LOOS & CO. INC.

WIRE AND WIRE ROPE DIVISION

Aircraft Cable and Cable Assemblies Catalog

About us.

The mission of Loos & Co., Inc. is to manufacture specialty wire and cable products for critical applications that demand the highest standards of performance and quality. Since the beginnings of the company in 1958, Loos & Co., Inc. has been the industry leader in the development of products for critical applications such as aerospace flight controls, elevators, rescue hoists, earthquake bracing, rigging, scaffolding, automotive controls and exercise equipment. Loos & Co., Inc. actively seeks to manufacture specialty products that are beyond the expertise of our competition.

Quality.

We are the only qualified manufacturer of bulk wire rope to Boeing and Douglas specifications. In addition, we are the qualified manufacturer to produce and certify MIL-DTL-83420 Type II cable for use in aerospace applications. Loos & Co., Inc. is ISO 9001-2008 and AS9100C certified.

ISO 9001 CERTIFICATION TM
Intertek

Customer Approvals

AgustaWestland
Airbus S.A.S
ATK Space Systems
AVIC
Beechcraft
Boeing Commercial Airplane, D1-9000
Bombardier Aerospace
Breeze-Eastern Corporation
Cessna Aircraft Co.
Erickson Air-Crane Inc.
FAA-PMA No. PQ2118NE Boeing Models
Goodrich Aerospace, Landing Gear Division
L3 Communications
Learjet
Lockheed Martin Aeronautics Co.
C-130 B-H Certified Parts Licensee
Lycoming Engines
Martin Baker America
Northrup Grumman Corp.
Pilatus
Piper Aircraft
Raytheon Aircraft Co.
Spirit Aerosystems
Textron Defense Systems
Triumph Group
TRW Space and Electronics Group

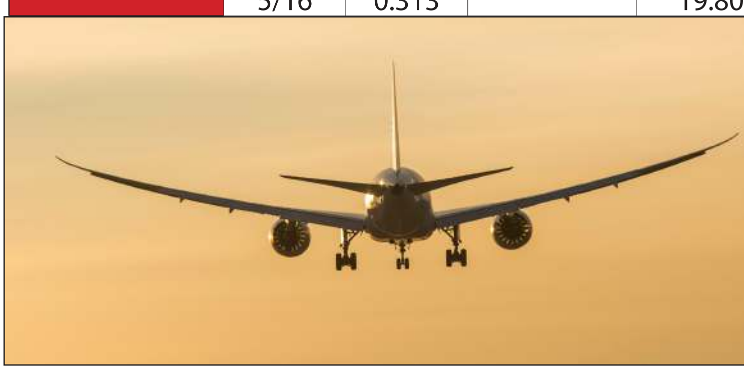
Specifications

Loos & Co., Inc. manufactures wire rope, cable, cable assemblies, and strand to these specs:

MANUFACTURER	SPECIFICATION	ROPE/CABLE	DESCRIPTION
Boeing	BMS 7-265 QPL-BMS 7-265	Rope	Aircraft controls; flexible
Bombardier Aerospace	BAMS 511-011	Cable	Aircraft control systems
Bombardier Canadair	CMS 511-01		
British Aerospace Standard	BS 2W 12:1989	Rope	Preformed zinc coated carbon steel
Douglas	DMS 1989	Rope	Steel; nylon-coated
	DMS 2114	Rope	Steel; non-flexible
	DMS 2187 DMS QPL 2187	Rope	7x31 Warrington-Seale; IWRC
	DMS 2192 DMS QPL 2192	Rope	6x31 Warrington-Seale; IWRC
	DMS 2220 DMS QPL 2220	Rope	Steel, controlled elongation
	DMS 2453 DMS QPL 2453	Rope	Nylon jacketed, tin-over-zinc coated
	DMS 2454 DMS QPL 2454	Strand	Nonflexible; tin-over-zinc coated
General Dynamics	P100	Rope	Flexible; CRES; coated and uncoated
	P101	Rope	Flexible; carbon steel; plastic coated and uncoated
International Standards Org.	ISO 2020	Rope	Preformed flexible steel for aircraft controls
MIL-SPEC	MIL-DTL-18375 QPL-18375	Rope	Flexible; corrosion-resistant; non-magnetic; for aircraft control
	MIL-DTL-6117 QML-6117	Rope	Assemblies; aviation; swage type
	MIL-DTL-83140 QPL-83140	Rope	Stainless steel preformed; rotation resistant; for aircraft rescue hoist, utility hoist and winching *Supersedes MIL-W-83140*
	MIL-DTL-83420 QPL-83420	Rope	Flexible; for aircraft control *Supersedes MIL-W-83420, MIL-C-5424 and MIL-W-1511*
	MIL-DTL-87161 QPL-87161	Strand	Non-flexible; for aircraft application *Supersedes MIL-W-87161, MIL-W-5693 and MIL-W-6940*
	MIL-DTL-87218 QPL-87218	Cable	Cable; lockclad; for aircraft control
	MIL-W-18242	Rope & Rope Assemblies	Single-leg-corrosion resisting steel, minesweeping
Northrop Grumman	GL505H	Cable	Lanyard cable-plastic covered
Piper Aircraft	PS 60043	Cable	Limited relaxation control cable
Ratheon Aircraft Co.	BS24917	Rope	Steel; flexible for aircraft flight control systems

Aircraft Cable

	DIAMETER		CONSTRUCTION	MIN. BREAK STRENGTH, LBS				BASE PART #
				MIL-DTL-83420		GF	SF	Combine 2-letter part code at left with base part number
	Fraction	Decimal		WGT/100', LBS	OD Jacket	Galvanized	302/304 Stainless Steel	
Bare Aircraft Cable	1/32	0.031	3x7	0.15	N/A	110		03037
	3/64	0.047	7x7	0.42	N/A	270		04777
	1/16	0.063		0.75	N/A	480		06377
	3/32	0.094		1.70	N/A	920		09477
	1/16	0.063	7x19	0.75	N/A	480		06379
	3/32	0.094		1.70	N/A	1,000	920	09479
	1/8	0.125		2.90	N/A	2,000	1,760	12579
	5/32	0.156		4.50	N/A	2,800	2,400	15679
	3/16	0.188		6.50	N/A	4,200	3,700	18879
	7/32	0.219		8.60	N/A	5,600	5,000	21979
	1/4	0.250		11.00	N/A	7,000	6,400	25079
	9/32	0.281		13.90	N/A	8,000	7,800	28179
	5/16	0.313		17.30	N/A	9,800	9,000	31378
	3/8	0375		24.30	N/A	14,400	12,000	37579
Jacketed Aircraft Cable	1/32	0.031	3x7	0.22	3/64			0313701
	3/64	0.047	7x7	0.49	1/16	270		0477701
				0.76	5/64			0477702
	1/16	0.063		0.93	3/32	480		0637701
				1.18	1/8			0637702
	3/32	0.094		1.85		920		0947701
				2.18	5/32			0947702
	1/16	0.063	7x19	0.93	3/32	480		0637901
				1.18	1/8			0637902
	3/32	0.094		1.99	1/8	1,000	920	0947901
				2.32	5/32			0947902
	1/8	0.125		3.62	3/16	2,000	1,760	1257901
	5/32	0.156		6.10	7/32	2,800	2,400	1567901
				7.51	9/32			1567902
	3/16	0.188		7.75	1/4	4,200	3,700	1887901
				9.20	5/16			1887902
	7/32	0.219		9.76	9/32	5,600	5,000	2197901
				11.55	11/32			2197902
	1/4	0.250		12.30	5/16	7,000	6,400	2507901
				14.42	3/8			2507902
	9/32	0.281		16.18	13/32	8,000	7,800	2817901
	5/16	0.313		19.80	7/16	9,800	9,000	3137902



Aircraft Control Assemblies

Our experience speaks for itself. Loos & Co., Inc. supplies cable assemblies to Bombardier, Lockheed Martin, and most every major manufacturer of commercial and military aircraft. We are a qualified manufacturer of bulk wire rope to Boeing and Douglas specifications—nearly every commercial aircraft is equipped with our cable. In addition, we are the only qualified manufacturer to produce and certify all MIL-DTL-83420 Type I and Type II cable for use in aerospace applications.

C-130 B-H Certified Parts License

Loos & Co., Inc. is licensed by Lockheed Martin to manufacture C-130 B-H Certified Parts for global distribution.

Lock-Clad Assemblies

Lock-clad cable is manufactured by swaging aluminum tubing over a 7x7 or 7x19 galvanized or stainless steel cable. Originally developed for aircraft control applications, Lock-clad has found additional industrial applications..

Cable Assembly Tolerances

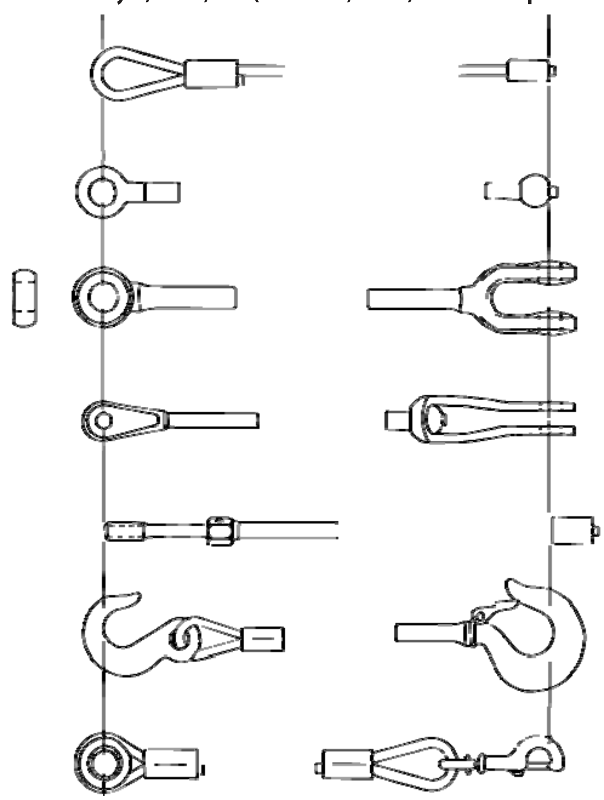
Liberal tolerances allow a faster rate of production and lower cost. The “standard” tolerances shown in the chart normally permit a cost saving over “close” tolerances. Tolerances closer than those shown can be supplied after review of your requirements and mutual agreement regarding methods of inspection.

LENGTH, FT		TOLERANCE STANDARD, IN	
[exclusive, inclusive]	Aircraft Critical	Cable 0 < 5/8”	Cable 0 > 5/8”
[0,6]	± .06	± .1/8	± 1/4
[6, 10]	± .09	± .3/16	± 3/8
[10, 20]	± .012	± .1/4	± 1/2
[20, 40	± .19	± .3/8	± 3/4
[40, 60]	± .25	± .1/2	± 1
[60, 80]	± .44	± .7/8	± 1-3/4
[80, 100	± .50	± 1	± 2
>100	± .56	± .1%*	± 2%*

*Percentage per foot—tolerance is rounded up to the next whole inch

STANDARD POINTS OF MEASURE FOR ASSEMBLIES

B.P. (Bearing Point); Loops, Hooks, Stops; CTR (Center); Eyes, Forks; End (or Overall; Studs, Ball and Stop



Technical Information

Service Life Over Pulleys

Cable or wire rope will give increased service if:

1. It operates over the largest possible pulley or sheave diameter
2. It is properly supported in the pulley or sheave groove

Working life of the individual wire strands is greatly reduced as the pulley or sheave diameter is diminished. The chart below shows minimum tread diameters over which various sizes and constructions of cable should operate.

Minimum Sheave Tread Diameters

	DESIRABLE MINIMUM, IN			CRITICAL MINIMUM, IN		
RATIO	42:1	24:1	12:1	26:1	18:1	10:1
CABLE, IN	6x7 7x7	6x19 7x19	6x31 7x31 6x37	6x7 7x7	6x19 7x19	6x31 7x31 6x37
1/16	2-5/8	–	–	1-3/4	–	–
3/32	2-15/16	2-1/4	–	2-5/8	1-11/16	–
1/8	5-1/4	3	–	3-1/2	2-1/4	–
5/32	6-9/16	3-1/4	–	4-3/8	2-7/8	–
3/16	7-7/8	4-1/2	–	5-1/4	3-3/8	–
7/32	9-3/16	5-1/4	–	6-1/8	4	2-1/2
1/4	10-1/2	6	3	7	4-1/2	3-1/8
5/16	13-1/8	7-1/2	3-3/4	8=3/4	5=5/8	3-3/4
3/8	15-3/4	9	4-1/2	10-1/2	6-3/4	4-3/8
7/16	18-3/8	10-1/2	5-1/4	12-1/4	7-7/8	
1/2	21	12	6	14	9	5

When designing a pulley groove, the groove should be 150% of the maximum tolerance of the wire rope.

EX: 1/8" 7 x 19 aircraft cable has a minimum tolerance of .014" (.125 min, .139 max).
Multiplying the .014" maximum tolerance by 150% = .021 ".
Adding .021" to 139" maximum diameter = .160" which should be the pulley groove dimension.

NOTE: When designing aircraft control cable systems, minimum ratio of cable diameter to pulley diameter is 35:1.

Wire Rope Stretch

In any cable or wire rope application, stretch may be a concern. There are two types of stretch in cable and wire rope – structural stretch and elastic stretch.

STRUCTURAL STRETCH: the lengthening of the lay in the construction of cable and wire rope as the individual wires adjust under load. Structural stretch in Loos & Co., Inc. products is less than 1% of the total cable length. This form of stretch can be completely removed by applying a cable or wire rope pre-stretching operation prior to shipment.

ELASTIC STRETCH: the actual physical elongation of the individual wires under load. The elastic stretch can be calculated by using this formula*:

$$E = [W \text{ X } G] / D2$$

E = Elastic Stretch, as a % of length**
W = Weight of load, in pounds
D = Diameter of cable, in inches
G = Available in chart below

	G FACTOR	
CONSTRUCTION	GALVANIZED	SS 302/304
1x7	0.00000061	0.000000735
1x19	0.00000068	0.000000779
7x7	0.00001070	0.00001200
7x19	0.00001400	0.00001620
6x19 IWRC	0.00001360	0.00001570
6x25 IWRC	0.00001440	0.00001600
19 x7	0.00001780	0.00001970

Stretch calculator also available at www.loosco.com

*Elastic Stretch derived from this formula is an approximation

**Keep your units constant. The length of your cable must be calculated in inches to correspond with diameter measurement.

Safety Lock Wire

Safety lock wire is a safety product that is often used in high vibration applications where fasteners could shake them free. Safety lock wire, like many of our products, is a product most people never even realized existed - yet they are around it daily. Planes, trains and automobiles all use safety lock wire to keep fasteners from shaking free.

Loos & Co., Inc. safety lock wire is manufactured from a variety of metals – 302/304 Stainless, 305 Stainless, 316 Stainless, Monel® or Inconel®. We manufacture safety lock wire to numerous specifications including MS20995, MS20995NC, MS20995N, AMS5685, AMS5687, NASM20995C, NASM20995NC and NASM20995N. Our safety lock wire is drawn from rod and annealed to give it the necessary ductility.

Specifications per NASM 20995*

MATERIAL	NOMINAL WIRE DIAMETER**							
	.015″	.020″	.031″	.032″	.040″	.041″	.047″	.091″
Stainless Steel 302/304	X	X		X		X		
Inconel®		X		X	X			
Monel®		X		X	X			

Packaging Options

- 1/4 lb. container (fits in tool box)
- 1 lb. EZ-pull containers
- 1 lb., 5 lbs., 10 lbs. sleeve/spool option (often used on gov't orders)
- Custom packaging available upon request

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