KOWEL

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KOWEL

STAINLESS STEEL WIRE & WELDING WIRE

www.kowel.co.kr

Jumping up through Kowel
Globalizing in the world

HISTORY OF KOWEL Special Steel Wire

Establishment

1982~1999

1982.10.08	Establishment of KOWEL Special Steel Wire Co.,Ltd.
1990.08.24	Establishment of Yang San Facility and Relocating
1994.03.31	Accomplishment of Export 4 million dollar
1996.12.18	ISO9002 Certificate
1998.02.23	Export bright prospect business company (Small and Medium Business Administration)
1999.03.3	Accomplishment of Export 8 million dollar

Development

2002~2008

2002.01.01	Take up Chang Won. Sung as the President
2003.02.25	KSA9001/ISO9001 Renewal
2006.12.26	Certificate of Innovation business company recognize (INNO-BIZ : Small and Medium Business Administration)
2008.06.26	Accreditation of R & D Department
2008.07.17	Part/Material Specialize Business (Ministry of Knowledge Economy)

2010~2013

2010.03.10	Registered on SKN #3,4 Qualified Supplier List (ShinKoRi Nuclear Power Plant Unit 3,4)
2011.08.08	ISO/TS16949:2009 Certificate (DQS KOREA)
2011.09.19	Registered on UAE BNPP Qualified Supplier List
2012.12.31	Receives a prize at 2012 Excellence S&M Awards (Small and Medium Business Administration)
2012.04.20	S.Q(SUPPLIER QUALITY) (Hyundai – Kia Motors)
2013.03.14	Registered on SUN #1,2 Qualified Supplier List
2013.05.10	Establishment of Yang San Eogok Facilities
2013.07.24	Registered on KHNP's Approved Spare Part Vender List (Korea Hydro & Nuclear Power Co.,Ltd)
2013.09.27	KEPIC Certificate (Korea Electric Association)

CERTIFICATE

ISO, TS 16949

ISO 9001

Certification of KEPIC

Certificate of Registration for KHNP

INNO-BIZ

Certificate of a Patent

R&D Center

Component &Material specialized company

Registration of utility model

Certification of KEPIC

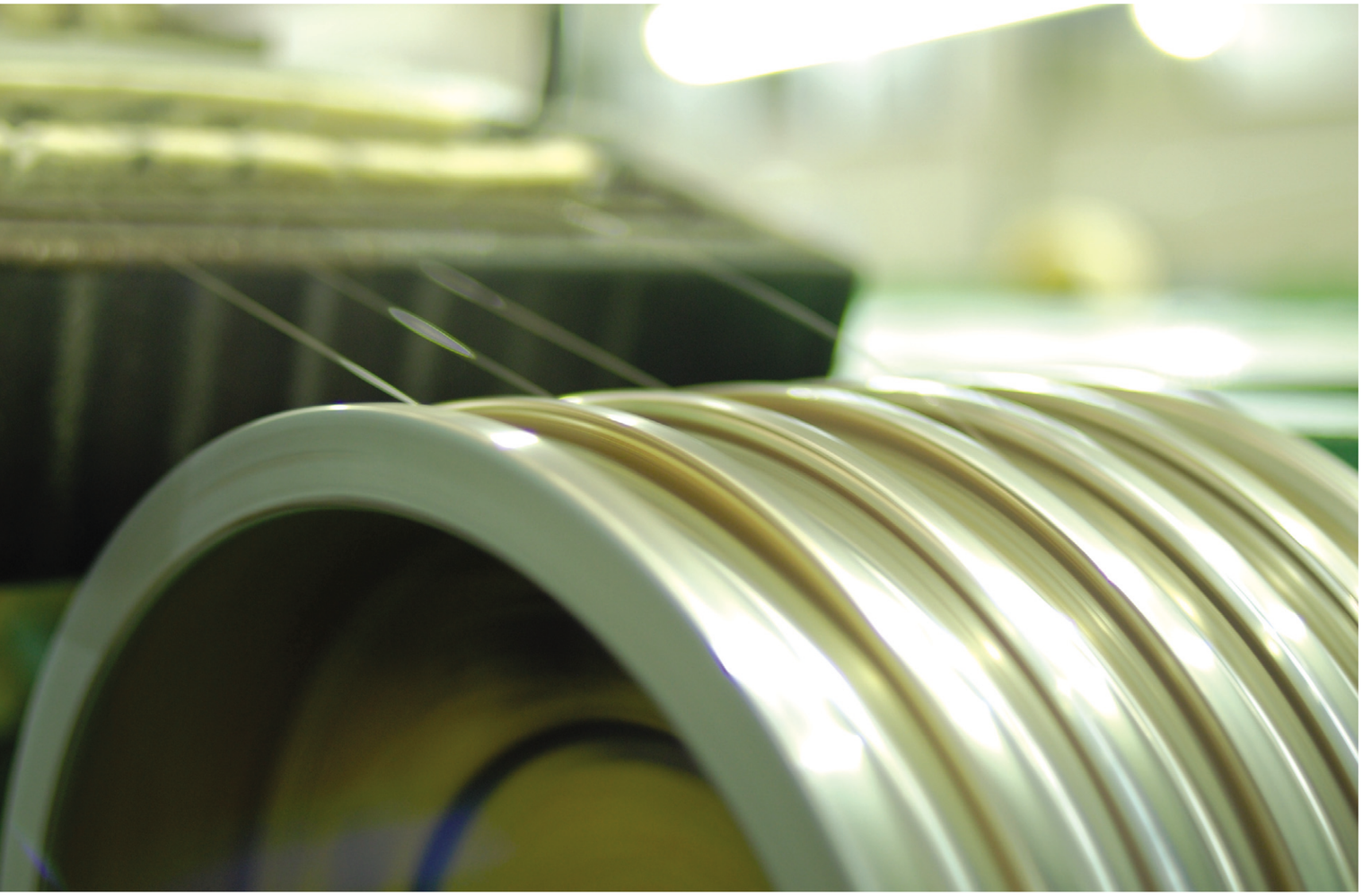
SQ Certificate Of Heat Treatment

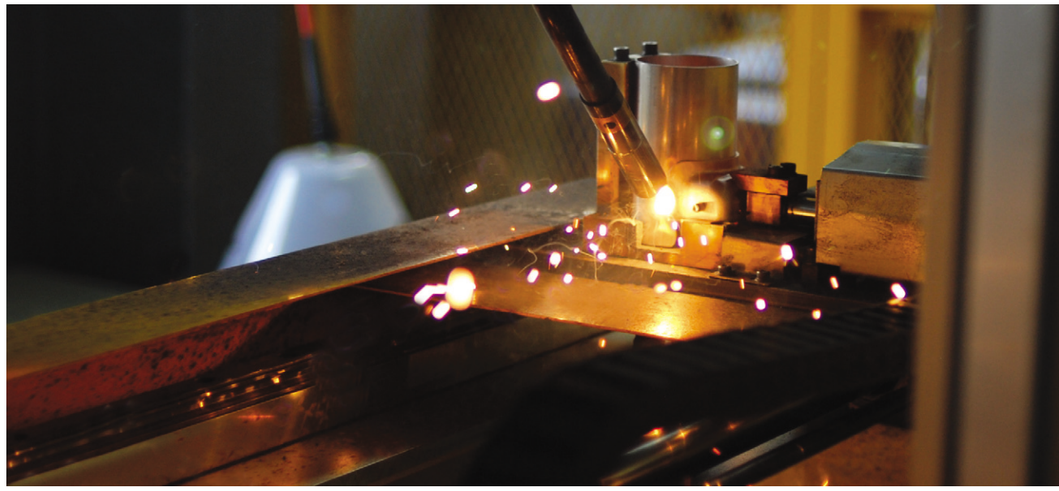
SQ Certificate Of Welding

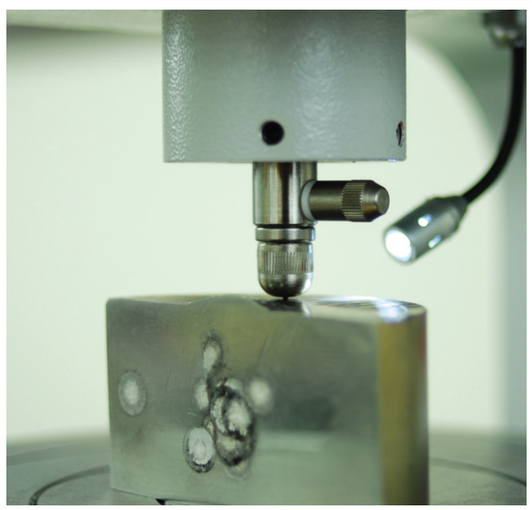
PRODUCTION CAPACITY

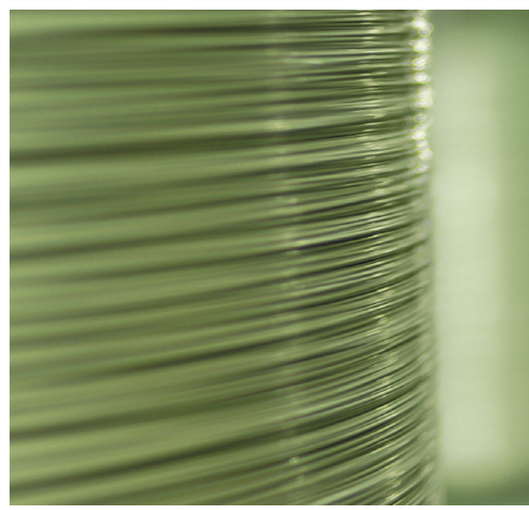
Production Capacity
3,600 Ton/Year
20 Million Dollars/Year

- Stainless Steel & Special Alloy Wire
- Stainless Steel Welding Wire





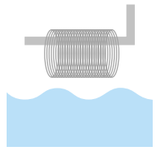




MANUFACTURING PROCESS

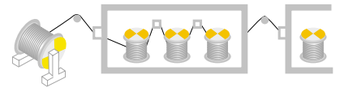
1. Wire Rod

Raw material for steel wire products supplied by steel mill. Steel mill make wire rod by hot rolling process from billet.



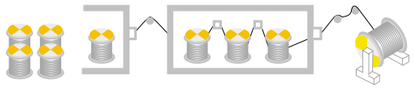
2. Surface treatment

Surface coating wire rod to facilitate drawing.



3. 1st Drawing

Surface coated wire rod is brought to 1st drawing machine to draw down required diameter and to give mechanical properties suitable for application.

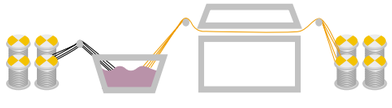


5. Intermediate Drawing

Intermediate drawing after 1st drawing.

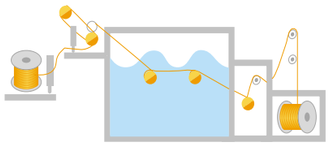
4. Anealing

Heat treatment to transform wire into required microstructure and to facilitate drawing.



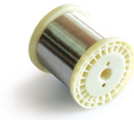
6. 2nd Anealing

Heat treatment to transform wire into required microstructure and to facilitate drawing.



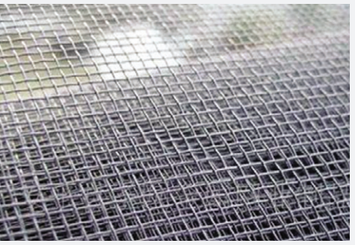
7. Final drawing

Final drawing to product required final diameter.



Wire Product

Weaving, Brading & Knitting Wires



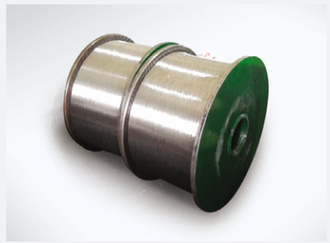
Specification for Soft Anealed Wires

304, 316, 316Ti, 309S			304L, 316L, 321		
Dia (㎜)	Tensile Strength (N/㎟)	Elongation(%)	Dia (㎜)	Tensile Strength (N/㎟)	Elongation(%)
0.10~0.22	Max 830	Min 30	0.10~0.22	Max 860	Min 30
0.23~0.37	Max 830	Min 35	0.23~0.37	Max 780	Min 30
0.38~0.50	Max 810	Min 35	0.38~0.50	Max 760	Min 35
0.51~0.70	Max 780	Min 35	0.51~0.70	Max 730	Min 35

Specification for Hard (F/H) Drawn Wires

302, 304, 316		304L, 316L	
Dia (㎜)	Tensile Strength (N/㎟)	Dia (㎜)	Tensile Strength (N/㎟)
0.10~0.19	2100~2400	0.10~0.31	1850~2050
0.20~0.31	2050~2300	0.32~0.44	1750~1950
0.32~0.44	2000~2250	0.45~0.60	1650~1850
0.45~0.60	1950~2200		

Pay-Off Pail Pack for Weaving, Braiding, Redrawing, Quality Stainless Steel Wire (Only Soft)



* BOBBIN in changing period reduced

Specification for Pay - Off Pail Pack

Dia (㎜)	Tolerance (㎜)	Ovality (㎜)	304, 316, 316Ti		304L, 316L	
			Tensile Strength (N/㎟)	Elongation (%)	Tensile Strength (N/㎟)	Elongation (%)
0.35~0.50	±0.006	0.006 under	Max 810	Min 35	Max 760	Min 35
0.51~0.70	±0.006	0.006 under	Max 780	Min 35	Max 730	Min 35

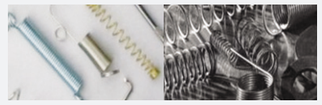
Spring Wires

Specification for General Spring Wires

Dia (㎜)	WPA	WPB	WPC
	302, 304, 316	302, 304	631JI
	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)
0.15 ~ 0.20	1650 ~ 1900	2150 ~ 2400	1950 ~ 2200
0.23 ~ 0.40	1600 ~ 1850	2050 ~ 2300	1930 ~ 2180
0.45 ~ 0.60	1600 ~ 1850	1950 ~ 2200	1850 ~ 2100
0.65 ~ 1.00	1530 ~ 1780	1850 ~ 2100	1800 ~ 2050
1.20 ~ 1.40	1450 ~ 1700	1750 ~ 2000	1700 ~ 1950
1.60 ~ 2.00	1400 ~ 1650	1650 ~ 1900	1600 ~ 1850
2.30 ~ 2.60	1320 ~ 1570	1550 ~ 1800	1500 ~ 1750
2.90 ~ 3.50	1230 ~ 1480	1450 ~ 1700	1400 ~ 1650

Specification for heat resistant Spring Wires

Dia (㎜)	X-750	718
	1/2H (SP' T)	WPB
	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)
1.0 ~ 3.0	1400 ~ 1550	1550 ~ 1750



CHQ Wires

Specification

Dia (㎜)	WSA		WSB		Surface
	304, 316, 304J3 304Cu, XM-7		304, 316, 304J3 304Cu, XM-7		
	Tensile Strength (N/㎟)		Tensile Strength (N/㎟)		
WSA 0.80-5.25 WSB 0.80-12.0	304	550 ~ 650	304	570 ~ 700	Matt Bright S-Co
	316	550 ~ 650	316	570 ~ 700	
	304J3	500 ~ 650	304J3	520 ~ 700	
	304Cu	460 ~ 600	304Cu	460 ~ 650	
	XM-7	450 ~ 590	XM-7	450 ~ 630	

EPQ Wires

Specification

Dia (mm)	1/4H	3/4H
	304, 316	304, 316
	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)
1.00 ~ 1.40	950 ~ 1150	1500 ~ 1750
1.50 ~ 1.80	950 ~ 1150	1450 ~ 1700
2.00 ~ 2.60	900 ~ 1100	1400 ~ 1650
2.80 ~ 3.50	900 ~ 1100	1300 ~ 1500
4.00 ~ 7.00	850 ~ 1000	–

Super-Hardness & Non-Magnetic Wires

Specification

Dia (mm)	416, 420J2, 420F	202M	
	1/4H	1/2H	F/H
	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)	
0.80 ~ 3.00	–	1400 ~ 1650	1750 ~ 2000
3.20 ~ 4.00	950 ~ 1200	1300 ~ 1550	1450 ~ 1950
4.01 ~ 6.50	900 ~ 1100	1200 ~ 1450	–
6.51 ~ 12.0	900 ~ 1050	1100 ~ 1350	–

Free-Cutting Wires

Specification

Dia (mm)	303C, 303F	
	Soft	1/4H
	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)
0.80 ~ 1.60	580 ~ 830	800 ~ 1100
1.61 ~ 3.00	540 ~ 780	780 ~ 1050
3.01 ~ 5.00	500 ~ 750	750 ~ 1000
5.01 ~ 12.0	–	700 ~ 950

Nail Wires

Specification

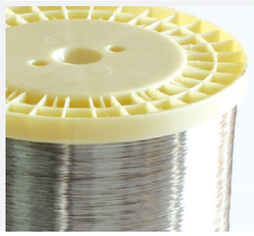
Dia (mm)	304, 316, 304J3	
	1/8H	1/4H
	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)
1.20 ~ 2.00	780 ~ 980	930 ~ 1150
2.01 ~ 3.00	780 ~ 980	900 ~ 1100
3.01 ~ 5.00	730 ~ 930	880 ~ 1050
5.01 ~ 7.00	680 ~ 880	830 ~ 950

PRODUCT STANDARD SIZE

Stainless Steel Wire

Wire Cond.	Dia (㎜)	Unit Package		Innerside Packing	Outerside Packing
		Spool / Coil / Pail	Approx.Wt.(Kg)		
Soft	0.10 ~ 0.14	DIN 100 Spool	1.5 ~ 2.0	Carton Box	Cardboard Box Wooden Case
	0.15 ~ 0.18	DIN 125 Spool	2.0 ~ 3.0		
	0.19 ~ 0.35	DIN 160 Spool	5.0 ~ 6.5		
		DIN 200 Spool	9.0 ~ 12.0		
		DIN 250 Spool	18.0 ~ 23.0		
		DIN 355 Spool	38.0 ~ 42.0		
	0.71 ~ 1.99	12" 16" 24"Coil / Pail	30 ~ 100 / 200 ~ 250	P.P Cloth	Cardboard Box Bundle with P.P Cloth
	2.00 ~ 5.25	24" Coil / Carrier	100 ~ 500		
Hard	0.10 ~ 0.30	DIN 100 Spool	1.5 ~ 2.0	Carton Box	Cardboard Box Wooden Case
	0.30 ~ 0.60	DIN 125 Spool	2.0 ~ 3.0		
		DIN 160 Spool	5.0 ~ 6.5		
		DIN 200 Spool	9.0 ~ 12.0		
		DIN 250 Spool	18.0 ~ 23.0		
		DIN 355 Spool	38.0 ~ 42.0		
	0.61 ~ 0.99	8" 10" 12" Coil	15 ~ 30	P.P Cloth	Cardboard Box
	1.00 ~ 1.99	12" 14" 18" 24" Coil	30 ~ 150		Cardboard Box Bundle with P.P Cloth
	2.00 ~ 15.0	24" 32" Coil / Carrier	100 ~ 500		

※ Can be changed according to the customer's request.



WELDING-WIRE PRODUCTS

Specification Solid MIG / TIG / Sub-merged Arc Wire

	Dia (㎜)	Low – bright Tensile Strength (N/㎟)	Hi – Matt Tensile Strength (N/㎟)	Tolerance (㎜)	Cast (㎜)	Helix (㎜)
MIG	0.8–1.6					
	300 Grade	880 ~ 1100	1370 ~ 1570	–0.010 ~ –0.030	400 ~ 500	20 under
	ER 410	–	1180 ~ 1370			
	ER 430	–	780 ~ 980			
	430 LNb	–	980 ~ 1180			

	Dia (㎜)	1.0 / 1.2	1.6 / 2.0 / 2.4 / 2.6	3.2 / 4.0	Tolerance (㎜)	Length (㎜)
TIG		Tensile Strength (N/㎟)	Tensile Strength (N/㎟)	Tensile Strength (N/㎟)		
	300 Grade	880 ~ 1130	780 ~ 1030	690 ~ 930	+0.010 ~ –0.030	± 3

	Dia (㎜)	2.4 / 3.2 / 4.0 (㎜)	Tolerance (㎜)	Cast (㎜)	Helix (㎜)
Sub-merged Arc wire		Tensile Strength (N/㎟)			
	300 Grade	690 ~ 930	–0.010 ~ –0.030	400 under	25 under

※ TIG Size, Grade and Heat No. are embossed on end side of rod each

Packing

Type	TIG	MIG	SAW
Pack (Kg) Spool	5KG/Pack	12.5Kg, 15Kg, 20Kg/Spool 100Kg, 150Kg 200Kg / Pail-Pack	25Kg / Wire basket 25Kg / Wire Coil

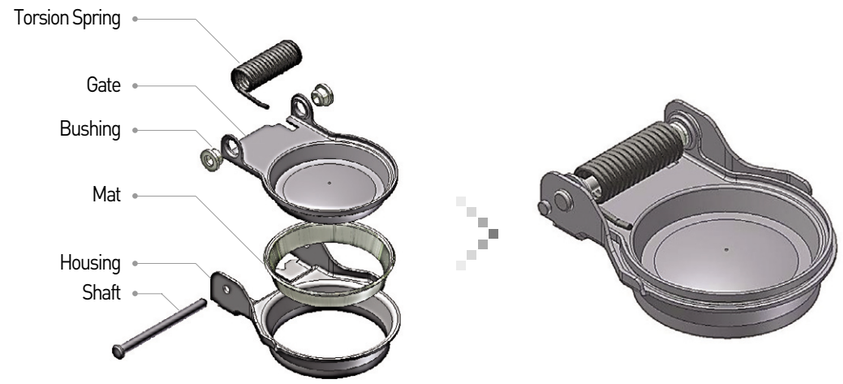
KOWEL

AUTOMOBILE BUSINESS

SUPPLYING ITEMS

Flexible Torsion Valve & Parts for Muffler

- Noise reducing valve and each part
- Customers: **Hyundai & Kia Motors**



PLANT BUSINESS

SUPPLYING ITEMS

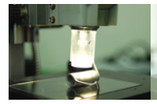
FABRICATION ITEMS & SUPPLYING ITEMS

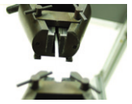
- WELDED FITTING (STAINLESS & CARBON)
- PIPING SUBASSEMBLY (STAINLESS & CARBON)

- FLANGE & BUTT WELDING
- SEAMLESS PIPE & PLATE (STAINLESS & CARBON)

- FORGED FITTINGS & BARS & BOLT, NUT, WASHER (STAINLESS & CARBON)
- SHAPE
  ANGLE, H-BEAM, CHANNEL

TESTING EQUIPMENT





The amount of Equipment							
NO.	TESTER-NAME	CAPACITY	DENSITY	APPLICABLE	HEADE	EAGOK FACTORY	OTHER
1	Tension & Pressure Tester	5TON	1kg	Tension test	O		
2	Tension tester	50kg	0.01kg	Tension test	O		
3	Surface Microscope	–	–	Wire's surface observation	O		
4	FERRITE SCOPE	–	–	D-FERRITE analysis	O		
5	PMI (Grade analyzer)	–	–	Grade analysis	O		
6	Radiation pyrometer	3,000℃	1℃	Temperature test	O		
7	Infrared pyrometer	-18℃~1500℃	0.1℃	Temperature test	O		
8	Infrared pyrometer	-20℃~500℃	0.1℃	Temperature test	O		
9	Small heat-treatment furnace	1,100℃	1℃	Sample heat-treatment	O		
10	Rockwell hardness tester	60, 100, 150kg	1HRC / HRB	Rockwell hardness test	O		
11	Spectral analyzer	–	–	Chemical element analysis	O		
12	Tension tester	50TON	1kg	Tension test		O	
13	Micro Vickers hardness tester	1kg	1Hv	Vickers hardness test		O	
14	Heat-treatment furnace	800℃	1℃	Heat-treatment		O	
15	Cutter	–	–	Specimen cutting		O	
16	Mounting Device	–	–	Hardness specimen fabrication		O	
17	Polishing Device	–	–	Specimen Polish		O	
18	Torsion Spring Tester	20kg	5g	VALVE ASSY TQ TEST		O	
19	Hot endurance Tester	1100℃	1℃	Spring hot endurance test		O	
20	Cold endurance Tester	–	–	Spring cold endurance test		O	
21	Valve torque Tester	50kg	1g	SPRING Unit TQ TEST		O	
22	Non-contact Two-dimensional analyzer	300mm	±0.002mm	Dimension Test		O	
23	Radiation pyrometer	-50℃~1000℃	0.1℃	Temperature Analyzer		O	
24	Electrical force analyzer	2942N~14709.98N	–	Material thickness Check		O	
25	Environmental Tester	-40℃~150℃	–	Thermal shock test		O	
26	Illumination analyzer	100,000 LUX	1LUX	illumination Analyze		O	

CHEMICAL COMPOSITION

STAINLESS STEEL GENERAL WIRE

Type	C(max.)	Si(max)	Mn(max.)	P(max)	S(max)	Ni(max.)	Cr	Mo(max.)	Cu(max.)	Other Elements
202M	0.05~0.15	1.00	7.50~11.00	0.060	0.030	5.00~8.00	17.00~19.00	–	–	–
302	0.15	1.00	2.00	0.045	0.030	8.00~10.00	17.00~19.00	–	–	–
304	0.08	1.00	2.00	0.045	0.030	8.00~10.50	18.00~20.00	–	–	–
304L	0.03	1.00	2.00	0.045	0.030	8.00~12.00	18.00~20.00	–	–	–
304J3	0.08	1.00	2.00	0.045	0.030	8.00~10.00	17.00~19.00	–	1.00~3.00	–
304Cu	0.08	1.00	2.00	0.045	0.030	10.00~14.00	16.00~18.00	–	2.00~3.00	–
302HQ(XM-7)	0.08	1.00	2.00	0.045	0.030	8.50~10.50	17.00~19.00	–	3.00~4.00	–
316	0.08	1.00	2.00	0.045	0.030	10.00~14.00	16.00~18.00	2.00~3.00	–	–
316L	0.03	1.00	2.00	0.045	0.030	12.00~15.00	16.00~18.00	2.00~3.00	–	–
316Ti	0.08	1.00	2.00	0.045	0.030	10.00~14.00	16.00~18.00	2.00~3.00	–	Ti 5xC%(Min)
321	0.08	1.00	2.00	0.045	0.030	9.00~13.00	17.00~19.00	–	–	Ti 5xC%(Min)
416	0.15	1.00	1.25	0.060	0.150	0.60	12.00~14.00	–	–	–
430/434A	0.12	1.00	1.00	0.040	0.030	0.60	16.00~18.00	–	–	–
631J1	0.09	1.00	1.00	0.040	0.030	7.00~8.50	16.00~18.00	–	–	Al 0.75 ~ 1.50

NICKEL & NICKEL ALLOY WIRE

Type	C	Si	Mn	Al	Ti	Ni	Cr	Cu	Co	Mo	Other Elements		
718	0.08 Max	0.35 Max	0.35 Max	0.20 ~ 0.80	0.9	52.00 As balance	17.0 ~ 21.0	0.30	1.00 Max	2.80 ~ 3.30	Nb+Ta 4.75 ~ 5.50	Fe Bal.	
X-750	0.08 Max	0.35 Max	0.35 Max	0.80	2.5	70.00 As balance	16.0	–	1.00 Max	–	Nb+Ta 1.00	Fe 8.00	
UDIMET520	0.02 ~ 0.06	–	–	1.80 ~ 2.30	2.90 ~ 3.25	52.00~59.00 balance	18.0 ~ 20.0	–	11.0 ~ 14.0	5.5 ~ 7.0	B 0.004 ~ 0.010	W 0.8 ~ 1.2	
WASPALOY	0.08 Max	0.15 Max	0.10 Max	0.015 Max	3.00	58.00 As balance	19.0	0.1 Max	13.50 Max	4.30	B 0.006	Fe 2.00 Max	Zr 0.05
C-276	0.01 Max	0.08 Max	1.00 Max	–	–	57.00	14.5 ~ 16.5	–	2.5 Max	15.0 ~ 17.0	Fe 4.0 ~ 7.0	W 3.0 ~ 4.5	V 0.35 Max

STAINLESS STEEL WELDING WIRE

Type	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Other Elements
ER307Si	0.08	0.80	7.0	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER308	0.08	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER308L	0.03	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER308H	0.04~0.08	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER308LSi	0.03	0.65~1.00	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER309	0.12	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER309L	0.03	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER309LSi	0.03	0.65~1.00	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER309LMo	0.03	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	2.00~3.00	0.75	–
ER310	0.08~0.15	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER312	0.15	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.50~22.00	0.75	0.75	–
ER316	0.08	0.30~0.65	1.00~2.50	0.030	0.030	11.00~14.00	19.50~22.00	2.00~3.00	0.75	–
ER316L	0.03	0.30~0.65	1.00~2.50	0.030	0.030	11.00~14.00	19.50~22.00	2.00~3.00	0.75	–
ER316LSi	0.03	0.30~0.65	1.00~2.50	0.030	0.030	11.00~14.00	19.50~22.00	2.00~3.00	0.75	–
ER320	0.07	0.60	1.00~2.50	0.030	0.030	32.00~36.00	19.00~21.00	2.00~3.00	3.00~4.00	8 x C min /1.0 max
ER320LR	0.025	0.15	1.50~2.00	0.015	0.02	32.00~36.00	19.00~21.00	2.00~3.00	3.00~4.00	Nb+Ta (8xC MiN1.00Max)
ER347	0.08	0.30~0.65	1.00~2.50	0.030	0.030	9.00~11.00	19.00~21.50	0.75	0.75	–
ER347Si	0.08	0.65~1.00	1.00~2.50	0.030	0.030	9.00~11.00	19.00~21.50	0.75	0.75	Nb+Ta (10xC MiN.1.00Max)
ER410	0.12	0.50	0.60	0.030	0.030	0.60	11.50~13.50	0.75	0.75	–
ER420J2	0.26~0.40	0.20~1.00	2.20~1.00	0.040	0.015	0.60	12.50~14.00	0.50	0.50	–
ER409Ti	0.03	0.30~1.00	0.40~1.00	0.030	0.020	0.75~1.00	10.50~11.70	0.10	0.10	Ti (6xC~0.75)
ER409LTi	0.025	0.40~0.60	0.50	0.030	0.005	0.30	12.30~12.80	0.10	0.10	Ti (0.30~0.40)
ER430	0.10	0.50	0.60	0.030	0.030	0.60	15.50~17.00	0.75	0.75	–
ER430LNb	0.01	0.43	0.41	–	–	–	–	–	–	–
ER2209	0.03	0.90	0.50~2.00	0.030	0.030	7.50~9.50	21.50~23.50	2.50~3.50	0.75	–

Type	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Al	Ti	Fe	Other Elements
ERNi-1	0.15	0.75	1.0	0.030	0.015	93.0 Min	–	–	0.25	1.5	2.0~3.5	1.0	–
ERNiCu-7	0.15	1.25	4.0	0.020	0.015	62.0~69.0	–	–	Rem	1.25	1.5~3.0	2.5	–
ERNiCr-3	0.10	0.50	2.5~3.5	0.030	0.015	67.0 Min	18.0~22.0	–	0.50	–	0.75	3.0	Nb+Ta (2.0~3.0)
ERNiCrFe-11	0.10	0.50	1.0	0.030	0.015	58.0~63.0	21.0~25.0	–	1.0	1.0~1.7	–	Rem	–
ERNiFeCr-2	0.08	0.35	0.35	0.015	0.015	50.0~55.0	17.0~21.0	2.80~3.30	0.30	0.20~0.80	0.65~1.15	Rem	Nb+Ta (2.80~3.30)
ERNiCrMo-3	0.10	0.50	0.50	0.020	0.015	58.0 Min	20.0~23.0	8.0~10.0	0.50	0.40	0.40	5.0	Nb+Ta (3.15~4.15)
ERNiCrMo-4	0.02	0.08	1.0	0.040	0.03	Rem	14.5~16.5	15.0~17.0	0.50	–	–	4.0~7.0	–