

**SHINE**

*STAINLESS STEEL WIRE ROPE*



**STAINLESS STEEL  
WIRE ROPE**

**SHINE**  
SHINE CO., LTD.



**DET NORSKE VERITAS**  
**MANAGEMENT SYSTEM CERTIFICATE**

Certificate No. 0203-1997-AQ-SEO-RvA

*This is to certify that  
the Quality Management System  
of*

**SHINE CO., LTD.**

*at*

Pusan Head Office : 192-12, Jeonpo 2-Dong, Pusanjin-Gu, Pusan, Korea  
Kimhae Plant : 851, Bonglim-Ri, Saenglim-Myun, Kimhae-City, Kyungnam, Korea

*has been found to conform to the Quality Management System Standard:*

**ISO 9001:2000, KS A 9001:2001**

*This Certificate is valid for the following product or service ranges:*

**Manufacture of Stainless Steel Wires, Wires for  
Welding and Ropes**

*Original Certification date:*  
August 30th, 1997

*Place and date:*  
Seoul, September 17th, 2003

*This Certificate is valid until:*  
August 30th, 2006

*for the Accredited Unit:*  
DNV CERTIFICATION B.V.,  
THE NETHERLANDS

*Compliance to the Standard in  
respect to the indicated scope is  
verified by the DNV approved  
registered Team Leader*



Gyu-Jung Choi  
Lead Auditor

In-Kyoon Ahn  
Management Representative

Lack of fulfilment of conditions as set out in the Appendix may render this Certificate invalid.

DET NORSKE VERITAS B.V. Haastrechtstraat 7, 3079 DC Rotterdam, The Netherlands, TEL.INT.:+31 10 479 86 00, FAX:+31 10 479 71 41

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## ● History

1991	June	KeumNong Metal Co.,Ltd. established
1992	April	Opening of the Pusan office
	July	New stocks issue ( Capital after issuance : USD 0.5 million )
	July	Change of name to Shine Metal Co.,Ltd.
1993	March	New stocks issue ( Capital after issuance : USD 1 million )
1994	July	Enlarging production capacity to 350 tons per month
1995	July	New stocks issue ( Capital after issuance : USD 2 millions )
1996	November	Official commendation for contribution to economic development by the ministry of Trade and Commerce
1997	May	Official commendation for contribution to education for foreigners by the ministry of Korea Federation of Small and Medium Business
	August	Acquisition of ISO 9002 quality certificate by DNV
	September	New stocks issue ( Capital after issuance : USD 4 millions )
	December	Enlarging production facilities for wire ropes
1998	May	Opening of the Seoul office
1999	March	Patent registering : Stainless wire's surface refining device & its principal
	July	Enlarging production capacity to 600 tons per month
	August	Recognition for Venture Business by the Bureau of Small and Medium Business
	December	Transfer of headquarters to Pusan
	December	Change of name to Shine Co.,Ltd.
2000	March	Patent registering : Bobbin for stainless steel wire
	April	Recognition for a superior manufacture and exporter by the Small and Medium industry Promotion Corporation
	July	Renewal of ISO 9002 quality certificate by DNV

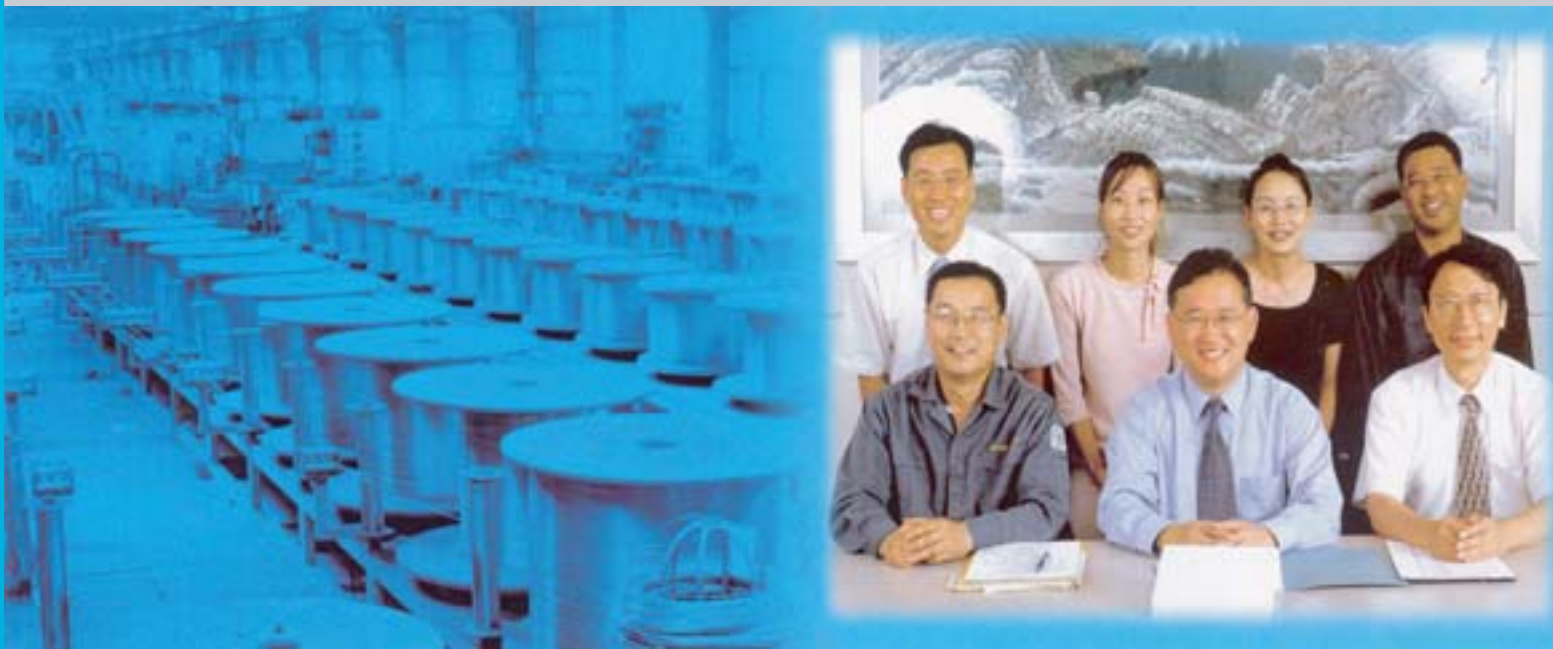


**● Introduction**

As a leader in the stainless steel wire and rope industry, Shine co.,Ltd. is proud to introduce it's complete line of the stainless steel wire ropes.

We offer a wide variety of stainless steel wire ropes for multiple applications such as Automotive industry, Building materials, Household appliances and Marine industry.

With over a decade of experience, we provide services and products that either meet or exceed the customer satisfaction. And our quality system ensures the quality for the whole products and adapts all the demands of our customers according to ISO 9002 certificate.

**STAINLESS STEEL WIRE ROPE**

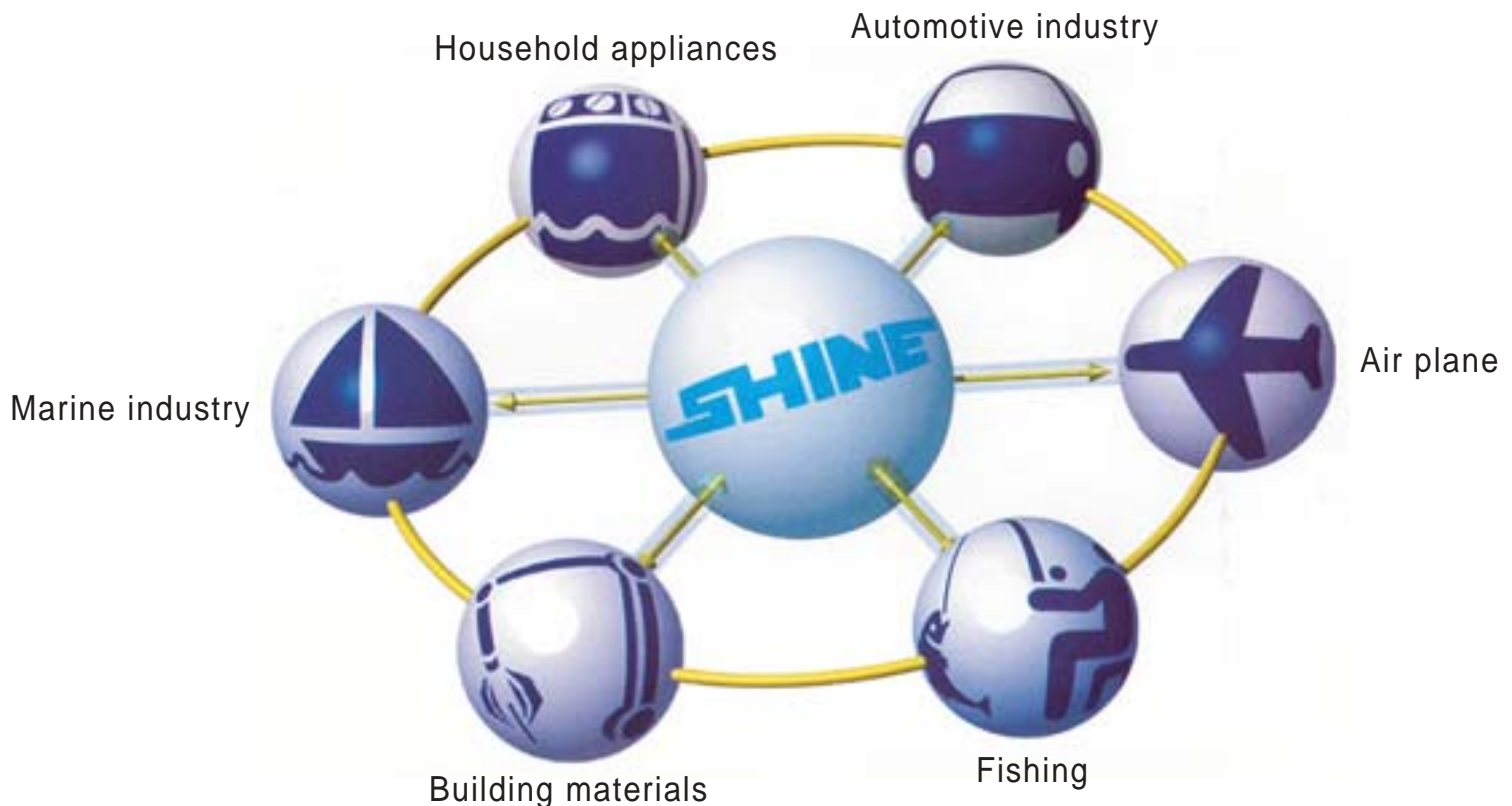
**● Application-Extent of Stainless Steel Wire Rope**

Stainless steel wire rope production in this line covers AISI 302/304 and AISI 316.

The quality of a stainless steel wire rope is determined to the greatest extent by its material wire. We manufacture the rope wire from the special grades of the stainless steel having special chemical compositions to withstand fatigue and wear under the most severe operating conditions.

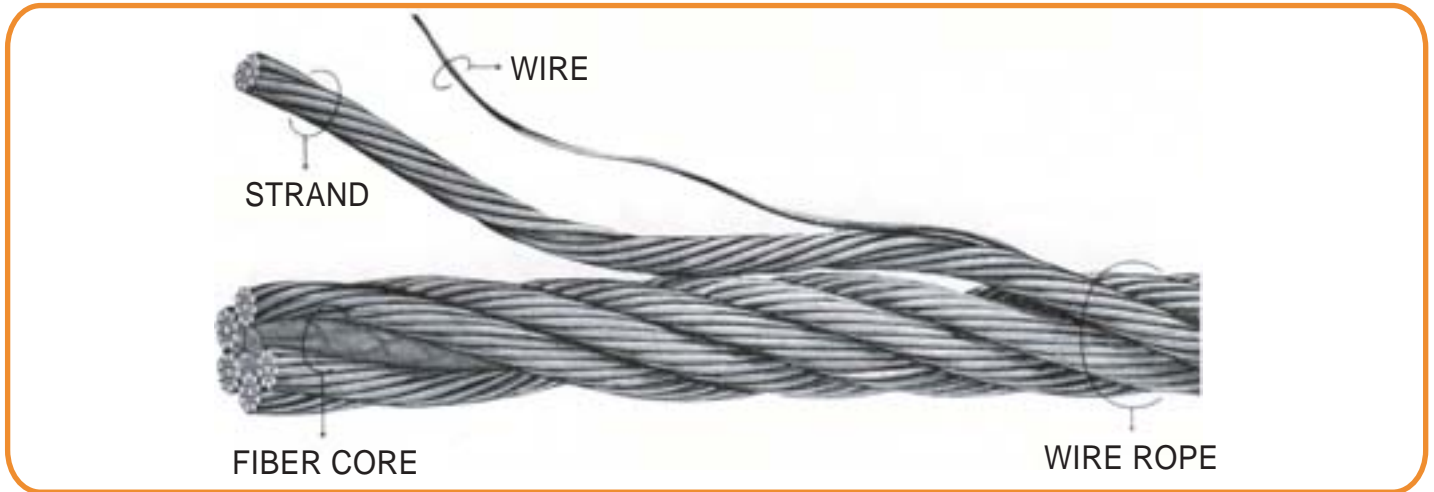
The rope wires are drawn precisely through diamond dies and the surface of them is bright and shiny.

The type 302/304 is the most suitable grade of stainless steel for rope wire with regard to the mechanical strength, fatigue and wear resistance. For those kinds of rope that should have a non-magnetic property particularly high resistance to corrosion, type 316 recommended.



● **General Information on Wire Rope**

**NAME OF THE PARTS COMPOSING WIRE ROPE**



**LAYS OF WIRE ROPE**

The lays of wire ropes, with few exceptions, are roughly divided into two kinds - Lang's Lay and Regular Lay. The Lang's Lay rope offers a better wearing surface when in use and can be expected to serve for a longer period than the Regular rope, which, meanwhile, is more flexible than Lang's Lay rope and easily spliced.



Right Regular Lay



Left Regular Lay



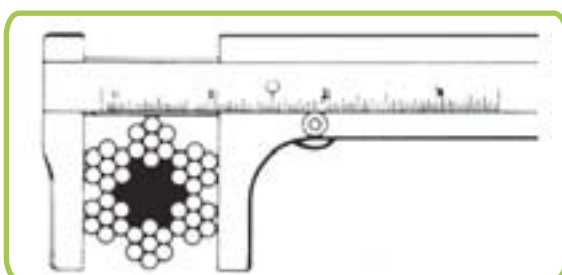
Right Lang's Lay



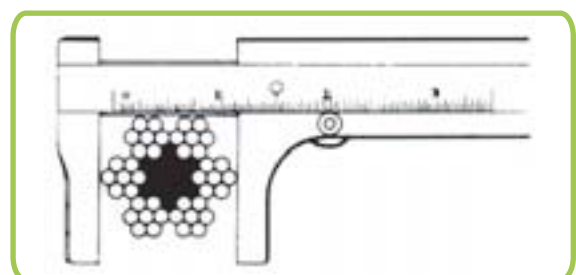
Left Lang's Lay

**HOW TO MEASURE ROPE SIZE**

The size of wire rope is the diameter of the circle which will just enclose all of the strands. The correct method is to measure over any pair of opposite strands. ( See drawings )

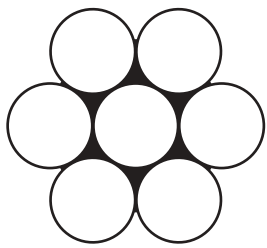
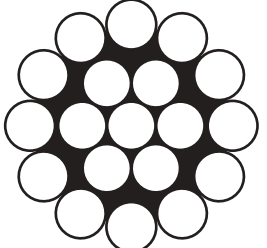
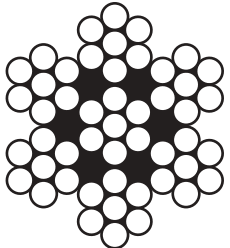


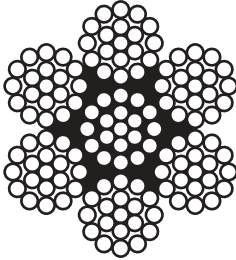
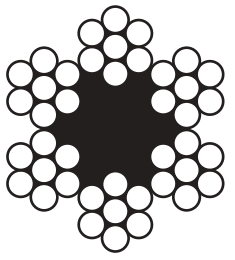
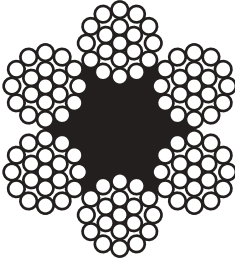
WRONG MEASUREMENT



CORRECT MEASUREMENT

● Available Construction & Section

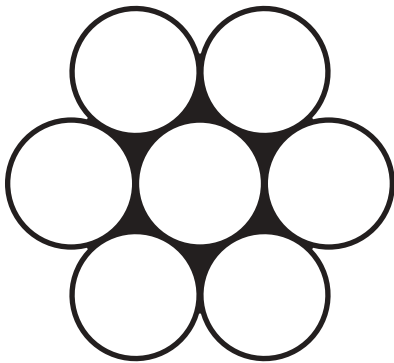
CONSTRUCTION	1 X 7	1X 19	7 X 7
Cross-Section			
Production - Range	0.30 ~ 4.00mm (0.012 ~ 5/32 Inch)	0.80 ~ 6.35mm (1/32 ~ 1/4 Inch)	0.80 ~ 12.00mm (1/32 ~ 7/16 Inch)

CONSTRUCTION	1 X 7	1X 19	7 X 7
Cross-Section			
Production - Range	1.50 ~ 16.00mm (1/16 ~ 5/8 Inch)	3.00 ~ 12.00mm (1/8 ~ 7/16 Inch)	3.00 ~ 16.00mm (1/8 ~ 5/8 Inch)

● Available coated with P.V.C or Nylon with yellow, red, black, white, etc.

Customer's colors are also available

## ● Construction 1 X 7

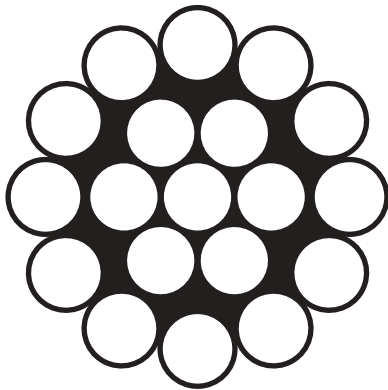


Nominal Dia. (In.)	Tolerance of Dia. (Plus only)	Wire Dia. (In.)	Min.B/S(Lbs.)		Approx Weight (Lbs/100FT)	Reference SPEC.
			302/304	316		
0.012	0.0006	0.0041	19	17	0.031	MIL-W-87161
0.016	0.0008	0.0055	35	31	0.056	
0.020	0.0010	0.0067	54	48	0.087	
0.024	0.0012	0.0083	78	69	0.126	
1/32	0.0016	0.0104	185	121	0.219	
3/64	0.0019	0.0156	375	272	0.495	
1/16	0.0025	0.0208	500	485	0.884	
5/64	0.0031	0.0260	847	752	1.370	
3/32	0.0038	0.0312	1,224	1,087	1.979	
1/8	0.0050	0.0417	2,185	1,940	3.534	
5/32	0.0062	0.0521	3,404	3,025	5.507	

Nominal Dia. (mm)	Tolerance of Dia. (%)	Wire Dia. (mm)	Min.B/S(KN)		Approx Weight (Kg/m)	Reference SPEC.
			1770N/mm <sup>2</sup>	1570N/mm <sup>2</sup>		
			302/304	316		
0.30	- 0 + 5	0.105	0.086	0.076	0.0005	DIN 3052
0.40		0.140	0.154	0.136	0.0008	
0.50		0.170	0.240	0.214	0.0013	
0.60		0.210	0.347	0.308	0.0019	
0.80		0.270	0.617	0.547	0.0033	
1.00		0.330	0.963	0.855	0.0052	
1.50		0.500	2.17	1.92	0.0117	
2.00	- 0 + 4	0.670	3.85	3.42	0.0208	
2.50		0.830	6.02	5.34	0.0325	
3.00		1.000	8.67	7.69	0.0468	
4.00		1.330	15.4	13.7	0.0832	

Commonly used for guying purpose where flexibility is not important.

## ● Construction 1 X 19

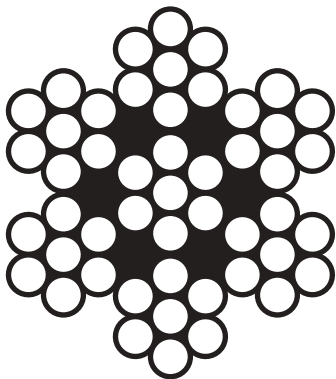


Nominal Dia. (In.)	Tolerance of Dia. (Plus only)	Wire Dia. (In.)	Min.B/S(Lbs.)		Approx Weight (Lbs/100FT)	Reference SPEC.
			302/304	316		
1/32	0.0016	0.0063	130	115	0.216	MIL-W-87161
3/64	0.0023	0.0094	375	262	0.486	
1/16	0.0025	0.0126	500	468	0.864	
5/64	0.0031	0.0156	800	725	1.350	
3/32	0.0038	0.0189	1,200	1,048	1.902	
7/64	0.0044	0.0220	1,600	1,431	2.647	
1/8	0.0050	0.0252	2,100	1,872	3.468	
5/32	0.0063	0.0311	3,300	2,918	5.405	
3/16	0.0075	0.0374	4,700	4,195	7.770	
7/32	0.0088	0.0437	6,300	5,725	10.601	
1/4	0.0100	0.0500	8,200	7,468	13.825	

Nominal Dia. (mm)	Tolerance of Dia. (%)	Wire Dia. (mm)	Min.B/S(KN)		Approx Weight (Kg/m)	Reference SPEC.
			1770N/mm <sup>2</sup>	1570N/mm <sup>2</sup>		
			302/304	316		
0.80	- 0 + 5	0.16	0.593	0.528	0.0033	DIN 3053
1.00		0.20	0.930	0.825	0.0051	
1.25		0.25	1.853	1.287	0.0080	
1.50		0.30	2.09	1.86	0.0115	
2.00	- 0 + 4	0.40	3.72	3.30	0.0204	
2.50		0.50	5.81	5.15	0.0319	
3.00		0.60	8.37	7.42	0.0459	
3.50		0.70	11.4	10.1	0.0625	
4.00		0.80	14.9	13.2	0.0816	
5.00		1.00	23.2	20.6	0.1275	
6.00		1.20	33.5	29.7	0.1836	
6.35		1.27	37.4	33.2	0.2056	

Generally used for Yacht rigging and other guying purpose. It is developed to meet the need for light weight, strong and flexible cable to reliably control the various functions of an aircraft.

● **Construction 7 X 7**

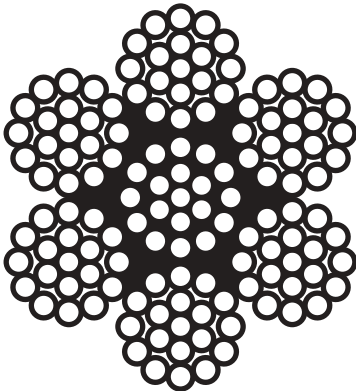


Nominal Dia. (In.)	Tolerance of Dia. (Plus only)	Wire Dia. (In.)	Min.B/S(Lbs.)		Approx Weight (Lbs/100FT)	Reference SPEC.
			302/304	316		
1/32	0.0025	0.0034	89	79	0.176	MIL-W-83420
3/64	0.0038	0.0061	270	180	0.400	
1/16	0.0050	0.0083	480	320	0.714	
5/64	0.0062	0.0087	558	497	1.106	
3/32	0.0075	0.0122	920	718	1.600	
1/8	0.0088	0.0139	1,440	1,282	2.854	
5/32	0.0109	0.0173	2,245	1,998	4.448	
3/16	0.0132	0.0209	3,227	2,872	6.395	
7/32	0.0131	0.0243	4,403	3,919	8.725	
1/4	0.0150	0.0278	5,743	5,112	11.380	
9/32	0.0141	0.0312	7,260	6,463	14.388	
5/16	0.0157	0.0348	8,979	7,992	17.793	
3/8	0.0188	0.0417	12,935	11,513	25.632	
7/16	0.0219	0.0487	17,579	15,647	34.836	

Nominal Dia. (mm)	Tolerance of Dia. (%)	Wire Dia. (mm)	Min.B/S(KN)		Approx Weight (Kg/m)	Reference SPEC.
			1770N/mm <sup>2</sup>	1570N/mm <sup>2</sup>		
			302/304	316		
0.80	- 0 + 8	0.090	0.405	0.361	0.0027	DIN 3055
1.00		0.110	0.633	0.563	0.0042	
1.20		0.135	0.912	0.812	0.0061	
1.35		0.150	1.154	1.028	0.0077	
1.50		0.170	1.426	1.269	0.0095	
2.00		0.225	2.540	2.256	0.0168	
2.50		0.280	3.962	3.520	0.0263	
3.00	0.330	5.710	5.080	0.0378		
4.00	- 0 + 7	0.440	10.20	9.022	0.0672	
5.00		0.530	15.90	14.10	0.1050	
6.00	- 0 + 6	0.640	22.90	20.30	0.1512	
6.35		0.680	25.55	22.75	0.1694	
7.00		0.740	31.10	27.65	0.2058	
8.00	- 0 + 5	0.850	40.60	36.10	0.2688	
9.00		0.960	51.40	45.60	0.3402	
10.0		1.070	63.50	56.30	0.4200	
11.0		1.170	76.80	68.20	0.5082	
12.0		1.260	91.50	81.10	0.6048	

Universally used on aircraft installations and particularly designed to be suited for this purpose

● **Construction 7 X 19**

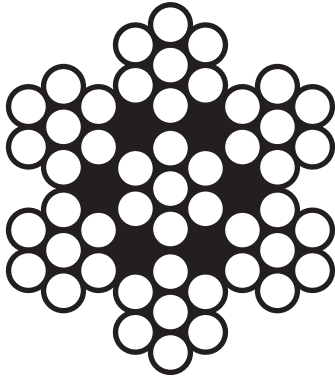


Nominal Dia. (In.)	Tolerance of Dia. (Plus only)	Wire Dia. (In.)	Min.B/S(Lbs.)		Approx Weight (Lbs/100FT)	Reference SPEC.
			302/304	316		
1/16	0.0050	0.0041	480	296	0.699	MIL-W-83420
3/32	0.0075	0.0063	920	663	1.560	
1/8	0.0088	0.0083	1,760	1,184	2.790	
5/32	0.0109	0.0104	2,400	1,845	4.344	
3/16	0.0131	0.0126	3,700	2,652	6.247	
7/32	0.0131	0.0146	5,000	3,619	8.519	
1/4	0.0150	0.0161	6,400	4,720	11.115	
9/32	0.0140	0.0187	7,800	5,968	14.053	
5/16	0.0156	0.0205	9,000	7,380	17.382	
3/8	0.0188	0.0240	12,000	10,632	25.040	
7/16	0.0219	0.0292	16,246	14,450	34.007	
1/2	0.0250	0.0333	21,228	18,882	44.437	
9/16	0.0282	0.0375	26,877	23,905	56.260	
5/8	0.0313	0.0417	33,190	29,521	69.476	

Nominal Dia. (mm)	Tolerance of Dia. (%)	Wire Dia. (mm)	Min.B/S(KN)		Approx Weight (Kg/m)	Reference SPEC.	
			1770N/mm <sup>2</sup>	1570N/mm <sup>2</sup>			
			302/304	316			
1.50	- 0	0.100	1.31	1.17	0.0092	DIN 3060	
2.00		0.135	2.34	2.08	0.0164		
2.50		+ 8	0.170	3.66	3.26	0.0258	
3.00	0.200		5.29	4.69	0.0369		
4.00	- 0	0.270	9.40	8.34	0.0656		
5.00	+ 7	0.330	14.70	13.02	0.1025		
6.00	- 0	0.390	21.20	18.75	0.1476		
7.00	+ 6	0.450	28.80	25.52	0.2009		
8.00	- 0	0.520	37.60	33.30	0.2624		
9.00		0.580	47.60	42.20	0.3321		
10.		0.640	58.80	52.10	0.4100		
11.0		+ 5	0.710	71.10	63.10	0.4961	
12.0			0.770	84.60	75.00	0.5904	
13.0			0.840	99.30	88.10	0.6929	
14.0	0.900		115.00	102.00	0.8036		
16.0	1.030	150.00	133.00	1.0496			

Advanced flexible products, leisure sports, fishery, chemical industry and machinery construction require more flexibility in anti-corrosive.

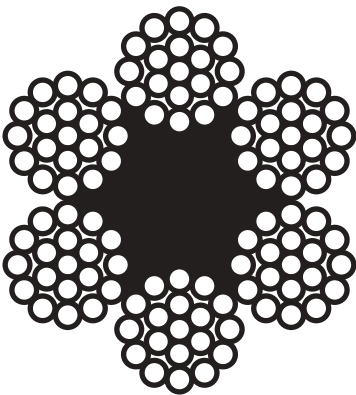
● **Construction 6 X 7 + FC**



Nominal Dia. (mm)	Tolerance of Dia. (%)	Wire Dia. (mm)	Min.B/S(KN)		Approx Weight (kg/m)	Reference SPEC.
			1770N/mm <sup>2</sup>	1570N/mm <sup>2</sup>		
			302/304	316		
3.00	- 0 + 8	0.33	5.290	4.704	0.0344	DIN 3055
4.00	- 0	0.44	9.410	8.354	0.0612	
5.00	+ 7	0.53	14.70	13.06	0.0956	
6.00	- 0 + 6	0.64	21.10	18.80	0.1376	
6.35		0.68	23.66	21.07	0.1542	
7.00		0.74	28.80	25.60	0.1873	
8.00		0.85	37.60	33.40	0.2446	
9.00	- 0 + 5	0.96	47.60	42.20	0.3096	
10.0		1.07	58.50	52.20	0.3822	
11.0		1.17	71.10	63.10	0.4625	
12.0		1.26	84.70	75.10	0.5504	

This construction is more compatible to 7X7 in flexibility and abrasion resistance.

● **Construction 6 X 19 + FC**



Nominal Dia. (mm)	Tolerance of Dia. (%)	Wire Dia. (mm)	Min.B/S(KN)		Approx Weight (kg/m)	Reference SPEC.
			1770N/mm <sup>2</sup>	1570N/mm <sup>2</sup>		
			302/304	316		
3.00	- 0 + 8	0.20	4.90	4.34	0.0336	DIN 3060
4.00	- 0	0.27	8.70	7.72	0.0597	
5.00	+ 7	0.33	13.60	12.06	0.0933	
6.00	- 0 + 6	0.39	19.60	17.36	0.1343	
7.00		0.45	26.70	23.63	0.1828	
8.00		0.52	34.80	30.84	0.2388	
9.00		0.58	44.10	39.10	0.3022	
10.0	- 0 + 5	0.64	54.40	48.20	0.3731	
11.0		0.71	65.80	58.40	0.4515	
12.0		0.77	78.30	69.50	0.5373	
13.0		0.84	91.90	81.50	0.6305	
14.0		0.90	107.00	94.60	0.7313	
16.0		1.03	139.00	124.00	0.9551	

The large outer wires of this construction make it ideally suited for extremely severe conditions as the large outer wires will wear deeply before parting resist crushing.

It is a good to withstand abrasion or crushing on the drum(drag lines, logging ropes, rotary drill lines and cable way track lines etc.)

## ● Max. Packing Length

Diameter		1 X 7		1 X 19		7 X 17(6 X 7+FC)		7 X 19 (6 X 19+FC)	
MM	Inch	M	Ft	M	Ft	M	Ft	M	Ft
0.30	0.012	20,000	65,500						
0.40	0.016	10,000	32,500						
0.50	0.020	6,000	19,500						
0.60	0.024	4,000	13,000						
0.80	1/32	10,000	32,500	6,000	19,500	8,000	26,000		
1.00	0.039	7,000	22,500	4,000	13,000	10,000	32,500		
1.20	3/64	5,000	16,000	9,000	29,500	8,500	27,500		
1.25	0.049	5,000	16,000	8,000	26,000	7,500	24,500		
1.35	0.053	10,000	32,500	7,000	22,500	6,600	21,500		
1.50	0.059	8,000	26,000	5,500	18,000	5,300	17,000		
1.60	1/16	7,000	22,500	5,000	16,000	4,600	15,000		
2.00	5/64	4,500	14,500	3,000	9,500	4,700	15,500	3,000	9,500
2.40	3/32	3,000	9,500	2,000	6,500	3,300	10,500	2,100	6,500
2.50	0.098	2,800	9,000	7,500	24,500	3,000	9,500	1,900	6,000
2.80	7/64	5,000	16,000	6,000	19,500	2,400	7,500	1,525	5,000
3.00	0.118	4,000	13,000	5,000	16,000	8,500	27,500	8,500	27,500
3.20	1/8	3,800	12,000	4,500	14,500	7,500	24,500	7,500	24,500
3.50	0.138	3,000	9,500	3,500	11,000	6,200	20,000	6,200	20,000
4.00	5/32	2,500	8,000	4,900	16,000	4,800	15,500	4,800	15,500
4.80	3/16			3,400	11,000	3,300	10,500	3,300	10,500
5.00	0.197			3,100	10,000	3,000	9,500	3,050	10,000
5.60	7/32			2,500	8,000	2,400	7,500	2,400	7,500
6.00	0.236			2,100	6,500	5,000	16,000	5,000	16,000
6.35	1/4			1,900	6,000	4,400	14,000	4,400	14,000
7.00	9/32					3,600	11,500	3,600	11,500
8.00	5/16					2,800	9,000	2,800	9,000
9.00	0.354					2,200	7,000	2,200	7,000
9.53	3/8					2,000	6,500	1,900	6,000
10.00	0.394					1,800	5,500	1,800	5,500
11.00	0.433					1,400	4,500	1,400	4,500
12.00	0.472					1,200	3,500	1,200	3,500
13.00	1/2							1,000	3,200
14.00	0.551							915	3,000
15.00	0.591							800	2,600
16.00	5/8							700	2,200

## ● Standard Packing Specification

(Unit : mm)

Length		0.30			0.40			0.50			0.60			0.80(1/32)			1.00		
M	Feet	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1,000											200	125	160	200	125	160	200	125	160
1,525	5,000							200	125	160	"	"	"	"	"	"	"	"	"
2,000	6,500							"	"	"	"	"	"	"	"	"	"	"	"
3,000	10,000	200	125	160	200	125	160	"	"	"	"	"	"	200	125	160	250	157	160
5,000		"	"	"	"	"	"	"	"	"				250	157	160	400	300	220
10,000		"	"	"	"	"	"										450	300	240
20,000		"	"	"	"	"	"												

Length		1.2~1.25(3/64)			1.35~1.40			1.50			1.60(1/16)			1.80			2.00(5/64)		
M	Feet	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
305	1,000																200	125	160
500																	"	"	"
763	2,500																250	157	160
1,000		200	125	160	200	125	160	250	157	160	250	157	160	250	157	160	300	220	220
1,525	5,000	250	157	160	250	157	160	"	"	"	300	200	220	400	300	220	400	300	"
2,000	6,500	"	"	"	300	220	220	400	300	220	400	300	"	"	"	"	450	"	240
3,000	10,000	400	300	200	400	300	220	"	"	"	450	"	240	450	"	240	"	"	"
5,000		450	"	"	450	300	240	450	"	240	"	=	"	500	"	"			
10,000		500	"	"															

Length		2.4~2.5(3/32)			3.0			3.20(1/8)			4.00(5/32)			5.00(3/16)			6.0		
M	Feet	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
305	1,000	200	125	160	250	157	160	250	157	160	400	300	220	450	300	240	450	300	240
500		250	157	160	400	300	220	400	300	220	450	"	240	"	"	"	500	"	"
763	2,500	400	300	220	"	"	"	450	"	240	"	"	"	500	"	"	600	"	"
1,000		"	"	"	450	"	240	"	"	"	500	"	"	550	"	"	600	"	400
1,525	5,000	450	"	240	500	"	"	500	"	"	550	"	"	550	"	400	"	"	"
2,000	6,500	"	"	"	"	"	"	550	"	"	600	"	"	600	"	"	650	"	"
3,000	10,000	500	"	"	550	"	"	600	"	"	600	"	400	650	"	"	750	"	"
5,000								600	"	400							900	350	"

Length		6.35(1/4)			7.00			8.00(5/16)			9.00			9.53(3/8)			10.0		
M	Feet	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
305	1,000	450	300	240	500	300	240	500	300	240	550	300	240	600	300	240	600	300	240
500		550	"	"	550	"	"	550	"	400	550	"	400	600	"	400	600	"	400
763	2,500	600	"	"	550	"	400	600	"	"	650	"	"	650	"	"	700	"	"
1,000		600	"	400	600	"	"	650	"	"	700	"	"	700	"	"	750	"	"
1,525	5,000	650	"	"	650	"	"	700	"	"	800	"	"	900	350	"	900	"	"
2,000	6,500	700	"	"	750	"	"	800	"	"	900	350	"						
3,000	10,000	800	"	"	900	350	"	950	350	"									

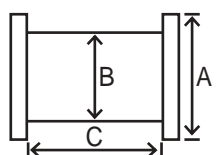
Length		11.0			12.0			13.0(1/2)			14.0			15.0			16.0		
M	Feet	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
305	1,000	600	300	400	600	300	400	600	300	400	650	300	400	650	300	400	650	300	400
500		650	"	"	650	"	"	700	"	"	750	"	"	800	"	"	800	"	"
763	2,500	700	"	"	750	"	"	800	"	"	900	350	"						
1,000		800	"	"	900	350	"	900	350	"									
1,525	5,000	950	350	"															

1) Above specifications could be changed subject to our purpose without any notice.

2) A:  $\geq 250 \Rightarrow$  Plastic spool (Din spool)

A:  $\geq 300 \Rightarrow$  Wooden Reel

3) Dia. of arbor hole (Wooden Reel) : 65 mm



## ● Physical Constants of Stainless Steel

### Type 302

Melting range, °F	2550 ~2590
Density, lbs/cu, inch	0.284
Specific heat, Btu/lb./°F (32-212°F)	1.12
Coefficient of thermal expansion, in./in./°F	
32 ~ 212°F	9.6 X 10 <sup>-6</sup>
32 ~ 600°F	9.9
32 ~ 1,000°F	10.2
32 ~ 1,200°F	10.4
Thermal conductivity, Btu/ft <sup>2</sup> /hr./°F/ft.	
212°F	9.4
932°F	12.4
Electrical resistivity, microhm-cm	
68°F	72
1,200°F	116
Magnetic permeability (H=200 Oersteds)	
Annealed	1.02 Max.

### Type 304 304L

Melting range, °F	2550 ~2650
Density, lbs/cu, inch	0.29
Specific heat, Btu/lb./°F (32-212°F)	0.12
Coefficient of thermal expansion, in./in./°F	
32 ~ 212°F	9.6 X 10 <sup>-6</sup>
32 ~ 600°F	9.9
32 ~ 1,000°F	10.2
32 ~ 1,200°F	10.4
Thermal conductivity, Btu/ft <sup>2</sup> /hr./°F/ft.	
212°F	9.4
932°F	12.4
Electrical resistivity, microhm-cm	
68°F	72
1,200°F	116
Magnetic permeability (H=200 Oersteds)	
Annealed	1.02 Max.

### Type 305

Melting range, °F	2550 ~2650
Density, lbs/cu, inch	0.29
Specific heat, Btu/lb./°F (32-212°F)	0.12
Coefficient of thermal expansion, in./in./°F	
32 ~ 212°F	9.6 X 10 <sup>-6</sup>
32 ~ 600°F	9.9
32 ~ 1,000°F	10.2
32 ~ 1,200°F	10.4
Thermal conductivity, Btu/ft <sup>2</sup> /hr./°F/ft.	
212°F	9.4
932°F	12.4
Electrical resistivity, microhm-cm	
68°F	72
Magnetic permeability (H=200 Oersteds)	
Annealed	1.02 Max.

### Type 316 316L

Melting range, °F	2550 ~2550
Density, lbs/cu, inch	0.29
Specific heat, Btu/lb./°F (32-212°F)	0.12
Coefficient of thermal expansion, in./in./°F	
32 ~ 212°F	8.9 X 10 <sup>-6</sup>
32 ~ 600°F	9.0
32 ~ 1,000°F	9.7
32 ~ 1,200°F	10.3
32 ~ 1,500°F	11.1
Thermal conductivity, Btu/ft <sup>2</sup> /hr./°F/ft.	
212°F	9.4
932°F	12.4
Electrical resistivity, microhm-cm	
68°F	74
Magnetic permeability (H=200 Oersteds)	
Annealed	1.02 Max.

## ● Corrosion Data of Stainless Steel - 1

( I - Very Good II- Good III - Fair IV - Poor )

Media	CONCENTRATION	°F	TYPE 430	TYPE 304	TYPE 316
Acetic Acid	5% Aerated	70	I	I	I
	10% Aerated	70	II	I	I
	10%	Boiling	II	I	I
	60%	60	III	I	I
	60%	Boiling	III	I	I
	100%	70	III	I	I
Acetic Anhydride	90% Anhydride	70	III	I	I
	90%	Boiling	IV	IV	I
Acetylene		70	I	I	I
Alcohol	Ehtyl	70	II	II	I
	Methyl	70	II	II	I
Aluminum Acetate	20%	70	II	II	II
	20%	Boiling	II	II	II
Aluminum Chloride	5%	70	IV	IV	III
	25%	70	IV	IV	III
Aluminum Fluoride	5%	70	IV	IV	IV
Aluminum Potassium Sulphate (Alum)	10%	70	III	II	II
Aluminum Sulphate	10%	Boiling	IV	II	II
Aluminum Sulphate	10%	70	IV	I	I
Ammonia		70	I	I	I
Ammonium Carbonate	1%	70	II		
	5%	70	II		
Ammonium Chloride	10%	Boiling	IV	IV	II
Ammonium Hydroxide		70	I	I	I
Ammonium Nitrate	All concentrations	70	I	I	I
Ammonium Perchlorate	10%	70	I	I	I
	10%	Boiling	IV	I	I
Ammonium Sulphate	10%	70	III	I	I
	10%	Boiling	IV	I	I
Ammonium Sulphite		70	IV	III	I
Aniline	Concentrated	70	I	I	I
Barium Chloride	10%	70	I	I	I
Beer		70	III	I	I
Benzoic Acid	10%	70	I	I	I
Blood		70	I	I	I
Boric Acid	10%	70	II	I	I
	Saturated	Boiling	III	II	II
Buttermilk		70	I	I	I
Butyric Acid	10%	70	III	II	II
	10%	Boiling	III	II	II
Calcium Carbonate	10%	70	I	I	I
Calcium Chloride	10%		III	II	II
Cane Juice	Sugar Cane		II	I	I
Carbolic Acid	C.P		II	II	II
Carbon Dioxide(Dry)			I	I	I
Carbonic Acid			II	II	II
Chloroacetic Acid	All concentrations		IV	IV	IV
Chromic Acid	10% C.P		II	II	II
	50% C.P		IV	II	II
Citric Acid	10%		II	II	II
	10%		III	II	II
	50%		II	II	II
	50%		IV	IV	II
Copper Chloride (Cupric Chloride)	10%		IV	IV	IV
Copper Nitrate (Cupric Nitrate)	10%		II	I	I

## ● Corrosion Data of Stainless Steel - 2

( I - Very Good II - Good III - Fair IV - Poor )

MEDIA	CONCENTRATION	°F	TYPE 430	TYPE 304	TYPE 316
Copper Sulphate (Cupric Sulphate)	10%		II	I	I
Cottonseed Oil			I	I	I
Epsom Salt (Magnesium Sulphate)	10%		I	II	I
Ethlene Glycol	All concentrations		I	I	I
Fatty Acids	100%		II	II	I
Ferric Chloride	10%		IV	IV	IV
Ferric Nitrate	10%		II	II	II
	50%		II	II	II
Ferric Sulphate	10%		II	II	II
	50%		II	II	II
Fluorine (Gas)	100%		I	I	I
Formaldehyde	40%		II	II	I
Formic Acid	10%	70	III	II	II
	50%	70	IV	II	I
Gasoline	Containing H <sub>2</sub> S	70	III	I	I
	Refined	70	I	I	I
Hydrobromic Acid	All concentrations	70	IV	IV	IV
Hydrogen Peroxide	10%	70	II	I	I
Lactic Acid	10%	70	IV	II	II
Magnesium Carbonate	10%	70	II	II	II
Magnesium Chloride	10%	70	II	III	II
Magnesium Sulphate	10%	70	I	I	I
	10%	70	II	I	I
	10%	Boiling	IV	I	I
Molasses		70		I	I
Nitric Acid	10%	70		I	I
	10%	Boiling		I	I
	20%	70		I	I
	20%	Boiling		II	II
	40%	70		I	I
	40%	Boiling		II	II
	90%	70		I	I
	100%	70		I	I
	100%	Boiling		IV	IV
Oxalic Acid	10%	70		II	II
Phosphoric Acid	10% Aerated	70		II	I
	10% Air Free	70		II	II
Picric Acid	All concentrations	70		II	II
Potassium	10%	70		II	II
Potassium Chloride	10%	70		II	I
Potassium Dichromate	10%	70		I	I
Potassium Permanganate	10%	70		II	II
	10%	Boiling		II	II
Propane	100%			I	I
Silver Nitrate	10%			II	I
	10%			II	II
Sodium Bisulphate	10%	70	I	I	I
Sodium Hydroxide	10%	70	I	I	I
Sodium Nitrite	10%	70	II	II	II
Sodium Phosphate	10%	70	II	II	II
Sodium Sulphate	10%	70	II	II	I
Tannic Acid	10%	70	II	II	II
Tartaric Acid	10%	70	II	I	II
Turpentine		70	I	I	I
Uric Acid	100%	70	II	II	II
Vegetable Oils		70	I	I	I

## ● Chemical Composition of Stainless Steel

Steel Grade						Chemical Composition(%)								
KS (STS)	JIS (SUS)	AISI	BS	DIN	EN	C Max.	Si Max.	Mn Max.	P Max.	S Max.	Ni	Cr	N Max.	Other
302	302	302	302S25	-	-	0.15	1.00	2.00	0.045	0.030	8.0~10.0	17.0~19.0	0.10	-
304	304	304	304S31	X5CrNi1810	1.4301	0.08	1.00	2.00	0.045	0.030	8.0~10.5	18.0~20.0	0.10	-
305	305	305	305S19	X5CrNi1812	1.4303	0.12	1.00	2.00	0.045	0.030	10.5~13.0	17.0~19.0	-	-
316	316	316	316S31	X5CrNiMo17122	1.4401	0.08	1.00	2.00	0.045	0.030	10.0~14.0	16.0~18.0	0.10	Mo2.0~3.0

## ● How To Order Stainless Steel Wire Rope

In Ordering, please specify following items.

1. Specification  
[EX] MIL - W - 83420
2. Construction  
[EX] (1) 1X7 ; MIL - W - 87161 or DIN 3052  
(2) 1X19 ; MIL - W - 87161 or DIN 3053  
(3) 7X7 ; MIL - W - 83420 or DIN 3055  
(4) 6X7+FC ; DIN 3055  
(5) 7X19 ; MIL - W - 83420 or DIN 3060  
(6) 6X19+FC ; DIN 3060
3. LAY  
[EX] S or Z- LAY
4. Grade of Steel  
[EX] AISI 302 or 304 or 316
5. Diameter  
[EX] 5.00mm, 5/32"
6. Length per Unit  
[EX] 1,000 M/Reel
7. Packing  
[EX] Plastic spool or Wooden reel
8. Remarks  
[EX] Shipping marks and other special requirements.