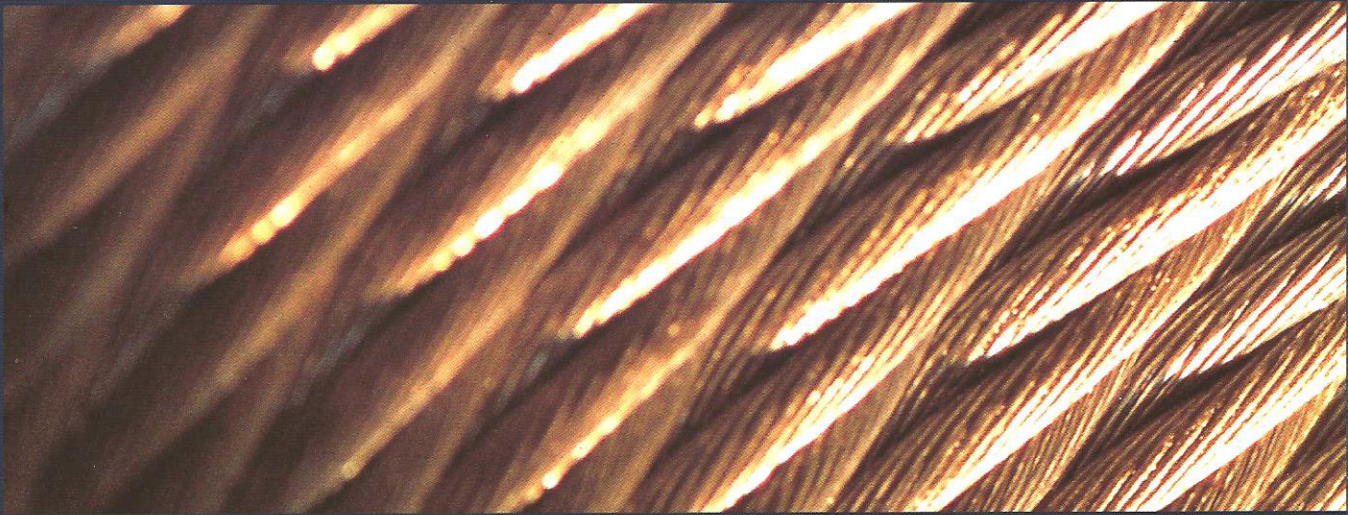
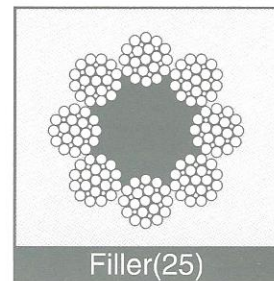
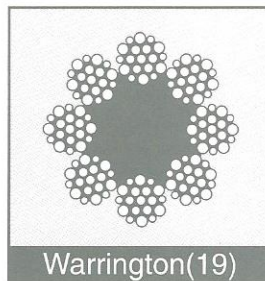
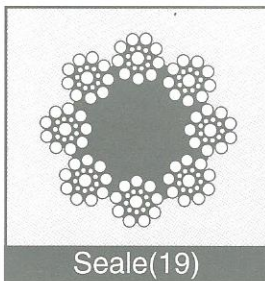


WIRE ROPE FOR ELEVATOR



8-Strand Wire Rope-Fiber Core

NOMINAL DIAMETER		MIN. BREAKING STRENGTH								APPROX. WEIGHT		MAX. LENGTH	
		FEDERAL (RR-W-410D)		FEDERAL & KISWIRE	JIS & KS		BS	ISO & BS	ISO				
INCH	mm	Iron Steel(lbs)	Traction Steel(lbs)	Extra Hi-strength Steel(lbs)	E-1(kN)	A(kN)	E-2(kN)	E-3(kN)	B(kN)	(lb/ft)	(kg/m)	(m)	(ft)
3/16	4.76	1,000	2,000	2,500	9.4	11.1	9.1	10.1	12.0	0.05	0.08	3,500	11,475
1/4	6.35	1,800	3,600	4,500	16.4	19.4	15.9	17.7	21.2	0.09	0.14	3,500	11,475
5/16	7.94	2,900	5,600	6,900	26.0	30.8	25.2	28.1	33.2	0.14	0.22	3,000	9,836
-	9	3,700	7,100	8,700	32.9	39.0	32.0	35.6	42.0	0.18	0.28	3,000	9,836
3/8	9.5	4,200	8,200	9,900	36.6	43.4	35.6	39.6	46.8	0.20	0.31	3,000	9,836
-	10	4,700	9,100	11,000	40.6	48.1	39.4	44.0	51.9	0.22	0.34	3,000	9,836
-	11	5,500	10,800	13,300	50.1	59.2	47.7	53.2	62.8	0.27	0.42	3,000	9,836
7/16	11.1	5,600	11,000	13,500	51.0	60.3	48.6	54.2	63.9	0.28	0.42	3,000	9,836
-	12	6,500	12,900	15,800	58.5	69.2	56.7	63.3	74.6	0.32	0.49	2,500	8,197
-	12.5	7,100	14,000	17,100	63.5	75.1	61.6	68.7	81.0	0.36	0.54	2,000	6,557
1/2	12.7	7,200	14,500	17,500	65.5	77.6	63.6	70.9	83.6	0.36	0.55	2,000	6,557
-	13	7,500	15,200	18,300	68.6	81.3	66.6	74.3	87.6	0.38	0.58	2,000	6,557
-	14	8,700	17,600	20,200	79.6	94.3	77.3	86.2	102	0.44	0.67	2,000	6,557
9/16	14.3	9,200	18,500	21,100	83.1	98.3	80.7	89.9	106	0.46	0.70	2,000	6,557
5/8	16	11,200	23,000	27,200	104	123	101	113	133	0.57	0.88	1,525	5,000
11/16	17.5	13,400	27,000	32,800	124	147	121	135	158	0.69	1.05	1,000	3,279
-	18	14,200	28,600	34,700	131	156	128	143	167	0.72	1.11	1,000	3,279
3/4	19.1	16,000	32,000	38,900	147	175	142	159	187	0.82	1.25	1,000	3,279



Diameter Tolerances

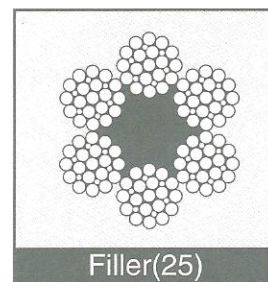
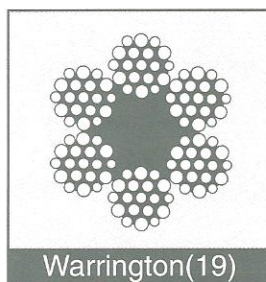
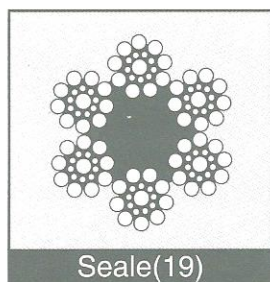
When measured under no load and under a load of 10% of the minimum breaking load (MBL), the actual rope diameter will be in accordance with the values shown below.

Rope diameter	No load	10% MBL
Up to and including 10 mm	+6% +2%	+4% 0%
Over 10 mm	+5% +2%	+3% 0%

Ropes produced according to federal specification RR-W-410D will meet diameter tolerances required by this specification.

6-Strand Wire Rope-Fiber Core

NOMINAL DIAMETER		MIN. BREAKING STRENGTH								APPROX. WEIGHT		MAX. LENGTH	
		FEDERAL (RR-W-410D)		FEDERAL& KISWIRE	JIS & KS		BS	ISO & BS	ISO				
INCH	mm	Iron Steel(lbs)	Traction Steel(lbs)	Extra Hi-strength Steel(lbs)	E-1(kN)	A(kN)	E-2(kN)	E-3(kN)	B(kN)	(lb/ft)	(kg/m)	(m)	(ft)
3/16	4.76	1,300	2,000	2,900	10.1	12.4	10.3	11.2	13.4	0.06	0.09	2,000	6,600
1/4	6.35	2,200	3,600	5,200	18.0	22.0	18.3	20.0	23.9	0.10	0.16	2,000	6,600
5/16	7.94	3,200	5,600	8,100	28.6	34.9	29.1	31.7	37.4	0.16	0.23	3,050	10,000
-	9	4,100	7,100	10,400	36.2	44.1	36.8	40.4	47.3	0.20	0.31	2,500	8,200
3/8	9.5	5,000	8,200	11,600	40.3	49.2	41.0	44.7	52.7	0.23	0.32	2,000	6,600
-	10	5,500	9,100	12,900	44.7	54.5	45.5	49.5	58.4	0.25	0.36	2,000	6,600
-	11	6,300	10,800	15,400	55.1	67.1	55.0	59.9	70.7	0.31	0.44	2,000	6,600
7/16	11.1	6,400	11,000	15,700	56.1	68.3	56.0	61.0	72.0	0.31	0.45	2,000	6,600
-	12	7,500	12,900	18,300	64.4	78.5	65.4	71.3	84.1	0.37	0.53	1,525	5,000
-	12.5	8,100	14,000	19,900	69.9	85.1	71.0	77.4	91.3	0.39	0.58	1,525	5,000
1/2	12.7	8,400	14,500	20,400	72.2	88.1	73.3	79.8	94.2	0.40	0.60	1,525	5,000
-	13	8,800	15,200	21,400	75.6	92.3	76.8	83.7	98.7	0.43	0.61	1,300	4,300
-	14	10,200	17,600	24,800	87.7	107	90.3	97.1	115	0.49	0.71	1,100	3,600
9/16	14.3	10,600	18,500	25,700	91.9	112	94.3	101	120	0.51	0.74	1,100	3,600
5/8	16	12,800	23,000	31,600	115	140	116	127	150	0.63	0.92	1,525	5,000
11/16	17.5	15,300	27,000	38,200	138	167	141	151	178	0.76	1.10	1,000	3,279
-	18	16,200	28,600	40,400	146	177	149	160	188	0.80	1.16	1,000	3,279
3/4	19.1	18,200	32,000	45,200	164	198	167	179	211	0.90	1.30	1,000	3,279



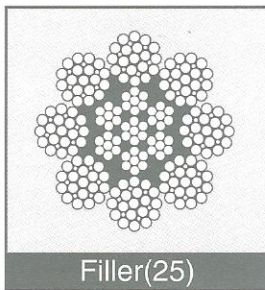
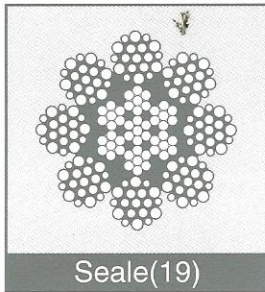
Wire Tensile Grades

Elevator ropes manufactured to other standards, including customer's own specifications, are available on request.

Class	Unit	Tensile Strength		Specification
		Inner Wires	Outer Wires	
Iron Steel	Lb/in ²	235,000	70,000	FEDERAL
Traction Steel	Lb/in ²	235,000	160,000	(RR-W-410D)
Extra Hi-strength Steel	Lb/in ²	257,000	235,000	FEDERAL&KISWIRE
E-1	N/mm ²	1,620	1,320	KS D 3514-97
A	N/mm ²	1,620	1,620	JIS G 3525-98
E-2	N/mm ²	1,770	1,180	BS 302-87
E-3	6 Strand	N/mm ²	1,570	BS 302-87
	8 Strand	N/mm ²	1,770	ISO 4344-83
B	N/mm ²	1,770	1,770	ISO 4344-83

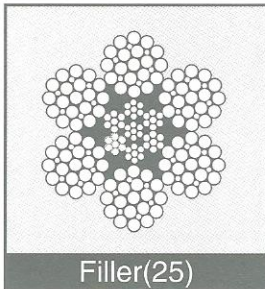
ELEVATOR WIRE ROPE

8-Strand Wire Rope-IWRC (Steel Core)



NOMINAL DIAMETER		MIN. BREAKING STRENGTH				APPROX. WEIGHT		MAX. LENGTH	
		(kN)		(Lbs)					
		INCH	mm	1370/1770 1570 (N/mm ²)	1770/1770 (N/mm ²)	199,000/257,000 228,000 (lb/in ²)	257,000/257,000 (lb/in ²)	(lb/ft)	(kg/m)
5/16	7.94	36.2	40.8	8.100	9.200	0.18	0.26	3,000	9,836
-	9	46.6	52.5	10.500	11.800	0.23	0.34	3,000	9,836
3/8	9.50	51.9	58.5	11.700	13.200	0.25	0.38	3,000	9,836
-	10	57.5	64.8	12.900	14.600	0.28	0.42	3,000	9,836
-	11	69.7	78.6	15.700	17.700	0.34	0.51	3,000	9,836
7/16	11.1	71.0	80.1	16.000	18.000	0.35	0.52	3,000	9,836
-	12	83.0	93.6	18.700	21.000	0.41	0.61	2,500	8,197
-	12.5	89.9	101	20.200	22.800	0.44	0.66	2,000	6,557
1/2	12.7	92.8	105	20.900	23.500	0.46	0.68	2,000	6,557
-	13	97.0	109	21.800	24.600	0.48	0.71	2,000	6,557
-	14	113	128	25.500	28.700	0.56	0.83	2,000	6,557
9/16	14.3	118	133	26.600	30.000	0.58	0.86	2,000	6,557
5/8	16	148	167	33.300	37.500	0.73	1.08	1,525	5,000
11/16	17.5	177	200	39.800	44.900	0.87	1.29	1,000	3,279
-	18	186	210	41.800	47.100	0.91	1.36	1,000	3,279
3/4	19.1	208	234	46.800	52.700	1.02	1.52	1,000	3,279
-	22	279	315	62.700	70.700	1.36	2.03	1,000	3,279

6-Strand Wire Rope-IWRC (Steel Core)



NOMINAL DIAMETER		MIN. BREAKING STRENGTH				APPROX. WEIGHT		MAX. LENGTH	
		(kN)		(Lbs)					
		INCH	mm	1370/1770 1570 (N/mm ²)	1770/1770 (N/mm ²)	199,000/257,000 228,000 (lb/in ²)	257,000/257,000 (lb/in ²)	(lb/ft)	(kg/m)
5/16	7.94	39.7	42.4	8.900	9.500	0.18	0.28	3,050	10,000
-	9	51.0	53.7	11.500	12.100	0.23	0.35	2,500	8,200
3/8	9.50	56.9	59.9	12.800	13.500	0.26	0.39	2,000	6,600
-	10	62.0	66.3	13.900	14.900	0.29	0.43	2,000	6,600
-	11	75.0	80.3	16.900	18.000	0.35	0.52	2,000	6,600
7/16	11.1	76.4	81.7	17.200	18.400	0.36	0.53	2,000	6,600
-	12	89.4	95.5	20.100	21.500	0.42	0.62	1,525	5,000
-	12.5	97.0	104	21.800	23.300	0.45	0.67	1,525	5,000
1/2	12.7	100	107	22.500	24.100	0.47	0.69	1,525	5,000
-	13	105	112	23.600	25.200	0.49	0.73	1,300	4,300
-	14	122	130	27.300	29.200	0.57	0.84	1,100	3,600
9/16	14.3	127	136	28.500	30.500	0.59	0.88	1,100	3,600
5/8	16	159	170	35.700	38.200	0.74	1.10	1,525	5,000
11/16	17.5	190	203	42.700	45.700	0.89	1.32	1,000	3,279
-	18	201	215	45.200	48.300	0.94	1.40	1,000	3,279
3/4	19.1	225	241	50.600	54.100	1.05	1.56	1,000	3,279
-	22	300	321	67.500	72.200	1.40	2.08	1,000	3,279

Safety Factor of Suspension Ropes

The Safety Factor is defined as the ratio of the minimum breaking load of the rope to the working load and it shall not be less than the followings.

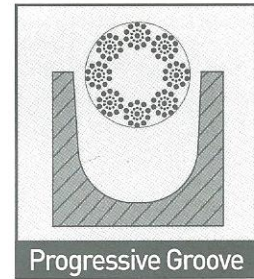
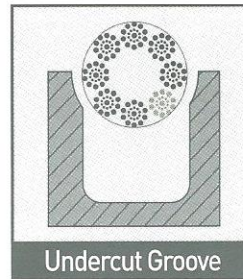
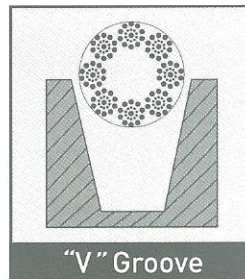
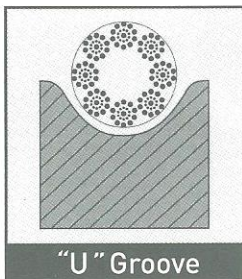
Rope speed not exceeding	30M/minute	8 to 1
Rope speed not exceeding	80M/minute	9 to 1
Rope speed not exceeding	120M/minute	10 to 1
Rope speed not exceeding	210M/minute	11 to 1
Rope speed not exceeding	420M/minute	12 to 1

Above ratio is obtained by using the boxed formula on the right.

- F**: Safety factor
- S**: Minimum breaking load of rope
- N**: Number of separate suspension rope
- K**: Roping factor -1 for 1 to 1 roping
2 for 2 to 1 roping
3 for 3 to 1 roping
- W**: Maximum static load imposed on all car ropes with car and its rated load at any position in the hoistway.

$$F = \frac{S \times N \times K}{W}$$

Sheaves or Drums for Suspension



The service life of elevator ropes is highly dependent on the design and condition of the sheaves and drums. Apart from the diameter, the shape and condition of the grooves is also a major factor especially where traction sheaves are concerned.

The minimum sheaves or drum diameter is 40 x rope diameter. For non driven sheaves the radius of the groove should be 5% larger than the radius of the rope. For traction sheaves with a U-groove with or without undercut, the radius of the groove should be adapted to the rope diameter.

Undercut U-grooves with included angle 90 or 105 have better traction than U-grooves and less friction pressure than V-grooves.

To prevent the rope from slipping in traction sheaves, V-groove sheaves are sometimes used, which exerts a wedging action on the rope. It will be obvious that in such grooves the rope is subject to serious deformation and deterioration. If this type of sheave is used, the grooves should be carefully inspected for wear and included angle should be between 35 and 40. Since, as soon as the rope run on the bottom of the groove, the wedging action is lost and the friction between rope and sheave is no longer sufficient to prevent the rope from slipping.

If the rope slips in the sheaves although the groove has the correct dimensions for the rope in question, this is usually due to ;

- overloading of the rope ;
- excessive acceleration and / or deceleration ;
- irregular stresses in the rope due to difference in wear of sheave grooves ;
- excessive lubrication of the rope.

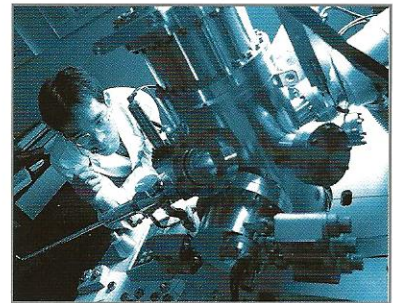
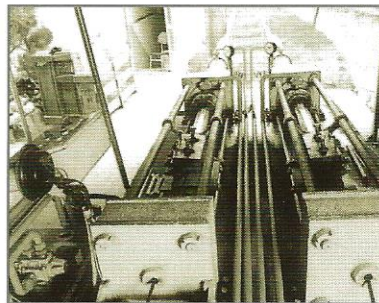
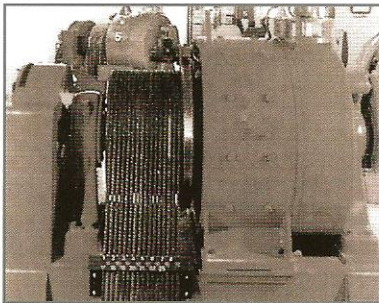
Recommendation of Ropes

Elevator ropes are usually supplied preformed with galvanized or bright finish. According to requirements of specific application, 6 or 8 strand ropes (with fiber cores) with S (19), W (19), or Fi (25) strand constructions are selectively recommended.

For ropes with the same diameter and same strand constructions, wires in 6 strand ropes are larger than wires in 8 strand ropes. Therefore, 6 strand ropes have better resistance against wedging and other deterioration such as abrasion. However, with less flexibility, 6 strand ropes require use of larger sheaves and drums, and are not suitable for use in high speed elevators or where reverse bending is required.

If the rope is less exposed to wedging deterioration, 8strand ropes can be used. 8 strand ropes are more resistant to fatigue caused by being bent around small drums or sheaves. 8 strand ropes also have a larger area of contact with the sheaves compared to 6 strand ropes.

In replacing elevator ropes, a complete set should be replaced at the same time. If used and new ropes are used together in one set, the elongation of each rope will be different and there will be uneven distribution of loads on each rope posing potential danger.



Superiority of Elephant Brand

a) Less Impact Vibration

Produced with strict diameter and ovality tolerance, which means less impacts and vibration of the rope during operation, providing pleasant boarding experience to the passengers.

b) High Fatigue Resistance

Has high fatigue resistance, achieved through even wire quality.

c) Less Slipping

Lubricated with special rope grease to prevent suspension rope from slipping during operation.

d) Less Waving & Spinning

Preformed precisely to minimize waving & spinning.

e) Less Constructional Stretch

Prestretched and pretensioned to ensure less constructional stretch during operation.

How to Order Wire Ropes

When asking for a quotation or placing orders, the required rope should be accurately specified with all the detail information listed below. In re-ordering, the best practice is to use the specification given in the previous order confirmation or invoice.

If the required rope has not been ordered before, please state the following data:

1. Construction (Ex. 8 × S(19)+FC)
2. Diameter (Ex. 5/8 inch)
3. Direction and Type of Lay (Ex. Right Hand Regular Lay)
4. Lubrication (Ex. A-2 type)
5. Breaking Strength (Ex. Traction Grade)
6. Packing Method (Ex. Wooden Reel)
7. Usage (For Hoist, Governor or Compensation)
8. Specification (Ex. ISO, BS, DIN, JIS, FEDERAL or BUYER'S OWN)

If parts of these data are not stated, the rope will be supplied in the nearest current type. It is therefore, recommended always to state the service for which the rope is intended.

Clients who require our advice on improving the service life of ropes for an existing installation should furnish the following information:

1. The data of the ropes used so far (see above) and their performance in actual practice
2. A reeving diagram including all data on sheaves and drums such as diameters, size of grooves, groove spacing, pitch of grooves on the drum, lifting speed etc.
3. Intensity of service
4. Nominal and maximum loads
5. Number of layers of the rope on the drum with lifted load
6. Special conditions, such as corrosive atmosphere, high temperature exposure etc.

On the basis of these data we will be able to give expert advice on the type of rope to be used.

Caution & Warnings

KISWIRE

KISWIRE shall not be liable under any circumstances for consequential or incidental damages resulting from the use of their products relating to personal injury, labor, cost or loss of profits. KISWIRE agrees to replace any of its products to be found defective in material.

WARNING

Any warranties, expressed or implied concerning the use of KISWIRE's product apply only to the nominal strength of new, unused wire rope.

All equipment using KISWIRE product must be properly used and maintained. Wire rope must be properly stored, handled, used and maintained. Most importantly, wire rope must be regularly inspected during use. Damage, abuse or improper maintenance can cause rope failure. Wire rope removal criteria are based on the use of steel sheaves. If synthetic sheaves are used, consult the sheave equipment manufacturer.

KISWIRE INTERNATIONAL SERVICE NETWORK

■ KISWIRE LTD. (Seoul, Korea)

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Chung-Ku, Seoul, Korea
TEL : 82-2-3166-114 / FAX : 82-2-3166-115

Busan Office : 667-1, Buam-Dong, Busanjin-Ku, Busan, Korea
TEL : 82-51-1508-10 / FAX : 82-51-805-1511

■ KISWIRE CO. (Osaka, Japan)

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■ KISWIRE CO. (Tokyo, Japan)

Ohtori Bldg., 7F 4-5 Oodenma-Cho,
Nihonbashi Chuo-Ku, Tohyo, Japan
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■ QINGDAO TAK, LTD. (Qingdao, China)

118, Chengxi No. 4 Road Jimo, Qingdao, China
TEL : 86-532-859-0118 / FAX : 86-532-859-0119

■ YANGTZE TAK, LTD. (Jiangsu, China)

45 Zhongyang Road, Economic & Technological Development
Zone, Nantong City, Jiangsu, China(226009)
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■ TREFILARBED KISWIRE LTD. (Shanghai, China)

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Lou Shan Guan Road, Shanghai China(200336)
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■ KISWIRE SDN. BHD. (Johor, Malaysia)

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Tebrau, 80300 Johor, Malaysia
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■ KISWIRE TRADING(S) CO., LTD. (Singapore)

135 Cecil Street, #06-01 LKN Building,
Singapore 069536
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■ KISWIRE EUROPE B.V. (Dongen, Netherlands)

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5100 AA Dongen The Netherlands
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■ KISWIRE TRADING, INC. (New Jersey, U.S.A.)

460 Bergen Boulevard #120 Palsades
Park, NJ. 07650 U.S.A.
TEL : 1-201-461-8895 / FAX : 1-201-461-8021

■ KISWIRE, INC. (Newberry, SC, U.S.A.)

257 Mawsons way, Newberry, SC 29108, U.S.A.
TEL : 1-803-321-0940 / FAX : 1-803-405-0307

■ Kiswire West Inc. (LA, U.S.A.)

3450 Wilshire Blvd. Suite #314, Los Angeles, CA 90010
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