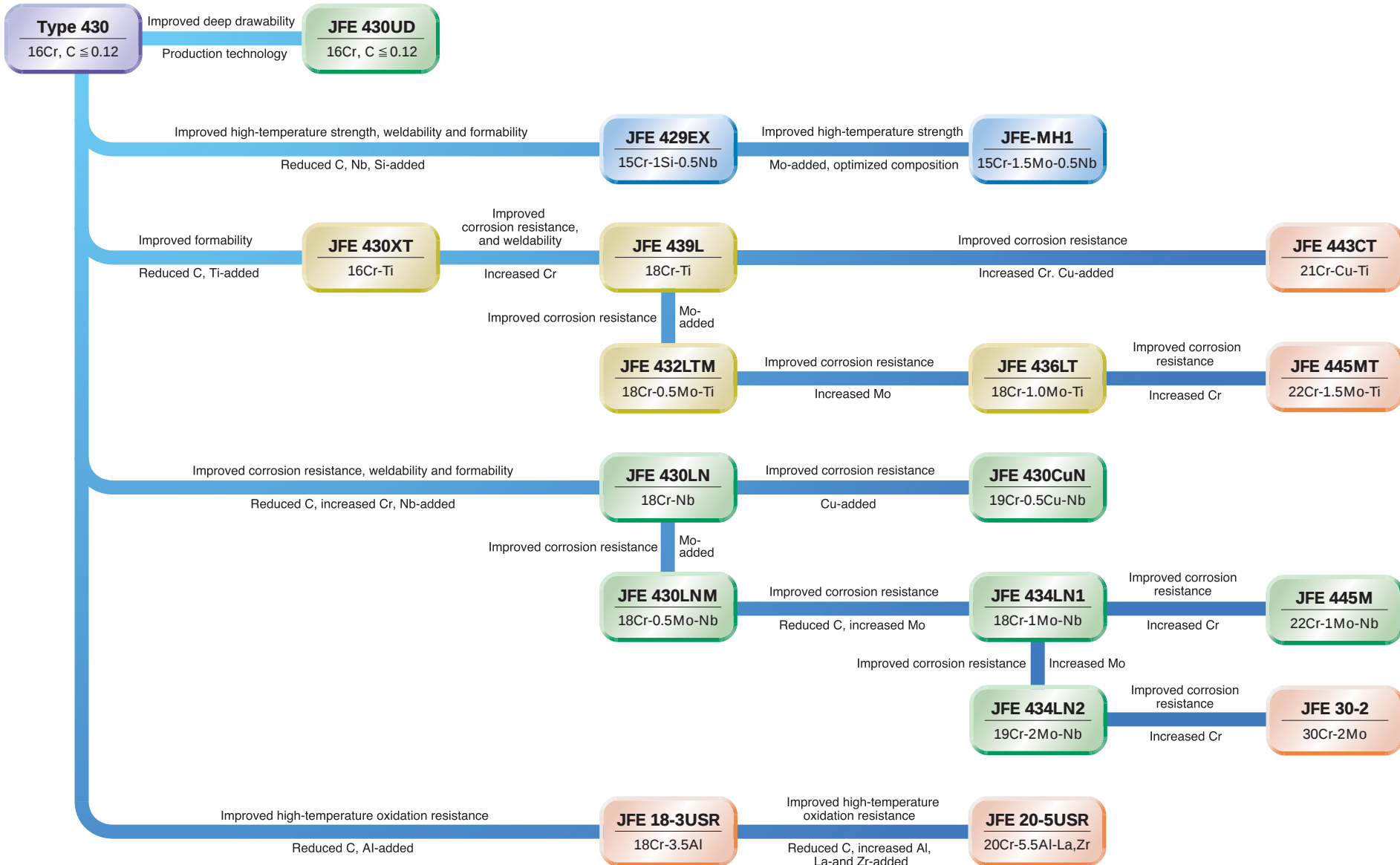


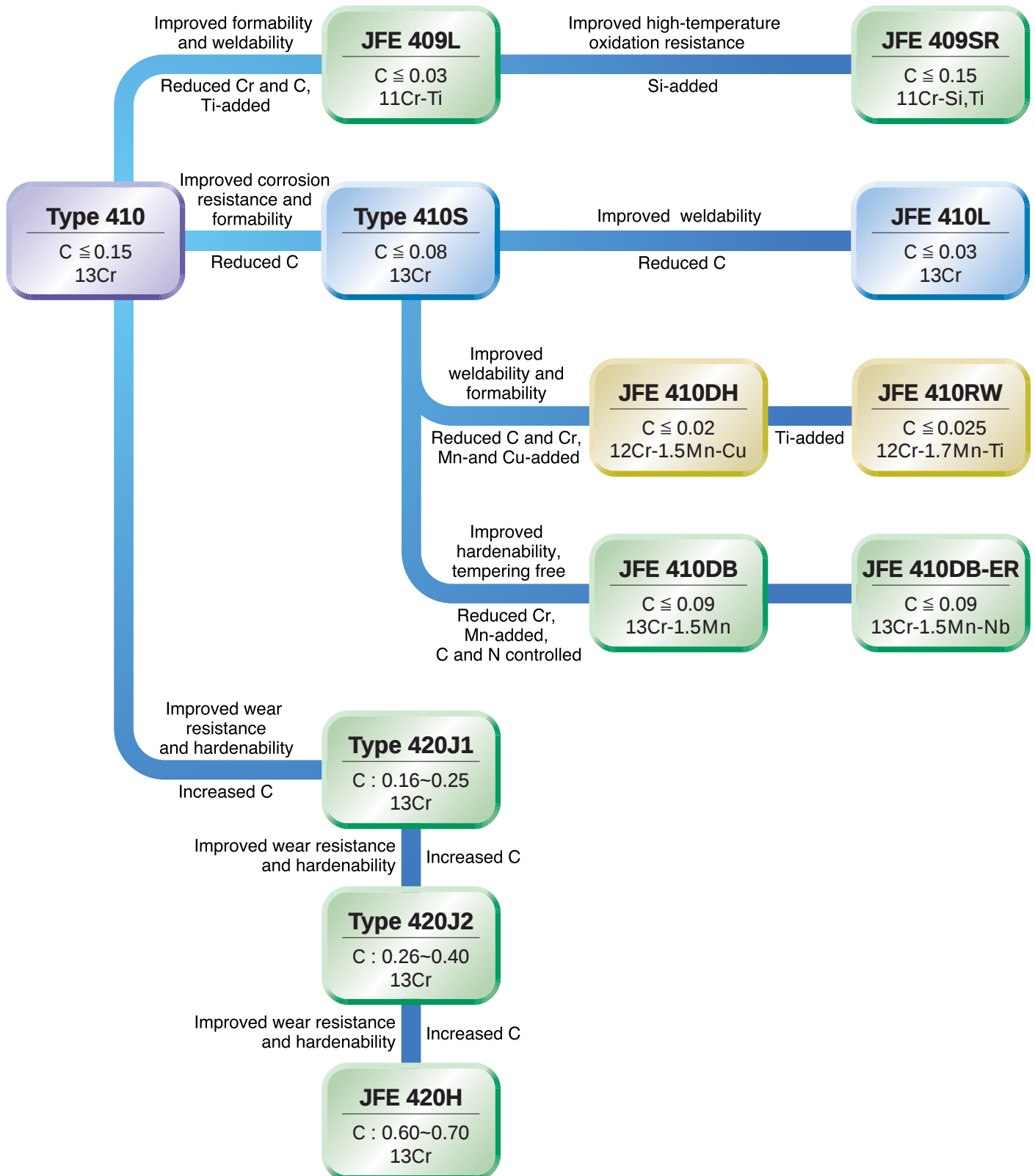
Families of Stainless Steel

Medium and High Cr-based



Families of Stainless Steel

Low Cr-based



Characteristics and Applications by Steel Type

Cr-based

Classification	Standard Designation				Basic Composition	Characteristics	Major Applications
	JFE Standard	JIS Standard	Corresponding EN Standard Chemical Composition	Corresponding ASTM, AISI Standard Chemical Composition			
Standard Type		SUS 410 *	1.4006	410	13Cr	So-called "13-Cr stainless steels."	Cutlery, machinery parts, and valves
		SUS 430	1.4016	430	16Cr	Typical Cr-based stainless steels.	Daily-use durable goods, kitchen equipment, decorative articles, and architectural trimming
Deep Drawable Type		SUS 410S	1.4000	410S	13Cr - 0.08C	13-Cr stainless steels with improved weld toughness, corrosion resistance and formability.	Table knife, hollow ware
	JFE 430UD	SUS 430	1.4016	430	16Cr	Deep drawability improved over that of 430.	Daily-use durable goods, kitchen equipment, decorative articles, and architectural trimming
	JFE 430XT	SUS 430LX			16Cr - Ti - ULC	Deep-drawability, anti-ridging property and weldability are improved.	Daily-use durable goods, kitchen equipment
Weldability and Corrosion Resistant Type	JFE 430LN	SUS 430LX			18Cr - Nb - ULC	Deep-drawability, anti-ridging property and weldability are improved.	Bicycle rims,silos,and central heating pipes
	JFE 439L	SUS 430LX	1.4510	439	18Cr - Ti - UL (C,N)	Good resistance to auto exhaust condensate.	Automobile mufflers, elevators, and kitchen equipment
	JFE 430CuN	SUS 430J1L			19Cr - 0.5Cu - Nb - UL (C,N)	Pitting corrosion resistance, formability and weldability improved over those of 430.	Automobile trim, kitchen equipment, household appliance parts
	JFE 430LNM	SUS 436J1L			18Cr - 0.5Mo - Nb - UL (C,N)	Pitting corrosion resistance and weldability are improved, suitable for use in equipment handling hot water.	Hot water storage tanks, water boilers, flash water heaters
	JFE 432LTM	(SUS 436J1L*)			18Cr - 0.5Mo - Ti - UL (C,N)	High resistance to auto exhaust condensate.	Automobile mufflers
		SUS 434 *	1.4113	434	18Cr - 1Mo	Corrosion resistance and pitting corrosion resistance of 430 are improved.	Automobile external panels
	JFE 434LN1	SUS 436L			18Cr - 1Mo - Nb - UL (C,N)	Workability and weldability of 434 are improved.	Hot water tanks, tanks for water coolers, and automobile braids
	JFE 436LT	SUS 436L			18Cr - 1.0Mo - Ti - UL (C,N)	Extra-high resistance to auto exhaust condensate.	Automobile mufflers, exhaust pipes, kitchen ware, container external panel
	JFE 443CT				21Cr - Cu - Ti - UL (C,N)	Pitting corrosion resistance and weather resistance are equivalent to that of Type 304. Excellent weldability.	Kitchen equipment, architectural trimming and external panels, hollow ware, household appliance parts
	JFE 434LN2	SUS 444		444	19Cr - 2Mo - Nb - UL (C,N)	Pitting corrosion resistance is excellent, comparable to that of 316.	Solar heat collector plates and hot water tanks
	JFE 445M	SUS 445J1			22Cr-1Mo-Nb - UL (C,N)	Atmospheric corrosion resistance is excellent, the same as that of SUS316	Heat storage tanks
	JFE 445MT	SUS 445J2			22Cr - 1.5Mo - Ti - UL (C,N)	Atmospheric corrosion resistance of JFE 445MT is improved.	Roof materials, ducts and architectural external panels
High Corrosion Resistant Type	JFE 30-2	SUS 447J1			30Cr - 2Mo - UL (C,N)	Ferritic stainless steels with highest Cr content, showing excellent atmospheric corrosion resistance even in coastal areas.	Architectural external panels and roof material, plants producing organic acids such as acetic acid and lactic acid, caustic soda plants, heat exchangers
For Machine Parts		SUS 403		403	13Cr - 0.1C	Suited to machine parts with excellent corrosion resistance and machinability.	Machine parts
For Cutlery		SUS 420J1	1.4021	420	13Cr - 0.2C	Suited for parts requiring wear resistance.	Turbine blades and parts for elevated-temperature use
		SUS 420J2	1.4028	420	13Cr - 0.3C	Higher quench hardness than that of 420J1.	Cutlery, nozzle valve seats, valves, and linear scales
	JFE 420H				13Cr - 0.6C	Far higher quenching hardness than that of SUS 420J2.	Cutlery
Oxidation Resistant Type	JFE 409L	SUH 409L	1.4512		11Cr - Ti - ULC	Carbon content of 409 is decreased to improve oxidation resistance and formability.	Exhaust pipes, manifolds, and converter cases
	JFE 409SR				11Cr - 1.5Si - Ti - UL (C,N)	Silicon content of 409 is increased to improve oxidation resistance.	Catalytic converters of automobiles and warm air heaters
	JFE 410L	SUS 410L			13C - LC	Softer and better in formability.	Container external panels
	JFE 429EX		1.4595		15Cr - 1Si - 0.5Nb - LC	High resistance to oxidation and thermal fatigue.	Automobile exhaust gas manifolds
	JFE-MH1				15Cr - 1.5Mo - 0.5Nb - ULC	Thermal fatigue resistance of JFE 429EX is increased.	Automobile exhaust gas manifolds
	JFE 18-3USR				18Cr - 3.5Al - ULC	Excellent oxidation resistance at high temperature.	Combustion chambers
	JFE 20-5USR				20Cr - 5.5Al - ULC	Excellent oxidation resistance, with no deterioration even in very thin sheets.	Metal honeycombs for automobile catalytic converters
For Welded Structure	JFE 410DH				12Cr - 1.5Mn - 0.3Cu - L (C,N)	Manganese content is increased to improve weld joint performance and weldability.	Marine-cargo container frames and water-wheel liners
	JFE410RW				12Cr-1.7Mn-Ti	Anti-corrosion resistance of weld parts is increased	Rail wagon
Wear Resistant Type	JFE 410DB				13Cr - 1.5Mn	Wide range of quenching temperatures can be used to obtain required hardness by quenching alone.	Disk brakes for motorcycles
	JFE 410DB-ER				13Cr - 1.5Mn - Nb	Higher heat-resistance than that of 410DB.	Disk brakes for motorcycles

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●Hardness is measured by HV or HRB only, depending upon the sheet thickness.

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Chemical Composition and Mechanical Properties

Cr-based (1)

Classification	Standard Designation				Chemical Composition%								Mechanical Properties						
	JFE Standards	JIS Standards	Corresponding EN Standard Chemical Composition	Corresponding ASTM, AISI Standard Chemical Composition #	C	Si	Mn	P	S	Cr	Mo	Others	Tensile Test			Hardness Test		Bend Test	
													Yield Strength N/mm ²	Tensile Strength N/mm ²	Elongation %	HV	HRB	Bending Angle	Inside Radius t: Thickness
Standard Type		SUS 410 *	1.4006	410	0.15 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	11.50 ~ 13.50			205 min.	440 min.	20 min.	210 max.	93 max.	180°	1.0 × t
		SUS 430	1.4016	430	0.12 max.	0.75 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 18.00			205 min.	420 min.	22 min.	200 max.	88 max.	180°	1.0 × t
Deep Drawable Type		SUS 410S	1.4000	410S	0.08 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	11.50 ~ 13.50			205 min.	410 min.	20 min.	200 max.	88 max.	180°	1.0 × t
	JFE 430UD	SUS 430	1.4016	430	0.12 max.	0.75 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 18.00			205 min.	420 min.	22 min.	200 max.	88 max.	180°	1.0 × t
	JFE 430XT	SUS 430LX			0.030 max.	0.75 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 19.00		Ti 0.10 ~ 1.00	175 min.	360 min.	22 min.	200 max.	88 max.	180°	1.0 × t
Weldability and Corrosion Resistant Type	JFE 430LN	SUS 430LX			0.030 max.	0.75 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 19.00		Nb 0.10 ~ 1.00	175 min.	360 min.	22 min.	200 max.	88 max.	180°	1.0 × t
	JFE 439L	SUS 430LX	1.4510	439	0.030 max.	0.75 max.	1.00 max.	0.040 max.	0.030 max.	17.00 ~ 19.00		N 0.020 max. Ti 6 × (C + N) ~ 0.75	175 min.	360 min.	22 min.	200 max.	88 max.	180°	1.0 × t
	JFE 430CuN	SUS 430J1L			0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 20.00		N 0.025 max. Nb 8 × (C + N) ~ 0.80 Cu 0.30 ~ 0.80	205 min.	390 min.	22 min.	200 max.	90 max.	180°	1.0 × t
	JFE 430LNM	SUS 436J1L			0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	17.00 ~ 20.00	0.40 ~ 0.80	N 0.025 max. Nb 8 × (C + N) ~ 0.80	245 min.	410 min.	20 min.	200 max.	90 max.	180°	1.0 × t
	JFE 432LTM	(SUS 436J1L*)			0.025 max.	0.75 max.	1.00 max.	0.040 max.	0.030 max.	17.00 ~ 19.00	0.40 ~ 0.80	N 0.015 max. Ti 8 × (C + N) ~ 0.80	205 min.	390 min.	25 min.	180 max.	88 max.	180°	1.0 × t
		SUS 434 *	1.4113	434	0.12 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 18.00	0.75 ~ 1.25		205 min.	450 min.	22 min.	200 max.	88 max.	180°	1.0 × t
	JFE 434LN1	SUS 436L			0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 19.00	0.75 ~ 1.50	N 0.025 max. Nb 8 × (C + N) ~ 0.80	245 min.	410 min.	20 min.	230 max.	96 max.	180°	1.0 × t
	JFE 436LT	SUS 436L			0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	16.00 ~ 19.00	0.75 ~ 1.50	N 0.025 max. Ti 11 × (C + N) ~ 0.75	245 min.	410 min.	20 min.	230 max.	96 max.	180°	1.0 × t
	JFE 443CT				0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	20.00 ~ 23.00		N 0.025 max. Ti 8 × (C + N) ~ 0.80 Cu 0.30 ~ 0.80	205 min.	390 min.	22 min.	200 max.	90 max.	180°	1.0 × t
	JFE 434LN2	SUS 444		444	0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	17.00 ~ 20.00	1.75 ~ 2.50	N 0.025 max. Nb 8 × (C + N) ~ 0.80	245 min.	410 min.	20 min.	230 max.	96 max.	180°	1.0 × t
	JFE 445M	SUS 445J1			0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	21.00 ~ 24.00	0.70 ~ 1.50	N 0.025 max. Nb 8 × (C + N) ~ 0.80	245 min.	410 min.	20 min.	230 max.	96 max.	180°	1.0 × t
	JFE 445MT	SUS 445J2			0.025 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	21.00 ~ 24.00	1.50 ~ 2.50	N 0.025 max.	245 min.	410 min.	20 min.	230 max.	96 max.	180°	1.0 × t
High Corrosion Resistant Type	JFE 30-2	SUS 447J1			0.010 max.	0.40 max.	0.40 max.	0.030 max.	0.020 max.	28.50 ~ 32.00	1.50 ~ 2.50	N 0.015 max. Cu 0.20 max.	295 min.	450 min.	22 min.	220 max.	95 max.	180°	1.0 × t

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Chemical Composition and Mechanical Properties

Cr-based (2)

Classification	Standard Designation				Chemical Composition%								Mechanical Properties						
	JFE Standards	JIS Standards	Corresponding EN Standard Chemical Composition	Corresponding ASTM, AISI Standard Chemical Composition #	C	Si	Mn	P	S	Cr	Mo	Others	Tensile Test			Hardness Test		Bend Test	
													Yield Strength N /mm²	Tensile Strength N /mm²	Elongation %	HV	HRB	Bending Angle	Inside Radius t: Thickness
For Machine Parts		SUS 403		403	0.15 max.	0.50 max.	1.00 max.	0.040 max.	0.030 max.	11.50 ~ 13.00			205 min.	440 min.	20 min.	210 max.	93 max.	180°	1.0 × t
For Cutlery		SUS 420J1	1.4021	420	0.16 ~ 0.25	1.00 max.	1.00 max.	0.040 max.	0.030 max.	12.00 ~ 14.00			225 min.	520 min.	18 min.	234 max.	97 max.	—	—
		SUS 420J2	1.4028	420	0.26 ~ 0.40	1.00 max.	1.00 max.	0.040 max.	0.030 max.	12.00 ~ 14.00			225 min.	540 min.	18 min.	247 max.	99 max.	—	—
	JFE 420H				0.60 ~ 0.70	1.00 max.	1.00 max.	0.040 max.	0.030 max.	12.50 ~ 14.00			—	540 min.	15 min.	220 max.	95 max.	—	—
Heat Resistant and Oxidation Resistant Type	JFE 409L	SUH 409L	1.4512		0.030 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	10.50 ~ 11.75		Ti 6 × C ~ 0.75	175 min.	360 min.	25 min.	175 max.	80 max.	180°	1.0 × t
	JFE 409SR				0.015 max.	1.00 ~ 2.50	1.00 max.	0.040 max.	0.030 max.	10.00 ~ 12.00		N 0.012 max. Ti 0.50 max.	—	440 min.	20 min.	170 max.	80 max.	180°	1.0 × t
	JFE 410L	SUS 410L			0.030 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	11.00 ~ 13.50			195 min.	360 min.	22 min.	200 max.	88 max.	180°	1.0 × t
	JFE 429EX		1.4595		0.030 max.	1.50 max.	1.00 max.	0.040 max.	0.030 max.	13.00 ~ 16.00		Nb 0.30 ~ 0.70	195 min.	360 min.	22 min.	200 max.	88 max.	180°	1.0 × t
	JFE-MH1				0.015 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	14.00 ~ 16.00	1.50 ~ 1.80	Nb 0.40 ~ 0.60	195 min.	360 min.	22 min.	200 max.	88 max.	180°	1.0 × t
	JFE 18-3USR				0.030 max.	1.50 max.	1.00 max.	0.040 max.	0.030 max.	17.00 ~ 19.00		Al 3.00 ~ 4.80 La, Zr added	295 min.	450 min.	20 min.	230 max.	96 max.	—	—
	JFE 20-5USR				0.015 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	19.00 ~ 21.00		Al 4.5 ~ 6.0 La 0.06 min. Zn added	—	490 min.	15 min.	250 max.	100 max.	—	—
For Welded Structures	JFE 410DH				0.020 max.	0.50 max.	1.00 ~ 2.50	0.040 max.	0.030 max.	10.75 ~ 13.50		Cu 1.0 max. N 0.020 max.	195 min.	410 min.	18 min.	210 max.	90 max.	180°	1.0 × t
	JFE 410RW				0.025 max.	1.00 max.	1.00 ~ 2.00	0.040 max.	0.030 max.	10.90 ~ 12.50		Ti 4 × (C + N) ~ 0.30 N 0.020 max.	340 min.	460 min.	20 min.	—	96 max.	—	—
Wear Resistant Type	JFE 410DB				0.09 max.	0.50 max.	1.00 ~ 2.50	0.040 max.	0.030 max.	10.00 ~ 14.50		C + N 0.04 ~ 0.10	175 min.	360 min.	20 min.	240 max.	98 max.	180°	1.0 × t
	JFE 410DB-ER				0.09 max.	0.50 max.	1.00 ~ 2.50	0.040 max.	0.030 max.	10.00 ~ 14.50		Nb added	175 min.	360 min.	20 min.	240 max.	98 max.	180°	1.0 × t

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Physical Properties

Type of Steel	Density	Electric Resistance ^{*1}	Magnetism	Specific Heat	Thermal Conductivity		Thermal Expansion Coefficient		Young's Modulus $\times 10^3$
				0~100°C	100°C	500°C	20~100°C	20~650°C	
	g /cm ³	10 ⁻⁶ Ω · cm	(Annealed Material)	J/kg · °C (Cal /g · °C)	W /m · °C (10 ⁻² Cal /cm · sec · °C)		10 ⁻⁶ /°C		N/mm ²
JFE 409L	7.74	59	Magnetic	468 (0.11)	32.9 (7.87)	30.5 (7.29)	11.4	12.3	201
JFE 409SR	7.70	59	Magnetic	502 ^{*1} (0.12)	16.7 ^{*1} (4.00)	—	11.4	11.9 ^{*6}	200
Type 410	7.75	57	Magnetic	460 (0.11)	24.9 (5.95)	25.7 (6.86)	9.9	11.7	200
JFE 429EX	7.70	67	Magnetic	460 (0.11)	26.8 (6.40)	28.8 ^{*3} (6.88)	10.9	12.2	225
JFE MH-1	7.72	61	Magnetic	460 (0.11)	26.4 (6.31)	—	10.3	12.0	216
Type 430	7.70	60	Magnetic	460 (0.11)	26.1 (6.24)	26.3 (6.28)	10.4	11.9	200
JFE 430LN	7.70	60.5	Magnetic	460 (0.11)	23.1 (5.53)	26.3 (6.28)	10.5	12.2	196
JFE 430LNM	7.72	54	Magnetic	460 (0.11)	29.7 (7.10)	—	10.3	11.8	226
JFE 432LTM	7.73	—	Magnetic	433 (0.10)	24.0 (5.74)	—	10.4	11.6	206
JFE 436LT	7.73	48	Magnetic	433 (0.10)	23.6 (5.63)	—	10.4	11.6	212
JFE 443CT	7.74	62	Magnetic	444 (0.11)	22.5 (5.38)	25.1 (6.00)	10.5	11.5	204
JFE 434LN2	7.75	62	Magnetic	460 (0.11)	21.1 (5.04)	25.2 (6.02)	10.1	11.6	206
JFE 445M	7.67	62	Magnetic	470 (0.11)	20.4 (4.87)	24.9 (5.95)	10.1	12.2	211
JFE 20-5USR	7.30	142	Magnetic	419 ^{*1} (0.10) 586 ^{*3} (0.14) 628 ^{*4} (0.15)	11.7 ^{*1} (2.80)	11.7 ^{*3} (2.80) 22.6 ^{*4} (5.40)	11.0	13.0 14.0 ^{*6}	196 ^{*5}
JFE 30-2	7.64	64	Magnetic	502 (0.12)	18.8 ^{*1} (4.50)	—	9.6	11.1	230
Type 301	7.93	72	Non-magnetic	502 (0.12)	16.2 (3.88)	21.4 (5.12)	16.9	18.7	193
Type 304	7.93	72	Non-magnetic	502 (0.12)	16.2 (3.88)	21.5 (5.13)	17.3	18.7	193
Type 316	7.98	74	Non-magnetic	502 (0.12)	16.2 (3.88)	21.5 (5.13)	16.2	18.5	193
SS400 common Steel	7.87	13	Magnetic	460 (0.11)	57.7 (13.80)	41.1 (9.80)	12.6	15.0 ^{*7}	206

Remarks : ^{*1} 20°C, ^{*2} 0~300°C, ^{*3} 600°C, ^{*4} 900°C, ^{*5} Estimated value, ^{*6} RT~700°C, ^{*7} RT~500°C

Note : The density shown in the table is the actually measured value as a physical property.
Calculations of mass for commercial transactions are based on JIS G4310 'Method of calculating mass of stainless steel sheets and heat-resistant steel sheets.'