Carl Stahl®
SAVA INDUSTRIES, INC.

- Precision Cable Assemblies
- Miniature & Small Cables
- Small MIL-SPEC Wire Rope
- Push-Pull Controls
- Plastic & Steel Idler Pulleys
- Wire Rope Terminals
- Fittings & Hardware
- Ferrous & Nonferrous Alloys

Design Guide for Cable Solutions™

www.savacable.com

CABLE SOLUTIONS®

IS.EN.ISO 9001:2008 Certified

Carl Stahl®
SAVA INDUSTRIES, INC.

For Over 35 Years…

Carl Stahl Sava Industries has been developing and manufacturing high quality precision miniature and small cables, fittings, assemblies, and pulleys for an increasing diverse range of customers and applications.

Founded as a garage-based business in the 1970s, Sava has steadily grown into a company with sales in excess of $21 million, more than 120 employees and four operational subsidiaries in the United States.

In 1988, Sava Industries was acquired by Carl Stahl GmbH of Süssen, Germany. As a member of the Carl Stahl group of companies, Sava is now part of an international network of over 50 sister companies with sales, manufacturing operations, and customers in more than 70 countries.

SAVA'S CORE BUSINESS…is high quality, value-added precision cable assemblies–particularly in applications requiring small, delicate miniature cables. We manufacture standard cable to nominal diameters as small as .006″, with extremely tight tolerances. Sava also applies the same high level of quality to cables and cable assemblies in all sizes, constructions, and materials up to a nominal diameter of 3/8″.

While many cables and assemblies are produced using common stainless steel alloys or galvanized steel, Sava specializes in working with exotic materials such as Vitallium®, Tungsten, and Inconel®. Cable is also available in bulk and can be coated with a variety of materials including nylon, vinyl, and Teflon®.

Sava also stocks pulleys in nylon, Delrin® or steel, with or without bearings; a large inventory of MIL Spec and other fittings to complement our bulk cable such as eyelets, threaded plugs, balls, loop sleeves, and turnbuckles; and a variety of tools, cutters, and kits for prototype assemblies.

CABLE SOLUTIONS®

IS.EN.ISO 9001:2008 Certified

Comprehensive In-House Capabilities…include complete engineering and manufacturing services backed by highly experienced sales professionals with extensive industry experience.

Our engineering team is available to assist with recommendations that enable our customers to achieve their performance goals in the most cost-effective manner possible.

Experienced Personnel...our key manufacturing staff have extensive, industry-specific experience and expertise in the areas of Stranding, Assembly, Extrusion, and Molding. All work product is carefully monitored by a skilled Quality Assurance group highly trained in metrology.

Our knowledgeable technical sales team provides advice and guidance to help our customers meet their requirements most effectively. Our sales staff is complemented by numerous independent manufacturers' representatives throughout the United States.

Sava's Customers…range from sole proprietors to Fortune 100 companies engaged in a wide range of businesses inclusive of medical/surgical devices, electronics, computers, telecommunications, aerospace, automotive, marine, and construction equipment, consumer goods, industrial machinery, lighting, vending and gaming machines, and many others.

Regardless of the size of your company or the extent of your needs, Sava has a cable solution to meet your exact application requirements.

ISO 9001 Certification…is your assurance Sava is committed to providing products of the highest quality that meet or exceed our customers' requirements and expectations.

Our extensive Quality Assurance Team employs rigorous standards in examining product samples during the manufacturing process, and in final inspection, to guarantee the finished product you receive conforms to all specifications.

Sava continues to invest in the latest, most sophisticated testing equipment and is an industry leader in meeting the more stringent IS.EN.ISO 9001:2008 standard.

Our Headquarters and Operational Subsidiaries…
are situated in various locations throughout the United States to serve and support our current and growing customer base.

Carl Stahl Sava Industries is headquartered in Riverdale, NJ and occupies 75,000 square feet in two company-owned buildings.

Carl Stahl Décor Cable Innovations, based in Chicago, IL, distributes stainless steel rope products and connectors for a wide range of architectural, decorative, and structural applications.

Carl Stahl American Lifting, based in Waukesha, WI, distributes a variety of lifting and material handling equipment inclusive of complex overhead crane systems, chain hoists, wire rope, and fabric slings.

Jordan Mfg and Metaport Mfg, based in Lafayette, NJ, manufacture a diverse variety of stampings and machined components.

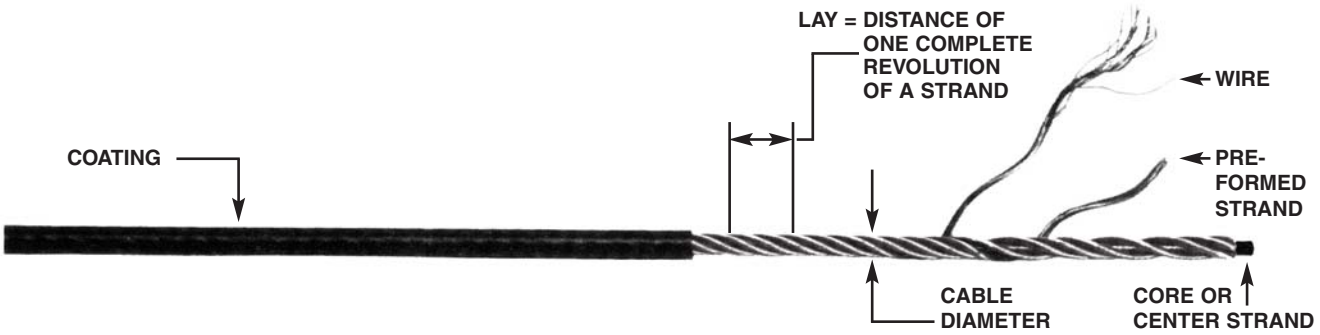
CABLE SOLUTIONS®
ISO 9001 CERTIFIED

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS®
ISO 9001 CERTIFIED

TABLE OF CONTENTS

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

APPLICATION INFORMATION



CABLE CONSTRUCTION

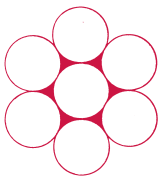
Strand, wire rope or cable, is a uniform helical arrangement of wires concentrically stranded together for a variety of operating conditions. These constructions have different properties which are designed for specific applications.

The STRAND constructions have larger wires, increased abrasion resistance, and less flexibility. In small sizes, they are useful as fishing lines and leaders, light guying and lanyards; in larger sizes, as guy strand, standard rigging on boats and other applications where flexibility of the cable is not essential.

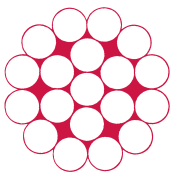
The CABLE constructions have more wires and are consequently more flexible with less abrasion resistance. This type of construction has applications in automotive, appliances, boating, instrumentation, aviation, agriculture, hobbies, medicine, recreation, etc.

BASIC CONSTRUCTIONS

STRAND Two or more wires laid together – the construction is normally referred to as 1 x the number of wires involved; i.e., 1x7, 1x19, etc.



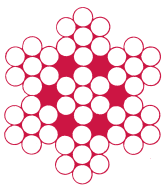
1x7 (7 WIRES)
This is the basic strand construction which is used in different combinations to construct another strand or other cables. It is somewhat stiff in larger diameters.



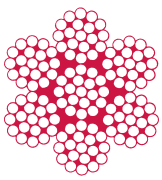
1x19 (19 WIRES)
Stronger than 1x7 and more symmetrical in configuration, affording still better properties than 1x7.

CABLE Three or more strands laid together – the construction is normally referred to as number of strands x number of wires in each strand (for example–7x7–see below).

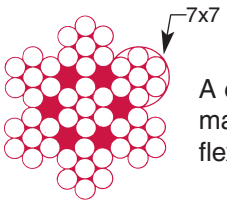
3x7 (21 WIRES)
A combination of three 1x7 strands. Very flexible in small diameters.



7x7 (49 WIRES)
A combination of seven 1x7 strands, affording abrasion resistance and flexibility through a wide range of diameters.



7x19 (133 WIRES)
A combination of seven 1x19 strands, producing a fine combination of strength and flexibility in a wide range of sizes.



7x49 (343 WIRES)
A combination of seven 7x7 strands, making a cable with extraordinary flexibility for use over small pulleys.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
ISO 9001 CERTIFIED

GUIDELINES FOR CABLE SELECTION

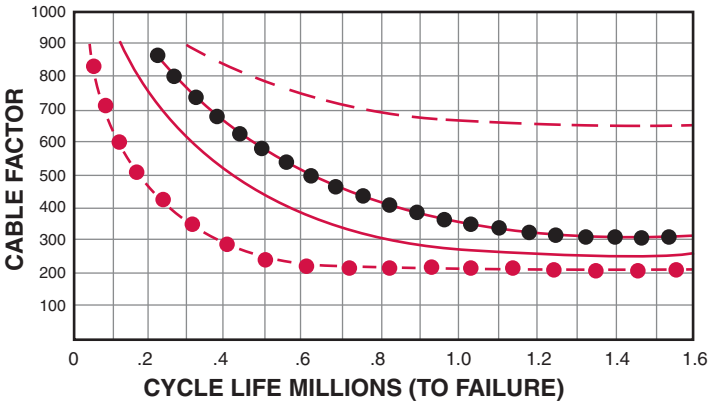
TO OPTIMIZE LIFE

1. Select a cable that has a minimum breaking strength of 10 times the working load.
2. Should a pulley be utilized, see chart on page 35, for proper pulley diameter.

AFTER you have determined the maximum tension on the cable and selected the cable diameter and pulley for your system, apply the numbers to the formula on the right to determine the cable load factor. Read anticipated cycle life from chart.

NOTE: A system frequently cannot be designed for optimum conditions. The formula and chart show that a trade-off can be made between cable size, pulley size and life.

CABLE FATIGUE LIFE CHART



NOTE: The numbers on this chart were determined under laboratory conditions and are intended to serve as a guide. Since there is considerable variation in application, we recommend actual life tests for your intended use.

DATA ON STRETCH OF CABLE AND STRAND

Two kinds of stretch occur in cable – constructional stretch and elastic stretch. They are due to two different causes.

Constructional Stretch
When strand and cable are made, the load at the closing head is light. Therefore, there are small clearances between the wires and strands, and between the strand and the core. The application of initial load causes wires and strands to seat properly, and a slight overall elongation of the strand or cable accompanies this section.

The amount of constructional stretch is not constant for all cables – it depends on such variables as type of construction, length of lay, and other factors, including the load applied.

Elastic Stretch
Elastic stretch is the actual elongation of the wires of a strand or a cable. This is caused by the application of a load, up to the yield point of the metal, and the stretch is approximately proportional to the load applied.

When the load is released, strand or cable subjected to elastic stretch returns to its approximate original length, providing the stretch has not reached the yield point of the metal.

Removal of Stretch
Where the elimination of as much stretch as possible is important, the cables or assemblies can be proof loaded to remove most of the constructional stretch. For assemblies, this process also verifies the holding power of the terminals. Proof loading is usually done by applying a 60% load to the cable or assemblies. This load is based on the minimum breaking strength of the cable or fittings, whichever is lower. Handling the cable as little as possible after prestretching helps eliminate putting constructional stretch back in.

FORMULA (see example)

$$\text{Cable Factor} = \frac{\text{Tension on Cable}}{\text{Bare Cable dia. x Pulley Root dia.}}$$

7x7 Construction Nylon Coated	Curve for part nos. 2014SN, 2018SN, 2027SN, 2031SN, 2036SN, 2048SN, 3048GN, 2064SN, 2094SN, 3064GN, 3094GN
3X7 Construction Nylon Coated	Curve for part nos. 2009SN, 2012SN, 2030SN
7x19 or 7x49 Construction Nylon Coated	Curve for part nos. 2019SN, 2024SN, 2032SN, 2037SN, 2038SN, 2046SN, 2047SN, 2050SN, 2054SN, 2065SN, 2095SN, 3065GN, 3095GN
7x7 Construction Uncoated	Curve for part nos. 2018, 2027, 2031, 2036, 2046, 2048, 2064, 2094, 3048, 3064, 3094

Example:
Determine the cable size, pulley diameter, and cycle life for a counterweight system working with a load of 15 lbs. Anticipated life of cable should be 2,000,000 cycles.

Step 1 Select a cable from page 8 which has a breaking strength of 10 times the load. Cables 2036, 2037, and 2038, .036″ diameter, qualify.

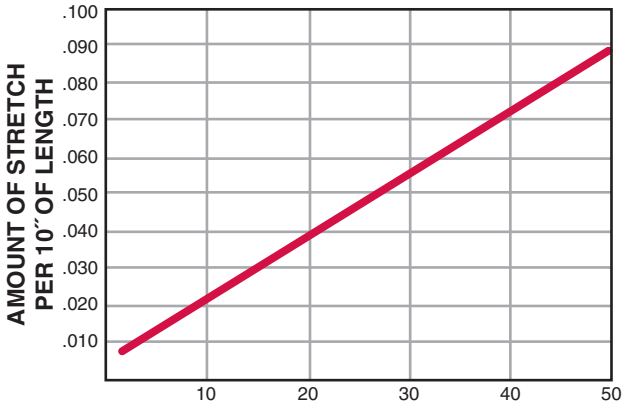
Step 2 Multiply cable diameter .036″ by 40 for pulley groove diameter. .036″ x 40 = 1.44″

Step 3 Cable Factor = $\frac{15}{.036 \times 1.44} = 289$

Applying this factor to the Cable Fatigue Life Chart, it is seen that a 7x7 bare cable will have an expected cycle life of only 400,000 cycles, which is not sufficient. When a nylon-coated cable (2036-SN) is selected, the Cable Factor line will not intersect the curve on the cable for a 7x7 or 7x19 coated.

The 7x7 coated cable (2036SN) is less expensive and would be the logical choice.

ELASTIC STRETCH CHARACTERISTICS OF SAVA CABLE



NOTE: For construction of 7x7, 7x19, 8x19, and 7x49. The chart represents close approximates.

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

SAVA'S STANDARD COATING TOLERANCES

NOMINAL COATING DIAMETER		COATING O.D. TOLERANCE	
inches	mm	inches	mm
.010 - .035	.25 - .90	+.004 -.000	+.10 -.00
.036 - .065	.91 - 1.65	+.008 -.000	+.20 -.00
.066 - .130	1.66 - 3.30	+.012 -.000	+.30 -.00
.131 - .260	3.31 - 6.60	+.018 -.000	+.45 -.00
.261 - .380	6.61 - 9.65	+.024 -.000	+.60 -.00
.381 - .500	9.66 - 12.70	+.032 -.000	+.80 -.00

SAVA'S STANDARD CABLE O.D. TOLERANCES

NOMINAL CABLE DIAMETER		CABLE O.D. TOLERANCE	
inches	mm	inches	mm
.006 - .020	.15 - .50	+.002 -.000	+.05 -.00
.021 - .035	.51 - .90	+.004 -.000	+.10 -.00
.036 - .065	.91 - 1.65	+.008 -.000	+.20 -.00
.066 - .095	1.66 - 2.40	+.010 -.000	+.25 -.00
.096 - .130	2.41 - 3.30	+.014 -.000	+.35 -.00
.131 - .260	3.31 - 6.60	+.018 -.000	+.45 -.00
.261 - .380	6.61 - 9.65	+.026 -.000	+.65 -.00

NOTES:

The following notes are common to both the stainless steel cables shown on pages 8 and 9 and the galvanized steel cables shown on page 11.

1. Coating for cables up to 1/16″ diameter is our No. 194 Nylon which is designed for superior fatigue life in thin wall applications in both high and low temperature ranges and has excellent abrasion resistance. Our No. 195 Nylon is used on cables 3/32″ and larger. This is also a superior grade resin, slightly less expensive yet has good flexibility, excellent abrasion resistance, and works well with larger diameter cables with greater bearing surfaces.
2. The vinyl coating part numbers refer to clear vinyl only. Color choices are available for a nominal additional charge. Vinyl is the most commonly used coating in cables over 3/32″ in diameter. It is more flexible than most coatings, has excellent resistance to sunlight, and is less expensive.
3. The most common coating diameters are shown. Contact SAVA if you have a special application.

PROLONGING CABLE LIFE

LUBRICATION

Nylon coated miniature stainless steel cables, P/N 2018SN through 2065SN (see pg. 8) are impregnated with our specially formulated lubricant which results in substantially improved fatigue life. For other lubricated cables, please consult with our sales office.

PLASTIC COATINGS

The coating of cables with nylon, vinyl, Teflon®, or other plastics offers a number of advantages. The plastic protects the wire from abrasion and chemical attack. It seals in the lubrication and seals out moisture, dirt, and grit. It cushions the cable from shock and pressure, protects pulleys from abrasion, and is easy to clean. Generally, in fatigue applications, using nylon, working life is increased 300% to 1000%.

STRENGTH AND SAFETY FACTORS

To arrive at the working load of a cable, the normal load as well as additional stresses caused by acceleration, shock, and bending must be considered. A safety factor should be applied, taking into consideration both the cost and the dangers which could result from failure. Where cable is stationary, a factor of 3½ is usually safe. In a hoisting application, the factor could be as high as 8 or 12 under special conditions. However, additional testing is highly recommended, with final decision and acceptance by the customer.

SWAGED CABLES

For applications requiring increased wear resistance and lower friction in a given size cable, particularly push-pull types, swaging provides a good answer. The average diameter decrease by swaging without appreciable loss in performance is approximately 10%.

In swaging, the outer wires are flattened to provide greater wear area and smoother surface. The breaking-strength-to-cable-diameter ratio remains constant, without appreciable loss of flexibility.

CUSTOM STRANDING

Our stranding equipment is available for manufacture of cables using your material or a material of your specifications. We have successfully manufactured cables from very unusual materials, some of which were also plastic coated.

CUSTOM PLASTIC COATINGS

SAVA's modern extrusion equipment and expertise lend themselves very well to extruding other plastic materials such as polypropylene, polyethylene, polyurethane, and many types of nylon. Also, we will be pleased to quote on coating more than one cable in a common jacket in either a flat or round shape. Colored plastic is possible in most plastics. Many of the cables are available in black nylon or vinyl coating.

ELECTRIC CUTTING

Electric cutting of uncoated cable is a process by which the ends of the cable are fused (sealed) to prevent fraying and to allow easy application of a fitting. It is particularly desirable to specify electric cutting where only one end of an assembly has a fitting. SAVA is equipped with automatic electric cutting machinery which is also available to cut your bulk cable to desired lengths. Unless you are similarly equipped, you will find this service particularly advantageous.

RELATIVE COSTS

CABLE CONSTRUCTION

Fewer number of wires in a cable will result in lower cost and less flexibility. Hence, a 1x19 (19 wires) will be less expensive than a 7x7 (49 wires) and a 7x7 will be less expensive and less flexible than a 7x19 (133 wires) in the same diameter.

MATERIAL

Stainless steel cable using standard 302/304 stainless, will cost approximately 1.5 to 3 times more than galvanized steel cable, depending on the size and construction. Galvanized steel cable with a plastic coating will generally cost less than stainless steel cable, particularly in sizes over 3/32″. Vinyl coating is less expensive than nylon, and Teflon® is the most expensive. Contact factory for other types of cable and coating materials available.

STRENGTH RECOMMENDATIONS

Specifying less than full strength on your cable assembly prints will usually result in lower pricing, usually accomplished by crimping the fitting over the cable coating (a loss of strength of approximately 35%). However, to obtain full breaking strength, the cable coating would then be stripped and the fittings swaged directly onto the cable.

Also note that cables with 1x19 construction have less holding strength, consult factory.

LENGTH TOLERANCES

Length tolerances are an important cost consideration. Close tolerances require more expensive cutting processes and increased inspection criteria. Cable sizes and fittings used often determine attainable tolerances. Assemblies specifying precision tolerances must state under what load the length is to be measured. Please, do not overspecify. Confirm your desired tolerances with SAVA Industries prior to production. Standard tolerances will be used unless otherwise agreed upon.

FITTINGS

The following is a ranking of the relative cost of fittings starting from the *least* expensive. The ranking is predicated on the cost of the fitting and its cost of attachment to the cable based on the assembly being manufactured by SAVA INDUSTRIES, INC.

1. EYE
2. BALL-END PLUG
3. BALL
4. THREADED PLUG
5. BALL & SHANK
6. LOOP
7. MS TERMINALS

RECOMMENDED LENGTH TOLERANCES

LENGTH (IN. FT.)	TOLERANCE ± (IN INCHES)			
	PRECISION	TIGHT	CLOSE	STANDARD
0.1 - 2.0	1/64	1/32	1/16	1/8
2.1 - 5.0	1/32	1/16	1/8	1/4
5.1 - 10.0	1/16	1/8	1/4	1/2
10.1 - 20.0	1/8	1/4	1/2	1
20.1 - 40.0	1/4	1/2	1	2
40.1 - 60.0	1/2	1	2	4
60.1 - 80.0	7/8	2	4	8
80.1 - 100.0	1-1/2	3	6	12
100.1 AND ABOVE		.5% of length	.8% of length	1.5% of length

PROOF LOADING–PRESTRESSING

Proof loading of cable assemblies serves two purposes. First, it ensures the efficiency of the assemblies; and second, it prestresses the cable, removing some of the constructional stretch. Proof loading is generally done at 60% of rated breaking strength. The removal of constructional stretch means that frequent adjustments are not necessary to maintain proper tension in a control system. After assemblies are proof loaded, subsequent handling should be held to a minimum, otherwise the prestressing effect will be partially removed. If stretch is critical in your application, we suggest contacting SAVA's Engineering Department for further information.

SPECIAL FITTINGS

It is always preferable to use a standard fitting shown in the catalog for cost effectiveness and prompt shipping schedule. Terminals other than those shown in this catalog can be applied for those requiring special or unusual fittings. Our engineers will be pleased to assist you in the most reliable and economical design. If you wish to supply your own terminal for SAVA to apply, please be certain to contact us regarding the design in order to eliminate special tooling charges. The bonding strength between cables and special or unusual fittings cannot be predicted beforehand. It is established only after testing a number of samples. The customer should check with our Engineering Department for the strength that can be achieved on the parts before going into full-scale production.

ISO 9001 CERTIFIED

P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com

Carl Stahl®
SAVA INDUSTRIES, INC.

TIPS ON DESIGNING AND ORDERING CABLE ASSEMBLIES

The following procedure offers a checklist on the information needed for SAVA to quote on your cable assembly. Please complete as much information as possible. If in doubt contact the factory for any design assistance.

The following information is required:

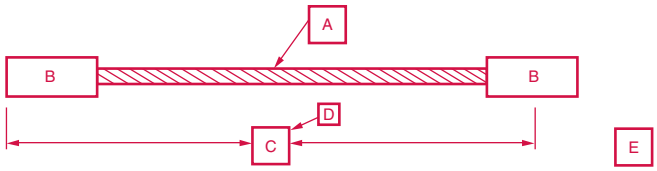
A . . . is the cable part number from the catalog.

B . . . identify the fittings. Remember, the least expensive fitting by far is the eye, followed in order of least cost by the ball end or straight plug, ball, threaded plug, ball and shank, loop and MS terminals.

C . . . for length, refer to fitting diagrams in the catalog to see where the standard measuring point is.

D . . . is length tolerance. Remember, close tolerances add to cost. Refer to page 6 for tolerance recommendations.

E . . . be sure to specify the strength requirements. Some fittings, such as the ball, do not provide full strength and these are noted in the catalog. Also, specifying less than full strength of the fitting will frequently result in lower pricing. For example, if you select a cable with a breaking strength of 480 lbs., have a load of 50 lbs. with a safety factor of 6-1, then a 300 lb. minimum cable assembly strength would be sufficient.



Typical Cable Assembly Layout

Other information:

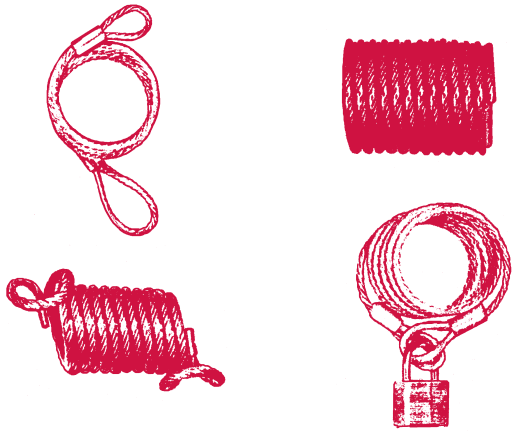
1. If a center fitting is required, the same principles apply.
2. If a loop fitting is required, be sure to list the P and D dimensions as shown on page 15 in the catalog. Be sure to add tolerances.
3. If 100% prestressing or prooftesting is required, please specify.
4. Full dimensions and strengths of special fittings must be given.

SELF-COILING CABLES FOR SECURITY APPLICATIONS

SAVA's self-coiling cables are manufactured from high tensile, aircraft grade steel cable. A vinyl coating is extruded to form a secure bond into the interstices of the cable wires. The coating gives the cable a soft, clean finish which protects the area of use. The cut-through resistance is determined by the size and construction of the inner steel cable. For example, a 3/16 7x7 construction with a vinyl coating to 1/4˝ is extremely difficult to cut through with a hack saw. A very large bolt cutter would be necessary.

Other features are:

- Compact, stores easily
- Returns to original shape
- Clean
- Strengths – 500-5000 lbs.
- Lengths can be varied
- Colored vinyl available on special order



CABLE APPLICATIONS

Cable and cable assemblies are designed to be a reliable and economical means of transmitting motion or controlling an item mechanically. Typically their usage falls into two broad applications listed here.

ACTUATING DEVICES

- Adjustment
- Alignment
- Braking
- Connecting
- Controlling
- Counterbalancing
- Cycling
- Driving
- Hoisting
- Traversing

LANYARDS

- Capturing
- Connecting
- Grounding
- Hanging
- Restraining
- Securing
- Stopping
- Supporting
- Tripping

USED IN THESE TYPICAL TYPES OF PRODUCTS

Aircraft • Appliances • Automotive • Bicycles • Boats • Carts • Computers • Copy Machines • Dental Equipment • Drafting Equipment • Farm Equipment
Floor Sweepers • Hospital Beds • Lawn Equipment • Material Handling • Medical Equipment • Models • Office Equipment • Plotters • Power Tools
Printers • Pumps • Scales • Ski Equipment • Tape Drives • Throttles • Timers • Toys and Games • Vending Machines • Washing Machines
X-Ray Equipment

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS
ISO 9001 CERTIFIED

PRECISION MINIATURE AND SMALL CABLES
STAINLESS STEEL CABLE, NYLON, AND VINYL COATED

UNCOATED						WITH NYLON COATING (See Notes 1 & 3 on pg. 5)			WITH VINYL COATING (See Notes 2 & 3 on pg. 5)			APPROXIMATE WEIGHT PER 100 FEET			
PART NO.	NOMINAL DIAMETER		CON-STRUC-TION	MIN. BREAKING STRENGTH		PART NO.	COATING DIAMETER		PART NO.	COATING DIAMETER		UNCOATED		COATED	
	in.	mm		lbs.	kg		in.	mm		in.	mm	lbs.	kg	lbs.	kg
2006	.006	.152	1x7	5	2.3	2006SN	.010	.254				0.01	0.00	0.01	0.00
2009	.009	.229	3x7	10	4.5	2009SN	.014	.356				0.02	0.01	0.02	0.01
2010	.010	.254	7x7	15	6.8	2010SN	.014	.356				0.02	0.01	0.02	0.01
2011	.012	.305	1x7	20	9.1	2011SN	.019	.483				0.03	0.01	0.04	0.02
2012	.013	.305	3x7	18	8.2	2012SN	.019	.483				0.03	0.01	0.04	0.02
2014	.014	.356	7x7	26	11.8	2014SN	.019	.483				0.03	0.01	0.04	0.02
2015	.016	.406	1x7	30	13.6	2015SN	.024	.610				0.04	0.02	0.05	0.02
2016	.017	.432	3x3	26	11.8	2016SN	.024	.610				0.04	0.02	0.05	0.02
2017	.019	.483	1x7	40	18.1	2017SN	.024	.610				0.06	0.03	0.07	0.03
2018	.018	.457	7x7	40	18.1	2018SN	.024	.610	2018SV	.024	.610	0.05	0.02	0.06	0.03
2019	.018	.457	7x19	40	18.1	2019SN	.024	.610				0.05	0.02	0.06	0.03
2020	.018	.457	1x19	45	20.5	2020SN	.024	.610				0.05	0.02	0.06	0.03
2023	.024	.610	7x7	70	31.8	2023SN	.030	.762				0.12	0.05	0.14	0.06
2024	.024	.610	7x19	70	31.8	2024SN	.030	.762				0.12	0.05	0.14	0.06
2027	.027	.686	7x7	90	40.8	2027SN	.034	.864				0.13	0.06	0.15	0.07
2030	.032	.813	3x7	110	49.9	2030SN 2030SN1	.037 3/64	.940 1.19	2030SV 2030SV1	.037 3/64	.940 1.19	0.16 0.16	0.07 0.07	0.22 0.31	0.10 0.14
2031	.032	.813	7x7	120	54.4	2031SN	.037	.940				0.16	0.07	0.22	0.10
2032	.032	.813	7x19	120	54.4	2032SN	.037	.940				0.16	0.07	0.22	0.10
2033	.032	.813	7x49	100	45.4	2033SN	.037	.940				0.16	0.07	0.22	0.10
2035	.036	.914	3x49	120	54.4	2035SN	.044	1.12				0.23	0.10	0.24	0.11
2036	.035	.914	7x7	160	72.6	2036SN	.044	1.12				0.23	0.10	0.26	0.12
2037	.038	.965	7x19	160	72.6	2037SN	.046	1.17				0.23	0.10	0.26	0.12
2038	.038	.965	49+(8x19)	160	72.6	2038SN	.046	1.17				0.23	0.10	0.26	0.12
2039	.038	.965	1x19	160	72.6	2039SN	.046	1.17				0.23	0.10	0.26	0.12
2045	.044	1.12	7x19	220	100	2045SN	.052	1.32				0.35	0.16	0.39	0.18
2046	.046	1.17	7x7	225	100	2046SN	.052	1.32				0.37	0.17	0.41	0.19
2047	.044	1.12	7x49	170	77.1	2047SN	.052	1.32				0.35	0.16	0.39	0.18
2048	3/64	1.19	7x7	270	122	2048SN2	1/16	1.59	2048SV2	1/16	1.59	0.42	0.19	0.49	0.22
2049	3/64	1.19	1x19	335	152	2049SN2	1/16	1.59				0.55	0.25	0.65	0.29
2050	3/64	1.19	7x19	270	122	2050SN2	1/16	1.59				0.55	0.25	0.65	0.29
2054	.054	1.37	7x49	250	113	2054SN2	1/16	1.59				0.55	0.25	0.65	0.29
2063	1/16	1.59	1x19	500	227	2063SN3	3/32	2.38	2063SV3	3/32	2.38	0.85	0.39	1.10	0.50
2064	1/16	1.59	7x7	480	218	2064SN3 2064SN4	3/32 1/8	2.38 3.18	2064SV3 2064SV4	3/32 1/8	2.38 3.18	0.75 0.75	0.34 0.34	0.93 1.50	0.42 0.68
2065	1/16	1.59	7x19	480	218	2065SN3	3/32	2.38	2065SV3	3/32	2.38	0.75	0.34	0.93	0.42
2080	5/64	1.98	7x19	700	318	2080SN3	3/32	2.38				1.42	0.64	1.60	0.73
2081	5/64	1.98	7x49	550	250	2081SN3	3/32	2.38				1.42	0.64	1.60	0.73
2082	5/64	1.98	7x7	800	360	2082SN3	3/32	2.38				1.42	0.64	1.60	0.73
2093	3/32	2.38	1x19	1200	544	2093SN4	1/8	3.18	2093SV4	1/8	3.18	2.00	0.91	2.20	1.00
2094	3/32	2.38	7x7	920	417	2094SN4 2094SN5 2094SN6	1/8 5/32 3/16	3.18 3.97 4.76	2094SV4 2094SV5 2094SV6	1/8 5/32 3/16	3.18 3.97 4.76	1.60 1.60 1.60	0.73 0.73 0.73	1.85 2.18 2.67	0.84 0.99 1.21
2095	3/32	2.38	7x19	920	417	2095SN4	1/8	3.18	2095SV4	1/8	3.18	1.74	0.79	1.99	0.90
2096	3/32	2.38	7x49	800	360	2096SN4	1/8	3.18				1.74	0.79	1.99	0.90
2124	1/8	3.18	1x19	2100	953	2124SN6	3/16	4.76				3.50	1.59	4.30	1.95
2125	1/8	3.18	7x7	1700	771	2125SN6	3/16	4.76	2125SV6	3/16	4.76	2.80	1.27	3.60	1.63
2126	1/8	3.18	7x19	1760	798	2126SN6	3/16	4.76	2126SV6	3/16	4.76	2.90	1.32	3.62	1.64
2158	5/32	3.97	7x19	2400	1089	2158SN7	7/32	5.56	2158SV7	7/32	5.56	4.50	2.04	5.40	2.45
2188	3/16	4.76	7x19	3700	1678	2188SN8	1/4	6.35	2188SV8	1/4	6.35	6.50	2.95	8.60	3.90
2252	1/4	6.35	7x19	6400	2903	2252SN10	5/16	7.94	2252SV10	5/16	7.94	11.00	4.99	13.50	6.12
2315	5/16	7.94	7x19	9000	4082	2315SN13	13/32	10.32	2315SV13	13/32	10.32	17.30	7.85	20.40	9.25
2375	3/8	9.53	7x19	12000	5443	2375SN15	15/32	11.91	2375SV15	15/32	11.91	24.30	11.02	28.00	12.70

NOTES: All coatings are extruded with natural plastic. Many are available in black and other colors for a nominal cost.
2030SN1 cable was previously 2030SN2, 2158 cable was 2168.

ISO 9001 CERTIFIED

P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com

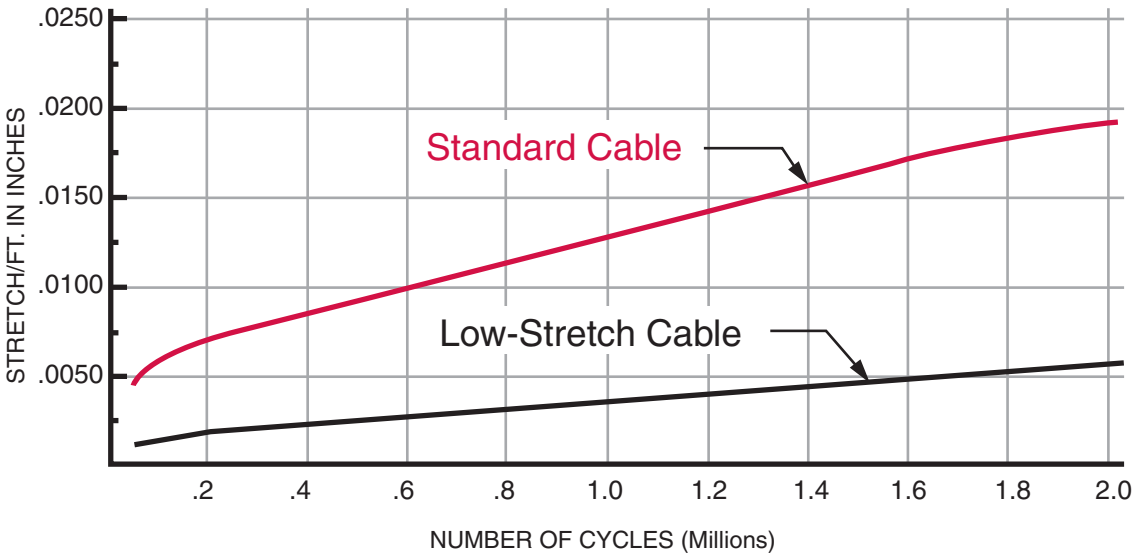
Carl Stahl®
SAVA INDUSTRIES, INC.

SAVA LOW-STRETCH HIGH-FATIGUE MINIATURE STAINLESS STEEL CABLE

Low-stretch cables solve the problem of tension loss in small cable drive systems. Stretch reduction of up to 300% compared to standard cables under dynamic working conditions can be realized. These newly developed cables are designed to reduce to practical insignificance the loss of resolution caused by stretch.

UNCOATED			NYLON COATED			CONSTRUCTION	MIN. BREAKING STRENGTH		APPROX. WT. (100 FT.)			
PART NO.	NOM. DIA.		PART NO.	COATING O.D.					UNCOATED		COATED	
	in.	mm		in.	mm		lbs.	kg	lbs.	kg	lbs.	kg
1021	.021	.534	1021SN	.027	.686	7x7	50	22.7	0.11	0.04	0.12	0.05
1023	.024	.610	1023SN	.030	.762	7x7	70	31.8	0.12	0.05	0.14	0.06
1024	.024	.610	1024SN	.030	.762	7x19	60	27.2	0.12	0.05	0.14	0.06
1027	.027	.686	1027SN	.034	.864	7x7	90	40.8	0.13	0.06	0.15	0.07
1031	.032	.813	1031SN	.037	.940	7x7	120	54.4	0.16	0.07	0.22	0.10
1032	.032	.813	1032SN	.037	.940	7x19	100	45.4	0.16	0.07	0.22	0.10
1036	.036	.914	1036SN	.046	1.17	7x7	160	72.6	0.23	0.10	0.26	0.12
1037	.036	.914	1037SN	.046	1.17	7x19	150	68.0	0.23	0.10	0.26	0.12
1048	.048	1.19	1048SN	.063	1.59	7x7	270	122.5	0.42	0.19	0.49	0.22
1050	.048	1.19	1050SN	.063	1.59	7x19	270	122.5	0.55	0.25	0.65	0.29
1064	.063	1.59	1064SN	.094	2.38	7x7	450	204.1	0.75	0.34	0.93	0.42
1065	.063	1.59	1065SN	.094	2.38	7x19	450	204.1	0.75	0.34	0.93	0.42

LOW-STRETCH vs STANDARD MINIATURE STEEL CABLE



Test data were obtained by cycling both standard and low-stretch cables under tension loads to 2,000,000 cycles while continuously monitoring the stretch.

TYPICAL APPLICATIONS INCLUDE

Computer Printers • Plotters • Typewriters • Instrumentation • Robotics • Other Precision Drive Mechanisms

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
ISO 9001 CERTIFIED

TEFLON® FEP COATED STAINLESS STEEL CABLE

PART NO.	UNCOATED NOMINAL DIAMETER		OUTSIDE DIAMETER OF COATING		CONSTRUCTION	MINIMUM BREAKING STRENGTH		APPROXIMATE WEIGHT PER 100 FEET	
	in.	mm	in.	mm		lbs.	kg	lbs.	kg
2014ST	.014	.356	.021	.53	7x7	26	12	0.04	0.02
2018ST	.018	.457	.026	.66	7x7	40	18	0.06	0.03
2023ST	.024	.610	.032	.813	7x7	70	32	0.14	0.06
2024ST	.024	.610	.032	.813	7x19	70	32	0.14	0.06
2027ST	.027	.686	.036	.914	7x7	90	41	0.15	0.07
2031ST	.032	.813	.040	1.02	7x7	120	54	0.22	0.10
2032ST	.032	.813	.040	1.02	7x19	120	54	0.22	0.10
2036ST	.036	.914	.049	1.24	7x7	160	73	0.26	0.12
2037ST	.038	.914	.049	1.24	7x19	160	73	0.26	0.12
2048ST2	3/64	1.19	.062	1.59	7x7	270	122	0.49	0.22
2050ST2	3/64	1.19	.062	1.59	7x19	270	122	0.49	0.22
2054ST2	.054	1.37	.062	1.59	7x49	250	113	0.65	0.29
2064ST3	1/16	1.59	.084	2.13	7x7	480	218	0.85	0.39
2065ST3	1/16	1.59	.084	2.13	7x19	480	218	0.85	0.39
2095ST4	3/32	2.38	1/8	3.18	7x19	920	417	2.25	1.02
2126ST6	1/8	3.18	3/16	4.76	7x19	1760	798	4.35	1.98
2188ST8	3/16	4.76	1/4	6.35	7x19	3700	1678	9.60	4.36

NOTE: All coatings are extruded with natural Teflon. Many are available in black, blue or other colors. Check with factory.

TEFLON® FEP OFFERS THE FOLLOWING EXCELLENT COMBINATION OF PROPERTIES

- Nonaging characteristics
- Low coefficient of friction
- Chemical inertness
- Exceptional dielectric properties
- Toughness and flexibility
- Continuous service temperature +400°F
- Heat resistance
- Nonstick characteristics
- Negligible moisture absorption (less than .01%)
- Weather resistance
- Nonflammable

DACRON CORD® AND ASSEMBLIES*

Natural (white) in color.
For additional colors in black, olive drab, etc. contact factory.

Dacron is a low stretch fiber with excellent abrasion and ultraviolet resistance, highly recommended for outdoor use.

- Braided
- Low stretch fiber
- All weather
- Inexpensive
- Great flexibility
- Nonconductive

PART NO.	NOMINAL DIAMETER (REF.)	TEST OF CORD	SAVA FITTINGS WHICH CAN BE APPLIED TO FORM ASSEMBLY	MINIMUM STRENGTH OF ASSEMBLY
DC033	.033	50 lb.	#305 EYE, #307 EYE, #7030 LOOP	25 lb.
DC042	.042	90 lb.	#305 EYE, #307 EYE, #7047 LOOP	40 lb.
DC060	.060	180 lb.	#310 EYE, #315 EYE, #318 EYE, #7062 LOOP	90 lb.

*Hand tools are not available to crimp eyelets. It is recommended you have SAVA assemble eyelets for you to obtain proper breaking strength.

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

GALVANIZED STEEL CABLE, NYLON, AND VINYL COATED

UNCOATED						WITH NYLON COATING (See Notes 1 & 3 on pg. 5)			WITH VINYL COATING (See Notes 2 & 3 on pg. 5)			APPROXIMATE WEIGHT PER 100 FEET			
PART NO.	NOMINAL DIAMETER		CONSTRUCTION	MINIMUM BREAKING STRENGTH		PART NO.	OUTSIDE DIAMETER OF COATING		PART NO.	OUTSIDE DIAMETER OF COATING		UNCOATED		COATED	
	in.	mm		lbs.	kg		in.	mm		in.	mm	lbs.	kg	lbs.	kg
3030*	1/32	.813	3x7	110	50	3030GN 3030GN1	.037 3/64	.940 1.19	3030GV 3030GV1	.037 3/64	.940 1.19	0.16 0.16	0.07 0.07	0.22 0.31	0.10 0.14
3048	3/64	1.19	7x7	270	122	3048GN2	1/16	1.59	3048GV2	1/16	1.59	0.42	0.19	0.49	0.22
3049	3/64	1.19	1x19	375	170	3049GN2	1/16	1.59	3049GV2	1/16	1.59	0.55	0.25	0.65	0.29
3063	1/16	1.59	1x19	500	227	3063GN3	3/32	2.38	3063GV3	3/32	2.38	0.85	0.39	1.10	0.50
3064	1/16	1.59	7x7	480	218	3064GN3 3064GN4	3/32 1/8	2.38 3.18	3064GV3 3064GV4	3/32 1/8	2.38 3.18	0.75 0.75	0.34 0.34	0.93 1.50	0.42 0.68
3065	1/16	1.59	7x19	480	218	3065GN3	3/32	2.38	3065GV3	3/32	2.38	0.75	0.34	0.93	0.42
3093	3/32	2.38	1x19	1200	544	3093GN4	1/8	3.18	3093GV4	1/8	3.18	2.00	0.91	2.20	1.00
3094	3/32	2.38	7x7	920	417	3094GN4 3094GN5 3094GN6	1/8 5/32 3/16	3.18 3.97 4.76	3094GV4 3094GV5 3094GV6	1/8 5/32 3/16	3.18 3.97 4.76	1.60 1.60 1.60	0.73 0.73 0.73	1.85 2.18 2.67	0.84 0.99 1.21
3095	3/32	2.38	7x19	1000	454	3095GN4	1/8	3.18	3095GV4	1/8	3.18	1.74	0.79	1.99	0.90
3124	1/8	3.18	1x19	2100	953	3124GN6	3/16	4.76	3124GV6	3/16	4.76	3.50	1.59	4.40	2.00
3125	1/8	3.18	7x7	1700	771	3125GN6	3/16	4.76	3125GV6	3/16	4.76	2.80	1.27	3.60	1.63
3126	1/8	3.18	7x19	2000	907	3126GN6	3/16	4.76	3126GV6	3/16	4.76	2.90	1.32	3.62	1.64
3157	5/32	3.97	7x7	2600	1179	3157GN7	7/32	5.56	3157GV7	7/32	5.56	4.30	1.95	5.20	2.35
3158	5/32	3.97	7x19	2800	1270	3158GN7	7/32	5.56	3158GV7	7/32	5.56	4.50	2.04	5.40	2.45
3187	3/16	4.76	7x7	3700	1678	3187GN8	1/4	6.35	3187GV8	1/4	6.35	6.50	2.95	8.60	3.90
3188	3/16	4.76	7x19	4200	1905	3188GN8	1/4	6.35	3188GV8	1/4	6.35	6.50	2.95	8.60	3.90
3219	7/32	5.56	7x19	5600	2540	3219GN9	9/32	7.14	3219GV9	9/32	7.14	8.60	3.90	9.76	4.43
3252	1/4	6.35	7x19	7000	3175	3252GN10	5/16	7.94	3252GV10	5/16	7.94	11.00	4.99	13.50	6.12
3315	5/16	7.94	7x19	9800	4445	3315GN13	13/32	10.32	3315GV13	13/32	10.32	17.30	7.85	20.4	9.25
3375	3/8	9.53	7x19	14400	6531	3375GN15	15/32	11.91	3375GV15	15/32	11.91	24.30	11.02	28.0	12.7

NOTES: All coatings are extruded with natural plastic. Many are available in black and other colors for a nominal cost.
3030 cable was previously 3032, 3030GN1 and GV1 cables were 3030GN2 and GV2, 3158 cable was 3168.
*3030 is being replaced with 2030 stainless steel, 1/32, 3x7 cable when current stock is depleted. See page 8, consult factory.

GALVANIZED STEEL CABLE, SAFETY ORANGE VINYL COATED

PART NO.	UNCOATED NOMINAL DIAMETER		OUTSIDE DIAMETER OF COATING		CONSTRUCTION	MINIMUM BREAKING STRENGTH		APPROXIMATE WEIGHT PER 100 FEET	
	in.	mm	in.	mm		lbs.	kg	lbs.	kg
3030GSV2*	1/32	.813	1/16	1.59	3x7	110	50	0.46	0.21
3048GSV3	3/64	1.19	3/32	2.38	7x7	270	122	0.68	0.31
3064GSV4	1/16	1.59	1/8	3.18	7x7	480	218	1.50	0.68
3094GSV6	3/32	2.38	3/16	4.76	7x7	920	417	2.67	1.21
3094GSV8	3/32	2.38	1/4	6.35	7x7	920	417	3.00	1.36
3126GSV6	1/8	3.18	3/16	4.76	7x19	2000	907	3.62	1.64
3188GSV8	3/16	4.76	1/4	6.35	7x19	4200	1905	8.60	3.90
3252GSV10	1/4	6.35	5/16	7.94	7x19	7000	3175	13.50	6.12

NOTES: *3030 is being replaced with 2030 stainless steel, 1/32, 3x7 cable when current stock is depleted. See page 8, consult factory.

Nylon coating is available on request. Other diameters and constructions are also available on request. These cables are coated with a highly visible bright orange vinyl coating and used as safety cables, lanyards, and on assemblies.

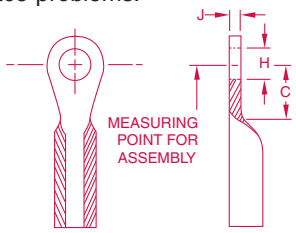
Orange vinyl-coated cables are frequently used as pull cords for operating safety switches to stop machines in an emergency.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS®
ISO 9001 CERTIFIED

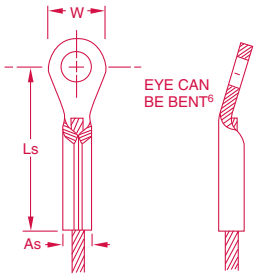
CABLE FITTINGS
AVAILABLE IN BULK OR FACTORY APPLIED

SAVA's miniature to small cable fittings are designed to be RELIABLE, PRECISE, EFFICIENT, and ECONOMICAL. These fittings were planned for use with SAVA's miniature and small cable. However, they can be applied to other cables which fall into the same size range. The combination of our miniature cable and fittings gives engineers a precise, economical, and reliable operating mechanism which can be the ideal solution to space problems.

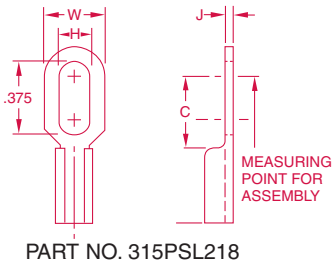
SAVA's precision-designed dies and modern equipment are used to manufacture cable assemblies. However, we offer most of these fittings loose and some can be crimped with pliers, vise, etc., for prototype applications. Although it can be an unreliable method of attaching, it is frequently convenient and necessary. We offer our prototype package on page 19 primarily for this purpose.



BEFORE CRIMPING



AFTER CRIMPING



PART NO. 315PSL218
PART NO. 315SSL218

BEFORE CRIMPING

This type can be developed for other cable sizes also.

EYE (EYELET)

PART NO.	FOR CABLE DIA.	H + .010 -.005	W ± .020	C REF.	As REF.	J + .010 -.005	Ls REF.	MATERIAL
302S100[1]	.010 - .034	.100	.190	.130	.100	.030	.300	Stainless Steel
303S377	.010 - .034	.377	.530	.340	.100	.030	.550	Stainless Steel
305S142 305S171	.014 - .044	.142 .171	.260	.150	.120	.040	.580[5] (or 460)	Stainless Steel Stainless Steel
307S190 307S220 307S250	.014 - .044	.190 .220 .251	.375	.230	.120	.040	11/16	Stainless Steel
310P156 310P190 310S156 310S190	1/32 - 1/16[7]	.157 .190 .157 .190	.330	.260	.140	.047	3/4	Plated Steel Plated Steel Stainless Steel Stainless Steel
315P190 315P218 315P260[2] 315S142 315S190 315S218 315S260[2]	3/64 - 1/16	.190 .219 .260 .142 .190 .219 .260	.420	.340	.210	.060	1	Plated Steel Plated Steel Plated Steel Stainless Steel Stainless Steel Stainless Steel Stainless Steel
315PSL218 315SSL218	3/64 - 1/16	.219	.410	.410	.210	.060	15/16	Plated Steel Stainless Steel
318P315 318P375 318P438 318S315 318S375 318S438	3/64 - 1/16	.315 .376 .438 .315 .376 .438	.625	.370	.210	.060	1	Plated Steel Plated Steel Plated Steel Stainless Steel Stainless Steel Stainless Steel
320P203 320P250 320S203 320S250	3/32	.204 .251 .204 .251	.500	.470	.280	.090	1-5/16	Plated Steel Plated Steel Stainless Steel Stainless Steel
321P375 321P500 321S375 321S500	3/32	.376 .501 .376 .501	.750	.470	.280	.090	1-3/16	Plated Steel Plated Steel Stainless Steel Stainless Steel
330P250[3] 330P316[3] 330S250 330S316	1/8	.251 .316 .251 .316	.580	.530	.350	.125	1-15/16	Plated Steel Plated Steel Stainless Steel Stainless Steel
331P375 331P500 331S375 331S500	1/8	.376 .501 .376 .501	.850	.600	.350	.125	1-13/16	Plated Steel Plated Steel Stainless Steel Stainless Steel
340P313 340P380 340P500[4] 340S313 340S380 340S500	5/32 - 3/16	.313 .380 .501 .313 .380 .501	1.000	.630	.500	.190	2-3/8	Plated Steel Plated Steel Plated Steel Stainless Steel Stainless Steel Stainless Steel
350P510 350P635 350S510 350S635	1/4	.512 .635 .512 .635	1.250	.750	.700	.250	2-7/8	Plated Steel Plated Steel Stainless Steel Stainless Steel

NOTES:

1. 302 eye holds 85 lbs. max.
2. 315x260 holds 350 lbs. max.
3. 330P eye holds 1600 lbs. max.
4. 340P500 holds 3500 lbs. max.
5. .580 dimensions will be furnished unless otherwise specified.
6. When designing a cable assembly with a bent eyelet, the angle must be specified with a standard tolerance of ± 5°
7. 310 eyelets hold 300 lbs. max.for 1/16″ cable.

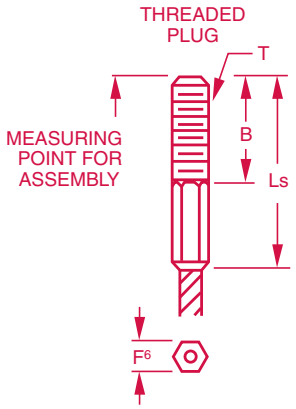
GENERAL NOTES:

Dimensions shown are after swaging. Before swaging, the legs on the shank of the fittings are in a straight-up position. Strength–These eye fittings require special tooling and considerable tonnage to crimp. Eyelet fittings generate the full rated breaking strength when swaged by Sava on 7x7 or 7x19 cables, except as noted above. Please note, to obtain rated breaking strength, any plastic coating must be removed from cable prior to swaging these fittings. Stainless steel material for eyes is AISI Type 302/304. Hand swaging tools are not available. We recommend that you have these fittings factory applied by Sava.

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

THREADED PLUG

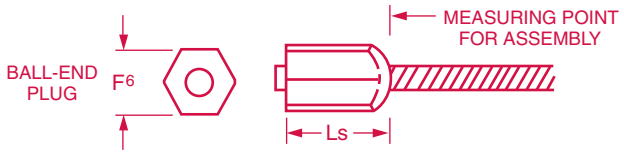
PART NO. & MATERIAL			DIMENSIONS (AFTER SWAGING)				
BRASS	STAINLESS STEEL	CARBON STEEL PLATED	FOR CABLE DIA.	THREAD SIZE T	THREAD LENGTH B	F[6] ±.010	Ls REF.
455B0500	455S0500	–	.010 - .048	#5 - 40	1/2	7/64	1
455B1000*	455S1000*	–	.010 - .048	#5 - 40	1	7/64	1-1/2
458B0750	458S0750	–	.010 - .048	#6 - 32	3/4	1/8	1-1/4
460B0500	460S0500	–	.028 - .048	#8 - 32	1/2	9/64	1
460B1000*	460S1000*	–	.028 - .048	#8 - 32	1	9/64	1-1/2
465B0500	465S0500	–	3/64 - 1/16	#10 - 24	1/2	5/32	1-1/8
465B1000*	465S1000*	–	3/64 - 1/16	#10 - 24	1	5/32	1-5/8
468B1250	468S1250	468P1250	3/64 - 1/16	#10 - 32	1-1/4	5/32	1-7/8
470B0750	470S0750	470P0750	1/16 - 3/32	1/4 - 20	3/4	7/32	1-5/16
–	475S0750	475P0750[7]	3/32 - 1/8	1/4 - 20	3/4	7/32	1-9/16
–	475S1250	475P1250[7]	3/32 - 1/8	1/4 - 20	1-1/4	7/32	2-1/16
–	475S1500	475P1500[3, 7]	3/32 - 1/8	1/4 - 20	1-1/2	7/32	2-5/16
–	476S1375	476P1375	1/16 - 1/8	1/4 - 28	1-3/8	7/32	2-3/16
–	477S1000	477P1000	1/8 - 5/32	5/16 - 18	1	9/32	1-15/16
–	477S2000	477P2000[3]	1/8 - 5/32	5/16 - 18	2	9/32	2-15/16
–	478S1500	478P1500	1/8 - 5/32	5/16 - 24	1-1/2	9/32	2-7/16
–	480S1250	480P1250	3/32 - 3/16	3/8 - 16	1-1/4	5/16	2-1/4
–	480S2250	480P2250[3]	3/32 - 3/16	3/8 - 16	2-1/4	5/16	3-1/4
–	481S1500	481P1500	1/8 - 3/16	3/8 - 24	1-1/2	5/16	2-1/2
–	482S1500	482P1500	1/4	1/2 - 13	1-1/2	7/16	2-13/16
–	483S2000	483P2000	1/4	1/2 - 20	2	7/16	3-5/16
–	485S1750	485P1750	5/16	5/8 - 11	1-3/4	9/16	3-5/8
–	490S2000	490P2000	3/8	3/4 - 10	2	11/16	4



NOTES:

1. If you order threaded plugs loose, the cable diameter must be given so that the proper hole can be furnished for the cable you intend to use.
2. Unless stated, all threads are right hand.
3. Available with left hand threads to fit super strength turnbuckles #810, 811, and 812. See page 16.
4. Rolled threads can be made available if requested.
5. Hand tool T185 available for prototype work on parts 455B; 458B; 460B; 465B; and 468B.
6. After swage dimensions. Before swage, the fitting is round.
7. 475P plugs hold 1600 lbs. max.

GENERAL NOTES: *Old part no. 457 is now 455, 462 is now 460, 467 is now 465. Strength–Threaded plug fittings generate the full rated breaking strength when swaged by Sava on 7x7 or 7x19 cables. Please note, to obtain rated breaking strength, any plastic coating must be removed from cable prior to swaging these fittings. Hand swaging tool availability is limited (see note 5). We recommend that you have these fittings factory applied by Sava.

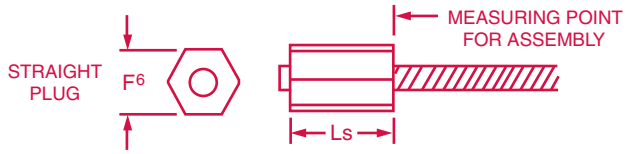


BALL-END PLUG

FOR CABLE SIZES .010 - 3/32

PART NO.	FOR CABLE DIA.	Ls REF.	F[6] ±.010	MATERIAL
401B1* 401B2* 401B3* 401B4*	.010 - .027 .028 - .037 .038 - .046 3/64	5/32	7/64	Brass
403B1 403B2 403B3 403B4*	.010 - .027 .028 - .037 .038 - .046 3/64	1/4	7/64	Brass
405B1 405B2 405B3 405B4	.010 - .027 .028 - .037 .038 - .048 .049 - .065	3/8	1/8	Brass
410B1 410B2	3/64 1/16	1/2	5/32	Brass
415B	3/32	9/16	7/32	Brass

NOTES: *Fittings hold 50% of cable strength.
Hand tool T185 available for prototype work on P/N 401, 403, 405, 410 only.



STRAIGHT PLUG

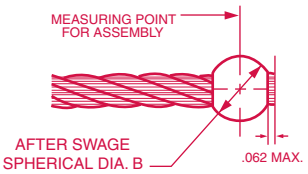
FOR CABLE SIZES 1/8 - 3/8

PART NO.	FOR CABLE DIA.	Ls REF.	F[6] ±.010	MATERIAL
420P 420S	1/8	5/8	5/16	Plated Steel Stainless Steel
422P 422S	5/32	11/16	7/16	Plated Steel Stainless Steel
425P 425S	3/16	3/4	7/16	Plated Steel Stainless Steel
430P 430S	1/4	1	9/16	Plated Steel Stainless Steel
435P 435S	5/16	1-1/4	11/16	Plated Steel Stainless Steel
440P 440S	3/8	1-9/16	7/8	Plated Steel Stainless Steel

NOTES: Strength–Straight plug fittings generate the full rated breaking strength when swaged by Sava on 7x7 or 7x19 cables. Please note, to obtain rated breaking strength, any plastic coating must be removed from cable prior to swaging these fittings. Hand swaging tools are not available. We recommend that you have these fittings factory applied by Sava.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS®
ISO 9001 CERTIFIED

BALL



BALL

PART NO.	FOR CABLE DIA.	B ±.005	MATERIAL
552S	.006 - .014	.035	Stainless Steel
553S	.006 - .024	.060	Stainless Steel
555B	.006 - .024	.080	Brass
557B or 557S	.009 - .036	.090	Brass or Stainless Steel
560B or 560S	.014 - .050	.125	Brass or Stainless Steel
562B or 562S	.034 - 1/16	.156	Brass or Stainless Steel
565B or 565S	.034 - 1/16	.190	Brass or Stainless Steel
570P 570S	.036 - 3/32 3/32	.250 .250	Plated Steel Stainless Steel
573P or 573S	1/8	.310	Plated or Stainless Steel
575S	5/32	.380	Stainless Steel
578S	3/16	.440	Stainless Steel
580P or 580S	1/4	.570	Plated or Stainless Steel
582S	5/16	.690	Stainless Steel

NOTE: 562 Balls with 1/16 cable hold min. 200 lbs.

GENERAL NOTES:

Dimensions shown are after swaging.

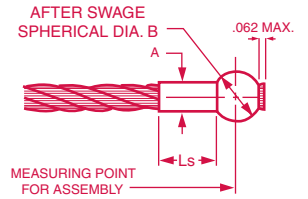
Strength–Balls swaged by Sava on 1/16 and 3/32 cables with constructions of 7x7 or 7x19, ball fittings hold 80% of rated breaking strength. All others over 3/32 develop 60% of rated cable strength on 7x7 or 7x19 constructions. For 3/64 and below consult factory for breaking strength.

For other ball sizes, or for strength of fittings swaged over plastic, consult factory. Balls can be swaged along the length of the cable. Before swage, ball fittings are oval in shape.

If ball is ordered loose, please state cable diameter you intend to use.

Hand swaging tools are not available. We recommend that you have these fittings factory applied by Sava.

BALL AND SHANK*



BALL AND SHANK

PART NO.	FOR CABLE DIA.	A ±.010	B ±.010	Ls REF	MATERIAL
505B 505S	.012-.036	.075	.125	.085	Brass Stainless Steel
510S1 510S2*	3/64 1/16	.112	.190	.156	Stainless Steel Stainless Steel
515P 515S*	3/32	.143	.253	.234	Plated Steel Stainless Steel
520P 520S*	1/8	.190	.315	.313	Plated Steel Stainless Steel
522S*	5/32	.222	.379	.391	Stainless Steel
525P 525S*	3/16	.255	.442	.470	Plated Steel Stainless Steel
530S*	1/4	.348	.567	.625	Stainless Steel
535S*	5/16	.413	.694	.810	Stainless Steel

NOTE: *Per MS-20664

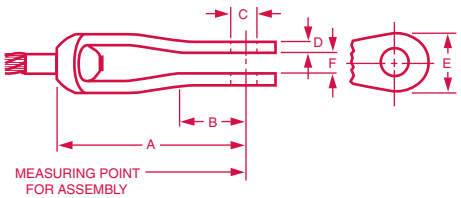
GENERAL NOTES:

Dimensions shown are after swaging.

Strength–Ball and shank fittings generate the full rated breaking strength when swaged by Sava on 7x7 or 7x19 cables, except for the 505 which is capable of holding 80%. Please note, to obtain rated breaking strength, any plastic coating must be removed from the cable prior to swaging these fittings.

Hand swaging tools are not available. We recommend that you have these fittings factory applied by Sava.

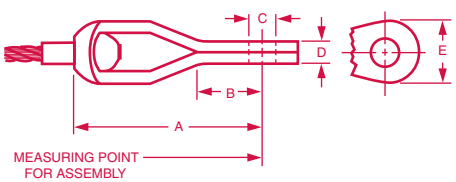
STRAP FORK (REF. NAS 1435-K)*



STRAP FORK

PART NO.	STAINLESS STEEL REF. NAS PART NO.	CABLE DIA.	A REF.	B REF.	C ±.010	D REF.	E REF.	F REF.	LBS. PER PIECE
SF2	NAS 1435K-2	1/16	1-1/16	.454	.188	.042	3/8	.093	.006
SF3	NAS 1435K-3	3/32	1-1/2	.616	.188	.049	7/16	.108	.013
SF4	NAS 1435K-4	1/8	1-5/8	.638	.188	.093	1/2	.195	.030

STRAP EYE (REF. NAS 1435-E)*



STRAP EYE

PART NO.	STAINLESS STEEL REF. NAS PART NO.	CABLE DIA.	A REF.	B REF.	C ±.010	D REF.	E REF.	LBS. PER PIECE
SE2	NAS 1435E-2	1/16	1-1/16	.454	.188	.088	3/8	.006
SE3	NAS 1435E-3	3/32	1-1/2	.616	.188	.103	7/16	.013
SE4	NAS 1435E-4	1/8	1-5/8	.638	.188	.190	1/2	.030

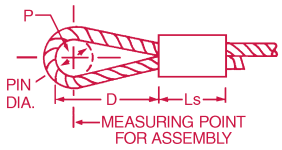
NOTE: *Ball and Shank is always recommended for use with strap terminals (noted above).

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

LOOP SLEEVES

PART NO.	FOR CABLE DIAMETERS	MATERIAL	Ls REF. AFTER SWAGE	USE TOOL & CAVITY NO.
7000B 7000S (S1)	.006 - .014	Brass Stainless Steel	.19 .25 (.06)	Pliers Factory Applied
7020B (B1) 7020S	.016 - .022	Brass Stainless Steel	.28 (.11) .25	T185-A Factory Applied
7025B 7025S	.023 - .026	Brass Stainless Steel	.28 .28	T185-A Factory Applied
7030C (C1) 7030S	.027 - .038	Zinc-Plated Copper Stainless Steel	.28 (.16) .28	T185-D Factory Applied
7047C (C1) 7047S (S1)	.039 - .054	Zinc-Plated Copper Stainless Steel	.44 (.18) .38 (.18)	T185-B or T188-1 Factory Applied
7062A 7062C (C1) 7062S	1/16	Aluminum Zinc-Plated Copper Stainless Steel	.46 .42 (.32) .45	T185-C or T188-2 T185-C or T188-2 T188-1
7092A 7092C 7092S	3/32	Aluminum Zinc-Plated Copper Stainless Steel	.63 .50 .44	T188-3 T188-3 51-C-887 or T188-2
7125A 7125C 7125S	1/8	Aluminum Zinc-Plated Copper Stainless Steel	.81 .75 .42	T188-4 T188-4 51-G-887 or T188-3
7156A 7156C 7156S	5/32	Aluminum Zinc-Plated Copper Stainless Steel	1.03 .88 .78	T188-5 T188-5 51-M-850 or T188-4
7187A (A1) 7187C 7187S	3/16	Aluminum Zinc-Plated Copper Stainless Steel	1.19 (.55) 1.25 1.10	T188-6 T188-6 51-P-850 or T188-5
7218A 7218C	7/32	Aluminum Zinc-Plated Copper	1.50 1.06	Factory Applied 51-F2-850
7250A 7250C 7250S	1/4	Aluminum Zinc-Plated Copper Stainless Steel	1.63 1.50 1.50	3-F6-950 3-F6-950 Factory Applied
7312A (A1) 7312C	5/16	Aluminum Zinc-Plated Copper	1.70 (.86) 1.38	Factory Applied Only
7375A (A1) 7375C	3/8	Aluminum Zinc-Plated Copper	2.38 (.95) 1.63	Factory Applied Only

NOTES: For large diameter cable sleeves, different lengths or finishes, consult factory. Loop sleeves per MS51844 also available, consult factory.



When ordering assemblies, specify "P" pin dia. and "D" distance from bearing point to fitting. "P" should be at least five (5) times the cable diameter for guaranteed breaking strength and "D" should be at least 2.5 times "P".

NOTES:

1. Although the stainless steel loop sleeves are available loose, they are usually factory applied.
2. Wherever possible, thimbles should be used with loop sleeves to protect the cable.
3. Specify pin "P" diameter.

Strength–when crimped over bare cable, standard length loop sleeves generate full breaking strength of cable. For shorter loop sleeves with suffix 1 or sleeves swaged over plastic, consult factory. Stainless steel sleeves generate a minimum of 85% of cable rated breaking strength.

Depending on size and material, loop sleeves may have round, oval or figure eight shape. Call factory for details, if required.

Copper may be substituted for brass, depending on availability.

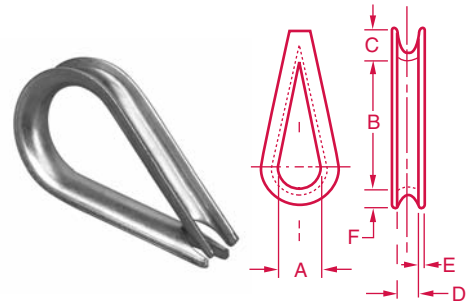
LOOP CRIMPS

Loop crimps are factory applied splices, which are very economical and hold approximately 50% of cable breaking strength dependent on cable size and type used. Not sold in bulk.

PART NO.	FOR CABLE DIAMETERS	MATERIAL	Ls REF. AFTER SWAGE
7010B 7010S	.009 - .027	Brass Stainless Steel	.09
7015B* 7015S*	.024 - .038	Brass Stainless Steel	.17
7050B 7050P 7050S	3/64 - 3/32	Tin-Plated Brass Tin-Plated Steel Stainless Steel	.26

NOTE: *7015B was 7010B2 and 7015S was 7010S2

THIMBLES



Thimbles, used with loop sleeves or malleable wire clips, protect cable from wear and tear. They help to distribute the load on the cable over a larger area, thereby increasing the life of the cable.

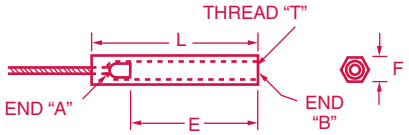
Thimbles come in either cold-rolled steel (zinc plated) or stainless steel (natural finish).

TO FIT CABLE DIA. IN INCHES	COLD ROLLED STEEL ZINC PLATED	STAINLESS STEEL	DIMENSIONS						WT.
	Military Spec.	Military Spec.	A Ref.	B Ref.	C Ref.	D Ref.	E Ref.	F Ref.	Per 1000
.015 - 3/64		AN100-C1*	.190	1/4	1/8	3/32	.015	3/64	2
3/64 - 1/16 - 5/64	AN100-3	AN100-C3	.350	45/64	3/16	3/32	.032	5/64	1.5
3/32 - 7/64 - 1/8	AN100-4	AN100-C4	.350	45/64	7/32	9/64	.032	5/64	4.3
5/32	AN100-5	AN100-C5	.400	51/64	7/32	11/64	.032	7/64	6
3/16	AN100-6	AN100-C6	.500	1	5/16	13/64	.032	9/64	9.8
7/32 - 1/4	AN100-8	AN100-C8	.700	1-13/32	13/32	17/64	.032	11/64	15
The following thimbles are hot galvanized, heavy-duty type. "D" dimension on these thimbles is the overall thickness.									
5/16	FF-T-276b Type III	–	1	1-7/8	–	1/2	–	–	140
3/8	FF-T-276b Type III	–	1-1/8	2-1/8	–	3/4	–	–	250

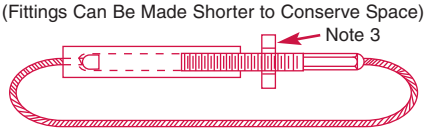
NOTES: Some thimbles may have open and/or uneven ends. Thimbles are recommended with loop sleeves above or with wire rope clips, see page 18.
*AN100-C1 is a miniature stainless steel thimble which has no applicable military specification.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
ISO 9001 CERTIFIED

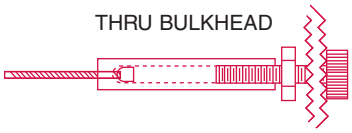
TURNBUCKLES



LOOP ASSEMBLY
(Fittings Can Be Made Shorter to Conserve Space)



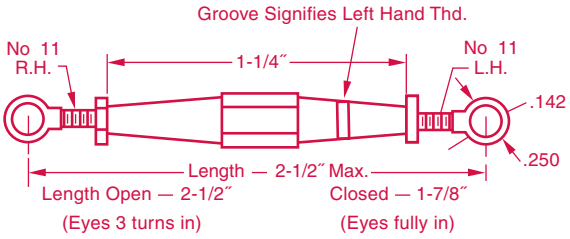
THRU BULKHEAD



PART NO.	CABLE DIA.	THREAD "T"	LENGTH "L" ±.015	LENGTH "E" REF	FLATS "F" ±.010	MATING PARTS	
						END "A"	END "B"
0801TB	.010 - 3/64	#5 - 40	1.00	.68	.187	#403 Ball End Plug (Factory Applied)	#455 Threaded Plug
0802TB	1/32 - 3/64	#8 - 32	1.12	.80	.218	#403 Ball End Plug (Factory Applied)	#460 Threaded Plug
0803TB	3/64 - 1/16	#10 - 24	1.25	.79	.250	#405 Ball End Plug (Factory Applied)	#465 Threaded Plug
0804TB	3/32 - 1/8	1/4 - 28	2.13	1.19	.375	#415 Ball End Plug (Factory Applied)	#476 Threaded Plug

NOTES: Standard Turnbuckle material is brass.
See page 13 for ball end plug and thread plug dimensions and materials.
Specify if nut is required.
If applicable consult factory for breaking strength limits.

MINIATURE PRECISION TURNBUCKLES



PART NO.	CABLE DIA.	TURNBUCKLE MATERIAL	MATING PARTS* (BRASS, PLATED STEEL, OR S.S.)
0011TB00	**	Brass	Eye (No. 11 L.H.) + Eye (No. 11 R.H.)
0011TB01	.010-.048	Brass	Eye (No. 11 L.H.) + Plug (455B0500 R.H.)
0011TB02	.010-.048	Brass	Plug (455B0500 L.H.) + Plug (455B0500 R.H.)

NOTES: Maximum pull strength 150 lbs. Check cable strength limit.
Each turnbuckle furnished with #5-40 R.H. and L.H. nut for locking purposes.
*Mating parts may vary pending availability
**Cable diameter must not exceed 3/32″ through eyelet hole.

SUPER STRENGTH TURNBUCKLES

Super strength turnbuckles are engineered for heavy-duty use and are designed to compete with drop forged strength at less cost. Bodies are made from a high-density aluminum alloy. Eyes are welded and bright zinc plated. Meet federal specifications for strength tests. Jam nuts are available, if required. Eye shape may vary, pending stock availability.

EYE & EYE

THREADED PLUG & THREADED PLUG

THREADED PLUG & EYE

PART NO.			CABLE DIA.	THREAD SIZE	TAKE UP REF.	BARREL LENGTH REF.	EYE & EYE LENGTH CLOSED REF.	SAFE WOKING LOAD LBS.
EYE & EYE	EYE & THREADED PLUG	THREADED PLUG & THREADED PLUG						
0810TB00	0810TB01	0810TB02	3/32 - 1/8	1/4 - 20	2-1/8	2-7/8	5-1/4	310
0811TB00	0811TB01	0811TB02	5/32	5/16 - 18	2-5/8	3-1/2	6-1/2	540
0812TB00	0812TB01	0812TB02	3/16	3/8 -16	3	4	8	820

NOTES: Threaded plug for 0810 is 475P1500, threaded plug for 0811 is 477P2000, threaded plug for 0812 is 480P2250; see page 13 for reference.
Ultimate load is 5 times safe working load.

DROP FORGED END FITTINGS

SAVA is equipped to manufacture cable assemblies utilizing various drop forged fittings, as shown below. For availability of different types and dimensions, contact SAVA.

HOOK WITH OR WITHOUT SAFETY LATCH

FOR CABLE SIZES
1/8″ TO 3/8″

ROD END

FOR CABLE SIZES
1/8″ TO 3/8″

YOKE END

FOR CABLE SIZES
1/8″ TO 3/8″

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

SAFETY SNAP HOOKS

SAVA is offering several designs of ruggedly built safety snap hooks. These hooks come with a spring-loaded safety snap which rests against the inside of the hook preventing accidental dislodgement of the cable.

Safety snap hooks can be incorporated in an assembly by us or sold separately.

PART NO. SH0750

Material	Galvanized Steel
Eye size	3/4 Ref.
Overall length	4 Ref.
Snap opening	3/4 Ref.
Ultimate breaking strength	3750 lbs.
Safe working load	750 lbs.

PART NO. SH2000

Material	Galvanized Steel
Eye size	11/16 Ref.
Overall length	4-3/8 Ref.
Snap opening	7/8 Ref.
Ultimate breaking strength	9000 lbs.
Safe working load	2000 lb.

PART SSHE

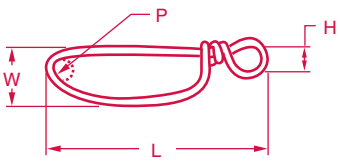
PART SSH

PART NO. SSH		PART NO. SSHE	STOCK SIZE REF.	OVERALL LENGTH REF.	SNAP OPENING REF.	MINIMUM BREAKING STRENGTH LBS.*	
PLATED STEEL	STAINLESS STEEL	PLATED STEEL				PLATED STEEL	STAINLESS STEEL
SSH5P	SSH5S	SSHE5P	.200	2.10	.250	400	600
SSH6P	SSH6S	SSHE6P	.240	2.40	.312	600	800
SSH8P	SSH8S	SSHE8P	.310	3.10	.375	1200	1500

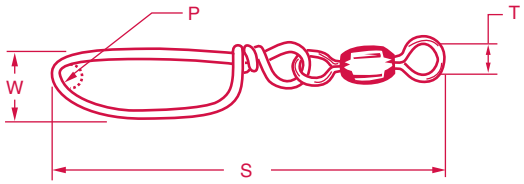
NOTE: *Maximum safe working load is determined by the end user. At least 5:1 safety factor is generally advised.

WIRE SNAP HOOKS

WITHOUT SWIVEL



WITH SWIVEL



PART NO.		APPROX. TEST LBS.							
WITHOUT SWIVEL	WITH SWIVEL	WITHOUT SWIVEL	WITH SWIVEL	L REF.	S REF.	W REF.	P REF.	H REF.	T REF.
SS2	SSB2	50	30	5/8	1-1/16	3/16	.052	.087	.075
SS3	SSB3	75	75	13/16	1-5/16	3/16	.060	.125	.120
SS4	SSB4	150	100	1-1/8	1-13/16	1/4	.084	.140	.140
SS5	SSB5	200	150	1-3/8	2-1/8	5/16	.097	.170	.168
SS6	SSB6	250	225	1-3/4	2-3/4	7/16	.134	.190	.190
SS7	SSB7	450	350	2	3-1/4	9/16	.170	.250	.237

NOTES: Designed for smaller cables, these hooks are made of stainless steel wire. The swivel is nickel-plated brass.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com

ISO 9001 CERTIFIED

TOOLS AND CUTTERS*

T185 COMPOUND CRIMPING TOOL

This four-nested precision crimping tool gives compound leverage of at least 15-1. Crimped properly, it will give full strength on copper and aluminum loop sleeve fittings 7020, 7025, 7030, 7047, and 7062. On ball end plug part nos. 401, 403, 405, and 410 and on threaded plug part nos. 455B, 458B, 460B, 465B, and 468B, it will give approximately 50% of rated cable strength when swaged over the nylon. Strip nylon for best swaging bond. This tool is designed for use on 7x7 or 7x19 construction cables. The scissor-action plier-type tool has jaws which are made of a tough chrome alloy steel. All component parts of the tool are hardened and tempered. The handles have nonslip plastic grips. Easy to use. Overall length 8-1/2″. Shipping weight: 1 lb.

A cable, when crushed or deformed in cutting, is difficult to use with fittings. These Swiss made, precision cable cutters, with unique triangular jaws, are designed to prevent frayed ends.

C07 CABLE CUTTER
Capacity 3/16″ diameter, length 8″, weight 10 oz.

NOTE: Other tools may be available, consult our office with your requirements

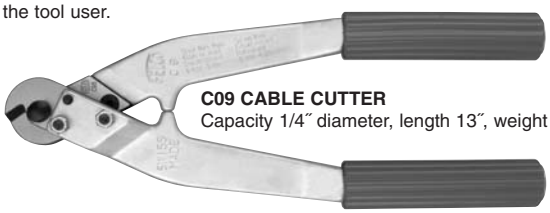
T188 COMPOUND CRIMPING TOOL

T188 is a six-cavity multiple-sleeve crimping tool and is made of high carbon steel, heat treated and hardened with centerless ground shoulder bolts. It is used on loop sleeves and stop sleeves from 3/64-3/16″ as indicated on page 15. It covers a range of cable strengths from 270 lbs. to 4200 lbs. in both galvanized and stainless steel cables. Each tool is clearly size-coded, is shipped with full instructions and includes a "go" gauge for after crimping. Tool length: 20″. Shipping weight: 5 lbs.

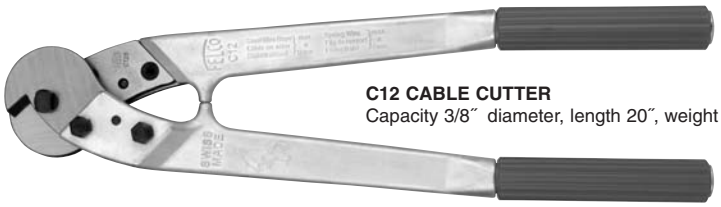
NOTE: We have determined through testing that the copper, aluminum, and stainless steel loop sleeves will hold in excess of 90% of nominal strength of galvanized or stainless steel cables manufactured to the fabrication requirements of MIL-DTL-83420 for 7x7 or 7x19 cables. See page 15 for strengths of stop sleeves. The holding power of sleeves on your cable should be checked by pull testing since the diameter and fabrication can vary from cable to cable. For cables of 1x7 or 1x19 construction, the use of two sleeves is recommended as well as thorough testing.

The T185/T188 tool is designed primarily for prototype or short-run applications. The strength of the crimp depends mainly upon the amount of pressure applied to the handles. For consistency, the same pressure should be applied when making more than one assembly. We recommend that all assemblies made with the T185/T188 be tested before use.

***NOTE:** Select tool or cutter carefully; follow recommendations indicated. Consult factory if in doubt.
Tools and cutters are not returnable. Strength of joint is a responsibility of the tool user.



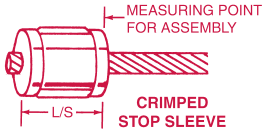
C09 CABLE CUTTER
Capacity 1/4″ diameter, length 13″, weight 2 lbs.



C12 CABLE CUTTER
Capacity 3/8″ diameter, length 20″, weight 3 lbs.

STOP SLEEVES


STOP SLEEVE



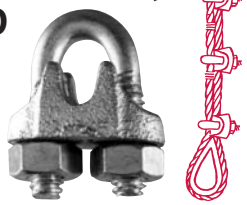
CRIMPED STOP SLEEVE

SAVA ITEM	REF. OLD PART NO.	FOR CABLE DIAMETERS	Ls REF. AFTER CRIMPED	TYPICAL HOLDING STRENGTH LBS.	TOOL & GROOVE CAVITY
8030C	803C	1/32	.22	110	T185-D
8047C	804C	3/64	.28	240	T188-1
8062C	805C	1/16	.30	325	T188-2
8092C	806C	3/32	.38	400	T188-3
8125C	807C	1/8	.38	900	T188-3
8156C	808C	5/32	.41	1200	T188-4
8187C	809C	3/16	.41	1600	T188-4
8218C	810C	7/32	.75	2500	51-MJ
8250C	811C	1/4	.82	3500	3-F6-950

NOTES: Std. material is copper.
Cables with 1x19 construction have less holding strength, consult factory.
Please note, to obtain typical holding strength above, any plastic coating must be removed from cable prior to swaging these fittings.

To obtain proper breaking strength with T188 tool, crimp once, rotate stop sleeve 30° and crimp again or allow factory to swage onto cable. Unless specified, cable will protrude beyond crimped stop sleeve or cable can be ground flush.
Also available in aluminum and other alloys, consult factory.

MALLEABLE WIRE ROPE CLIPS, STAINLESS STEEL AND GALVANIZED



Standard wire rope clips–designed for maximum holding stength. Heavy-duty construction throughout. For in-between sizes, use next larger size clip.

PART NO.	MATERIAL	FOR CABLE DIA.	RECOM-MENDED NO. OF CLIPS	EST. WT. 100 PCS. IN LBS.
WRC02G WRC02S	Malleable Steel Stainless Steel	1/16-3/32	2	1.5
WRC04G WRC04S	Malleable Steel Stainless Steel	1/8 - 5/32	2	4.5
WRC06G WRC05S	Malleable Steel Stainless Steel	3/16 - 7/32	3	6.5
WRC08G WRC06S	Malleable Steel Stainless Steel	1/4 - 9/32	3	13.2 6.5
WRC10G WRC08S	Malleable Steel Stainless Steel	5/16	3	12.1 13.2
WRC12G	Malleable Steel	3/8 - 7/16	3	25.5

NOTE: Thimbles are recommended with wire rope clips, see page 15.

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

PROTOTYPE ASSEMBLIES

Make your own prototype cable assemblies, lanyards, control cabling, etc. Use the finest, most flexible, most durable material–SAVA'S Miniature Cable–a multiplicity of fine STAINLESS STEEL wires, internally lubricated and coated with a tough abrasion-resistant nylon. When your design is completed, inquire with SAVA about production quantities.

This package consists of:
Precision Crimping Tool No. T185
2 choices of the following 20 cable sizes
4 choices (15 pcs. ea.) of the following fittings

KIT PACKAGE – MK 48

CABLE PART NO.	SIZE OF SPOOL OR COIL	OUTSIDE DIAMETER (INCL. COATING)	CONSTRUCTION	BREAKING STRENGTH	LOOP SLEEVE	BALL END PLUG	THREADED[2] PLUG
2009SN	25´	.014	3x7	10	7000B	401B1 or 403B1	455B0500
2012SN	25´	.019	3x7	18	7020B	401B1 or 403B1	455B0500
2014SN	25´	.019	7x7	26	7020B	401B1 or 403B1	455B0500
2018SN	25´	.024	7x7	40	7025B	401B1 or 403B1	455B0500
2024SN	10´	.030	7x19	70	7030C	403B2 or 405B2	455B0500 or 460B0500
2027SN	25´	.034	7x7	90	7030C	403B2 or 405B2	455B0500 or 460B0500
2031SN	25´	.037	7x7	120	7030C	403B2 or 405B2	455B0500 or 460B0500
2032SN	10´	.037	7x19	120	7030C	403B2 or 405B2	455B0500 or 460B0500
2036N	25´	.044	7x7	160	7047C	403B3 o 405B3	455B0500 or 460B0500
2037SN	10´	.046	7x19	160	7047C	403B3 or 405B3	455B0500 or 460B0500
2038SN	10´	.046	49+(8x19)	160	7047C	403B3 or 405B3	455B0500 or 460B0500
2047SN	10´	.052	7x49	170	7047C	405B4 or 410B2	465B0500
2048	15´	3/64	7x7	270	7047C	405B3 or 410B1	465B0500
2048SN2	15´	1/16	7x7	270	7062A	405B3[1] or 410B1[1]	465B0500[1]
2050SN2	15´	1/16	7x19	270	7062A	405B3[1] or 410B1[1]	465B0500[1]
2054SN2	10´	1/16	7x49	250	7062A	405B4[1] or 410B2[1]	465B0500[1]
2064	15´	1/16	7x7	480	7062A	405B4 or 410B2	465B0500
2064SN3	15´	3/32	7x7	480	7062A[1]	405B4[1] or 410B2[1]	465B0500[1]
2065	15´	1/16	7x19	480	7062A	405B4 or 410B2	465B0500
2065SN3	15´	3/32	7x19	480	7062A[1]	405B4[1] or 410B2[1]	465B0500[1]

[1]The nylon must be stripped off to use fitting. [2]All threaded plugs will be brass.

NOTE: Tool No. T185 is designed to give full cable strength for the loop sleeves. The ball end plugs and the threaded plugs, crimped over the nylon, will give approximately 50% of the rated breaking strength of the cable when properly applied. All above fittings, when factory applied, will give full rated strength of the cable. To get maximum crimping bond, strip nylon from cable. The T185 is designed for prototype or short-run applications by attaching fittings to cables and is to be used only on brass and copper fittings. We recommend that all assemblies made with the T185 be tested for strength before use.

SAVA recommends the use of a thimble when using loop sleeves. Miniature thimble part no. AN100-C1 should be used for cables 2009SN – 2048; Part AN100-C3 for cables 2048SN2 – 2064 and 2065, 2064SN3 and 2065SN3.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
ISO 9001 CERTIFIED

MIL SPEC CABLE AND FITTINGS

MIL-DTL-83420 CABLE

MIL-DTL-83420 cables are primarily used with MS-type terminals for both commercial aircraft and military applications. SAVA sells this cable in bulk or will quote your cable assembly design in compliance with MIL-T-6117 or MIL-T-781. We are fully equipped to proof load or prestress your assemblies to reduce constructional stretch and provide fitting reliability. For commercial grades of the equivalent cables at greatly reduced price, please refer to pages, 8, 9, 10 and 11 of this catalog.

TYPE I NON-JACKETED WIRE ROPE

MIL-DTL-83420, LATEST AMENDMENT COMPOSITION B, CORROSION RESISTANT STEEL

SAVA Part No.	Nominal Cable Dia.		Construction	Tolerance on Diameter (Plus Only)		Allowable Increase of Dia. at Cut End		Minimum Breaking Strength Composition B		Approximate Weight per 100 Feet	
	in.	mm		in.	mm	in.	mm	lbs.	kg	lbs.	kg
S030	1/32	.79	3x7	.006	.152	.006	.152	110	50	0.16	0.07
S048	3/64	1.19	7x7	.008	.203	.008	.203	270	122	0.42	0.19
S064	1/16	1.59	7x7	.010	.254	.009	.229	480	218	0.75	0.34
S065	1/16	1.59	7x19	.010	.254	.009	.229	480	218	0.75	0.34
S094	3/32	2.38	7x7	.012	.305	.010	.254	920	418	1.60	0.72
S095	3/32	2.38	7x19	.012	.305	.010	.254	920	418	1.74	0.79
S126	1/8	3.18	7x19	.014	.356	.011	.279	1,760	798	2.90	1.31
S158	5/32	3.97	7x19	.016	.406	.017	.432	2,400	1089	4.50	2.04
S188	3/16	4.76	7x19	.018	.457	.019	.483	3,700	1678	6.50	2.95
S252	1/4	6.35	7x19	.018	.457	.021	.533	6,400	2903	11.00	4.99
S315	5/16	7.94	7x19	.022	.559	.024	.610	9,000	4082	17.30	7.85
S375	3/8	9.53	7x19	.026	.660	.027	.686	12,000	5443	24.80	11.00

TYPE II JACKETED WIRE ROPE

MIL-DTL-83420, LATEST AMENDMENT COMPOSITION B, CORROSION RESISTANT STEEL WITH NYLON JACKET

SAVA Part No.	Nominal Cable Dia.		Construction	Outside Diameter of Jacket		Tolerance on Jacket O.D. (Plus Only)		Jacket Wall Thickness (Reference)		Approximate Weight per 100 Feet	
	in.	mm		in.	mm	in.	mm	in.	mm	lbs.	kg
S030N047	1/32	.79	3x7	3/64	1.19	.008	.203	.008	.203	0.22	0.10
S048N063	3/64	1.19	7x7	1/16	1.59	.010	.254	.008	.203	0.49	0.22
S064N094	1/16	1.59	7x7	3/32	2.38	.012	.305	.016	.406	0.93	0.42
S064N125	1/16	1.59	7x7	1/8	3.18	.014	.356	.031	.787	1.18	0.53
S065N094	1/16	1.59	7x19	3/32	2.38	.012	.305	.016	.406	0.93	0.42
S065N125	1/16	1.59	7x19	1/8	3.18	.014	.356	.031	.787	1.18	0.53
S094N125	3/32	2.38	7x7	1/8	3.18	.014	.356	.016	.406	1.85	0.84
S094N156	3/32	2.38	7x7	5/32	3.97	.016	.406	.031	.787	2.18	0.99
S095N125	3/32	2.38	7x19	1/8	3.18	.014	.356	.016	.406	1.99	0.90
S095N156	3/32	2.38	7x19	5/32	3.97	.016	.406	.031	.787	2.32	1.05
S126N188	1/8	3.18	7x19	3/16	4.76	.018	.457	.031	.787	3.62	1.64
S158N218	5/32	3.97	7x19	7/32	5.56	.018	.457	.031	.787	6.10	2.77
S188N250	3/16	4.76	7x19	1/4	6.35	.018	.457	.031	.787	7.75	3.51
S252N313	1/4	6.35	7x19	5/16	7.94	.020	.508	.031	.787	12.30	5.58
S315N438	5/16	7.94	7x19	7/16	11.11	.024	.610	.063	1.60	19.80	8.98
S375N500	3/8	9.53	7x19	1/2	12.7	.027	.686	.063	1.60	27.20	12.34

TYPE I NON-JACKETED WIRE ROPE

MIL-DTL-83420, LATEST AMENDMENT COMPOSITION A, CARBON STEEL, TIN OR ZINC COATED

SAVA Part No.	Nominal Cable Dia.		Construction	Tolerance on Diameter (Plus Only)		Allowable Increase of Dia. at Cut End		Minimum Breaking Strength Composition A		Approximate Weight per 100 Feet	
	in.	mm		in.	mm	in.	mm	lbs.	kg	lbs.	kg
G030	1/32	.79	3x7	.006	.152	.006	.152	110	50	0.16	0.07
G048	3/64	1.19	7x7	.008	.203	.008	.203	270	122	0.42	0.19
G064	1/16	1.59	7x7	.010	.254	.009	.229	480	218	0.75	0.34
G065	1/16	1.59	7x19	.010	.254	.009	.229	480	218	0.75	0.34
G094	3/32	2.38	7x7	.012	.305	.010	.254	920	418	1.60	0.72
G095	3/32	2.38	7x19	.012	.305	.010	.254	1,000	453	1.74	0.79
G126	1/8	3.18	7x19	.014	.356	.011	.279	2,000	907	2.90	1.31
G158	5/32	3.97	7x19	.016	.406	.017	.432	2,800	1270	4.50	2.04
G188	3/16	4.76	7x19	.018	.457	.019	.483	4,200	1905	6.50	2.95
G252	1/4	6.35	7x19	.018	.457	.021	.533	7,000	3175	11.00	4.99
G315	5/16	7.94	7x19	.022	.559	.024	.610	9,800	4445	17.30	7.85
G375	3/8	9.53	7x19	.026	.660	.027	.686	14,400	6532	24.30	11.00

TYPE II JACKETED WIRE ROPE

MIL-DTL-83420, LATEST AMENDMENT COMPOSITION A, CARBON STEEL TIN OR ZINC COATED WITH NYLON JACKET

SAVA Part No.	Nominal Cable Dia.		Construction	Outside Diameter of Jacket		Tolerance on Jacket O.D. (Plus Only)		Jacket Wall Thickness (Reference)		Approximate Weight per 100 Feet	
	in.	mm		in.	mm	in.	mm	in.	mm	lbs.	kg
G030N047	1/32	.79	3x7	3/64	1.19	.008	.203	.008	.203	0.22	0.10
G048N063	3/64	1.19	7x7	1/16	1.59	.010	.254	.008	.203	0.49	0.22
G064N094	1/16	1.59	7x7	3/32	2.38	.012	.305	.016	.406	0.93	0.42
G064N125	1/16	1.59	7x7	1/8	3.18	.014	.356	.031	.787	1.18	0.53
G065N094	1/16	1.59	7x19	3/32	2.38	.012	.305	.016	.406	0.93	0.42
G065N125	1/16	1.59	7x19	1/8	3.18	.014	.356	.031	.787	1.18	0.53
G094N125	3/32	2.38	7x7	1/8	3.18	.014	.356	.016	.406	1.85	0.84
G094N156	3/32	2.38	7x7	5/32	3.97	.016	.406	.031	.787	2.18	0.99
G095N125	3/32	2.38	7x19	1/8	3.18	.014	.356	.016	.406	1.99	0.90
G095N156	3/32	2.38	7x19	5/32	3.97	.016	.406	.031	.787	2.32	1.05
G126N188	1/8	3.18	7x19	3/16	4.76	.018	.457	.031	.787	3.62	1.64
G158N218	5/32	3.97	7x19	7/32	5.56	.018	.457	.031	.787	6.10	2.77
G188N250	3/16	4.76	7x19	1/4	6.35	.018	.457	.031	.787	7.75	3.51
G252N313	1/4	6.35	7x19	5/16	7.94	.020	.508	.031	.787	12.30	5.58
G315N438	5/16	7.94	7x19	7/16	11.11	.024	.610	.063	1.60	19.80	8.98
G375N500	3/8	9.53	7x19	1/2	12.7	.027	.686	.063	1.60	27.20	12.34

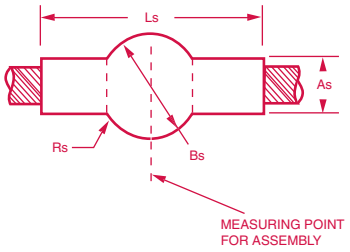
ISO 9001 CERTIFIED

P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com

Carl Stahl®
SAVA INDUSTRIES, INC.

MS-20663 BALL AND DOUBLE SHANK

MS PART NO. STAINLESS STEEL	FOR CABLE DIA.	As DIA.		Bs SPHERICAL DIA.		Ls APPROX.	Rs MAX RAD.
MS-20663-C1*	1/32 - 3/64	.075	REF.	.125	± .003	.180	.012
MS-20663-C2	1/16	.112	+ .000 - .003	.190	+ .000 - .003	.390	.014
MS-20663-C3	3/32	.143		.253		.578	.019
MS-20663-C4	1/8	.190		.315		.765	.023
MS-20663-C5	5/32	.222	+ .000 - .004	.379	+ .000 - .004	.953	.028
MS-20663-C6	3/16	.255	+ .000 - .005	.442	+ .000 - .005	1.140	.033
MS-20663-C7	7/32	.302		.505		1.328	.038
MS-20663-C8	1/4	.348		.567		1.515	.042
MS-20663-C9	9/32	.382	+ .000 - .007	.632	+ .000 - .007	1.719	.046
MS-20663-C10	5/16	.413		.694		1.875	.046



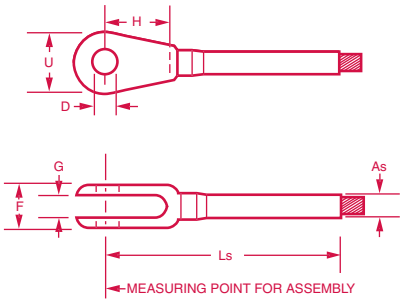
NOTES: *SAVA's P/N MS-20663-C1 has no applicable military specification.
All measurements in inches. Dimensions shown are after swaging.
Unless otherwise specified, decimal tolerances are ± .010.
STRENGTH: Generates full rated breaking strength of wire rope.
USAGE: Swaged to wire rope at ends or in center as control point.

MS-20664 SINGLE BALL AND SHANK

See page 14.

MS-20667 FORK

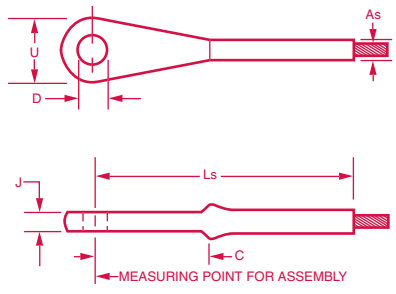
MS PART NO. STAINLESS STEEL	FOR CABLE DIA.	As DIA.		D DIA.		F + .010 - .005	G ± .003	H	LS APPROX.	U DIA.
MS-20667-2	1/16	.138		.190		.218	.093	.500	1.75	.344
MS-20667-3	3/32	.190				.254	.108	.670	2.06	.438
MS-20667-4	1/8	.219	+ .000			.383	.195	.735	2.61	.547
MS-20667-5	5/32	.250	- .005	.250		.406	.202	.800	3.00	.688
MS-20667-6	3/16	.313			+ .002	.543	.260	.880	3.24	.781
MS-20667-7	7/32	.375	+ .000		- .000	.625	.296	.970	3.74	.906
MS20667-8	1/4	.438	- .007	.375		.688	.313	1.070	4.10	.969
MS-20667-9	9/32	.500	+ .000	.438		.719	.327	1.170	4.48	1.156
MS-20667-10	5/16	.563	- .008			.765	.348	1.268	4.86	1.265
MS-20667-12	3/8	.625		.500	+.005 - .000	.830	.380	1.525	5.74	1.500



NOTES: All measurements in inches. Dimensions shown are after swaging.
Unless otherwise specified, decimal tolerances are ± .010.
STRENGTH: Generates full rated breaking strength of wire rope.

MS-20668 EYE

MS PART NO. STAINLESS STEEL	FOR CABLE DIA.	As DIA.		C ± .020	D DIA.		J		LS APPROX.	U + .025 - .010 DIA.
MS-20668-2	1/16	.138		.523			.088		1.809	.359
MS-20668-3	3/32	.190		.707	.190		.103		2.160	.438
MS-20668-4	1/8	.219	+.000	.738			.190		2.593	.500
MS-20668-5	5/32	.250	-.005	.831	.250	+.002	.197	+.000	3.029	.640
MS-20668-6	3/16	.313		.903	.313	- .000	.255	- .005	3.187	.781
MS-20668-7	7/32	.375	+.000	1.007			.291		3.678	.813
MS-20668-8	1/4	.438	-.007	1.133	.375		.307		4.062	.968
MS-20668-9	9/32	.500		1.257	.438		.322		4.512	1.109
MS-20668-10	5/16	.563	+.000	1.373			.343		4.969	1.218
MS-20668-12	3/8	.625	-.008	1.688	.500	+.005 -.000	.375	+.000 -.015	5.968	1.500



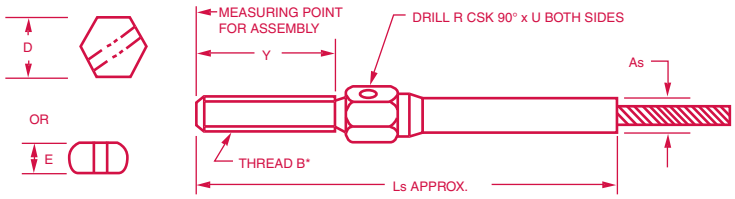
NOTES: All measurements in inches. Dimensions shown are after swaging.
Unless otherwise specified, decimal tolerances are ± .010.
STRENGTH: Generates full rated breaking strength of wire rope.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS
ISO 9001 CERTIFIED

MS-21259 THREADED TERMINALS

MS PART NO. STAINLESS STEEL		FOR CABLE DIA.	THREAD B* NF-3A UNF-3A	As DIA.		D REF.	E REF.	Ls APPROX.	R +.005 −.000 DIA.	U DIA.	Y +.063 −.000
LH THREAD	RH THREAD										
MS-21259-2-LH	MS-21259-2-RH	1/16	# 6-40	.138		.188	.156	2.65	.063	.094	1.045
MS-21259-3-LH	MS-21259-3-RH	3/32	#10-32	.190		.250	.187	3.00			1.204
MS-21259-4-LH	MS-21259-4-RH	1/8	1/4-28	.219	+ .000 - .005	.313	.250	3.59			1.376
MS-21259-5-LH	MS-21259-5-RH	5/32		.250				3.97			1.376
MS-21259-6-LH	MS-21259-6-RH	3/16	5/16-24	.313		.375	.312	4.17	.098	.125	1.453
MS-21259-7-LH	MS-21259-7-RH	7/32	3/8-24	.375	+ .000	.438	.375	4.81			1.625
MS-21259-8-LH	MS-21259-8-RH	1/4		.438	- .007	.500	.438	5.24			1.750
MS-21259-9-LH	MS-21259-9-RH	9/32	7/16-20	.500	+ .000	.625	.563	5.75			1.875
MS-21259-10-LH	MS-21259-10-RH	5/16	1/2-20	.563	- .008	.688	.625	6.27			2.000
MS-21259-12-LH	MS-21259-12-RH	3/8	9/16-18	.625		.750	.688	7.06			2.250

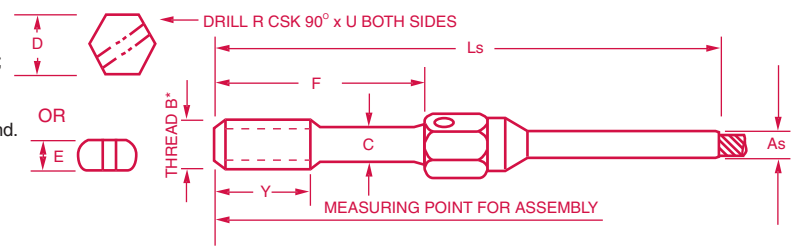
NOTES: All measurements in inches. Dimensions shown are after swaging.
Unless otherwise specified, decimal tolerances are ± .010.
STRENGTH: Generates full rated breaking strength of wire rope.
*THREADS: Right-hand (RH) and left-hand (LH) threads available; unless otherwise specified, right-hand threads will be furnished.
These terminals **are not** to be used with turnbuckle barrels.



MS-21260 THREADED TERMINALS

MS PART NO. STAINLESS STEEL		FOR CABLE DIA.	THREAD B* NF-3A UNF-3A	As DIA.		C +.006 -.000 DIA.	D REF.	E REF.	F REF.	Ls APPROX.	R +.005 −.000 DIA.	U DIA.	Y ± .047
LH THREAD	RH THREAD												
MS-21260-L2-LH	MS-21260-L2-RH	1/16	# 6-40	.138		.092	.188	.156	2.172	3.67	.063	.094	.375
MS-21260-S2-LH	MS-21260-S2-RH								1.297	2.79			
MS-21260-L3-LH	MS-21260-L3-RH	3/32	#10-32	.190		.133	.250	.187	2.157	3.86			.500
MS-21260-S3-LH	MS-21260-S3-RH								1.282	2.98			
MS-21260-L4-LH	MS-21260-L4-RH	1/8	1/4-28	.219	+ .000 - .005	.195	.313	.250	2.157	4.28	.098	.125	.563
MS-21260-S4-LH	MS-21260-S4-RH								1.282	3.40			
MS-21260-L5-LH	MS-21260-L5-RH	5/32		.250					2.157	4.66			.625
MS-21260-S5-LH	MS-21260-S5-RH								1.282	3.78			
MS-21260-L6-LH	MS-21260-L6-RH	3/16	5/16-24	.313		.245	.375	.312	2.157	4.78			.750
MS-21260-S6-LH	MS-21260-S6-RH								1.282	3.90			
MS-21260-7-LH	MS-21260-7-RH	7/32	3/8-24	.375	+ .000	.306	.438	.375	2.157	5.21			.875
MS-21260-8-LH	MS-21260-8-RH	1/4		.438	- .007		.500	.438	2.157	5.52			
MS-21260-9-LH	MS-21260-9-RH	9/32	7/16-20	.500	+ .000	.361	.625	.563	2.157	5.90			1.000
MS-21260-10-LH	MS-21260-10-RH	5/16	1/2-20	.563	- .008	.406	.668	.625	2.157	6.30			
MS-21260-12-LH	MS-21260-12-RH	3/8	9/16-18	.625		.476	.750	.688	2.327	7.01			1.125

NOTES: All measurements in inches. Dimensions shown are after swaging.
Unless otherwise specified, decimal tolerances are ± .010.
STRENGTH: Generates full rated breaking strength of wire rope.
*THREADS: Right-hand (RH) and left-hand (LH) threads available; unless otherwise specified, right-hand threads will be furnished.
Normally used in conjunction with turnbuckle barrel MS-21251.
L and S designation refers to long and short shanks on threaded end.



ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

PUSH-PULL CONTROL ASSEMBLIES

Push-pull and pull-pull cable controls offer a reliable method of transmitting motion between two fixed points or between points which are changing their relative position. Because of flexibility, they can be routed up, down, over obstacles and around corners without intermediate links or pulleys. Fewer working parts increase operational dependability of cable controls. They are virtually maintenance free as no periodic adjustments are necessary due to wear and tear of worn connections. Cable controls do not transmit noise and vibration.

SAVA is flexible enough to handle small as well as large volume orders for cable controls. A wide variety of end fittings are available to the designer for use with the casings and core cables.

CONSTRUCTION

The basic component of a push-pull control consists of a solid wire with a casing of plastic tube or spirally wrapped wire. See Figure 1. Substituting a flexible cable for the solid wire allows the control system to be bent to facilitate routing.

Different fittings as shown in the following text can be attached to the ends of the casing and cable for ease of operation.

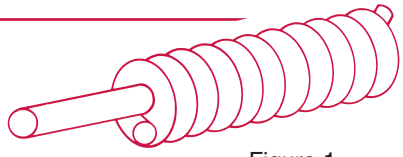


Figure 1

LOSS OF MOTION

The principal elements of lost motion in a control system are backlash and deflection. See Figure 2. Backlash is caused by the core member moving inside the casing with the change in direction of motion. It is a function of the clearance between the core and casing and total number of degrees of bend in the cable. This can be reduced by careful design. The other cause of loss of motion is deflection of the core wire under compressive load. Elastic strain in the core member due to compressive or tensile force also contributes to the loss of motion. The casing must be anchored securely to keep it from responding to the compression or tension modes of input loading.

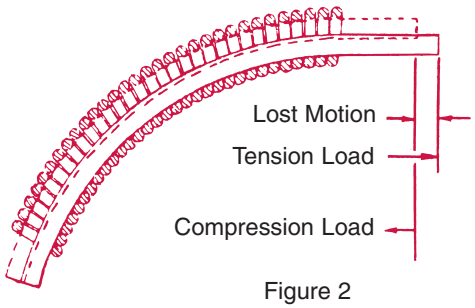


Figure 2

TRAVEL

Travel of the core inside the casing should be kept to a minimum since longer travel increases friction and decreases output. In the push-pull type of application, the chance of buckling of the core becomes greater. The travel should be limited to less than 5˝ if possible. The linear speed of operation should be relatively low.

BEND RADII AND LIFE

Cable bend radii should always be as generous as possible for maximum cable life and efficiency. Smaller bends cause reduced service life because of added friction. Depending on the size of the casing and the construction of the moving core member, the minimum recommended radius can vary from 2 to 8 inches.

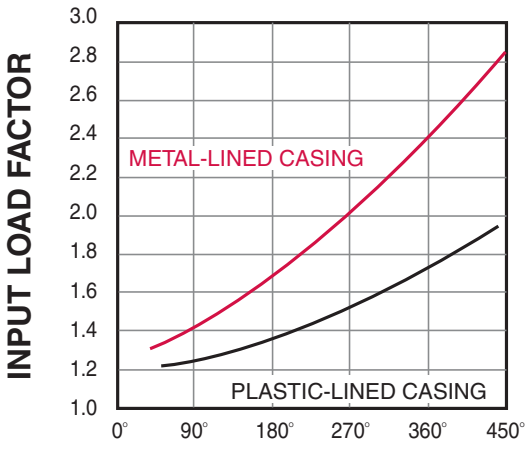
INPUT LOAD FACTOR

Friction between the core and the casing causes a loss in output force for a certain amount of input force. Friction is a function of the degrees of bend in the system. The ratio of the input force to the output force is called the Input Load Factor. The Input Load Factor has been plotted against the degrees of bend in the system and is shown in the accompanying graph. For selecting the right control system, the input load has to be determined by multiplying the output load with the Input Load Factor obtained from the graph using the following formula:

I = Input Load
P = Output Load
F = Input Load Factor (from graph)
I = P x F

Example: Consider a push-pull assembly with metal-lined casing requiring an output load of 6 lbs. Total degrees of bend in the system–270°. Input Load Factor from chart–2.05.

Input Load = 6 x 2.05 = 12.30 lbs.



Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS®
ISO 9001 CERTIFIED

PUSH-PULL CASING AND CORES

For light load applications casing made from nylon can be used. For heavier loads casing made from a round or half round wire tightly wound to resemble a closed spring is good for most applications. This type of casing is flexible, resists kinking and can be clamped or terminated without distortion of the wall. The casing can be ordered with a plastic coating. Casing with a plastic liner offers reduced friction and less start-up inertia.

LUBRICATION

Generally, lubrication is not advised in the casing. Lubricant tends to collect dirt, which impedes the movement of the core inside the casing. The core cable can perform efficiently with little or no lubrication. If lubricant is desired for a particular application, it must be specified by the customer which lubricant to be applied to the core cable prior to the assembly.

PART NO.	CASING O.D. REF.	CASING I.D. REF.	STANDARD CASING MATERIAL	SOLID CORE WIRE SIZE	1x7, 1x19 7x7 CORE CABLE RANGE
C090[1]	0.09	0.040	Nylon	.020 S.S.	.015 - .027
C130N[1]	0.13	0.060	Nylon	.032 S.S.	.024 - .040
C070	0.07	0.035	Galv. Steel	.020 S.S.	.018 - .027
C070VC	.070 w/Black PVC to .090	0.035	Galv. Steel	.020 S.S.	.018 - .027
C096	0.096	0.050	Galv. Steel	.032 S.S.	.027 - .037
C132	0.132	0.060	Galv. Steel	.036 S.S.	.036 - .050
C132VC	.132 w/Black PVC to .170	0.060	Galv. Steel	.036 S.S.	.036 - .050
C187	0.187	0.080	Galv. Steel	.054 S.S.	.045 - .063
C187PC	.187 w/Black HDPE to .225	0.080	Galv. Steel	.054 S.S.	.045 - .063
C187PL	0.187	0.080	Galv. Steel w/HDPE Lining	.054 S.S.	.045 - .063
C187PLPC	.187 w/Black HDPE to .225	0.080	Galv. Steel w/HDPE Lining	.054 S.S.	.045 - .063
C277[2]	0.277	0.140	Galv. Steel	N/A	3/32
C277PC[2]	.277 w/Black HDPE to .305	0.140	Galv. Steel	N/A	3/32
C277PL	0.277	0.140	Galv. Steel w/HDPE Lining	N/A	3/32
C277PLPC	.277 w/Black HDPE to .305	0.140	Galv. Steel w/HDPE Lining	N/A	3/32

NOTES: 1 Nylon casing is molybdenum disulfide impregnated for friction reduction.
2 C277 and C277PC casing may be provided with HDPE lining, based on availability.

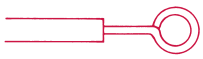
Casings available from stock are shown in the chart above. For other types of casing such as **stainless steel** and other sizes consult factory.

END TERMINALS FOR CORE WIRES

The simplest core is a solid wire which is adequate for low input loads and minimum bends. If the force is only in the pull direction, a stranded cable can be used with much tighter bends.

Simple terminations can be provided on a solid core wire by forming the high tensile steel wire in the typical shapes shown below. Some catalog fittings, such as eyes, end plugs, etc. can be used on solid wire. Please consult factory.

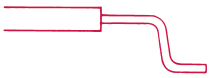
CENTERED LOOP



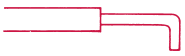
OFFSET LOOP

U BEND

Z BEND



L BEND



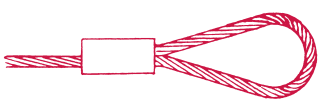
END TERMINALS FOR CORE CABLES

At right are shown typical cable fittings used as push-pull cable core terminals. The dimensions for these should be taken from our catalog using the proper cable core size. Special terminals can also be manufactured.

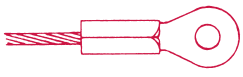
BALL
(PG. 14)

STOP SLEEVE (PG. 15)
OR END PLUG (PG. 13)

THREADED PLUG
(PG. 13)



LOOP SLEEVE
(PG. 15)



EYELET
(PG. 12)

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

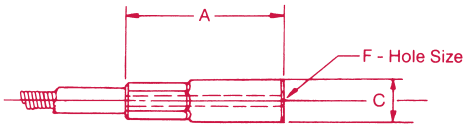
END TERMINALS FOR CORE CASING

For many applications simply clamping the casing close to the end of the control is acceptable. However, casing fittings can be applied directly to the ends. Special fittings developed for this purpose are shown below.

CAP AND GROOVE TERMINALS

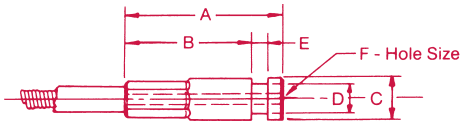
PART NO.[1]		AVAILABLE WITH CASING NO.	A REF.	B REF.	C REF.	D REF.	E[2] REF.	F REF.
GROOVED TERMINAL	CAP TERMINAL							
6005	6105	C070,C070VC,C096	.98	.74	.19	.125	.090	.047
6006	6106	C132, C132VC	.98	.74	.25	.180	.090	.063
6008	6108	C187, C187PC C187PLPC C187PL	1.00	.76	.25	.180	.090	.080
6013	6113		1.25	.87	.38	.250	.130	.125
6014	6114	C277, C277PC	1.50	1.12	.44	.344	.130	.125

NOTES: [1]State material required by suffix - B (Brass) - S (S.S.) - P (Plated Steel).
[2]This dimension can be modified for special snap rings.



SHOWN AFTER CRIMPING

CAP TERMINAL



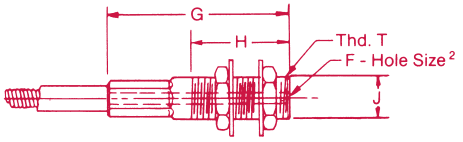
SHOWN AFTER CRIMPING

GROOVE TERMINAL

BULKHEAD TERMINALS

PART NO.	AVAILABLE WITH CASING NO.	G REF.	H REF.	J REF.	T REF.
6465[1]	C070, C070VC	1.62	1.00	.19	#10-24
6475	C070, C070VC, C096	2.06	1.25	.25	1/4-20
6477	C096, C132, C132VC	1.94	1.00	.31	5/16-18
6480	C132, C132VC, C187, C187PC, C187PL, C187PLPC	2.25	1.25	.38	3/8-16
6482	C187, C187PC, C187PL, C187PLPC	2.81	1.50	.50	1/2-13
6485	C277, C277PC	3.38	1.75	.63	5/8-11

NOTES: [1]Part no. 6465 is available in brass and stainless steel; the rest of the terminals are available in plated or stainless steel. State material required by suffix B (Brass), S (S.S.), P (Plated Steel). Other thread lengths and specials are available; see page 13. Jam nuts and washers furnished unless otherwise specified. To complete part no., add…casing no. desired. (such as 6475S096)
[2]Hole size will match inside diameter of casing.



SHOWN AFTER CRIMPING

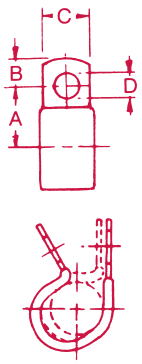
BULKHEAD TERMINAL

CLAMP TERMINALS FOR CASING

PART NO.	MATERIAL	USED FOR CASING	A REF.	B REF.	C REF.	D REF.
951N	Nylon	C130N	5/16	13/64	1/2	3/16
952N	Nylon	C070	9/32	5/32	3/8	1/8
953P[1]	Plated Steel	C132 C132VC	11/32	3/16	3/8	11/64
954P[1]	Plated Steel	C187, C187PLPC C187PL, C187PC	13/32	7/32	1/2	13/64
955P[1]	Plated Steel	C277	7/16	7/32	1/2	13/64
956P[1]	Plated Steel	C277PC	5/8	3/8	5/8	11/32

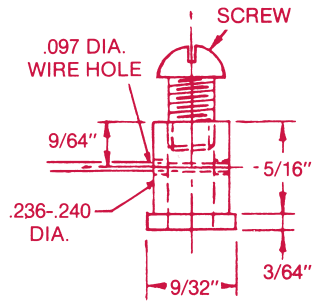
NOTE: [1]The steel clamps are vinyl lined.

CLAMP TERMINAL



WIRE CLAMP

PART NO. WC-1
MATERIAL: PLATED STEEL



Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
ISO 9001 CERTIFIED

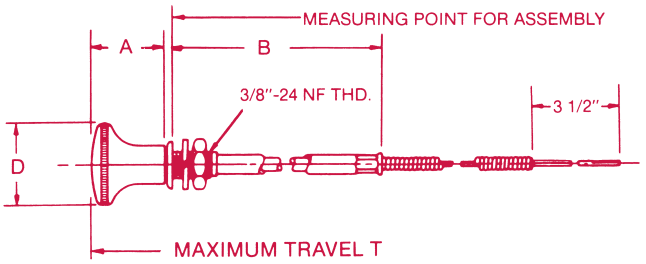
OTHER TYPES OF CONTROLS AVAILABLE

PUSH-PULL CONTROL

This type of push-pull assembly is ideal for choke or damper control.

Fits wire size .054″ or cable diameter .045-.063 with C187 series casing (see pg. 24).

PART NO. PPC1 AND PPC11



ITEM	A REF.	B REF.	D REF.	T REF.
PPC1	31/32	3-9/16	1-1/16	2-1/4
PPC11	3/4	3-1/8	7/8	1-1/2

LOCKING PUSH-PULL CONTROL

This control provides infinite adjustment for its entire travel. The operator can position the control where desired and then lock it in place by turning it clockwise.

Specially suited for applications where spring tension or vibration causes ordinary controls to creep.

Fits wire size .054″ or cable diameter .045-.063 with C187 series casing (see pg. 24).

All PPC part numbers will consist of the following:

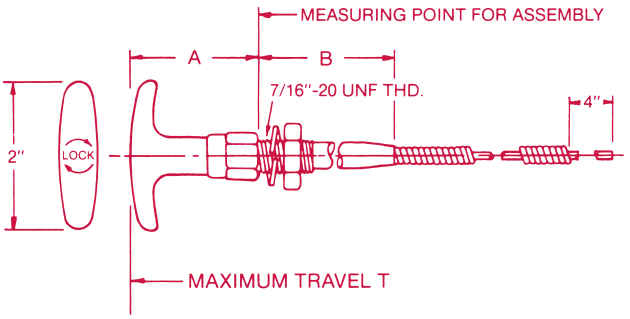
1 knob with plunger — 1 lock washer

1 sleeve with face plate — 1 jam nut

For assembly order please specify length of casing and wire.

Part numbers PPC11 and PPC22 are less expensive, have shorter travel, and are intended for lighter duty applications.

PART NO. PPC2 AND PPC22



ITEM	A REF.	B REF.	T REF.
PPC2	1-3/4	4-1/8	3
PPC22	1-5/8	2-15/16	2

NOTE: PPC2 may not be available in small quantity. Consult factory.

DESIGN PROCEDURE

1. Select a cable suitable to withstand the load. Keep in mind, the more wires in a cable the more flexible the cable will be. For push-pull types of application the solid core wire will be most suitable. Next to that a 1x7 or 1x19 construction cable may be used where the movement is small and the casing is adequately constrained.

   Select a casing and make a scale layout drawing. Try to keep the number of bends to a minimum and the radii of bends to a maximum. The radius should not be less than 100 times the core diameter. Remember, the lighter casing with a light load will be more flexible.

2. Build a prototype of the design in its final configuration. Apply loads to determine performance characteristics.

3. Determine exact dimensions of the assembly from the prototype. Check tolerances on all components to keep the length at a minimum so extra bends are not necessary. Indicate the movement of the core inside the casing.

4. Prepare a drawing and indicate the distance moved by the core inside the casing. Include lengths, tolerances, end fittings, casing, core, quantities, and send to SAVA with a request for quote.

TYPICAL APPLICATIONS INCLUDE

Dampers • Releases • Valves • Vents • Doors • Connectors • Linkages • Shutoffs • Reset Devices

ISO 9001 CERTIFIED

P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com

Carl Stahl®
SAVA INDUSTRIES, INC.

PULLEYS
SMALL NYLON PULLEYS – BEARING MOUNTED

GENERAL INFORMATION

SAVA's Bearing Mounted Nylon Pulleys are primarily engineered and designed for use with small cables and cords. They offer greatly increased mechanical efficiency over plastic pulleys and are considerably less expensive than bearing mounted pulleys now available. SAVA pulleys are being used on recorders, metering equipment, indicators, control mechanisms, drive systems, etc.

Two basic types of bearing mounted pulleys are offered. The SP series is used where a more precise shielded bearing is required and the UP series where a commercial type bearing is adequate. These are described in more detail with the charts. In addition to the pulleys shown, SAVA can manufacture special diameters and shapes to fit your requirements.

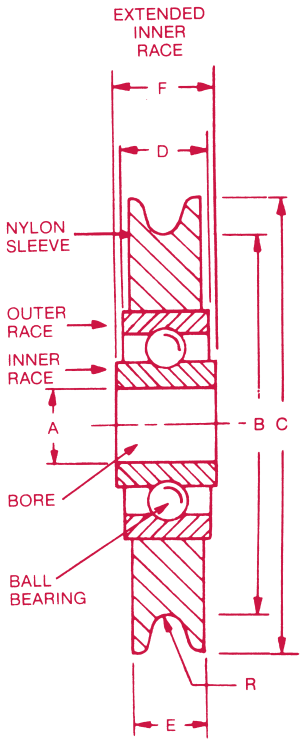
In all cases where "CABLE SIZES TO" are noted, it should be understood that this includes the coating, if any.

SP SERIES PULLEYS

The SP series pulleys below incorporate a precision, double shielded, lubricated single row ball bearing which is ABEC3 precision built to give all the accuracy needed to satisfy the load, speed, and life expectancy requirements of many applications now using more expensive ultra-precise bearings.

Please note that pulleys with extended inner races are more expensive than those without extensions.

SAVA ITEM	REF. OLD PART NO.	DIMENSIONS							CABLE SIZES TO	LOAD[2] (LBS)
		A ± .0005	B ± .020	C ± .020	D ± .010	E ± .010	F[1] + .000 - .005	R REF.		
SP2031 SP2031E	SP-231 SP-231-E	.125	.310	.375	.110	.093	N/A .141	.015	1/32	10
SP2044 SP2044E	SP-243 SP-243-E	.125	.437	.500	.156	.125	N/A .188	.025	3/64	10
SP2050 SP2050E	SP-250 SP-250-E	.125	.500	.625	.156	.125	N/A .188	.015	1/32	10
SP2063 SP2063E	SP-263 SP-263-E	.125	.625	.750	.156	.156	N/A .188	.025	3/64	10
SP3050E	SP-248-E	.1875	.500	.625	.125	.125	.156	.015	1/32	10
SP3088	SP-387	.1875	.885	1.070	.250	.219	N/A	.025	3/64	90
SP3106	SP-310	.1875	1.063	1.250	.250	.219	N/A	.035	1/16	90
SP4088 SP4088E	SP-487 SP-487-E	.250 .250	.885	1.070	.281 .188	.219 .188	N/A .219	.025	3/64	90
SP4125	SP-613	.250	1.250	1.500	.281	.281	N/A	.050	3/32	90
SP4138	SP-614	.250	1.375	1.750	.281	.281	N/A	.065	1/8	90



NOTES: [1]Where F dimension is not applicable (N/A) on the chart, the bearing does not have an extended inner race.
[2]Dynamic Load Rating is given in lbs. at 500 RPM.

BEARING LIFE

The load ratings shown on the dimensional tables give the approximate dynamic capacity of the bearings under normal operating conditions of constant load and speed of 2500 hours average life. These figures assume that the bearings are properly mounted, operate under clean conditions, and are properly lubricated. For load ratings at speeds other than 500 PM shown in the dimensional table, multiply the rating at 500 RPM by the following factors:

50 RPM	100 RPM	300 RPM	800 RPM	1000 RPM
2.50	1.90	1.23	.83	.76

It is frequently necessary to determine what life a bearing will have when operating under a known or mean radial load at some constant or average speed. The Load-Life Formula may be written as follows:

$$\text{LIFE (UNKNOWN) @} = \frac{\text{Load Rating at 2500 hours}}{\text{Actual Radial Load}}$$

The above figures are estimates based on statistical evidence and are intended to serve as a guide.

The nylon pulley is a press fit over the bearing. Improper alignment of cable or cord may cause premature failure of the bearing or in certain installations cause the pulley sleeve to come off. Since there is considerable variation in application, we recommend actual life tests for your intended use.

NOTE: Most pulleys can be supplied with metric bearings; please inquire. Pulleys can be manufactured out of other plastics for an additional cost.

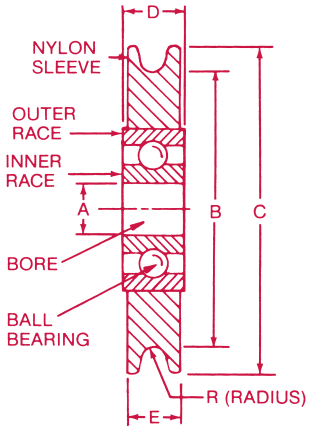
SMALL NYLON PULLEYS – BEARING MOUNTED (Cont.)

UP SERIES PULLEYS

SAVA's inexpensive UP series pulleys are used for moderate load and speed application not requiring the use of more precise ground bearings. The bulk of all applications falls into this category. The UP series pulleys are furnished with an open-type precision machined ball bearing, which is lightly lubricated.

UP2044, UP2050, and UP2063 are also available with open-type, ABEC1 precision ground bearings with ball retainers and are very free turning. If you wish to purchase a precision ground brearing for these pulleys, specify the pulley part followed by R2X1 Bearing; e.g., UP2044R2X1.

UP PULLEY

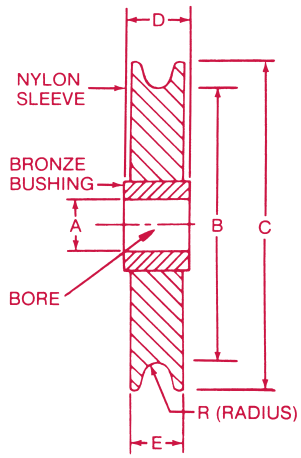


SAVA ITEM	REF. OLD PART NO.	A +.005 -.001	B ± .020	C ± .020	D ± .010	E ± .010	R REF.	CABLE SIZES TO	LOAD[2] (LBS)
UP2044	UP-243	.125	.437	.500	.156	.125	.025	3/64	10
UP2050	UP-250	.125	.500	.625	.156	.125	.015	1/32	10
UP2063	UP-263	.125	.625	.750	.156	.156	.025	3/64	10
UP2081[1]	UP-281	.125	.813	1.000	.171	.156	.025	3/64	35
UP3088	UP-387	.187	.885	1.070	.250	.219	.025	3/64	35
UP3106	UP-310	.187	1.063	1.250	.250	.219	.035	1/16	45
UP4088	UP-487	.250	.885	1.070	.250	.219	.025	3/64	35
UP4106	UP-410	.250	1.063	1.250	.250	.219	.035	1/16	45
UP4125	UP-413	.250	1.250	1.500	.312	.281	.050	3/32	80
UP4138	UP-414	.250	1.375	1.750	.312	.281	.065	1/8	80
UP6125	UP-613	.375	1.250	1.500	.312	.281	.050	3/32	70
UP6138	UP-614	.375	1.375	1.750	.312	.281	.065	1/8	70

NOTES: [1]UP2081 contains an ABEC1 precision ground shielded bearing with bore tolerance ± .0005.
[2]Dynamic Load Rating is given in lbs. at 500 RPM.

MP SERIES PULLEYS

MP PULLEY



This line of nylon pulleys offers an oil-impregnated bushing of porous, sintered, self-lubricating bronze. This vacuum impregnated oil, equivalent to SAE 30, supplements the pure bronze structure and forms a hydraulic cushion which absorbs unusual shock and permits the bushing to carry heavier loads than the SP of UP series pulleys. This nylon pulley is also highly corrosion and wear resistant.

SAVA ITEM	REF. OLD PART NO.	A ± .002	B ± .020	C ± .020	D ± .010	E ± .010	R REF.	CABLE SIZES TO	STATIC LOAD LBS MAX.
MP2063	MP-263	.127	.625	.750	.187	.156	.025	3/64	20
MP3088	MP-387	.189	.885	1.070	.250	.219	.025	3/64	70
MP3106	MP-310	.189	1.063	1.250	.250	.219	.035	1/16	90
MP4088	MP-487	.252	.885	1.070	.250	.219	.025	3/64	70
MP4106	MP-410	.252	1.063	1.250	.250	.219	.035	1/16	90
MP4125	MP-413	.252	1.250	1.500	.313	.281	.050	3/32	160
MP4138	MP-414	.252	1.375	1.750	.313	.281	.065	1/8	180
MP6125	MP-613	.377	1.250	1.500	.313	.281	.050	3/32	160
MP6138	MP-614	.377	1.375	1.750	.313	.281	.065	1/8	180

STORAGE

SAVA's nylon pulleys with oil-impregnated sintered bronze bushings can be stored indefinitely in suitable containers using plastic bags, wax paper, metal, glass, etc. Woods, ordinary paper and cardboard are not suitable since they absorb oil from the bushings. Properly stored SAVA's oil-impregnated bushings retain their oil supply indefinitely.

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

ZINC PLATED STEEL PULLEYS
WITH SHIELDED & UNSHIELDED BALL BEARING

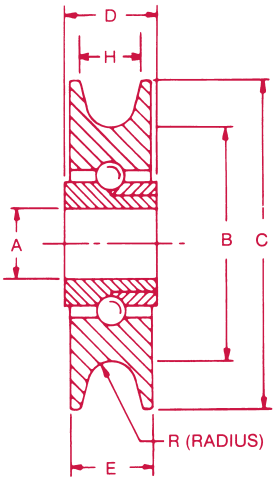
CP SERIES PULLEYS

This economical line of precision machined ball bearing pulleys is grooved for small cables. They offer precision steel balls, case-hardened steel races, light lube, machined raceways, and are zinc plated.

For shielded pulleys, which are internally lubricated and have plastic seals, add "S" after "CP" prefix, such as CPS2038.

SHIELDED

UNSHIELDED



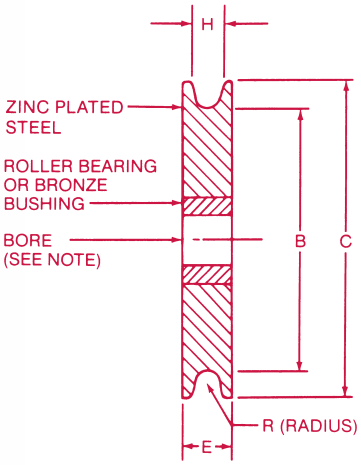
SAVA ITEM	REF. OLD PART NO.	A +.005 -.000	B ± .010	C ± .010	D ± .005	E ± .005	H ± .005	R REF.	CABLE SIZES TO	RADIAL CAPACITY AT 50 RPM*
CP(S)2038	CP(S)-243	.125	.380	.500	.188	.156	.096	.025	3/64	36 lbs.
CP(S)3075	CP(S)-375	.187	.750	1.000	.375	.312	.219	.065	1/8	145 lbs.
CP(S)3088	CP(S)-387	.187	.875	1.060	.281	.250	.190	.050	3/32	175 lbs.
CP(S)4088	CP(S)-487	.250	.875	1.250	.437	.375	.250	.095	3/16	175 lbs.
CP(S)6125	CP(S)-413	.375	1.250	1.750	.500	.437	.315	.125	1/4	290 lbs.
CP(S)6150	CP(S)-650	.375	1.500	2.000	.500	.437	.315	.125	1/4	410 lbs.

NOTES: *The sum of the radial and thrust load on any installation should not exceed the radial load capacity. To obtain the radial capacity at other speeds, multiply the radial capacity above with the following conversion factors: 100 RPM - .75; 300 RPM - .39; 600 RPM - .28; 900 RPM - .22; 1,000 RPM - .19.

ZINC PLATED STEEL PULLEYS
WITH BRONZE BUSHINGS OR ROLLER BEARINGS*

OP SERIES PULLEYS

This line of OP Pulleys is a continuation of the CP Series, except this pulley allows for larger cable up to 3/8″. The OP Series also offers a more economical and optional bronze bushing or roller bearing.



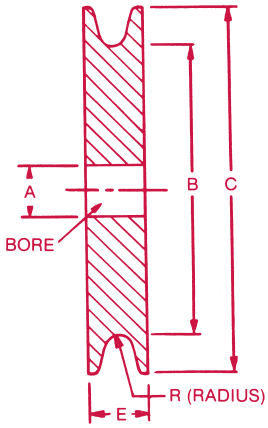
SAVA ITEM	REF. OLD PART NO.	B ± .015	C + .015	E ± .010	H ± .010	R REF.	CABLE SIZES TO
OP0150	OP-163	1-1/2	2	.440	.345	.125	3/16
OP0200	OP-200	2	2-1/2	.440	.345	.150	1/4
OP0250	OP-250	2-1/2	3	.625	.530	.215	5/16
OP0281	OP-298	2-13/16	3-1/2	.625	.530	.240	3/8

NOTE: For availability of bushings and bearings, please refer to page 33.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com

ISO 9001 CERTIFIED

BLACK DELRIN® PULLEYS



BP SERIES PULLEYS

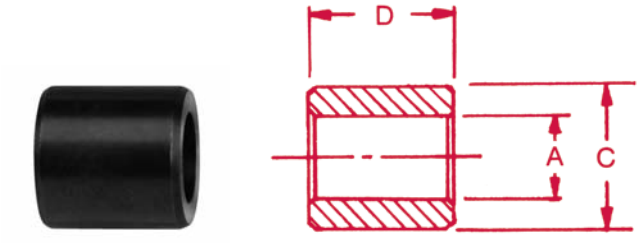
The chemical composition, regular structure, and high crystallinity of Delrin® give SAVA Black Delrin® pulleys a combination of physical properties not available with either metals or other plastics such as:

- High mechanical strength and rigidity
- Fatigue endurance unmatched by other plastics
- Excellent resistance to moisture, gasoline, sunlight, solvents, and many other neutral chemicals
- Good electrical insulating characteristics
- Excellent dimensional stability and wide useful temperature range (+347°F melt point)
- Resiliency
- Natural lubricity

SAVA ITEM	REF. OLD PART NO.	OTHER BORES ARE AVAILABLE A ± .005	B ± .020	C ± .020	E ± .010	R REF.	CABLE SIZES TO
BP2031	BP-231-2	.128	.310	.375	.093	.015	1/32
BP2044	BP-243	.128	.438	.500	.125	.025	3/64
BP2050	BP-250	.128	.500	.625	.125	.015	1/32
BP2063	BP-263	.128	.625	.750	.156	.025	3/64
BP3081	BP-381	.190	.813	1.000	.170	.025	3/64
BP3088	BP-387	.190	.885	1.070	.219	.025	3/64
BP3106	BP-310	.190	1.063	1.250	.219	.035	1/16
BP4122	BP-416	.254	1.225	1.575	.330	.095	3/16
BP4125	BP-413	.254	1.250	1.500	.281	.050	3/32
BP4138	BP-414	.254	1.375	1.730	.281	.065	1/8
BP5158	BP-516	.316	1.580	1.950	.405	.125	1/4
The following pulleys are manufactured from nylon. They are primarily used for fiber rope; however, in many cases they function well with cables.							
BP4061	BP-406	.254	.615	.960	.400	.170	1/4-5/16
BP4100	BP-411	.254	1.000	1.375	.400	.135	1/4
BP4118	BP-412	.268	1.175	1.750	.440	.130	1/4

NOTE: BP4100 and BP4118 have extended hubs of .025 per side.

STEEL INSERTS

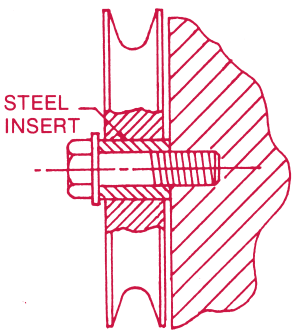


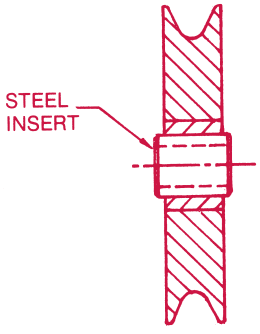
BI SERIES INSERTS

These inexpensive steel inserts can be used to reduce bore diameters. They are made wider than our pulley bearings so that the pulley can rotate freely while the insert is held on the sides.

The inserts are case-hardened and black oxide finished.

USED PRIMARILY ON OP AND LP SERIES PULLEYS





SAVA ITEM	REF. OLD PART NO.	A ± .002	C ± .002	D REF.
BI192531	BI-45	3/16	1/4	5/16
BI255050	BI-50	1/4	1/2	1/2
B1315050	BI-55	5/16	1/2	1/2
B1385050	BI-60	3/8	1/2	1/2
B1387575	BI-65	3/8	3/4	3/4
B1507575	BI-70	1/2	3/4	3/4

ISO 9001 CERTIFIED
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
Carl Stahl®
SAVA INDUSTRIES, INC.

"MD" NYLON PULLEYS

LP SERIES PULLEYS

SAVA LP Pulleys utilize a high strength molded nylon containing finely divided particles of molybdenum disulfide ("MD") solid lubricant.

CONSIDER THESE ADVANTAGES

- Reduced cost
- 6-1 weight savings over steel
- Corrosion resistant
- Self lubricating
- Nongalling
- Low friction
- High tensile strength
- Abrasion-resistant properties
- Runs quietly and smoothly
- Low coefficient of thermal expansion
- Lower H_2O absorption
- Excellent impact resistance
- Less heat-generating friction
- Excellent vibration and fatigue resistance

...ALSO

- The improved strength of the molybdenum disulfide ("MD")–impregnated nylon enables it to support bearing loads greater than other thermoplastic materials.
- The inherent resiliency of this material enables it to return to original dimension after deformation because of unusual extreme loading.

...AND

- Bare wire rope used in conjunction with this type of LP pulleys has shown **450%** improvement in the endurance life of bare wire rope when tested at 10%, and 220% improvement when tested at 20% of wire rope breaking strength.

SAVA LP pulleys can also be molded from the basic plastics listed in the chart below. "MD" nylon, we feel, has properties which offer overall advantages. However, it cannot be offered in colors as other plastics. Polyethylene and polypropylene offer significant cost advantages but with considerable loss of physical properties as indicated on the chart.

PHYSICAL PROPERTIES OF BASIC PLASTICS

PHYSICAL PROPERTIES	ASTM	UNIT	"MD" NYLON	NYLON 6/6	ACETAL	HIGH-DENSITY POLYETHYLENE	POLY-PROPYLENE
Tensile Strength	D638	PSI	13,500	9,000-12,000	8,800-12,000	2,500-4,300	4,000-5,500
Elongation at Break	D638	%	15	20-200	12-75	170-180	200-700
Shear Strength	D732	PSI	10,500	9,600	7,700-9,500		
Flexural Strength (Yield)	D790	PSI	16,500	12,500-14,000	13,000-15,500		5,000-7,000
Hardness, Rockwell	D785	R	119	110-120	119-122		50-96
Compressive Strength	D695	PSI	13,000	5,000	16,000		3,500-8,000
Deflection Temperature °F (264 PSI)	D648	°F	210	200-450	230-255	154-158	115-140

NOTE: This information, based on our experience, is in line with accepted engineering practice and is believed to be reliable. However, we do not warrant the conformity of our materials to the listed properties or the suitability of our materials for a particular purpose.

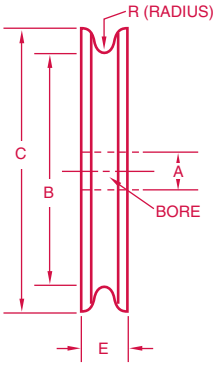
How to Order:

For pulleys without bushings or bearings, select pulley number from table on page 32, and add size of bore if you wish SAVA to bore the pulley; e.g., LP0438-.625.
For pulleys with bushings or bearings, select pulley number from table on page 32, and add bushing or bearing number from respective tables on page 33; e.g., LP0338-RB385650.

GENERAL NOTES: For volume customers, your name or logo can be substituted for the SAVA logo. Custom-designed pulleys can be made to your specific size requirements. Please provide a drawing showing the dimensions as outlined in the sketch on page 32.
These pulleys can also be assembled with the bore inserts shown on page 30 of our catalog.
Pulley and cable alignment is very important in preventing premature failure and attaining long life in working or in static load conditions. Any application which has inherent pulley-cable misalignment should be thoroughly tested for the application.

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS
ISO 9001 CERTIFIED

LP SERIES PULLEYS



SAVA ITEM	REF. OLD PART NO.	PLAIN BORE SIZE RANGE A[1] +.002 -.001	B REF.	C REF.	E REF.	R REF.	FOR CABLE SIZES	TYPE	MAX. LOAD[3] (LBS.)	APPROX. WT. EA. OZ.
LP0220	LP-22	.375 - 1.000	2.200	2.500	.250	.050	1/16 - 3/32	A	200	.7
LP0188	LP-18	.375 - .625	1.875	2.440	.687	.160	1/8 - 5/16	B	1600	1.3
LP0200	LP-20	.375 - .625	2.000	2.500	.438	.110	1/8 - 3/16	B	800	.9
LP0250	LP-25	.375 - .625	2.500	3.000	.438	.110	1/8 - 3/16	B	800	1.2
LP0256	LP-26	.375 - .625	2.563	3.000	.625	.190	1/8 - 3/8	B	1600	1.5
LP0300	LP-30	.375 - .625	3.000	3.500	.438	.110	1/8 - 3/16	B	800	1.4
LP0338	LP-33	.375 - 1.000	3.375	4.000	.500	.140	3/16 - 1/4	B	1400	2.5
LP0388	LP-38	.375 - 1.000	3.875	4.500	.500	.140	3/16 - 1/4	B	1400	2.8
LP0438	LP-43	.500 - 1.000	4.375	5.000	.500	.140	3/16 - 1/4	B	1400	3.5
LP0463	LP-46	.500 - 1.000	4.625	5.500	.625	.170	1/4 - 5/16	C	1600	4.3
LP0513	LP-51	.500 - 1.000	5.125	6.000	.625	.200	1/4 - 3/8	C	1600	5.6
LP0525	LP-52	.500 - 1.000	5.250	6.000	.625	.170	1/4 - 5/16	C	1600	5.9

NOTES: For availability of bushings and bearings, please refer to page 33.

Pulleys in the above chart are sold with an incomplete hole (cored). When machining these, care should be taken to make the bore concentric with the outside diameter. This is normally done in a lathe. Completing the bore in a drill press is not recommended because of possible misalignment and loss of concentricity. SAVA has semi-automated equipment to perform this according to your specifications.

Maximum load indicates allowable load for pulleys furnished with bearings under static load conditions. For long pulley fatigue life, a load equal to 25% or less of the maximum load column is recommended.

Type A

Type B

Type C

BORE WEAR ON LP PULLEYS WITHOUT BEARINGS

On lightly loaded applications where the working load is less than 10% of the maximum load, as shown above, it is possible to use these pulleys without bushings or antifriction bearings. Analyzing the wear characteristics, it was found that two factors directly affect the wear on bearings: pressure (P) and surface velocity (V). Working with these two factors, a relationship with the bearing wear has been developed. Tests were run on our Pulley Testing Machine with different sizes of pulleys under various load conditions. Results obtained so far are depicted in the graph below. Shafts and mating parts made from hardened and ground steel perform best, while unhardened steel surfaces will wear quickly in many applications, particularly if unlubricated. Our tests for pulley wear were run on ground shafts with no lubrication. Lubrication will reduce wear. It is difficult to estimate wear rates for lubricated bearing surfaces, since this depends, to a great extent, on the lubricant and the efficiency of its application to the bearing surface.

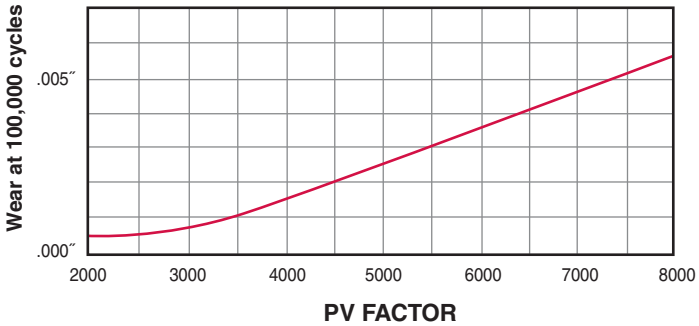
The following formula will predict the approximate bore wear on LP pulleys without bushings or bearings.

$$\text{PV Factor} = P \times V$$

$$P = \frac{W}{d \times L}$$

$$V = \frac{\pi \times d \times n}{12}$$

P = Pressure in p.s.i.
W = Load on bearing in pounds
d = Diameter of bearing in inches
L = Width of bearing in inches
n = r.p.m.
V = Velocity in feet/min.



RECOMMENDED BORE DIMENSIONS FOR LP PULLEYS W/O BEARINGS

I.D. CODE	SHAFT DIA. INCHES	BORE DIMENSIONS + .002 - .001
1	3/8	.376
2	7/16	.439
3	1/2	.501
4	9/16	.564
5	5/8	.626
6	11/16	.689
7	3/4	.751
8	7/8	.876
9	1	1.002

GROOVE WEAR

All of our tests show insignificant groove wear when used with coated cable at the end of 500,000 cycles.

ISO 9001 CERTIFIED

P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com

Carl Stahl®
SAVA INDUSTRIES, INC.

SINTERED BRONZE BUSHINGS

SAVA ITEM	DIMENSIONS I.D.	DIMENSIONS LENGTH	USED ON NYLON PULLEY PART NOS.	USED ON STEEL PULLEY PART NOS.
MP253825	1/4	1/4	LP0220	–
MP253844		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP253850		1/2	LP0338, LP0388	–
MP253869		11/16	LP0188	–
MP324425	5/16	1/4	LP0220	–
MP324444		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP324450		1/2	LP0338, LP0388	–
MP385025	3/8	1/4	LP0220	–
MP385044		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP385050		1/2	LP0338, LP0388, LP0438	–
MP385063		5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
MP385069		11/16	LP0188	–
MP506325	1/2	1/4	LP0220	–
MP506944		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP506350		1/2	LP0338, LP0388, LP0438	–
MP506363		5/8	LP0256, LP0463, LP0513,LP0525	OP0250, OP0281
MP506369		11/16	LP0188	–
MP638850	5/8	1/2	LP0338, LP0388, LP0438	–
MP631063		5/8	LP0463, LP0513, LP0525	OP0250, OP0281
MP751050	3/4	1/2	LP0338, LP0388, LP0438	–
MP751063		5/8	LP0463, LP0513, LP0525	OP0250, OP0281

LP pulleys are available with a variety of sintered, oil-impregnated, bronze bushings and with ball and needle roller bearings. The following tables show the standard sizes. For specials, please contact the factory. With bearings, these pulleys offer excellent wear properties and prolonged life using loads not exceeding the recommended limits (see note 3 on page 32). Pulleys should not be allowed to move from side to side without restraints, because the bearing might work sideways out of the bore.

STANDARD NEEDLE ROLLER BEARINGS

SAVA ITEM	TYPE	DIMENSIONS I.D.	DIMENSIONS LENGTH	USED ON NYLON PULLEY PART NOS.	USED ON STEEL PULLEY PART NOS.
RB254425	Unsealed	1/4	1/4	LP0220	–
RB254444	Unsealed	1/4	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB325044	Unsealed	5/16	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB385644	Unsealed	3/8	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RS385644	Sealed	3/8	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB385650	Unsealed	3/8	1/2	LP0338, LP0388, LP0438	–
RB385663	Unsealed	3/8	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RS385663	Sealed	3/8	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RB506944	Unsealed	1/2	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RS506944	Sealed	1/2	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB506950	Unsealed	1/2	1/2	LP0338, LP0388, LP0438	–
RB506963	Unsealed	1/2	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RS506963	Sealed	1/2	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RB638150	Unsealed	5/8	1/2	LP0338, LP0388, LP0438	–
RB638163	Unsealed	5/8	5/8	LP0463, LP0513, LP0525	OP0250, OP0281
RB751050	Unsealed	3/4	1/2	LP0338, LP0388, LP0438	–
RS751050	Sealed	3/4	1/2	LP0338, LP0388, LP0438	–
RB751063	Unsealed	3/4	5/8	LP0463, LP0513, LP0525	OP0250, OP0281
RS751063	Sealed	3/4	5/8	LP0463, LP0513, LP0525	OP0250, OP0281

NOTE: Unsealed roller bearings are protected from rust only. These should be grease lubricated before use. We suggest that bearings should be wiped with grease before installation. Sealed bearings are prelubricated.

BALL BEARINGS

SAVA ITEM	BEARING DESCRIPTION	DIMENSIONS I.D.	DIMENSIONS LENGTH	USED ON NYLON PULLEY PART NOS.	USED ON STEEL PULLEY PART NOS.
SP38	Ground and Shielded	.1875 +.0005 -.0000	1/4	LP0220	–
UP38	Unground and Open	.188 +.004 -.000	1/4	LP0220	–
UP48	Unground and Open	.250 +.004 -.000	1/4	LP0220	–
UP50E	Unground and Shielded	.375 +.004 -.000	5/8[1]	LP0338, LP0388 LP0438, LP0463 LP0513, LP0525	OP0150, OP0200 OP0250, OP0281

NOTES: [1]Includes extended inner race of .060 each side. For LP0463, LP0513, LP0525, OP0250, and OP0281, the inner race will be flush with the hub.

Bearings can be ordered as separate items if you prefer to install them or use them in another application.

Theoretical Load Rating on ball bearings is 53 lbs. at 600 RPM.

For other speeds use the conversion factor below:

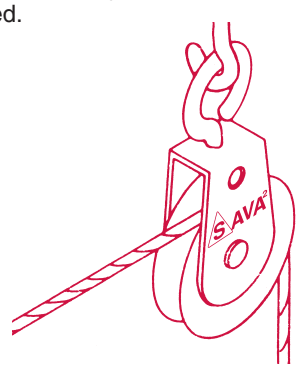
3.6 @ 50 RPM
2.7 @ 100 RPM
1.4 @ 300 RPM
.8 @ 900 RPM
.7 @ 1000 RPM
.6 @ 1200 RPM

Carl Stahl®
SAVA INDUSTRIES, INC.
P.O. Box 30 • 4 North Corporate Drive, Riverdale, New Jersey 07457-0030
973.835.0882 • Fax: 973.835.0877 • www.savacable.com
CABLE SOLUTIONS®
ISO 9001 CERTIFIED

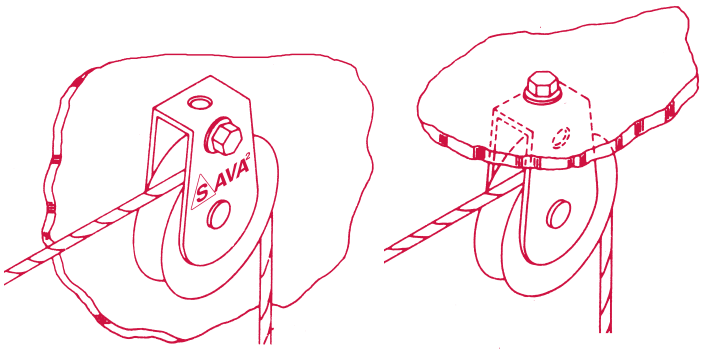
BRACKET PULLEYS

These inexpensive brackets offer the option of different size pulleys, materials, and eyes as depicted. They can be top, side or eye mounted.

How to Order:
Select and list from chart–①pulley no., ②bracket style, and ③material; e.g. BP4061APS.



② EYE MOUNT (Swivel Type)
Bracket Style A

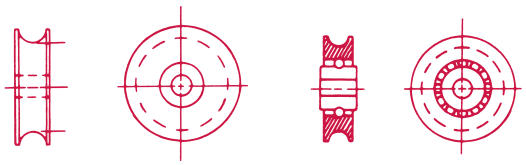


② SIDE MOUNT OR TOP MOUNT
Bracket Style B

① PULLEY NO (SIZE O.D.)	PULLEY TYPE (MAXIMUM CABLE DIA.)	EYE SIZE	③MATERIAL AVAILABLE FOR BRACKET	A	B	C	D	E	F	G	H	J	K	L	M	N
BP4061 (.960) BP4100 (1.375)	N (1/4″)	2	Stainless Steel (SS)[1] or Plated Steel (PS)[1]	1.65	1.00	.70	.66	.78	1.15	.37	.22	—	.05	.21	—	(1x) .19
CP4088 CPS4088 (1.250)	P (3/16″)															
LP0200 (2.50) LP0250 (3.00)	N (3/16″)	3	Plated Steel (PS)	3.00	2.00	1.50	.78	.88	2.00	.50	.25	.53	.08	.23	(2x) .19	(2x) .19
CP6125 CPS6125 CP6150 CPS6150 (1.75) (2.00)	P (1/4″)															

NOTES: [1] If the material ordered is stainless steel (SS), then the bracket, eye, and rivet will be furnished in 300 Series SS Otherwise, for plated steel (PS), rivet and eye will be plated steel and the bracket will be stainless steel.
For volume customers, your name and logo can be substituted for the SAVA logo.
See catalog for pulley details.

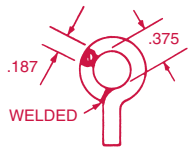
PULLEY TYPE



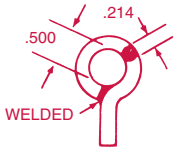
MATERIAL - NYLON
TYPE N

MATERIAL - PLATED STEEL
TYPE P

EYE SIZE

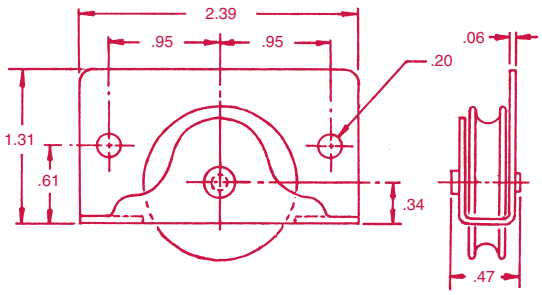


SIZE 2
500 LBS. MIN.
BREAKING STRENGTH

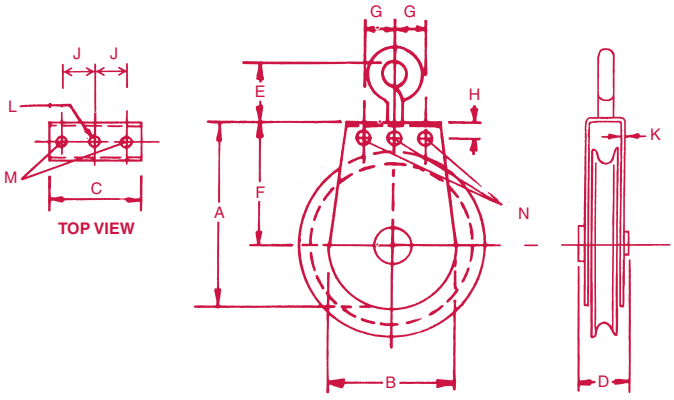


SIZE 3
700 LBS. MIN.
BREAKING STRENGTH

SPECIAL BRACKETS



SIDE MOUNT BRACKET STYLE C
PART NO. BP4122CAL
ALUMINUM BRACKET WITH PULLEY BP4122



MIN. STRENGTHS NOTED ABOVE ARE FOR THE BRACKET PULLEY ASSEMBLY.

NOTE: Maximum safe working load is determined by the end user. At least a 3:1 safety factor is generally advised. This is exclusive of any shock load.
For volume customers, specially designed brackets can be manufactured. All dimensions are for reference only.

PULLEYS

When cable is used over pulleys, the cable life can be significantly prolonged by proper groove design. Laboratory tests prove that improper groove design reduces cable bending life to 90%. These same tests show that doubling a pulley diameter can increase cable bending life up to thirteen times. Also, pulley diameters less than fifteen rope diameters fall into a range in which cable life is relatively low.

Cable life is reduced as the groove radius changes from the contour of the cable to a flat surface. For maximum cable life, the groove should make contact with the cable on at least 1/3 of the cable circumference.

RECOMMENDED MINIMUM PULLEY DIAMETERS
To Maximize Life

CABLE CONSTRUCTION	PULLEY DIAMETERS (ROOT)
3 x 7	50 times rope (uncoated dia.)
7 x 7	40 times rope (uncoated dia.)
7 x 19	25 times rope (uncoated dia.)
7 x 49	15 times rope (uncoated dia.)

HOW PULLEY SIZE AFFECTS CABLE STRENGTH

The radius of bend has an affect on the strength of cable. In order to take this into account in selecting the size pulley to be used with a given diameter cable, the following table can be used as a guide:

RATIO "A" = $\frac{\text{PULLEY DIA.}}{\text{CABLE DIA.}}$	STRENGTH EFFICIENCY COMPARED TO CATALOG STRENGTH IN %
40	95
30	93
20	91
15	89
10	86
8	83
6	79
4	75
2	65
1	50

FOR EXAMPLE: Using a .030″ dia. cable with a .600″ dia. pulley. Ratio "A" = .600 ÷ .030 = 20 and the strength efficiency = 91% as compared to the catalog strength of the cable.

SALES POLICY AND TERMS

FITTINGS–Most cable fittings shown in this catalog are available in prototype packages of 25 pieces for those who wish to make their own initial assemblies. However, many require special tooling which is expensive to develop. We recommend that you ask SAVA to quote you on your requirements.

PULLEYS–Pulleys are available from stock. Some are sold in prototype packages.

CABLE–Most cables shown are in stock and are sold in minimum quantities of 250 feet. Some cables are made to order since the demand is infrequent. For cables made to order, the minimum order quantity is normally 1000 feet and SAVA will ship the yield of the manufacturing run.

WARRANTY

All products sold by Carl Stahl Sava Industries, Inc. are guaranteed against manufacturing defects. Any item found to be defective will be replaced or an adjustment made provided that we are notified promptly upon receipt. An item is considered defective only if it fails to meet specifications set forth in the purchaser's Purchase Order or other specifications published by the Company. We reserve the right to request that an item be returned to us for examination; we are not responsible for any labor or other charges incurred in replacement of any item. In no event shall our liability for any defective product exceed its replacement cost to us. THE COMPANY EXPRESSLY DISCLAIMS ANY AND ALL RESPONSIBILITY OR LIABILITY FOR THE PERFORMANCE OF ANY PRODUCT INTO WHICH THE COMPANY'S PRODUCTS ARE INTEGRATED OR ASSEMBLED AND PURCHASER AGREES TO HOLD THE COMPANY HARMLESS AGAINST ANY SUCH LIABILITY. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE COMPANY SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES.

CERTIFICATIONS–Unless specified on the quotation, prices do not include the preparation of certifications or any other documentation that may be required by purchaser. Please contact factory, as additional fees may apply.

CREDIT AND PAYMENT TERMS–Net 30 payment terms will be extended to firms with a satisfactory commercial rating. To avoid delay in servicing an order, we will ship COD when proper credit information is not available. Unless otherwise noted, prices are quoted FOB shipping point.

MINIMUM BILLING–$150.00 domestic, $200.00 non-domestic.

RETURNED CHECK CHARGE–$25.00

RETURNED MERCHANDISE–All material that is not the subject of a request for return authorization within thirty (30) days of shipment shall be deemed accepted by the customer. Credit will not be issued for material returned without authorization from us. All returned std. items in satisfactory condition are subject to a handling charge of 20%. Contact factory for a return authorization number. Items manufactured to customer's specifications may not be returned.

TOOLS AND CUTTERS–Are not returnable.

SPECIFICATIONS–The dimensions, weights, lengths, strengths, and other specifications shown in this catalog are for reference only and subject to variation within reasonable tolerances and subject to change without notice.

ACCEPTANCE OF ORDERS–All orders are subject to acceptance by our home office. We are not responsible for delays or nonfulfillment due to riot, fire, floods, strikes or other causes beyond our control. Prices are based on costs and conditions existing on the date of quotation and are subject to change by the seller before final acceptance by seller. Unless otherwise agreed upon, purchaser agrees to accept and pay for quantities ±5% of the total quantity ordered. Quoted delivery is subject to prior sales.

BLANKET ORDERS–A blanket order is a firm contract for acceptance of the total quantity ordered, to be delivered over time. All blanket orders are to be shipped complete and accepted within one year of the date of the order. In the event that the complete order is not accepted by purchaser within one year, the price may revert to that for the quantity taken and the purchaser will be responsible for the difference, along with cancellation charges and charges for material and work in process and/or in final inventory.

Sales Representative

Sava's Medical Brochure is available online or in print.
www.savacable.com/medical

Carl Stahl®
SAVA INDUSTRIES, INC.

P.O. Box 30, 4 North Corporate Drive
Riverdale, NJ 07457-0030
973.835.0882 • Fax: 973.835.0877
www.savacable.com

DG1007 5K