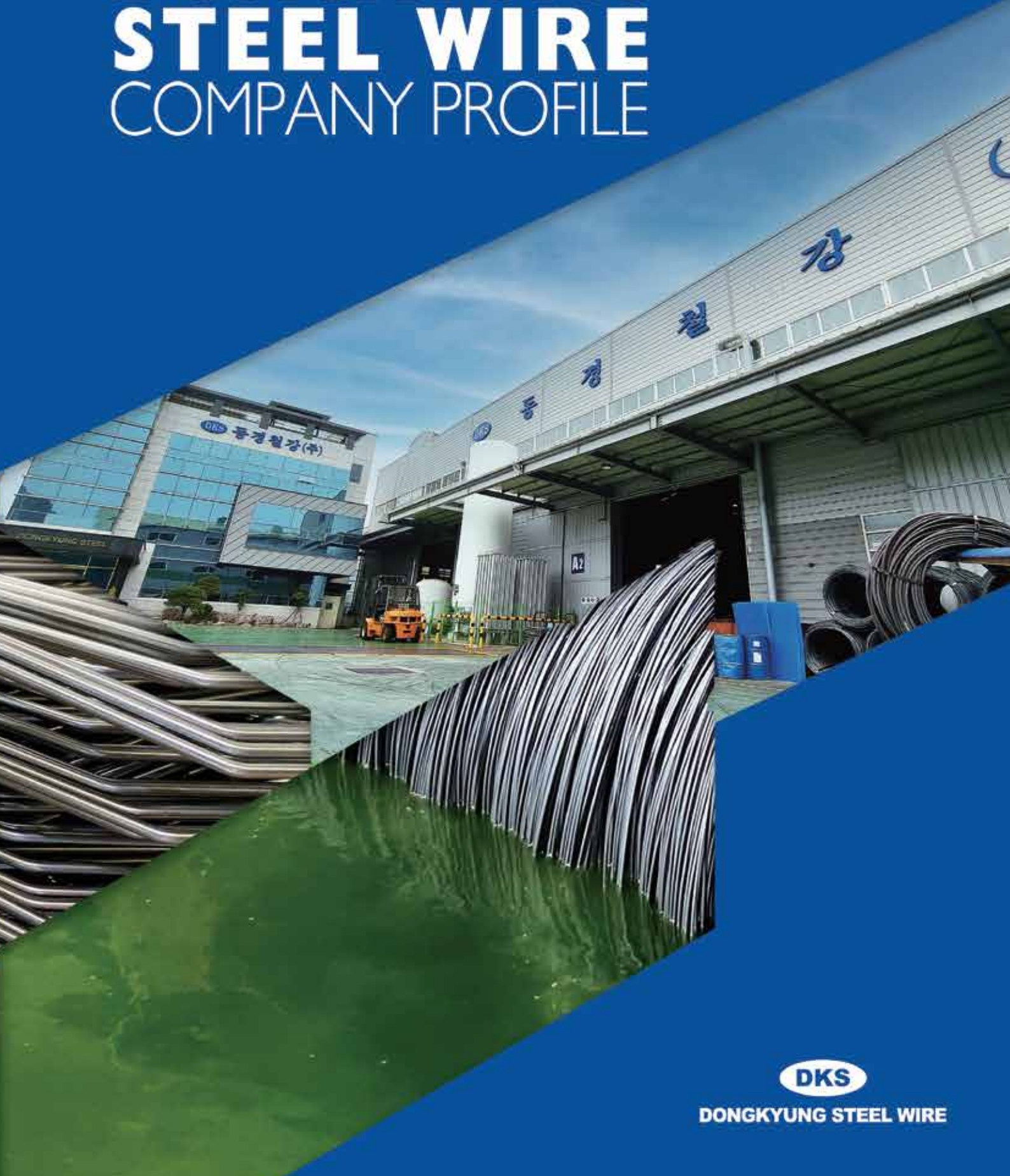


DONGKYUNG STEEL WIRE COMPANY PROFILE



DONGKYUNG STEEL WIRE

We are
a company
that meets
customer needs.

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Global Integrated Wire Rod Company



First-Class Quality

Advancement of Technology

Simplification of Process

DKS
동경철강(주)
DONG KYUNG STEEL WIRE CO., LTD.



CEO Message

We would like to express our deep gratitude to our customers for working together to create the future of Dong Kyung Steel Wire.

Since its establishment in 1999, we have been a professional manufacturer of steel wire rods.

We have established stable relationships of trust with our business partners, and as a symbiotic partner, we have achieved remarkable growth both in Japan and overseas through continuous quality improvement and technological development cooperation.

We manufacture and supply products that meet these needs by proactively and aggressively coping with the sudden changes in the external environment, which include production of high-quality products that meet customer needs, efficient management stability, and cost reduction.

We also do our best to make a reasonable and efficient post-management and satisfaction.

We will devote ourselves to R&D as a company that can contribute to the environment of the coming future, and strengthen the structural system for customer satisfaction.

We would like to once again thank the customers who have spared us trust and love for Dong Kyung Steel Wire. We will always listen to you and be with you.

CEO Il-Kyung Sung

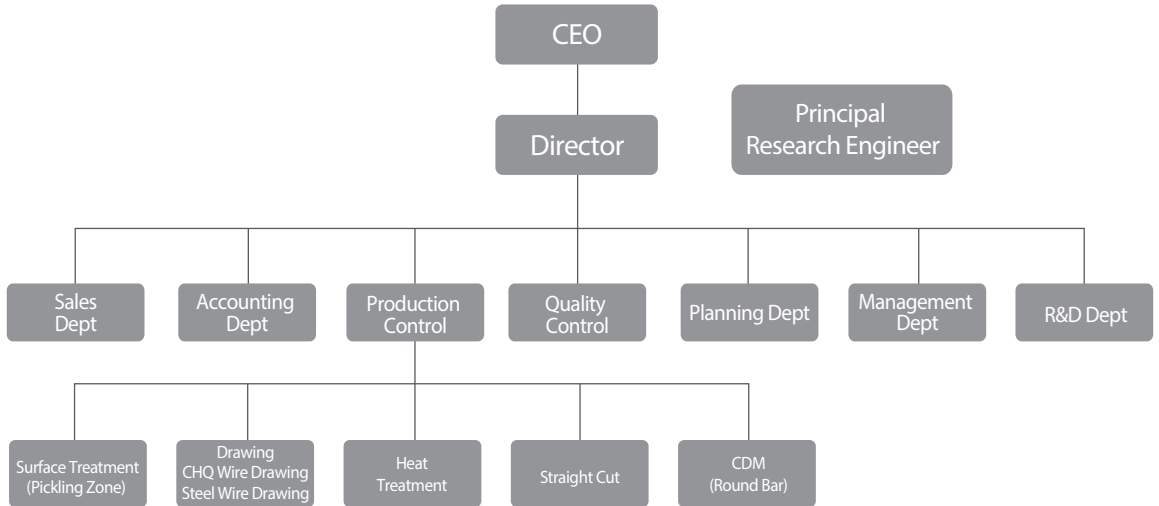
We build reputation and trust through the past.

Company history

- | | | |
|-------|-----|---|
| 2020. | 12. | Selection of Leading Firms in Strategic Industry in Busan |
| | 09. | Designation of root technology specialist |
| | 07. | Acquirement of Busan Star(Pre-Camp.) Company |
| | 05. | Materials and Components Specialized |
| | 03. | R&D Center Established |
| 2019. | 10. | Acquirement of MAIN-Biz Busan Innopolis |
| | 09. | Partnership with KITECH |
| 2017. | 01. | Movement and Extension to |
| 2011. | 05. | Acquirement of MAIN-Biz |
| 2005. | 05. | Acquirement of KS |
| | 09. | Acquirement of MAIN-Biz National Industrial Complex |
| 2004. | 04. | ISO 9001:2000, KS A 9001:2001 Dong Kyung Steel Wire |
| 2002. | 07. | Movement and Extension to Noksan Company |
| 1999. | 11. | Change in Business Name to |
| | 02. | Establishment of Kyung-il Steel |

ORGANIZATION

Dongkyung Steel Wire promise to pursue transparent management and become a harmonious and exemplary partner.



CERTIFICATE



PATENTS



Patents

WIRE ELONGATING MACHINE AND PROCESSING METHOD USING THE SAME
KR 10-2022056

LINEAR MOTION GUIDE RAIL MACHINING METHOD AND LINEAR MOTION GUIDE RAIL PRODUCED BY USING IT
KR 10-2014839

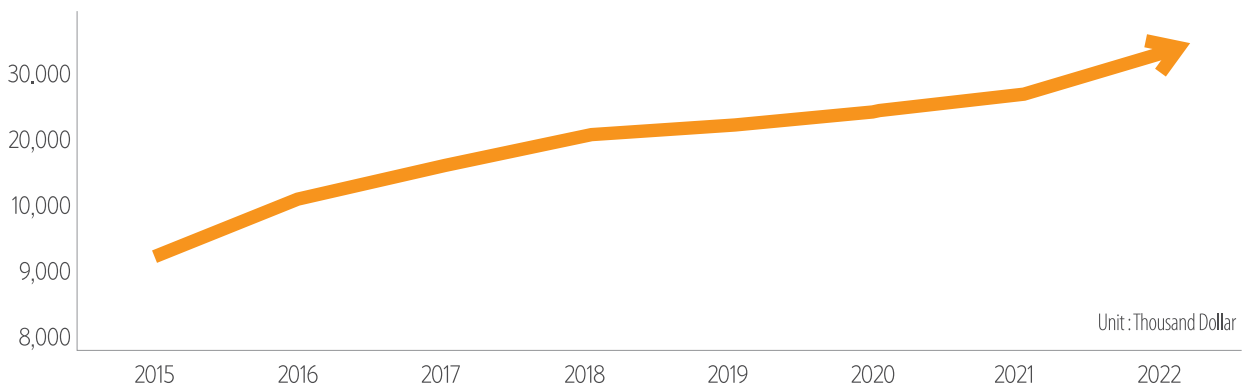
Design Registration
KR 30-0977364



We walk with customers..

Dongkyung Steel Wire acquired ISO and KS quality certification system and manages the company's business. In line with the rapidly changing information trend, we are introducing a smart factory system to ensure real-time production and inventory management from 2019. It also operates a research institute that can contribute to the upcoming future environment. It is a company that focuses on research and development. To maximize sustainable growth and revenue generation in fast-changing markets and competition, we are pursuing market portfolios and customer diversification.

SALES





Main Factory



2nd Factory



3rd Factory

CAPACITY

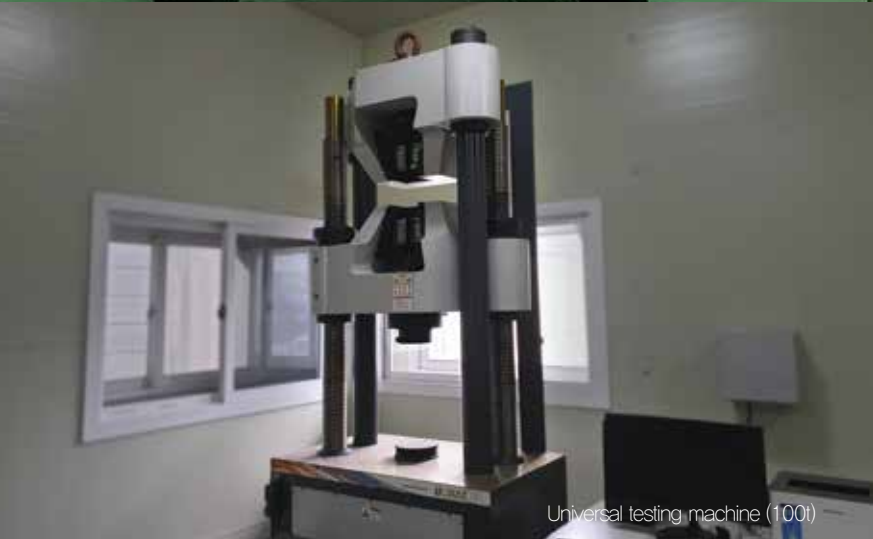
Item	Grade	Diameter(mm)	Purpose & Application	Tone /month	Remark
CHQ Wire	SWRCH 10A, 18A SWRCH 25F, 45F SCM415, 435, 440 SUJ2, AISI 4140	2.0 ~ 40.0	Bolt Nut Parts Ball Bearing	3,000	
STS Wire	STS304/304L STS316/316L STS410 STS430	2.0 ~ 34.0	Bolt Nut Screw Shaft	500	
Steel Wire	SWRM 6~20	2.0 ~ 40.0	Car Seat Wire Mesh Hanger	800	
CD-Bar	S20C, S45C AISI 4140 SAE1010, 1018 STS304/304L STS316/316L	14.0 ~ 25.0	Shaft B7 L7	500	4000 mm ~ 6000 mm
Steel Bar		2.0 ~ 15.0		200	130 mm ~ 4000 mm
Hard Drawn Steel Wire	62A 72A 82A	0.8~10.0	Spring for Auto Parts	600 ~ 800	
SA Heat Treatment				500 ~ 600	

Technology The Best for Your Needs

In order to improve the quality of human resources, we are focusing on research and development by having Ph.D. researchers from the Korea Institute of Production and Technology. In order to increase external development capability, it obtained certification of material parts equipment company and root technology company (Drawing) certification in 2020. It was certified as Busan Star Company in 2020 to leap forward and develop R&D.



Temperature controller



Universal testing machine (100t)



Specimen cutting machine



Universal testing machine (31)



Hardness test equipment



Hot mounting press



Specimen grinder



Microscope

Cold Heading Quality Wire CHQ WIRE

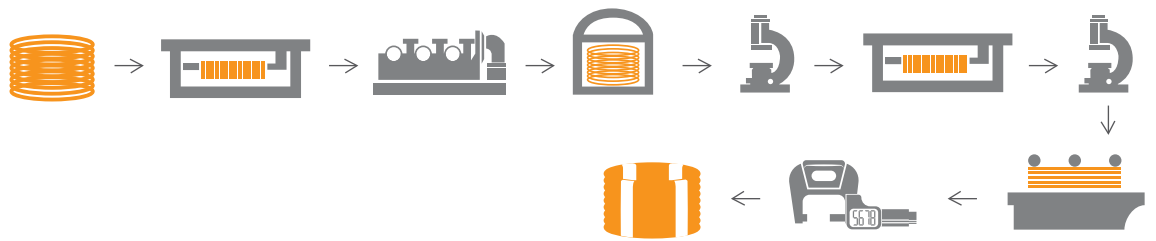
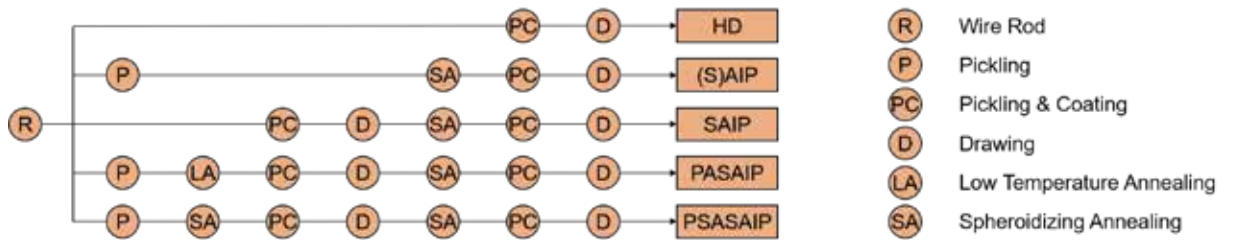
Dongkyung Steel Wire is supplying raw materials and processing materials, and is making efforts to supply excellent materials by expanding various items and processing facilities. The CHQ Wire is a material used to make parts such as bolts, nuts, and screws at room temperature, and produces excellent cold heading quality products with the highest heat treatment quality and film coating quality through the latest facilities.

CHQ WIRE

CHQ Wire refers to the Cold pressure method among metal forming methods(Cold Heading, Cold Forging; a type of processing method at room temperature). Strict levels of quality are required for the internal(skin tissue, internal defects) and external(dimensions and surface conditions) of the material.

Dongkyung Steel Wire provides excellent quality CHQ wires at domestic and abroad through the latest facilities.

● Manufacturing Process



● Usage

Usage	Grade		Process
	AISI/SAE	JIS	
Wood Screw Machine Screw (Slotted)	1008-1010R	CH8A, CH10A	HD (S)AIP
Wood Screw (+)	1008-1010R	CH8A, CH10A	SAIP,(S)AIP
Machine Screw (+)	1008-1012AI 1010R	CH8A, CH10A, CH12A	SAIP,(S)AIP HD
Tapping Screw (+)	1015-1016AI 1018-1022R	CH18A, CH22A	SAIP
Tubular Rivet	1006AI 1006R	CH6A	(S)AIP
Tubular Rivet (Drilled)	1006AI 1006R	CH6A	SAIP
Bolt (Automobile)	1045 4135	CH45K SCM435	HD
Nut	1008-1015R 1108-1110	CH8A,CH10A, CH22A	SAIP
	1023-1025A1 1023-1025SI	CH25K	HD
	1035-1045 4135-4140 5135-5140	CH25K,CH45K SCM435, SCM440 SCr440	SAIP
Steel Ball	1010-1020A 1010-1020SI	CH10A, CH18A CH12A	SAIP
	1010-1015R 5115-5120 4115-4120 52100	CH10A,CH12A SCr415,420 SCM415,420 SUJ2	HD SAIP (S)AIP
Socket Screw	4037-4042 4035-4140	SCM435,440	SAIP
Ball Joint Stud	5115-5120 4115-4120	SCr415,420 SCM415,420	SAIP
	5135-5140 4135-4140	SCr440 SCM435,440	SAIP
Piston Pin	5015-5020 5115-5120 4115-4120	SCr415,420 SCM415,420	SAIP
Special Application (Difficult Cold Forming) Special Application (Machine and Cold Forming)	Low-Silicon or Aluminium Killed Steel Rimmed or Free Cutting Steel		SAIP(S)AIP HD

● Facility production capacity

Equipment	Quantity	Capacity (Ton/year)
Bell Furnace	4	6,000 ton/year
Pickling & Coating Line	1	36,000 ton/year
Drawing Machine	8	36,000 ton/year

● Ovality of diameter and tolerance Range

Diameter (mm)	Tolerance (mm)	Ovality (mm)
≤ 5,00	+0 / -0,02	≤ 0,01
5,01 - 10,00	+0 / -0,03	≤ 0,015
10,10 - 16,00	+0 / -0,04	≤ 0,02
≥ 16,01	+0 / -0,05	≤ 0,025

● Package diameter and weight

Diameter (mm)	Internal(mm)	External(mm)	Weight(kg)
≤ 5,00	400 - 600	700 - 850	Max, 500
5,01 - 14,00	700 - 1,100	1,050 - 1,450	Max, 1,000
≥ 14,01	1,000 - 1,150	1,300 - 1,500	Max, 2,000

● Specification

Specification	Grade		Symbol
	AISI/SAE	DIN	
Austenite	302HQ	1.4567	WSA
	304	1.4301	
	304HC/304J3	—	WSB
	305	1.4303	
	316	1.4401	
Ferrite	410	1.4006	WSB
Martensite	430	1.4016	
	434	1.4113	

● Mechanical properties

Symbol	Diameter(mm)	Grade	Tensile Strength (kgf/mm ²)	Elongation(%)	Reduction of Area rate(%)
WSA	0.8 ~ 2.0	STS XM-7	49~64	≥ 30	≥ 70
	2.0 ~ 5.5	STS XM-7	45~60	≥ 40	≥ 70
		STS 304HC, 304L	52~67	≥ 40	≥ 70
WSB	0.8 ~ 2.0	STS XM-7	51~69	≥ 20	≥ 65
		STS 430	51~71		≥ 65
	2.0 ~ 17.0	STS XM-7	46~64	≥ 25	≥ 65
		STS 304HC, 304L	54~72	≥ 25	≥ 65
		STS 430	46~61	≥ 10	≥ 65

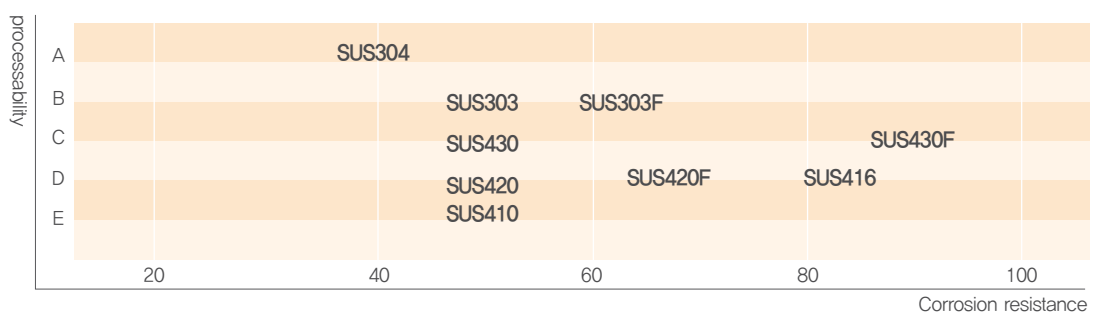
● Ovality of diameter and tolerance range

Diameter(mm)	Tolerance(mm)		Ovality(mm)	
	Management	Disire	Management	Disire
0.80~3.00	-0.025	-0.02	≤ 0.013	≤ 0.010
3.01~6.00	-0.03	-0.025	≤ 0.013	≤ 0.010

● Chemical Composition

Material	C	Si	Mn	P	S	Cr	Ni	Mo
STS304	≤ 0.08	≤ 1.00	≤ 2.00	≤ 0.045	≤ 0.030	8.00 ~ 10.50	18.00 ~ 20.00	—
STS304L	≤ 0.030	≤ 1.00	≤ 2.00	≤ 0.045	≤ 0.030	9.00 ~ 13.00	18.00 ~ 20.00	—
STS316	≤ 0.08	≤ 1.00	≤ 2.00	≤ 0.045	≤ 0.030	10.00 ~ 14.00	16.00 ~ 18.00	2.00 ~ 3.00
STS316L	≤ 0.030	≤ 1.00	≤ 2.00	≤ 0.045	≤ 0.030	12.00 ~ 15.00	16.00 ~ 18.00	2.00 ~ 3.00
STS410	≤ 0.15	≤ 1.00	≤ 1.00	≤ 0.040	≤ 0.030	11.50 ~ 13.50	—	—
STS420J1	0.16 ~ 0.25	≤ 1.00	≤ 1.00	≤ 0.040	≤ 0.030	12.00 ~ 14.00	—	—
STS420J2	0.26 ~ 0.40	≤ 1.00	≤ 1.00	≤ 0.040	≤ 0.030	12.00 ~ 14.00	—	—
STS430	≤ 0.12	≤ 0.75	≤ 1.00	≤ 0.040	≤ 0.030	16.00 ~ 18.00	—	—

● Comparison table of processability and corrosion resistance



Ordinary Steel Wire

LOW CARBON STEEL WIRE

Tokyo Steel produces materials for heated seats in cars. In order to produce and supply materials that meet customer needs and specifications smoothly, we promise to secure various selected materials and build data base by item and specification to contribute to customer development.



LOW CARBON STEEL WIRE

Key materials in various areas, including Hume pipes, concrete piles, wire mesh, steel fiber, deck plates, screws, grills, farm machinery and equipment, electronics, automotive components, and more.



● Manufacturing Process



● Type and Wire Diameter

Spec. : KS D 3552, JIS G 3532

Type	Symbol	Diameter(mm)
Low carbon steel wire	SWM-B	0.10 ~ 18.00
	SWM-F	

● Ovality of diameter and tolerance Range

Diameter(mm)	SWM-B, SWM-F	Diameter(mm)	SWM-B, SWM-F
~0.35	±0.01	2.90 ~ 3.20	±0.04
0.35 ~ 0.80	±0.02	3.20 ~ 4.00	±0.05
0.80 ~ 2.00	±0.03	4.00 ~ 6.00	
2.00 ~ 2.90	±0.04	6.00 ~	±0.06

● Tensile Strength

Type	SWM-B	SWM-F
Diameter(mm)	Tensile Strength(N/mm ²)	Tensile Strength(N/mm ²)
0.10 ~ 1.30	-	-
1.30 ~ 1.80		
1.80	590~1270	320~1270
2.00		
2.30		
2.60		
2.90		
3.20	540~1130	
3.50		
4.00		
4.50		
5.00	440~1030	
5.50		
6.00		
6.50		
7.00		
7.50	390~930	
8.00 ~ 16.00		
16.00 ~ 18.00		
	320~880	

Cold Drawn Bar CD-BAR

CD-bar is high-quality steel bar that is processed and calibrated to give precision and straightness of surface tissue and dimensions while cold-drawing annealing rolled wire to a certain dimension.

CD-BAR

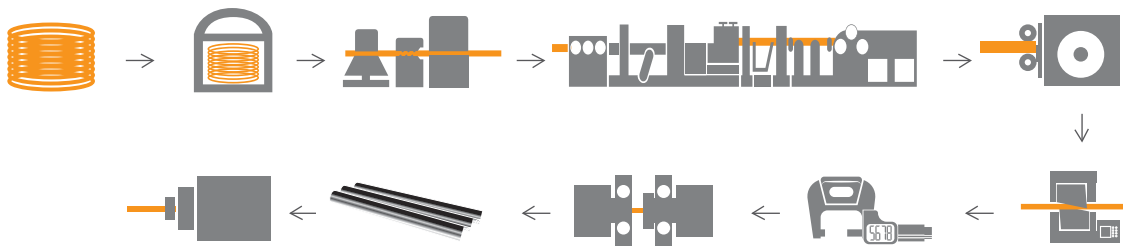
● Production range

Shape	Diameter(mm)	Length(mm)
Round	14.0 ~ 25.0	4000 ~ 6000

● Ovality of diameter and tolerance Range

Diameter(mm)	3mm ~ 6mm	6mm ~ 10mm	10mm ~ 18mm	18mm ~ 30mm
Level9 (IT9)	-0.030	-0.036	-0.043	-0.052

● Manufacturing Process



● Rolled Steel for normal Structures

- Hot rolled steel and used for structures such as buildings, bridges, ships, vehicles, etc.

Steel Grade	Chemical Composition(%)					Tensile Strength (N/mm ²)	Remark
KS	C	Si	Mn	P	S		
SS330/SS235	≤ 0.25	≤ 0.45	≤ 1.40	≤ 0.050	≤ 0.050	330 ~ 450	SS400, SS275 SS490, SS315 are used for welding structures
SS400/SS275						400 ~ 550	
SS490/SS315	≤ 0.28	≤ 0.50	≤ 1.50			490 ~ 630	
SS540/SS410	≤ 0.30	≤ 0.55	≤ 1.60	≤ 0.040	≤ 0.040	≥ 540	

● Carbon Steel for mechanical structures

- It has the advantage of the mechanical properties of carbon steel (tension strength, hardness, yield point) and is produced for secondary processing.
- Usage : Bolts, Nuts, Pins, Shaft, Steer system

Steel Grade			Chemical Composition(%)				
KS	JIS	AISI	C	Si	Mn	P	S
SM10C	S10C	1010	0,08 ~ 0,13	0,15 ~ 0,35	0,30 ~ 0,60	≤ 0.030	≤ 0.035
SM15C	S15C	1015	0,13 ~ 0,18				
SM20C	S20C	1020	0,18 ~ 0,23				
SM25C	S25C	1025	0,22 ~ 0,28		0,60 ~ 0,90		
SM30C	S30C	1030	0,27 ~ 0,33				
SM38C	S38C	1038	0,35 ~ 0,41				
SM40C	S40C	1040	0,37 ~ 0,43				
SM45C	S45C	1045	0,42 ~ 0,48				
SM50C	S50C	1050	0,47 ~ 0,53				
SM55C	S55C	1055	0,52 ~ 0,58				

● Alloy Steel for mechanical structures

- Alloy steel is made by hot rolling and is often used for secondary mechanical structures.
- Usage : Automotive bumper, OA device, home appliances, Grille covers

Steel Grade			Chemical Composition(%)							
KS	AISI	DIN	C	Si	Mn	P	S	Ni	Cr	Mo
SCM432	—	—	0,27 ~ 0,37	0,15 ~ 0,35	0,30 ~ 0,60	≤ 0.030	≤ 0.030	≤ 0.25	1,00 ~ 1,50	0,15 ~ 0,30
SCM430	4130	—	0,28 ~ 0,33		0,90 ~ 1,20				0,15 ~ 0,30	
SCM435	4135 / 4137	34CrMo4	0,33 ~ 0,38		0,90 ~ 1,20				0,15 ~ 0,30	
SCM440	4140 / 4142	42CrMo4	0,38 ~ 0,43		0,60 ~ 0,90				0,90 ~ 1,20	0,15 ~ 0,30
SCM445	4145 / 4147	—	0,43 ~ 0,48		0,90 ~ 1,20				0,15 ~ 0,30	
SCM415	—	16CrMo4	0,13 ~ 0,18		0,90 ~ 1,20				0,15 ~ 0,25	
SCM420	4148	50CrMo4	0,18 ~ 0,23		0,90 ~ 1,20				0,15 ~ 0,25	

● Stainless Steel Bar

- Stainless steel bar is highly corrosion resistant, strong against external shocks, and low heat treatment hardening for easy use in poor environments.

Type	Steel Grade		Ingredient(%)	Usage
	AISI	JIS		
303	STS303 STS303C	SUS303 SUS303C	17Cr – 18Ni	OA Shaft(Printer, Copy), Nuts, Bolts, Brushing, Car parts
304	STS304 STS304L STS304J3	SUS304 SUS304L SUS304J3	18Cr – 8Ni 18Cr – 9Ni 7Cr – 8,5Ni 3Cu	Construction material ladder, Tableware, Car parts, Bolt, Nut
316	STS316 STS316L	SUS316 SUS316L	18Cr – 12Ni 2Mo	Medical supplies, coastal buoys, and paper industries
400	STS410	SUS410	11,5Cr	Motor Shaft, Bolts, Nuts, For Annealing
	STS416	SUS416	12Cr	Car parts, Electronic Materials
	STS420J1 STS420J2 STS420F	SUS420J1 SUS420J2 SUS420F	13Cr – 0,3C	Bolts, Shaft, Spring, Tableware, Knife pin
	STS430 STS430F	SUS430 SUS430F	18Cr – Ni(x)	Car parts, Tank electronic components, Rivets

HARD DRAWN STEEL WIRE

Hard drawn steel wire refer to produced using high-quality hard steel wire have excellent straightness and are excellent with no flatness, line chafing and waves. In particular, Drawing machine and heat treatment facilities that determine the quality of the product are provided to meet the customer's needs. We secure excellent manpower and produce various hard-line products with uniform surface lubrication and high-strength hard-line products.

HARD DRAWN STEEL WIRE

- In general, the hard steel wire process refers to the product of Wire Rod heat treatment (Optional)
 - 1st Cold drawn processing - Heat treatment (Annealing) - 2nd Cold drawn processing.
 Some products are only used for 1st Cold heading processing due to demand.

Standard	Details
KS D 3510	Hard Drawn Steel Wires
JIS G 3521	Hard Drawn Steel Wires
ASTM A 227	Steel Wire Cold Drawn for Mechanical Springs
ASTM A 407	Steel Wire Cold Drawn for Coiled Type Springs
ASTM A 417	Steel wire, cold-drawn, for Zig-Zag, square-formed, and sinuous-type upholstery spring units
ASTM A 679	Steel Wire, High Tensile Strength, Hard Drawn, for Mechanical Springs
AS 1472	Carbon Steel Spring Wire for Mechanical Springs
BS 1408	Patented Cold Drawn Steel Spring Wire
BS 4637	Carbon Steel Wire for Coiled Springs
BS 4638	Carbon steel wire for ZigZag and squared-form springs
BS 5216	Patented Cold Drawn Carbon Steel Wire for Mechanical Springs
DIN 17223	Round Springs Steel Wire Quality Specification Patented Drawn Spring Wire Made of Unalloyed Steel

- Grade : JIS SWRH 42A, 42B, 62A, 62B, 67B, 72A, 72B, 77A, 77B, 82A, 82B 5.5~10mm

● Usage

Type	Carbon content	Usage
Hard steel wire for spring	0.40 ~ 0.50%	Bicycle wheels, Mass-produced iron bars, Percussion nets, Rolling, Bolts, Tuning pins, Hair pins
	0.50 ~ 0.65%	Rolling, Hair pins, Washer, Out cashing, Zigzag spring, Tool, Screen mesh, Nets
	0.65 ~ 0.86%	Tensile spring, Compression spring, Torsional spring, Aluminium ducts, Bed spring, Bearing, Laundry tongs, Concrete nail, Chain pins

● Type and Wire Diameter

Type	Symbol	Diameter	Remarks
Hard steel wire A	SW-A	0.32~ 10.0mm	Spring mainly subjected to a fixed load
Hard steel wire B	SW-B	0.32~ 10.0mm	
Hard steel wire C	SW-C		

● Tensile Strength / Ovality / Diameter tolerance / Surface

Diameter (mm)	Tensile Strength				SW-A,B,C		
	SW-A N/mm ²	SW-B N/mm ²	SW-C N/mm ²	High Strength Wire N/mm ²	Diameter (mm)	Ovality mm(Max)	Surface
0.50	1,620 ~ 1,910	2,210	2,210 ~ 2,500	2,500 ~ 2,740	±0.015	0.015	GOOD
0.55	1,570 ~ 1,860	2,160	2,160 ~ 2,450	2,450 ~ 2,700	±0.020	0.020	GOOD
0.60	1,570 ~ 1,810	2,110	2,110 ~ 2,400	2,400 ~ 2,560	±0.020	0.020	GOOD
0.65	1,570 ~ 1,810	2,110	2,110 ~ 2,400	2,350 ~ 2,600	±0.020	0.020	GOOD
0.70	1,520 ~ 1,770	2,060	2,060 ~ 2,350	2,350 ~ 2,600	±0.020	0.020	GOOD
0.80	1,520 ~ 1,770	2,010	2,010 ~ 2,300	2,300 ~ 2,550	±0.020	0.020	GOOD
0.90	1,520 ~ 1,770	2,010	2,010 ~ 2,260	2,250 ~ 2,500	±0.020	0.020	GOOD
1.00	1,470 ~ 1,720	1,960	1,960 ~ 2,210	2,210 ~ 2,400	±0.020	0.020	GOOD
1.20	1,420 ~ 1,670	1,910	1,910 ~ 2,160	2,160 ~ 2,350	±0.030	0.030	GOOD
1.40	1,370 ~ 1,620	1,860	1,860 ~ 2,110	2,110 ~ 2,300	±0.030	0.030	GOOD
1.60	1,320 ~ 1,570	1,810	1,810 ~ 2,060	2,060 ~ 2,250	±0.030	0.030	GOOD
1.80	1,270 ~ 1,520	1,770	1,770 ~ 2,010	2,010 ~ 2,210	±0.030	0.030	GOOD
2.00	1,270 ~ 1,470	1,720	1,720 ~ 1,960	1,960 ~ 2,160	±0.030	0.030	GOOD
2.30	1,230 ~ 1,420	1,670	1,670 ~ 1,910	1,910 ~ 2,110	±0.040	0.040	GOOD
2.60	1,230 ~ 1,420	1,670	1,670 ~ 1,910	1,860 ~ 2,060	±0.040	0.040	GOOD
2.90	1,180 ~ 1,370	1,620	1,620 ~ 1,860	1,810 ~ 2,010	±0.040	0.040	GOOD
3.20	1,180 ~ 1,370	1,570	1,570 ~ 1,810	1,810 ~ 2,010	±0.040	0.040	GOOD
3.50	1,180 ~ 1,370	1,570	1,570 ~ 1,770	1,760 ~ 1,960	±0.050	0.050	GOOD
4.00	1,180 ~ 1,370	1,570	1,570 ~ 1,770	1,720 ~ 1,910	±0.050	0.050	GOOD
4.50	1,130 ~ 1,320	1,520	1,520 ~ 1,720	1,720 ~ 1,910	±0.050	0.050	GOOD
5.00	1,130 ~ 1,320	1,520	1,520 ~ 1,720	1,670 ~ 1,860	±0.050	0.050	GOOD
5.50	1,080 ~ 1,270	1,470	1,470 ~ 1,670	1,620 ~ 1,760	±0.050	0.050	GOOD
6.00	1,030 ~ 1,230	1,420	1,420 ~ 1,620	1,570 ~ 1,720	±0.060	0.060	GOOD
6.50	1,030 ~ 1,230	1,420	1,420 ~ 1,620	1,520 ~ 1,670	±0.060	0.060	GOOD
7.00	980 ~ 1,180	1,370	1,370 ~ 1,570	1,470 ~ 1,620	±0.060	0.060	GOOD
8.00	980 ~ 1,180	1,370	1,370 ~ 1,570	1,520 ~ 1,670	±0.060	0.060	GOOD
9.00	930 ~ 1,130	1,320	1,320 ~ 1,520	1,470 ~ 1,620	±0.070	0.070	GOOD
10.00	930 ~ 1,130	1,320	1,320 ~ 1,520	1,420 ~ 1,570	±0.070	0.070	GOOD

● Torsional characteristics

Diameter (mm)	SW-A		SW-B		SW-C	
	Number of torsions(Min)	Torsional appearance	Number of torsions(Min)	Torsional appearance	Number of torsions(Min)	Torsional appearance
0.32 ~ 0.65	—	—	—	—	—	—
0.70	20	GOOD	20	GOOD	20	GOOD
0.80	20	GOOD	20	GOOD	20	GOOD
0.90	20	GOOD	20	GOOD	20	GOOD
1.00	20	GOOD	20	GOOD	20	GOOD
1.20	20	GOOD	20	GOOD	20	GOOD
1.40	20	GOOD	20	GOOD	20	GOOD
1.60	20	GOOD	20	GOOD	20	GOOD
1.80	20	GOOD	20	GOOD	20	GOOD
2.00	20	GOOD	20	GOOD	20	GOOD
2.30	15	GOOD	15	GOOD	15	GOOD
2.60	15	GOOD	15	GOOD	15	GOOD
2.90	15	GOOD	15	GOOD	15	GOOD
3.20	15	GOOD	15	GOOD	15	GOOD
3.50	15	GOOD	15	GOOD	15	GOOD
4.00	10	GOOD	10	GOOD	10	GOOD
4.50	10	GOOD	10	GOOD	10	GOOD
5.00	10	GOOD	10	GOOD	10	GOOD
5.50	10	GOOD	10	GOOD	10	GOOD
6.00	10	GOOD	10	GOOD	10	GOOD
6.50~10.0	—	—	—	—	—	—

PIANO WIRE

Piano wire refer to produced using high-quality hard steel wire have excellent straightness and are excellent with no flatness, line chafing and waves. In particular, Drawing machine and heat treatment facilities that determine the quality of the product are provided to meet the customer's needs. We secure excellent manpower and produce various hard-line products with uniform surface lubrication and high-strength hard-line products.

PIANO WIRE

- In general, the Piano steel wire refers to the product of Wire Rod heat treatment (Optional) - 1st Cold drawn processing - Heat treatment (Annealing) - 2nd Cold drawn processing.
- Some products are only used for 1st Cold heading processing due to demand.

Classification	Stringed Instruments	Advanced spring
America, Europe	Music String Wire	Music Spring Wire
Korea, Japan	Music Wire	Piano Wire

- Grade: JIS SWRS 42B, 62A, 62B, 67B, 72A, 72B, 77A, 75A, 75B, 77B, 82A, 80A, 80B, 82A, 82B 87A, 87B, 92A, 92B 5.5~10mm

● Usage

- It is used as a high-end spring with a dynamic load mainly on the engine valve springs, brake springs, clutch springs and compressor springs of real devices, electronic communication devices, automobiles, using 0.6 to 0.9% carbon content.

● Type and Wire Diameter

Specification	Type	Purduction symbol
Piano 1	PW-1	Spring under mainly moving loads.
Piano 2	PW-2	

● Tensile Strength / Diameter tolerance / Ovality / Surface

Diameter (mm)	Tensile Strength		Diameter tolerance/Ovality/Surface			Tensile Strength	Diameter tolerance/Ovality/Surface		
	PW-1 (SWP-A : JIS)	PW-2 (SWP-B : JIS)	Diameter tolerance (mm)	Ovality (mm/Max)	Surface	PW-3 (SWP-B:JIS)	Diameter tolerance (mm)	Ovality (mm/Max)	Surface
	N/mm ²	N/mm ²							
0.50	2,300 ~ 2,550	2,550 ~ 2,790	±0,008	0,008	GOOD	-	-	-	-
0.55	2,260 ~ 2,500	2,500 ~ 2,750	±0,010	0,010	GOOD	-	-	-	-
0.60	2,210 ~ 2,450	2,450 ~ 2,700	±0,010	0,010	GOOD	-	-	-	-
0.65	2,210 ~ 2,450	2,450 ~ 2,700	±0,010	0,010	GOOD	-	-	-	-

0.70	2,160 ~ 2,400	2,400 ~ 2,650	±0,010	0,010	GOOD	—	—	—	—
0.80	2,110 ~ 2,350	2,350 ~ 2,600	±0,010	0,010	GOOD	—	—	—	—
0.90	2,110 ~ 2,300	2,300 ~ 2,500	±0,010	0,010	GOOD	—	—	—	—
1.00	2,060 ~ 2,260	2,260 ~ 2,450	±0,010	0,010	GOOD	2,010 ~ 2,210	±0,010	0,010	GOOD
1.20	2,010 ~ 2,210	2,210 ~ 2,400	±0,015	0,015	GOOD	1,960 ~ 2,160	±0,015	0,015	GOOD
1.40	1,960 ~ 2,160	2,160 ~ 2,350	±0,015	0,015	GOOD	1,910 ~ 2,110	±0,015	0,015	GOOD
1.60	1,910 ~ 2,110	2,110 ~ 2,300	±0,015	0,015	GOOD	1,860 ~ 2,060	±0,015	0,015	GOOD
1.80	1,860 ~ 2,060	2,060 ~ 2,260	±0,015	0,015	GOOD	1,810 ~ 2,010	±0,015	0,015	GOOD
2.00	1,810 ~ 2,010	2,010 ~ 2,210	±0,015	0,015	GOOD	1,770 ~ 1,910	±0,015	0,015	GOOD
2.30	1,770 ~ 1,960	1,960 ~ 2,160	±0,020	0,020	GOOD	1,720 ~ 1,860	±0,020	0,020	GOOD
2.60	1,770 ~ 1,960	1,960 ~ 2,160	±0,020	0,020	GOOD	1,720 ~ 1,860	±0,020	0,020	GOOD
2.90	1,720 ~ 1,910	1,910 ~ 2,110	±0,020	0,020	GOOD	1,720 ~ 1,860	±0,020	0,020	GOOD
3.20	1,670 ~ 1,860	1,860 ~ 2,060	±0,020	0,020	GOOD	1,670 ~ 1,810	±0,020	0,020	GOOD
3.50	1,670 ~ 1,810	1,810 ~ 1,960	±0,030	0,030	GOOD	1,670 ~ 1,810	±0,030	0,030	GOOD
4.00	1,670 ~ 1,810	1,810 ~ 1,960	±0,030	0,030	GOOD	1,670 ~ 1,810	±0,030	0,030	GOOD
4.50	1,620 ~ 1,770	1,770 ~ 1,910	±0,030	0,030	GOOD	1,620 ~ 1,770	±0,030	0,030	GOOD
5.00	1,620 ~ 1,770	1,770 ~ 1,910	±0,030	0,030	GOOD	1,620 ~ 1,770	±0,030	0,030	GOOD
5.50	1,570 ~ 1,710	1,710 ~ 1,860	±0,030	0,030	GOOD	1,570 ~ 1,720	±0,030	0,030	GOOD
6.00	1,520 ~ 1,670	1,670 ~ 1,810	±0,040	0,040	GOOD	1,520 ~ 1,670	±0,040	0,040	GOOD
6.50	1,520 ~ 1,670	1,670 ~ 1,810	±0,040	0,040	GOOD	—	—	—	—
7.00	1,470 ~ 1,620	1,620 ~ 1,770	±0,040	0,040	GOOD	—	—	—	—
8.00	1,470 ~ 1,620	—	—	—	—	—	—	—	—
9.00	1,420 ~ 1,570	—	—	—	—	—	—	—	—
10.00	1,420 ~ 1,570	—	—	—	—	—	—	—	—

● Torsion / Wind up / Bending / Depth of blemish / Decarburized layer

Dia-meter (mm)	PW-1 (SWP-A : JIS)						PW-2 (SWP-B : JIS)						PW-3 (SWP-C : JIS)					
	Number of Torsion (Min)	Torsional Appearance	Wind up	Bending	Depth of blemish mm (Max)	Decarburized layer mm (Max)	Number of Torsion (Min)	Torsional Appearance	Wind up	Bending	Depth of blemish mm (Max)	Decarburized layer mm (Max)	Number of Torsion (Min)	Torsional Appearance	Wind up	Bending	Depth of blemish mm (Max)	Decarburized layer mm (Max)
0.50	—	—	GOOD	—	—	—	—	—	GOOD	—	—	—	—	—	—	—	—	—
0.55	—	—	GOOD	—	—	—	—	—	GOOD	—	—	—	—	—	—	—	—	—
0.60	—	—	GOOD	—	—	—	—	—	GOOD	—	—	—	—	—	—	—	—	—
0.65	—	—	GOOD	—	—	—	—	—	GOOD	—	—	—	—	—	—	—	—	—
0.70	25	GOOD	—	—	—	ZERO	25	GOOD	—	—	—	ZERO	—	—	—	—	—	—
0.80	25	GOOD	—	—	—	ZERO	25	GOOD	—	—	—	ZERO	—	—	—	—	—	—
0.90	25	GOOD	—	—	—	ZERO	25	GOOD	—	—	—	ZERO	—	—	—	—	—	—
1.00	25	GOOD	—	—	0.02	ZERO	25	GOOD	—	—	0.02	ZERO	25	GOOD	0.01	0.02	—	—
1.20	25	GOOD	—	—	0.02	ZERO	25	GOOD	—	—	0.02	ZERO	25	GOOD	0.01	0.02	—	—
1.40	25	GOOD	—	—	0.02	ZERO	25	GOOD	—	—	0.02	ZERO	25	GOOD	0.01	0.02	—	—
1.60	25	GOOD	—	—	0.02	ZERO	25	GOOD	—	—	0.02	ZERO	25	GOOD	0.01	0.02	—	—
1.80	25	GOOD	—	—	0.02	ZERO	25	GOOD	—	—	0.02	ZERO	25	GOOD	0.01	0.03	—	—
2.00	25	GOOD	—	—	0.02	ZERO	25	GOOD	—	—	0.02	ZERO	25	GOOD	0.01	0.03	—	—
2.30	20	GOOD	—	—	0.03	ZERO	20	GOOD	—	—	0.03	ZERO	25	GOOD	0.02	0.03	—	—
2.60	20	GOOD	—	—	0.03	ZERO	20	GOOD	—	—	0.03	ZERO	25	GOOD	0.02	0.04	—	—
2.90	20	GOOD	—	—	0.03	ZERO	20	GOOD	—	—	0.03	ZERO	25	GOOD	0.02	0.04	—	—
3.20	20	GOOD	—	—	0.04	ZERO	20	GOOD	—	—	0.04	ZERO	25	GOOD	0.02	0.05	—	—
3.50	20	GOOD	—	—	0.04	ZERO	20	GOOD	—	—	0.04	ZERO	25	GOOD	0.02	0.05	—	—
4.00	15	GOOD	—	—	0.04	ZERO	15	GOOD	—	—	0.04	ZERO	25	GOOD	0.02	0.05	—	—
4.50	15	GOOD	—	—	0.05	ZERO	15	GOOD	—	—	0.05	ZERO	25	GOOD	0.03	0.05	—	—
5.00	15	GOOD	—	—	0.05	ZERO	15	GOOD	—	—	0.05	ZERO	25	GOOD	0.03	0.05	—	—
5.50	15	GOOD	—	—	0.06	ZERO	15	GOOD	—	—	0.06	ZERO	25	GOOD	0.03	0.05	—	—
6.00	15	GOOD	—	—	0.06	ZERO	15	GOOD	—	—	0.06	ZERO	25	GOOD	0.03	0.05	—	—
6.50	—	—	—	GOOD	0.07	ZERO	—	—	—	GOOD	0.07	ZERO	—	—	—	—	—	—
7.00	—	—	—	GOOD	0.07	ZERO	—	—	—	—	—	—	—	—	—	—	—	—
8.00	—	—	—	GOOD	0.07	ZERO	—	—	—	—	—	—	—	—	—	—	—	—
9.00	—	—	—	GOOD	0.08	ZERO	—	—	—	—	—	—	—	—	—	—	—	—
10.00	—	—	—	GOOD	0.08	ZERO	—	—	—	—	—	—	—	—	—	—	—	—

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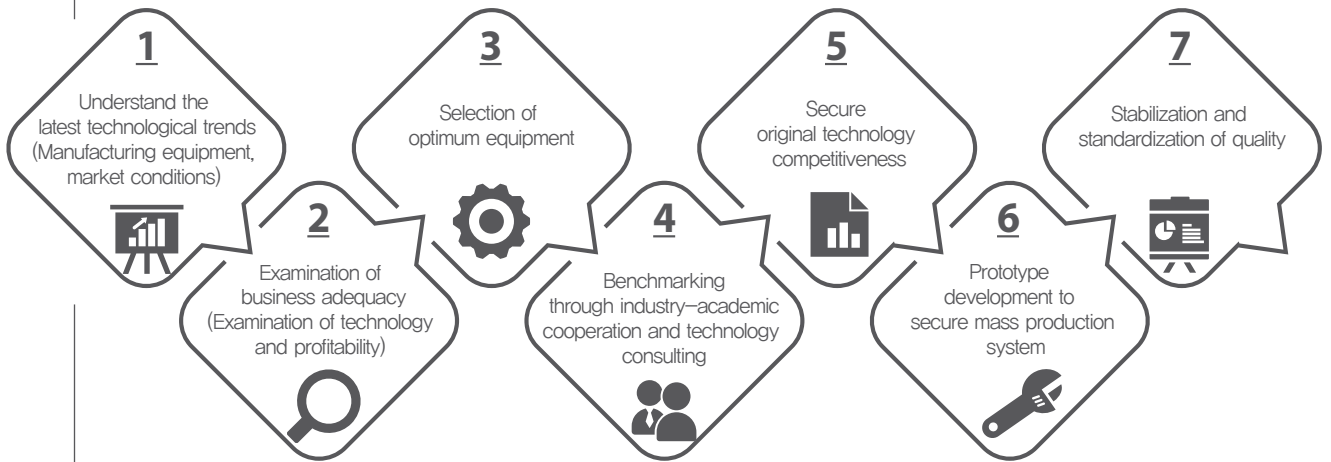
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03. **Surface** : Plating, alloying-plating, Non-plating
04. **Corrosion Preventive Lubricant** : Yes or No
05. **Coating** : Bonderite, Lube
06. **Usage** : Detailed use of the product (Spiring, Rolling, Bolts, Shaft etc)
07. **Package** : Carrier, Coil
08. **Weight** : Required unit weight according to packaging type
09. **Product delivery date** : Desired delivery date
10. **Special Note** : Note

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