity and tapered cavity in special dies. Refer to page 25 of the *Wire Rope End Termination User's Manual* for proper sleeve and die selection.

Dies for 28mm and larger

Swaging on 28mm and larger metric ropes for Flemish Eye slings requires the selection of the proper S-505 Standard Steel sleeve and the use of 2 sets of open channel dies (1st stage and 2nd stage) for each size. Beginning with the 1st stage die and finishing with the 2nd stage die will achieve proper after swage dimensions. Dies for S-505 sleeves 28mm and larger are single cavity with open channel. Refer to page 24 of the *Wire Rope End Termination User's Manual* for proper sleeve and die selection.

Important: If the specific size metric rope required is not listed on page 24 of the *Wire Rope End Termination User's Manual* refer to Intermediate Metric Die Chart on page 25 of the manual for proper sleeve and die selection.

Dies for QUIC-PASS® Swaging System – 1/4" through 1-1/2"

The *QUIC-PASS*® swaging system allows "Flemish style" wire rope terminations to be swaged in only two passes. This is accomplished while maintaining currently published efficiency ratings and utilizing National Swage S-505 Standard "COLD TUFF"® Steel Sleeves.

The special design of the *QUIC-PASS*® dies allows the swaging process to be completed in just two passes, resulting in a 50-75% reduction in the number of passes required with conventional swaging systems. Unlike standard round dies, the *QUIC-PASS*® dies close completely with each pass, resulting in an increase in overall swaging process efficiencies (the job can be performed quicker), a reduction in the complexity of swaging (the concern for excess flashing between dies has been eliminated) and a reduction in training time needed for operators (more user friendly).

The finished sleeve has a "Hex" appearance that provides a *QUIC-CHECK*® look to determine if the termination has been swaged and provides a flat surface that allows for ease of I.D. stamping on the finished sleeve. Refer to page 24 of the *Wire Rope End Termination User's Manual* for proper die selection.

Dies for S-501 & S-502 Swage Sockets

Swaging all S-501 & S-502 Swage Sockets requires the use of single cavity die. This is a special die designed with a relief for swage sockets and extra length to swage the full length of the shank. Refer to pages 36 and 37 of the *Wire Rope End Termination User's Manual* for proper die selection.

Swage Sockets for Spiral Strand Rope
Our tests indicate that if the spiral strand is 1 x 19 or greater, and the ultimate strength does not exceed Table 1 of ASTM A586, you can use dies for size swage sockets up to the 1-1/4". For sizes greater than 1-1/4" the following will apply:

1. Closed S-502 Sockets: One (1) socket size larger with shank modified for actual strand diameter 1-3/8" through 2".
2. Open S-501 Sockets: One (1) socket size larger with shank modified for actual strand diameter 1-3/8" through 2".
3. If the strand is of greater strength than Table 1 of ASTM A586 or has less metallic area, we must recalculate the design and test for adequacy.

Dies for S-506 Turnback Sleeves

Turnback eye terminations using 5/16" through 1" S-506 Sleeves utilize the S-505 Standard Steel Sleeve die (1st Stage open channel die only). The 1-1/4" S-506 Sleeve utilizes the 1-3/8" socket (S-501 and S-502) die. Refer to page 46 of the *Wire Rope End Termination User's Manual* for proper die selection.

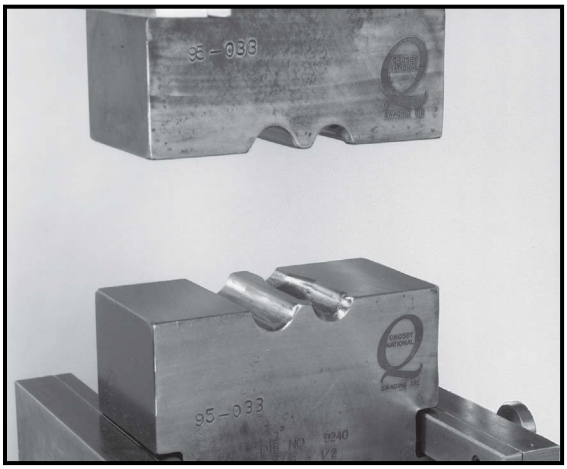
Dies for S-409 Buttons

Buttons are swaged in open channel dies. Refer to page 42 of the *Wire Rope End Termination User's Manual* or page 47 of this catalog for proper die selection.

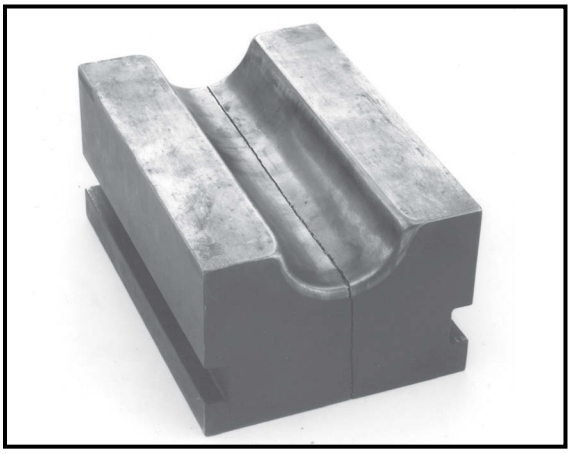
Specific recommended swaging practices can be found in each product section of this catalog. The proper die selection and the recommended maximum after swage dimensions are referenced in the section of this catalog that contains the product you are swaging. This information can also be found in the National Swage Die Guide, or by referring to the National Swage Die Chart.

Dies and die adapters to fit other type swaging machines are available upon request (Refer to page 19 of the *Wire Rope End Termination User's Manual*).

Single Cavity Die



Two Cavity Die



Never use dies that are cracked, worn or abraided (galled).

After Swage Inspection Procedures

⚠ WARNING

- **Read, understand, and follow these instructions before using the National QUIC-PASS® Swaging System.**
- **Improper after swage dimensions can result in sling failure resulting in property damage, serious injury or death.**
- **Always gauge or measure the after swage dimensions to ensure proper sling performance.**
- **Using National Swaging System with ropes and termination styles other than shown in these procedures may reduce the performance of the termination and lead to premature failure.**
- **When using rope constructions other than shown in this procedure, the termination must be destructive tested and documented to prove adequacy of the assembly to be manufactured.**
- **The QUIC-PASS® Swaging System is designed only for "Flemish Eye" terminations using National S-505 Standard Steel Sleeves.**
- **The QUIC-PASS® Swaging System is not designed for Cable-Laid wire rope slings.**

Checking Swaging Dimensions

One of the important considerations in producing a quality termination is the overall diameter of the fitting after the swaging process is complete. Since all dies wear, and the swaged fitting used in terminations has spring back, the results of swaging should be checked periodically to determine the wear condition of the die as well as to ensure the fitting is swaged to proper dimensions.

Key Facts About After Swage Dimensions:

1. In addition to worn dies, not achieving the proper after swage dimension can also be due to the die not being fully closed during swaging. Dies showing excessive wear should be replaced.
2. The effective swaging that dies can accomplish stops when the die lands touch each other. Any continued swaging adds needless wear and strain on the dies and swaging machine.
3. By placing a light oil on the die faces and in the cavity, the dies will be lubricated as well as protected.
4. The oozing of the oil from the faces of the dies as they touch will indicate when the dies have closed. At this point, stop the swaging cycle.
5. Additional swaging adds needless wear and strain to the dies and swaging machine.
6. Never use dies that are cracked, worn or abraded (galled).
7. The Crosby Group does not recommend the checking of die dimensions as an acceptable method of determining the quality of a swage sleeve, button, ferrule, or socket.
8. It is our recommendation that the checking of the after swage dimension of the swaged fitting is the most accurate indicator of a properly swaged termination. Measuring the die cavity only is not an acceptable process control check.
9. If the die cavity wears, the dies are not closed completely during swaging. If an inadequate number of presses are used, it could be quickly identified by checking the after swage dimension of the part.
10. Swaging Machine not producing sufficient tonnage will affect after swage dimensions.

No-Go Gauge Information

To assist in checking the after swage dimensions of the fitting, the Crosby Group provides the National No-Go Gauges. When used correctly the National No-Go Gauges can determine if the fittings were swaged to the proper diameter. We would recommend that all Crosby products or product swaged in Crosby dies be checked with the proper gauge to determine the acceptability of the swaging process.

- Gauges are made of hardened alloy steel and machined to strict tolerances.
- Gauge can be used to verify that all fittings have been swaged properly.
- After swage dimensions not within the maximum limits may result from worn dies or improper swaging techniques.
- Other type gauges are available upon request.
- National No-Go Gauges are available for a variety of products (See Table 1).
- **No-Go Gauges and QUIC-PASS® No-Go Gauges are not interchangeable.**

Table 1 - Standard Round No-Go Gauges

Fitting	Size	Part No.
505 Sleeve	1/4 - 7/8	1095512
505 Sleeve	1 - 1-1/2	1095521
505 Sleeve	1-3/4	1095530
505 Sleeve	2	1095549
505 Sleeve	2-1/4	1095558
505 Sleeve	2-1/2	1095587
505 Sleeve	2-3/4	1095576
505 Sleeve	3	1095565
505 Sleeve	3-1/2	1095594
505 Sleeve	3-3/4	1095601
505 Sleeve	4	1095610
501/502 Socket	1/4 - 1	1095647
501/502 Socket	1-1/8 - 1-3/4	1095656
501/502 Socket	2	1095665

Using No-Go Gauges

When swaged properly, the gauge will go up and down (see Figure 1) and around the full length of the fitting (see Figure 2).

For the proper after swage dimensions, see the section in this publication for the specific product you are swaging.

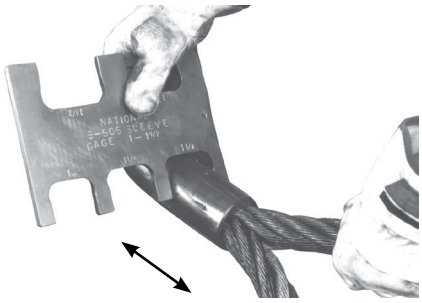


Figure 1

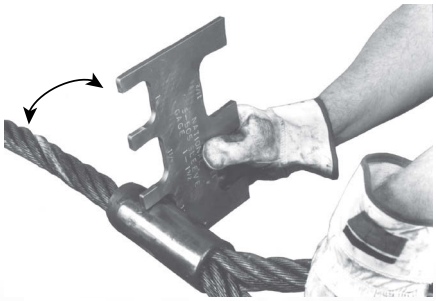


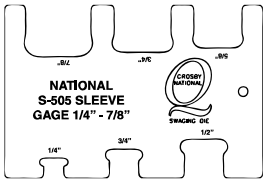
Figure 2

QUIC-PASS® No-Go Gauges

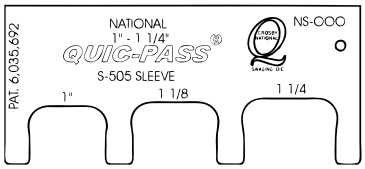
As a further aid, QUIC-PASS® No-Go gauges are available for checking the sleeve's dimensions after swaging is complete.

- Gauges are made of hardened alloy steel and machined to strict tolerances.
- Gauge can be used to verify that all sleeves have been swaged properly.
- "After Swage" dimensions not within the maximum limits may result from worn dies or improper swaging techniques.
- **No-Go Gauges and QUIC-PASS® No-Go Gauges are not interchangeable.**

QUIC-PASS® No-Go Gauges	
Sleeve and Size	**Stock No.**
No-Go Gauge for S-505 1/4" - 7/8"	1923705
No-Go Gauge for S-505 1" - 1-1/4"	1923712
No-Go Gauge for S-505 1-3/8" - 1-1/2"	1923714



Stock No. 1923705



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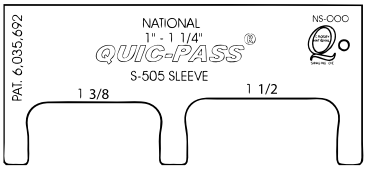
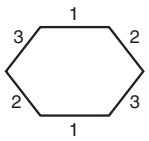


Stock No. 1923714

Use a National QUIC-PASS® No-Go Gauge to check the after swage dimensions to ensure that it has been swaged to the proper dimension. When swaged properly, the gauge will slide up and down the full length of the sleeve on all three sets of opposing flats.



QUIC-PASS® Maximum After Swage Dimensions

Size (in.)	Maximum "After Swage" Dimension (in.)
1/4	0.565
5/16 - 3/8	0.769
7/16 - 1/2	1.016
9/16 - 5/8	1.247
3/4	1.475
7/8	1.738
1	1.955
1-1/8	2.170
1-1/4	2.405
1-3/8	2.610
1-1/2	2.835

Important Safety Information

- **Crosby does not recommend** a "Texas Tuck" style termination with Crosby National S-505 "COLD TUFF®" Standard Steel Sleeves.
- Only Crosby National S-505 "COLD TUFF®" Standard Steel Sleeves are recommended when using the QUIC-PASS® Swaging System.
- National S-505 Standard Steel Sleeves, when used with the QUIC-PASS® Swaging System, are only recommended for use with one (1) part 6 X 19 or 6 X 37, IPS or XIP (EIP), XXIP (EEIP), RRL, IWRC rope.
- The condition of the swaging machine can cause sleeve "After Swage" size not to be within the proper dimensions. Example: worn bushings, loose tie rods, loose die holders, misaligned platens, worn pins, worn linkage, etc.
- Swaging dies being worn, damaged, misused, or undersized can cause sleeve "After Swage" size not to be within the proper dimension.
- Swaging die holders excessively worn, damaged, misused or loose can cause sleeve "After Swage" size not to be within the proper dimension. Only use QUIC-PASS® dies and die holders inspected and properly secured in National swaging machines.
- Always refer to Warning and Application information found in this catalog and *Wire Rope End Terminations User's Manual.*