MENAM

STAINLESS STEEL ALLOY & CARBON STEEL

MENAM

MENAM STAINLESS WIRE PUBLIC CO., LTD
บริษัท แม่น้ำสแตนเลสไวร์ จำกัด (มหาชน)

Stainless Steel Wire & Profile wire

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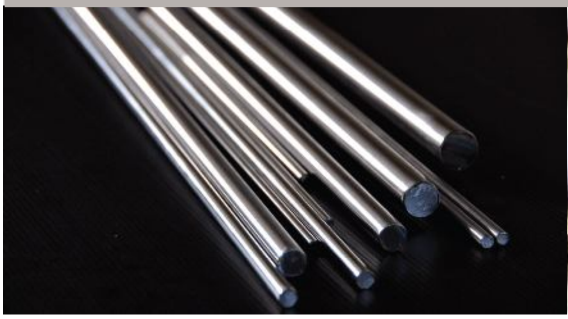

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Alloy & Carbon Steel

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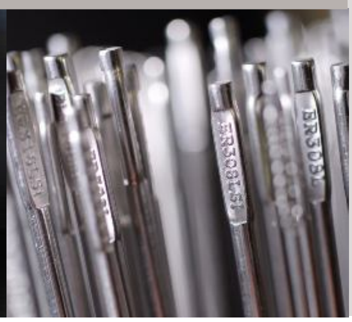

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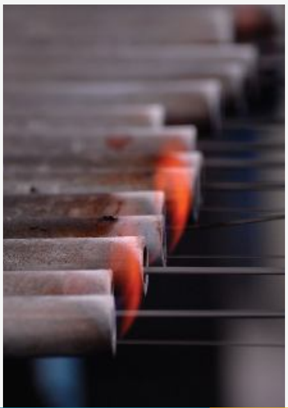



COMPANY PROFILE

COMPANY NAME	: MENAM STAINLESS WIRE PUBLIC CO., LTD
OFFICE & FACTORY	: 299 Moo 6 Bangpreang, Bangbor, Samutprakarn 10560 THAILAND
TEL	: (+66) 2 725 3999
FAX	: (+66) 2 725 3939, (+66) 2 725 3933
EMAIL	: info@menamstainless.com sales@menamstainless.com
CAPITAL REGISTERED	: 299,000,000 Thai Baht
SHAREHOLDER	: Thai 85%, Taiwanese 15%
TOTAL AREA	: Total 32 RAI *(Approx. 50,000 Sqm.)*
PRODUCTION SIZE	: Approx. 22,000 Sqm.
CAPACITY	: 12,000 MT/Year
EMPLOYEE	: 300 people
MAIN BUSINESS	▪ Manufacturing of Cold Drawn Stainless Steel Wire, Profile Wire, Bar, Precision Bar, Stainless Steel Consumable MIG & TIG, Exhaust Welding Wire ▪ Manufacturing of Cold Drawn Alloy & Steel Bar (Bearing Steel, Machine Structural Use and Machining, Cutting Ability)

BRIEF HISTORY

ESTABLISHMENT	: 28 September 1991 With Capital Registered 60,000,000 Thai Baht
CERTIFIED	: ISO 9001 : 2000 (22 March 2002) Lioyd's Register (5 May 2006) : JIS Standard (5 May 2007), ISO 14001: 2004 (8 March 2010) : Bureau Veritas (24 February 2011)
2002	: Moved in Factory and Office in Bangplee Industrial Estate at 429 Moo 16, Bangsaotong, Samutprakarn
2007	: Change company name to "Menam Stainless Wire Public Company Limited" : Increased Capital from 60,000,000 Thai Baht to 299,000,000 Thai Baht
2009	: Moved to new factory and office at 299 Moo 6, Bangpreang, Bangbor, Samutprakarn 10560
2011	: 20th Company Anniversary
2012	: TS 16949 Certified : New Corporate logo : Official launching "Automotive Exhaust Welding Wire"

STAINLESS STEEL WIRE

WIRE SIZE :	Diameter 0.5 mm. – 15.0 mm.

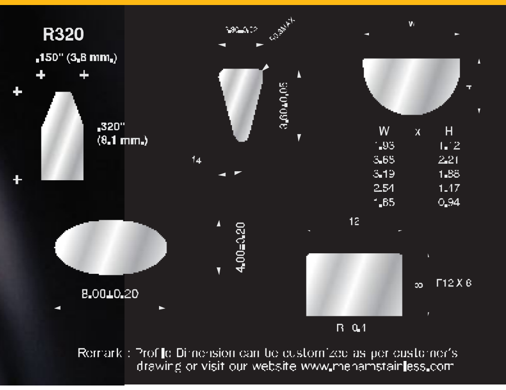
GRADE AVAILABLE :	Austenitic Series	: 202, 204CU, 205, 304, 304L, 304H, 304HC, 316, 316L, 304J3, 304N, 316Ti, 303, 303Cu, 310, 310S, 302HQ (XM7), 321
	Ferritic & Martensitic Series	: 410, 420F, 420J2, 420F2, 430, 430F, 416, 440C
	PH Series	: 630, 631J1, & Others.

TYPE OF WIRE: Soft Weaving, Annealed, Braiding wire, EPQ Wire, Cold Heading Quality, Spring Quality, Electrode Core Wire, Fastener, Screw, Bolt, Nut, Rivet, Turning parts, Cable Wire, and etc.

PACKING STYLE :
- Bare Coil, Spool (Metal or Wooden), Reel, etc.
- Fumigated wooden case for Exporting.

** Customized package, please contact our sales representative.*

STAINLESS STEEL PROFILE WIRE



STAINLESS : 304, 304L, 316, 316L, 316Ti, 321, 430 etc.

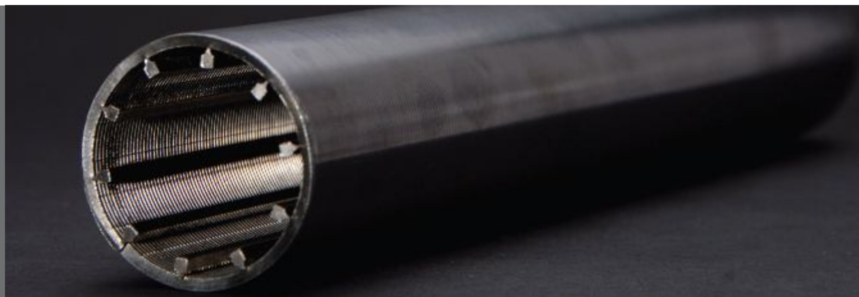
CARBON STEEL : S45C etc.

Dimentional Tolerance

W x D	Width	Depth
Minimum (mm)	0.70	1.00
Maximum (mm)	8.00	16.00

PROFILE APPLICATION

Filter Screen, Tube Screen, Flat Screen etc.
Industry : Oil & Gas, Water resource, Food processing and etc.



STAINLESS STEEL BAR & PRECISION BAR

Bar : 1.0 mm – 25.41 mm (1 Inch)

Length : Up to 6 meters

GRADE AVAILABLE:

Austenitic Series : 202, 204CU, 205, 304, 304L, 304H, 304HC, 316, 316L, 304J3, 304N, 316Ti, 303, 303Cu, 310, 310S, 302HQ (XM7), 321

Ferritic & Martensitic Series : 410, 420F, 420J2, 420F2, 430, 430F, 416, 440C

PH Series : 630 , 631J1, & Others.

SURFACE FINISH

: Normal, Bright, Centerless Grinding(CG), Chamfered, Polished

FREE CUTTING BAR

Dia (mm)	AISI 303, 303F, 303C, 316F		AISI 416, 420J2, 420F, 446		AISI 440C
	Soft	1/4 H	1/8H	1/4H	1/4H
0.80 mm - 1.60 mm	570 - 820	780 -1130	640 - 800	750 - 930	-
1.60 mm - 5.00 mm	520 - 770	740 - 1080	590 - 750	700 - 880	640 - 930
5.00 mm - 12.00 mm	500 - 750	740 - 1030	590 - 750	700 - 830	

APPLICATION

Motor Shaft, Printer Shaft, Water pump Shaft, Automotive parts, Machinery parts, Bearing etc.

ALLOY & CARBON STEEL

CARBON STEEL Machine Structural Use

GRADE : S 10C, S 12C, S 15C, S 17C, S 20C, S 22C, S 25C, S 28C, S 30C, S 33C, S 35C, S 38C, S 40C, S 43C, S 45C, S 48C, S 50C, S 53C, S 55C, S 58C etc.

Remark : JIS G 4051 : 2009

OTHER GRADES

GRADE : SS400, SMn, SCM, SW, SWRCH, SUP, SWRM etc.

FREE CUTTING STEEL Machining & Cutting Ability

GRADE : SUM 21, SUM 22, SUM 22L, SUM 23, SUM 23L, SUM 24L, SUM 25, SUM 31, SUM 31L, SUM 32, SUM 41, SUM 42, SUM 43 etc.

Remark : JIS G 4804 : 2008

PRODUCT SIZE RANGE

- Wire : Dia. 0.8 mm – 15.0 mm
- Bar : 1.0 mm – 25.41 mm (1 Inch)

  Length : Up to 6 meters

HIGH CARBON CHROMIUM BEARING STEEL

GRADE : SUJ 2, SUJ 3, SUJ 4, SUJ 5

Remark : JIS G 4805 : 2008

SURFACE FINISHING

- Normal
- Bright
- Centerless Grinding (CG)
- Polished
- Chamfered

Diameter (mm)	Tolerance (Round)			
	General Standard	JIS Standard		
		Class7 (h7)	Class8 (h8)	Class9 (h9)
1.0 - 3.0	+0 -0.03	+0 -0.01	+0 -0.014	+0 -0.025
over 3.0 - 6.0	+0 -0.04	+0 -0.012	+0 -0.018	+0 -0.030
over 6.0 - 10.0	+0 -0.05	+0 -0.015	+0 -0.022	+0 -0.036
over 10.0 - 18.0	+0 -0.06	+0 -0.018	+0 -0.027	+0 -0.043
over 18.0 - 25.4	+0 -0.07	+0 -0.021	+0 -0.033	+0 -0.052

Length Tolerance (Meter)	Tolerance (mm)
1	+ / - 6.6
2	+ / - 13.3
3	+ / - 20.0
4	+ / - 26.6
5	+ / - 33.3
6	+ / - 40.0

STRAIGHTNESS

Length,L	Deflection,D
Every 1000 mm for length	0.10 mm
Every 300 mm for length	0.05 mm

ALLOY & CARBON STEEL CHEMICAL COMPOSITION

High Carbon Chromium Bearing Steels : Chemical Composition

Unit : %

SUJ 2	0.95 or 1.10	0.15 or 0.35	0.50 max.	0.025 max.	0.025 max.	1.30 to 1.60	-
SUJ 3	0.95 or 1.10	0.40 or 0.70	0.90 to 1.15	0.025 max.	0.025 max.	0.90 to 1.20	-
SUJ 4	0.95 or 1.10	0.15 or 0.35	0.50 max.	0.025 max.	0.025 max.	1.30 to 1.60	0.10 to 0.25
SUJ 5	0.95 or 1.10	0.40 or 0.70	0.90 to 1.15	0.025 max.	0.025 max.	0.90 to 1.20	0.10 to 0.25

Remark : JIS G 4805 : 2008

Free-Cutting Carbon Steels : Chemical composition

Unit : %

SUM 21	0.13 max.	0.70 -1.00	0.07 - 0.12	0.16 - 0.23	-
SUM 22	0.13 max.	0.70 -1.00	0.07 - 0.12	0.24 - 0.33	-
SUM 22L	0.13 max.	0.70 -1.00	0.07 - 0.12	0.24 - 0.33	0.10 - 0.35
SUM 23	0.09 max.	0.75 - 1.05	0.04 - 0.09	0.26 - 0.35	-
SUM 23L	0.09 max.	0.75 - 1.05	0.04 - 0.09	0.26 - 0.35	0.10 - 0.35
SUM 24L	0.15 max.	0.85 - 1.15	0.04 - 0.09	0.26 - 0.35	0.10 - 0.35
SUM 25	0.15 max.	0.90 - 1.40	0.07 - 0.12	0.30 - 0.40	-
SUM 31	0.14 - 0.20	1.00 - 1.30	0.040 max.	0.08 - 0.13	-
SUM 31L	0.14 - 0.20	1.00 - 1.30	0.040 max.	0.08 - 0.13	0.10 - 0.35
SUM 32	0.12 - 0.20	0.60 - 1.10	0.040 max.	0.10 - 0.20	-
SUM 41	0.32 - 0.39	1.35-1.65	0.040 max.	0.08 - 0.13	-
SUM 42	0.37 - 0.45	1.35 - 1.65	0.040 max.	0.08 - 0.13	-
SUM 43	0.40 - 0.48	1.35 - 1.65	0.040 max.	0.24 - 0.33	-

Remark : JIS G 4804 : 2008

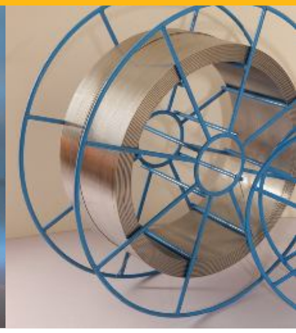
Carbon Steel for machine structural use : Chemical composition

Unit : %

S 10C	0.08 - 0.13	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.035 max.
S 12C	0.10- 0.15	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.035 max.
S 15C	0.13 - 0.18	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.035 max.
S 17C	0.15 - 0.20	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.035 max.
S 20C	0.18 - 0.23	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.035 max.
S 22C	0.20 - 0.25	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.035 max.
S 25C	0.22 - 0.28	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.035 max.
S 28C	0.25 - 0.31	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 30C	0.27 - 0.33	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 33C	0.30 - 0.36	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 35C	0.32 - 0.38	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 38C	0.35 - 0.41	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 40C	0.37 - 0.43	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 43C	0.40 - 0.46	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 45C	0.42 - 0.48	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 48C	0.45 - 0.51	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 50C	0.47 - 0.53	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 53C	0.50 - 0.56	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 55C	0.52 - 0.58	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 58C	0.55 - 0.61	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.
S 09C K	0.07 - 0.12	0.10 - 0.35	0.30 - 0.60	0.025 max.	0.025 max.
S 15C K	0.13 - 0.18	0.15 - 0.35	0.30 - 0.60	0.025 max.	0.025 max.
S 20C K	0.18 - 0.23	0.15 - 0.35	0.30 - 0.60	0.025 max.	0.025 max.

Remark : JIS G 4051 : 2009

STAINLESS STEEL WELDING WIRE

STAINLESS STEEL AUTOMOTIVE EXHAUST WELDING WIRE & GENERAL WELDING WIRE

MIG WELDING WIRE

Spool Packing

DIAMETER (mm)	WEIGHT/SPOOL
0.8 mm/ 0.9 mm	5 kg/ 12 kg or 12.50 kg
1.0 mm/1.2 mm/1.4 mm/1.6 mm	5 kg/ 12 kg / 12.50 kg or 15 kg

**Spool : S300, BS300, BS200*

Drum Packing

DIAMETER (mm)	WEIGHT/DRUM
0.8 mm/ 0.9 mm/1.0 mm/1.2 mm/1.4 mm/1.6 mm	100 kg / 200 kg

TIG WELDING ROD

DIAMETER x LENGTH (mm)	WEIGHT/TUBE
1.0 – 4.0 mm x 915 mm (36 inchs) or 1000 mm	5.00 kg or 4.50 kg(10 lbs)

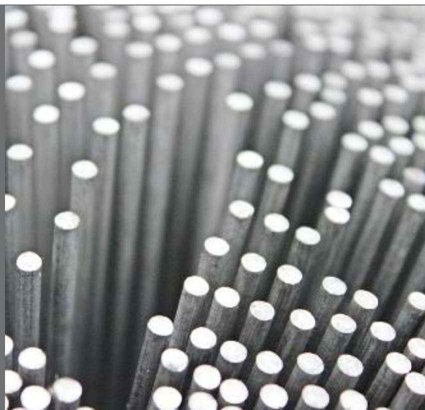
WELDING GRADE AVAILABLE

ER307Si, ER308, ER308L, ER308LSi, ER309, ER309LSi, ER309Mo, ER310, ER310S, ER312, ER16–8–2, ER316, ER316L, ER316LSi, ER316JIL, ER317, ER317L, ER321, ER347, ER347L, ER430, ER410, ER430LNb, ER439Ti and Others.

STAINLESS CORE WIRE
FOR ELECTRODE MANUFACTURING

Diameter(mm)	Cut Length(mm)
2.0 2.6 3.2 4.0	300/ 350

Remark :
Diameter and length can be customized as per customer's requirement.




STAINLESS STEEL WELDING WIRE : Technical Data

Product MIG/TIG	Nearest to JIS Z 3321	Nearest to AWS A 5.9	Nearest to DIN 8556	General Description	Chemical Analysis (%)*									
					C	Si	Mn	Cr	Ni	P	S	Cu	Mo	
MS M-308L MS T-308L	308L	ER 308L	SG-1.4316	most frequently used for welding base metals of similar composition 0.03% maximum carbon increases resistance to intergranular corrosion.	0.03	0.30-0.65	1.0-2.5	19.5-22.0	9.0-11.0	0.03	0.03	0.75	-	
MS M-308LSi MS T-308LSi	308LSi	ER 308LSi	SG-1.4316	similar usage as 308L,but the 0.65-1.00% silicon content improves weldability in the gas shielded welding process.	0.03	0.65-1.00	1.0-2.5	19.5-22.0	9.0-11.0	0.03	0.03	0.75	0.75	
MS M-309L MS T-309L	309L	ER 309L	SG-1.4332	used for welding metals with dissimilar composition 0.03% maximum carbon increases resistance to intergranular corrosion.	0.03	0.03-0.65	1.0-2.5	23.5-25.0	12.0-14.0	0.03	0.03	0.75	0.75	
MS M-309LSi MS T-309LSi	309LSi	ER 309LSi	SG-1.4332	similar usage as 309L,but the 0.65-1.00% silicon content improves weldability in the gas shielded welding process.	0.03	0.65-1.00	1.0-2.5	23.5-25.0	12.0-14.0	0.03	0.03	0.75	0.75	
MS M-316L MS T-316L	316L	ER 316L	SG-1.4330	used principally for welding molybdenum-bearing austenitic materials containing maximum 0.03% carbon.	0.03	0.30-0.65	1.0-2.5	18.0-20.0	11.0-14.0	0.03	0.03	0.75	2.0-3.0	
MS M-316LSi MS T-316LSi	316LSi	ER 316LSi	SG-1.4330	similar usage as 316L,but the 0.65-1.00% silicon content improves weldability in the gas shielded welding process.	0.03	0.65-1.00	1.0-2.5	18.0-20.0	11.0-14.0	0.03	0.03	0.75	2.0-3.0	
MS M-310 MS T-310	310	ER 310	SG-1.4842	suitable for welding of similar composition (26.5%Cr-21%Ni) or clad part of a18% Cr-8%Ni stainless steel.	0.08-0.15	0.30-0.65	1.0-2.5	25.0-28.0	20.0-22.5	0.03	0.03	0.75	0.75	
MS M-312 MS T-312	312	ER 312	SG-1.4337	suitable for welding of dissimilar metals such as stainless steel,carbon steel and low alloy steel ,MS M-312 has excellent usability and weldability. Owing to the austenite structure containing large contents of ferrite, MS M-312 has good crack resistibility	0.15	0.30-0.65	1.0-2.5	28.0-32.0	8.0-10.5	0.03	0.03	0.75	0.75	
MS M-347 MS T-347	347	ER 347	SG-1.4551	suitable for welding of 316,316L and 318 stainless steel. With Nb(Cb) added as a stabilizer and reduce the possibility on intergranular chromium carbide precipitation	0.08	0.30 0.65	1.0 2.5	19.0-21.5	9.0-11.0	0.03	0.03	0.75	0.75	Nb 10xC%-1.0
MS M-430 MS T-430	430	ER 430	SG-14015	suitable for welding 430,405 stainless steel. The MS M430 classification usually requires preheating and postweld heat treatment.	0.10	0.50	0.60	15.5-17.0	0.60	0.03	0.03	0.75	0.75	
SPECIAL GRADE														
MS M-307 MS T-307	307	ER 307	-	For welding for the joining of armour plate, austenitic manganese steels, ferritic chromium stainless steels and dissimilar steels.The wire also suitable for buffer layering prior to hardfacing.The weld deposit is work hardenable and heat resistance up to 850°C.	0.04-0.14	0.30-0.65	3.30-4.75	19.5-22.0	8.0-10.7	0.03	0.03	0.75	0.5-1.5	
AUTOMOTIVE EXHAUST WELDING GRADES														
MS M-430LNb MS T-430LNb	ER 430LNb	-	-	For welding of ferritic stainless steel, such as exhaust manifold, catalytic converter of automobile. Excellent oxidation resistance at high temperature. Excellent ductility and mechanical properties.	0.03	0.50	0.60	15.5-17.0	0.60	0.03	0.03	0.75	0.75	Nb 8xC-1.2
MS M-439Ti MS T-439Ti	-	-	-	For welding of ferritic stainless steel, such as exhaust manifold, catalytic converter of automobile. Excellent oxidation resistance at high temperature. Excellent ductility and mechanical properties.	0.030 max	0.90 max	1.0 max	17.0-19.0	0.50 max	0.04	0.03	-	0.03	Ti 0.36-0.75(12xC)

WIRE SPECIFICATION

Tensile Strength/Elongation & Mechanical Specification

Type	Wire diameter (mm)	300 Series	400 Series	
		Austenitic	Ferritic	Martensitic
			410, 430	420J2
Soft # 1	over 0.3 - 0.5	63 - 87 (20)	Customized	
	over 0.5 - 1.6	59 - 83 (30)		
	over 1.6 - 5.0	53 - 78 (30)		
	over 5.0 - 14.0	51 - 76 (30)		
Soft # 2	over 0.8 - 1.6	64 - 85 (NA)		66 - 94 (NA)
1/8H	over 1.6 - 5.0	60 - 80 (NA)		61 - 89 (NA)
	over 5.0 - 14.0	60 - 80 (NA)		61 - 84 (NA)
1/4H(SP)	over 0.8 - 1.6	80 - 115 (NA)		66 - 94 (NA)
	over 1.6 - 5.0	76 - 110 (NA)		61 - 89 (NA)
	over 5.0 - 14.0	76 - 104 (NA)		61 - 84 (NA)
1/2H	over 0.8 - 1.6	116 - 148 (NA)		
	over 1.6 - 5.0	111 - 144 (NA)		
	over 5.0 - 6.0	105 - 134 (NA)		
3/4H	over 0.3 - 6.0	164 - 188 (NA)		
	over 0.6 - 1.0	156 - 181 (NA)		
	over 1.0 - 1.4	148 - 173 (NA)		
	over 1.4 - 2.0	143 - 168 (NA)		
	over 2.0 - 2.6	135 - 160 (NA)		
	over 2.6 - 4.0	126 - 150 (NA)		
	over 4.0 - 6.0	113 - 137 (NA)		
	over 6.0 - 8.0	102 - 127 (NA)		
	over 8.0	102 - 127 (NA)		
Full Hard	over 0.3 - 0.4	209 - 234 (NA)		
	over 0.4 - 0.6	199 - 224 (NA)		
	over 0.6 - 1.0	189 - 214 (NA)		
	over 1.0 - 1.4	179 - 203 (NA)		
	over 1.4 - 2.0	169 - 193 (NA)		
	over 2.0 - 2.6	158 - 183 (NA)		
	over 2.6 - 4.0	148 - 173 (NA)		
	over 4.0 - 6.0	138 - 163 (NA)		
	over 6.0 - 8.0	130 - 154 (NA)		
	over 8.0 - 9.0	116 - 140 (NA)		
	over 9.0 - 10.0	100 - 125 (NA)		
	over 10.0 - 12.0	90 - 115 (NA)		

Diameter/Dimensional Tolerance

SOFT # 1, SOFT#2, 1/2H

Wire Diameter (mm.)	Tolerance	Permissible Ovality	Tolerance	Permissible Ovality
over 0.3 - 0.4	+0.008	0.008 max	+0.008	0.008 max
over 0.4 - 0.7	+0.01	0.01 max	+0.01	0.01 max
over 0.7 - 1.0	+0.01	0.01 max	+0.015	0.015 max
over 1.0 - 1.6	+0.01	0.01 max	+0.02	0.02 max
over 1.6 - 3.2	+0.02	0.02 max	+0.03	0.02 max
over 3.2 - 5.0	+0.03	0.03 max	+0.04	0.04 max
over 5.0 - 9.0	+0.04	0.04 max	+0.05	0.05 max
over 9.0 - 12.0	+0.04	0.04 max	+0.06	0.06 max
over 12.0 - 14.0	+0.04	0.04 max	+0.07	0.07 max

3/4H , FULL HARD

Wire Diameter (mm.)	Tolerance	Permissible Ovality	Tolerance	Permissible Ovality
over 0.3 - 0.4	+0.008	0.008 max	+0.008	0.008 max
over 0.4 - 0.8	+0.01	0.01 max	+0.01	0.01 max
over 0.8 - 1.6	+0.01	0.01 max	+0.015	0.015 max
over 1.6 - 3.2	+0.02	0.02 max	+0.02	0.02 max
over 3.2 - 5.0	+0.03	0.03 max	+0.025	0.025 max
over 5.0 - 6.0	+0.04	0.04 max	+0.025	0.025 max
over 6.0 - 1.0	+0.04	0.04 max	+0.035	0.035 max
over 10.0 - max	+0.04	0.04 max	+0.05	0.05 max

BAR & PROFILE SPECIFICATION

ROUND BAR & PROFILE BAR

Mechanical Specification
Diameter / Dimensional Tolerance

Profile Bar

Diameter (mm)	Tolerance		
	General Standard	JIS Standard	
		Class8 (h8)	Class9 (h9)
3 max	+0 −0.1	+0 −0.1	+0 −0.014
over 3.0 − 6.0	+0 −0.12	+0 −0.12	+0 −0.18
over 6.0 − 10.0	+0 −0.15	+0 −0.15	+0 −0.22
over 10.0 − max	+0 −0.18	+0 −0.18	+0 −0.27

Round Bar

Diameter (mm)	Tolerance			
	General Standard	JIS Standard		
		Class7	Class8	Class9
over 0.8 − 3.0	+0 −0.02	+0 −0.01	+0 −0.014	+0 −0.025
over 3.0 − 6.0	+0 −0.03	+0 −0.012	+0 −0.018	+0 −0.03
over 6.0 − 10.0	+0 −0.04	+0 −0.015	+0 −0.022	+0 −0.036
over 10.0 − 25.4	+0 −0.04	+0 −0.018	+0 −0.027	+0 −0.043

Length Tolerance

Length (Meter)	Tolerance (mm)
1	+ / − 6.6
2	+ / − 13.3
3	+ / − 20.0
4	+ / − 26.6
5	+ / − 33.3
6	+ / − 40.0

Tensile Strength / HV

Grade	Tensile Strength (kgf/mm2)	Vickers Hardness : HV
303 , 304 , 316 , series 3	60 − 100	150 − 300
420 , 410 , series 4	50 − 100	150 − 300

Straightness

Length,L	Deflection,D
Every 1000 mm for length	0.10 mm
Every 300 mm for length	0.05 mm

CHEMICAL COMPOSITION FOR STAINLESS STEEL

WELDING WIRE

Chemical Composition for Stainless Steel Welding wire

Grade			Chemical composition								Unit : %
JIS	AISI	DIN	C	Si	Mn	P	S	Ni	Cr	Mo	Others
Y308	ER308	SG 1.4302	0.08 max.	0.65 max	1.00 – 2.50	0.03 max	0.03 max	9.00 – 11.00	19.50 – 22.00	–	–
Y308L	ER308L	SG 1.4316	0.03 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	9.00 – 11.00	19.50 – 22.00	–	–
–	ER308LSi	–	0.03 max	0.65 – 1.00	1.00 – 2.50	0.03 max	0.03 max	9.00 – 11.00	19.50 – 22.00	–	–
Y309	ER309	SG 1.4829	0.12 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	12.00 – 14.00	23.00 – 25.00	–	–
Y309L	ER309L	SG 1.4332	0.03 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	12.00 – 14.00	23.00 – 25.00	–	–
–	ER309LSi	–	0.03 max	0.65 – 1.00	1.00 – 2.50	0.03 max	0.03 max	12.00 – 14.00	23.00 – 25.00	–	–
Y309Mo	ER309Mo	SG 1.4459	0.12 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	12.00 – 14.00	23.00 – 25.00	2.00 – 3.00	–
Y310	ER310	SG 1.4842	0.15 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	20.00 – 22.50	25.00 – 28.00	–	–
Y310S	ER310S	–	0.08 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	20.00 – 22.50	25.00 – 28.00	–	–
Y312	ER312	SG 1.4337	0.15 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	8.00 – 10.50	28.00 – 32.00	–	–
Y16-8-2	ER16-8-2	–	0.10 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	7.50 – 9.50	14.50 – 16.50	1.00 – 2.00	–
Y316	ER316	SG 1.4403	0.08 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	11.00 – 14.00	18.00 – 20.00	2.00 – 3.00	–
Y316L	ER316L	SG 1.4430	0.03 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	11.00 – 14.00	18.00 – 20.00	2.00 – 3.00	–
–	ER316LSi	–	0.03 max	0.65 – 1.00	1.00 – 2.50	0.03 max	0.03 max	11.00 – 14.00	18.00 – 20.00	2.00 – 3.00	–
Y316JIL	ER316JIL	–	0.03 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	11.00 – 14.00	18.00 – 20.00	2.00 – 3.00	Cu 1.00 – 2.50
Y317	ER317	SG 1.4440	0.08 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	13.00 – 15.00	18.50 – 20.50	3.00 – 4.00	–
Y317L	ER317L	SG 1.4440	0.03 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	13.00 – 15.00	18.50 – 20.50	3.00 – 4.00	–
Y321	ER321	–	0.08 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	9.00 – 10.50	18.50 – 20.50	–	Ti 9xC% – 1.00
Y347	ER347	SG 1.4551	0.08 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	9.00 – 11.00	19.00 – 21.50	–	Nb 10xC% – 1.00
Y347L	ER347L	–	0.03 max	0.65 max	1.00 – 2.50	0.03 max	0.03 max	9.00 – 11.00	19.00 – 21.50	–	Nb 10xC% – 1.00
Y430	ER430	SG 1.4015	0.10 max	0.50 max	0.60 max	0.03 max	0.03 max	0.60 max	15.50 – 17.00	–	–
Y410	ER410	SG 1.4009	0.12 max	0.50 max	0.60 max	0.03 max	0.03 max	0.60 max	11.50 – 13.50	0.75 max	–
Special Grade			C	Si	Mn	P	S	Ni	Cr	Mo	Others
–	ER307	–	0.04–0.14	0.30–0.65	3.30–4.75	0.03 max	0.03 max	8.00–10.70	19.50–22.00	0.50–1.50	–
–	ER430LNb	–	0.03 max	0.50 max	0.60 max	0.03 max	0.03 max	0.60 max	15.50 – 17.00	0.75 max	Cu 0.75 max , Nb 8xc-1.2
–	ER439Ti	–	0.03 max	0.90 max	1.0 max	0.04 max	0.03 max	0.50 max	17.00–19.00	0.30 max	Ti : 0.36-0.75(12xc)

CHEMICAL COMPOSITION FOR STAINLESS STEEL

WIRE & BAR

Chemical composition for Stainless Steel Wire & Bar

Grade — Chemical compsition — Unit :%

	AISI	DIN	C	Si	Mn	P	S	Ni	Cr	Mo	Others	Characteristics and Application
SUS201	201	-	0.15 max	1.00 max	5.50 - 7.50	0.060 max	0.030 max	3.50 - 5.50	16.00 - 18.00	-	N 0.25 max	Alternative grade of SUS301
SUS302	302	1.4319	0.15 max	1.00 max	2.00 max	0.045 max	0.030 max	8.00 - 10.00	17.00 - 19.00	-		Alternative grade of SUS302 High Tensile strength, Spring, Constructional use
SUS303	303	1.4305	0.15 max	1.00 max	2.00 max	0.20 max	0.15 min	8.00 - 10.00	17.00 - 19.00	(<0.60)		Good free-Cutting ability. Automatic machined parts such as screw, bolt
SUS303Se	303Se	-	0.15 max	1.00 max	2.00 max	0.20 max	0.060 max	8.00 - 10.00	17.00 - 19.00	-	Se 0.15 min	Screw
SUS303Cu			0.15 max	1.00 max	3.00 max	0.20 max	0.15 min	8.00 - 10.00	17.00 - 19.00		Cu 1.50 - 3.50	Improved free cutting and cold heading quality, Shafts Usage
SUS304	304	1.4301	0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	8.00 - 10.50	18.00 - 20.00	-		General corrosion resistance, food processing , equipment parts , Kitchenware
SUS304L	304L	1.4306	0.030 max	1.00 max	2.00 max	0.045 max	0.030 max	9.00 - 13.00	18.00 - 20.00	-		intergranular corrosion (e.g. welding by SUS304)
SUS304N1	304N	-	0.08 max	1.00 max	2.50 max	0.045 max	0.030 max	7.00 - 10.50	18.00 - 20.00	-	N 0.10 - 0.25	Structural parts for higher strength
SUS304J3	-	-	0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	8.00 - 10.50	17.00 - 19.00	-	Cu 1.00 - 3.00	Natural properties between 304 and XM-7. Bolts and Nuts Usage
SUS305	305	-	0.12 max	1.00 max	2.00 max	0.045 max	0.030 max	10.50 - 13.00	17.00 - 19.00	-		Low work hardening. Cold heading quality
SUS309S	309S	1.4833	0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	12.00 - 15.00	22.00 - 24.00			Superior corrosion and oxidation resistance to 304, Parts for chemical plant, heat treatment, furnace
SUS310S	310S	1.4845	0.08 max	1.50 max	2.00 max	0.045 max	0.030 max	19.00 - 22.00	24.00 - 26.00	-		Superior corrosion and heat resistance to SUS309S. Parts for thermal exchanger in furnace.
SUS316	316	1.4401/1.4436	0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	10.00 - 14.00	16.00 - 18.00	2.00 - 3.00		More corrosion-resistance than 304. Anti-rust purpose . Chemical plant. equipment (paper, soap, chemical textile, fertilizer)
SUS316L	316L	1.4404/1.4435	0.030 max	1.00 max	2.00 max	0.045 max	0.030 max	12.00 15.00	16.00 - 18.00	2.00 - 3.00		Extreme low carbon 316. High anti-corrosion
SUS316F	-	-	0.08 max	1.00 max	2.00 max	0.045 max	0.10 min	10.00 -14.00	16.00 - 18.00	2.00 - 3.00		Enhanced free cutting quality by adding sulfur into 316. Watchband Usage
SUS317	317	1.4449	0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	11.00 - 15.00	18.00 - 20.00	3.00 - 4.00		Environment which requires corrosion resistance (e.g. dyeing machine)
SUS317L	317L	1.4438	0.030 max	1.00 max	2.00 max	0.045 max	0.030 max	11.00 - 15.00	18.00 - 20.00	3.00 - 4.00		Improved intergranular corrosion resistance (e.g. dyeing machine)
SUS321	321	1.4541	0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	9.00 - 13.00	17.00 - 19.00		Ti 5*C% min	Ti addition. High temperature purpose. Parts which are unable to be heat treated after welding. equipment parts used between 730 900 thermal condition
SUS347	347	1.4550	0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	9.00 - 13.00	17.00 19.00	-	Nb10*C% min	Superior intergranular corrosion resistance
SUSXM7	302HQ		0.08 max	1.00 max	2.00 max	0.045 max	0.030 max	8.50 - 10.50	17.00 - 19.00		Cu 3.00 - 4.00	Cu addition into 304. Enhanced cold heading quality

Grade — Chemical composition — Unit :%

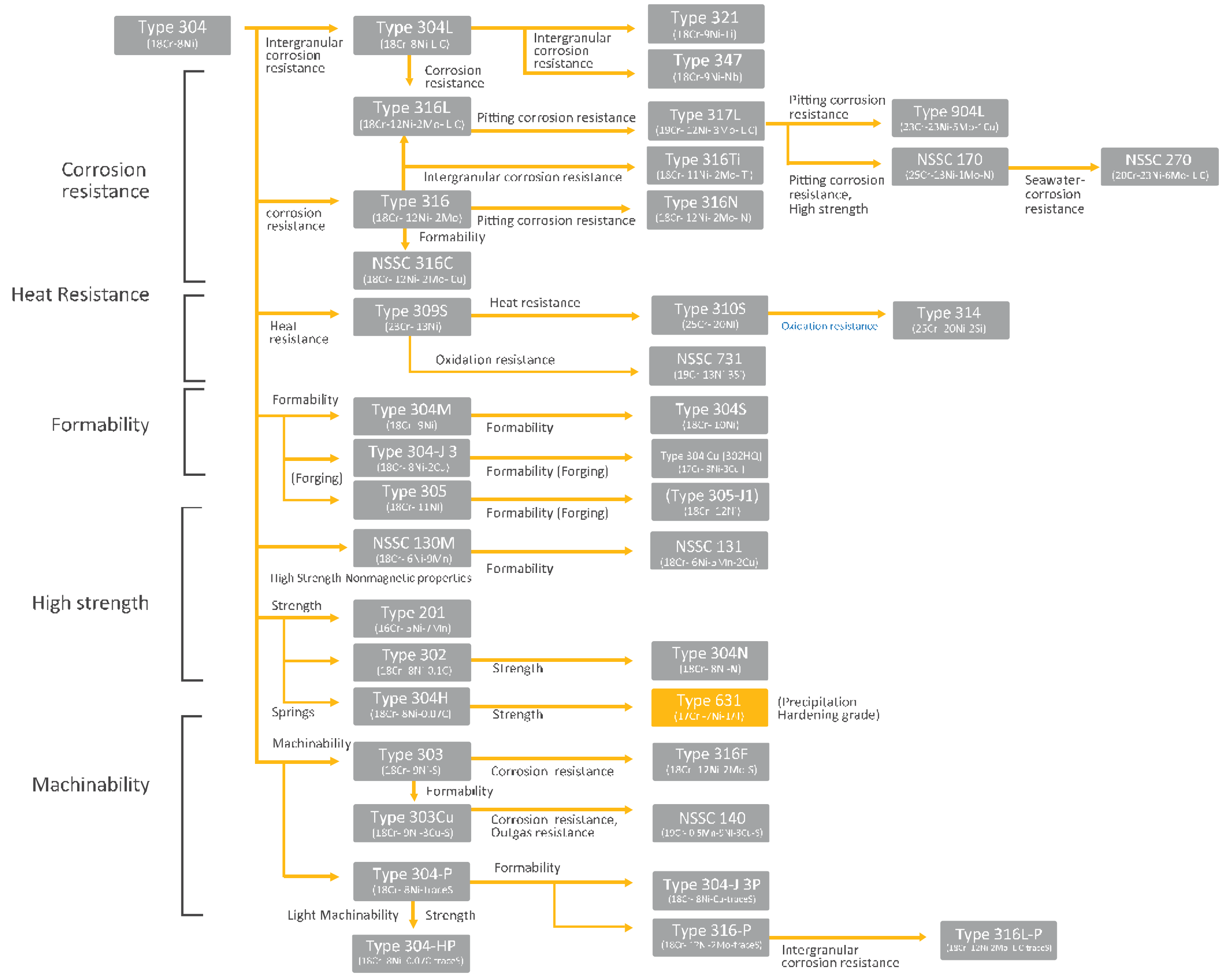
JIS	AISI	DIN	C	Si	Mn	P	S	Ni	Cr	Mo	Others	Characteristics and Application
SUS430	430	1.4016	0.12 max	0.75 max	1.00 max	0.040 max	0.030 max	-	16.00 - 18.00	-	-	Good anti-corrosion. Bolts, Nuts, Scrubber
SUS430F	430F	1.4104	0.12 max	1.00 max	1.25 max	0.060 max	0.15 min	-	16.00 - 18.00	(<0.60)	-	Bolt,nut
SUS434	434	1.4113	0.12 max	1.00 max	1.00 max	0.040 max	0.030 max	-	16.00 - 18.00	0.75 - 1.25	-	Improved grade. Better anti-corrosion than 430 Automobile exterior equipment
SUS403	403	1.4000	0.15 max	0.50 max	1.00 max	0.040 max	0.030 max	(<0.60)	11.50 13.00			Turbine blade, compressor, valve parts
SUS410	410	1.4006	0.15 max	1.00 max	1.00 max	0.040 max	0.030 max	(<0.60)	11.50 - 13.00	-	-	High machinability. Fasteners Pump shaft
SUS410F2	-	-	0.15 max	1.00 max	1.00 max	0.040 max	0.030 max	(<0.60)	11.50 13.00		Pb 0.05 0.30	Machinery parts
SUS416	416	1.4005	0.15 max	1.00 max	1.25 max	0.060 max	0.15 min	(<0.60)	12.00 14.00	(<0.60)		Better free cutting fot automatic lathe Screw, bolt, nut usage
SUS420J1	-	-	0.16 - 0.25	1.00 max	1.00 max	0.040 max	0.030 max	(<0.60)	12.00 - 14.00	-	-	Motor shaft, machinery parts
SUS402J2	-	1.4031	0.26 - 0.40	1.00 max	1.00 max	0.040 max	0.030 max	(<0.60)	12.00 - 14.00	-	-	Excellent hardness. Machine shafts, Electric shafts Electric shafts
SUS420F	-	-	0.26 - 0.40	1.00 max	1.25 max	0.060 max	0.15 min	(<0.60)	12.00 14.00	(<0.60)	-	Improved grade. Better machinability than 420J2 Valve parts, Shaft, Machining tool parts
SUS420F2			0.26 - 0.40	1.00 max	1.00 max	0.040 max	0.030 max	(<0.60)	12.00 - 14.00	-	Pb 0.05 - 0.30	High strength machinery parts
SUS431	431	1.4057	0.20 max	1.00 max	1.00 max	0.040 max	0.030 max	1.25 - 2.50	15.00 - 17.00	-	-	Nozzle, bearing
SUS440C	440C	1.4125	0.95 - 1.20	1.00 max	1.00 max	0.040 max	0.030 max	(<0.60)	16.00 - 18.00	(<0.75)	-	Highest hardness among Heat resistent stainless steel, for nozzel, bearing
SUS631J1	-	-	0.09 max	1.00 max	1.00 max	0.040 max	0.030 max	7.00-8.50	16.00 - 18.00	-	Al 0.75 - 1.50	Spring

HARDNESS CONVERSION TABLE

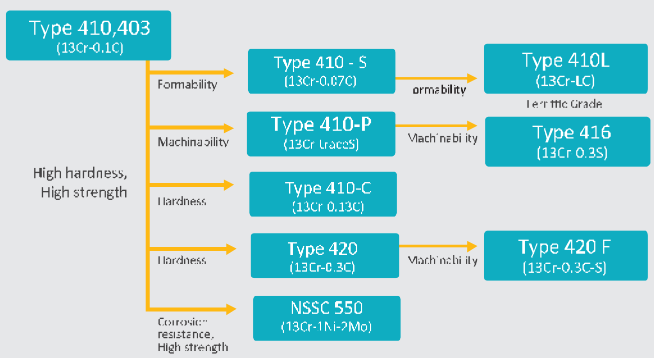
Vickers hardness (HV)	Brinell hardness 10 mm ball,3.00 kgf load (HB)			Rockwell hardness (HR)				Shore hardness (HS)	Tensile strength (Approximate)	
	standard ball	Hultgren ball	Tungsten-carbide ball	A scale, 60 kgf load	B scale, 100 kgf load	C scale, 150 kgf load	D scale, 100 kgf load		Austenitic Stainless steel kgf/mm2	Chromium Stainless steel kgf/mm2
600	-	550	564	78.6	-	55.2	67.0	74	245	-
590	-	542	554	78.4	-	54.7	66.7			
580	-	532	545	78.0	-	54.1	66.2	72	236	-
570	-	527	535	77.8	-	53.6	65.8			
560	-	519	525	77.4	-	53.0	65.4	71	227	-
550	505	512	17	77.0	-	52.3	64.8			
540	496	503	507	76.7	-	51.7	64.4	69	218	-
530	488	495	497	76.4	-	51.1	63.9			
520	480	487	488	76.1	-	50.5	63.5	67	209	-
510	473	479	479	75.7	-	49.8	62.9			
500	465	471	471	75.3	-	49.1	62.2	66	200	-
490	456	460	460	74.9	-	48.4	61.6			
480	448	452	452	74.5	-	47.7	61.3	64	189	-
470	441	442	442	74.1	-	46.9	60.7			
460	433	433	433	73.6	-	46.1	60.1	62	178	-
450	425	425	425	73.3	-	45.3	59.4			
440	415	415	415	72.8	-	44.5	58.8	59	167	-
430	405	405	405	72.3	-	46.6	58.2			
420	397	397	397	71.8	-	42.7	57.5	57	156	-
410	388	388	388	71.4	-	41.8	56.8			
400	379	379	379	70.8	-	40.8	56.0	55	145	134
390	369	369	369	70.3	-	39.8	55.2			
380	360	360	360	69.88	(110.0)	38.8	54.4	52	136	127
370	350	350	350	69.2		37.7	53.6			
360	341	341	341	68.7	(109.0)	36.6	52.8	50	127	120
350	331	331	331	68.1		35.5	51.9			
340	322	322	322	67.6	(108.0)	34.4	51.1	47	118	113
330	313	313	313	67.0		33.3	50.2			
320	303	303	303	666.4	(107.0)	32.2	49.4	45	109	106
310	294	294	294	65.8		31.0	48.4			
300	284	284	284	65.2	(105.5)	29.8	47.5	42	100	-
295	280	280	280	64.8		29.2	47.1			
290	275	275	275	64.5	(104.5)	28.5	46.5	41	97	96
285	270	270	270	64.2		27.8	46.0			
280	265	265	265	63.8	(103.5)	27.1	45.3	40	94	-
275	261	261	261	63.5		26.4	44.9			
270	256	256	256	63.1	(102.0)	25.6	44.3	38	91	88
265	252	252	252	62.7		24.8	43.7			
260	247	247	247	62.4	(101.0)	24.0	43.1	37	88	-
255	243	243	243	62.0		23.1	42.2			
250	238	238	238	61.6	99.5	22.2	41.7	36	85	81
245	233	233	233	61.2		21.3	41.1			
240	228	228	228	60.7	98.1	20.3	40.3	34	80	78
230	219	219	219	-	96.7	18.0	-	33		
220	209	209	209	-	95.0	15.7	-	32	75	71
210	200	200	200	-	93.4	13.4	-	30		
200	190	190	190	-	91.5	11.0	-	29	68	65
190	181	181	181	-	89.5	8.5	-	28		
180	171	171	171	-	87.1	6.3	-	26	62	59
170	162	162	162	-	85.0	3.0	-	25		
160	152	152	152	-	87.1	-	-	24	56	53
150	143	143	143	-	78.7	-	-	22	50	50

TREE DIAGRAM OF STAINLESS STEEL

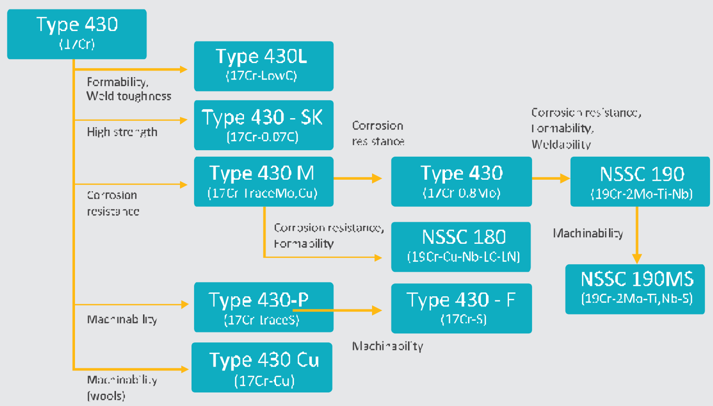
AUSTENITIC STAINLESS STEELS



Martensitic stainless Steels



Ferritic Stainless Steels



Dual-phase (austenitic-ferritic) Stainless Steels

Pitting corrosion resistance,
Intergranular corrosion resistance

Precipitation Hardening Stainless Steels

Reference : NSSC Technical Guide Book

MENAM

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