

STAINLESS STEEL

Sn addition/Resource saving/
High-purity ferritic stainless steel

EXPERIENCE
KNOWLEDGE
INNOVATION



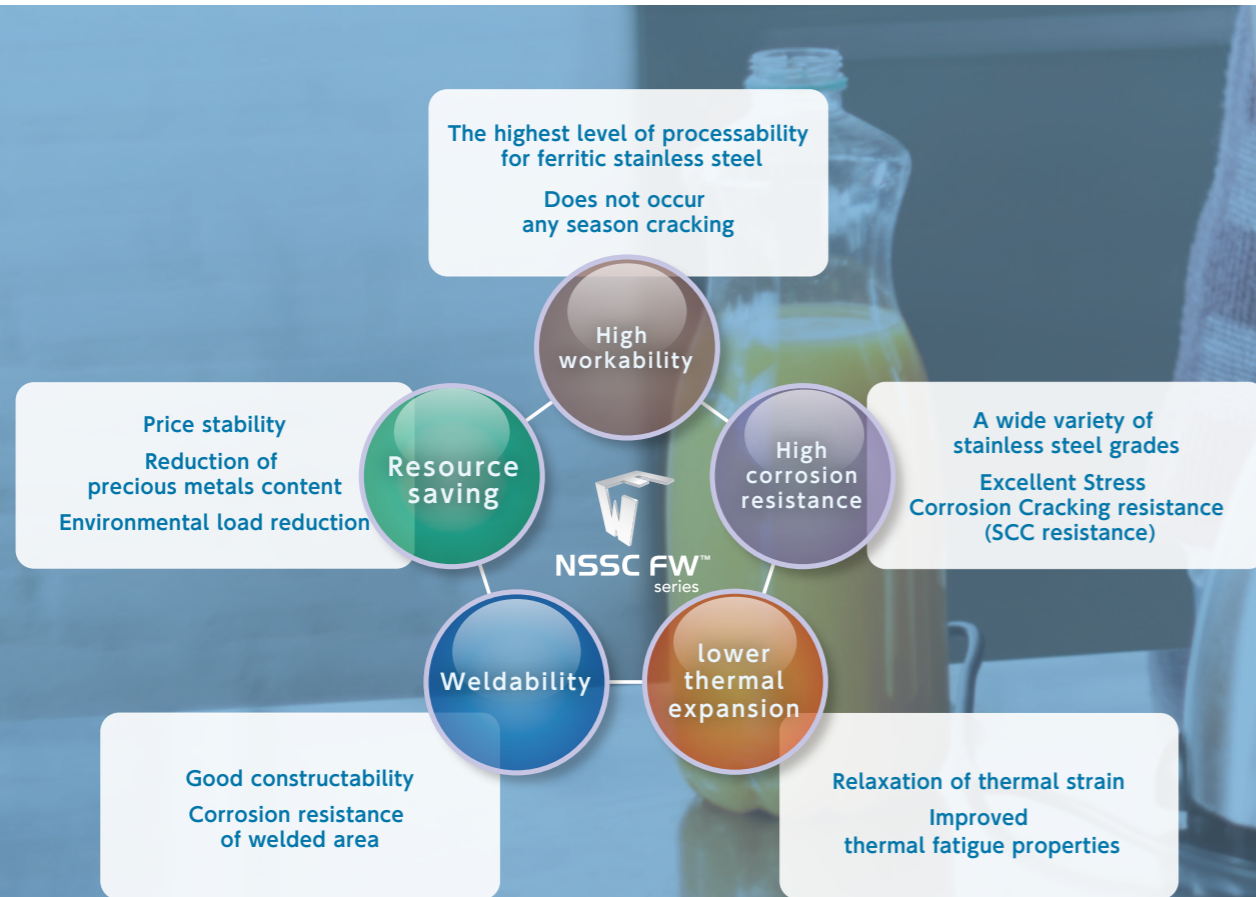
NSSC FW™
series

Cr & Ni **35%** Saving

0

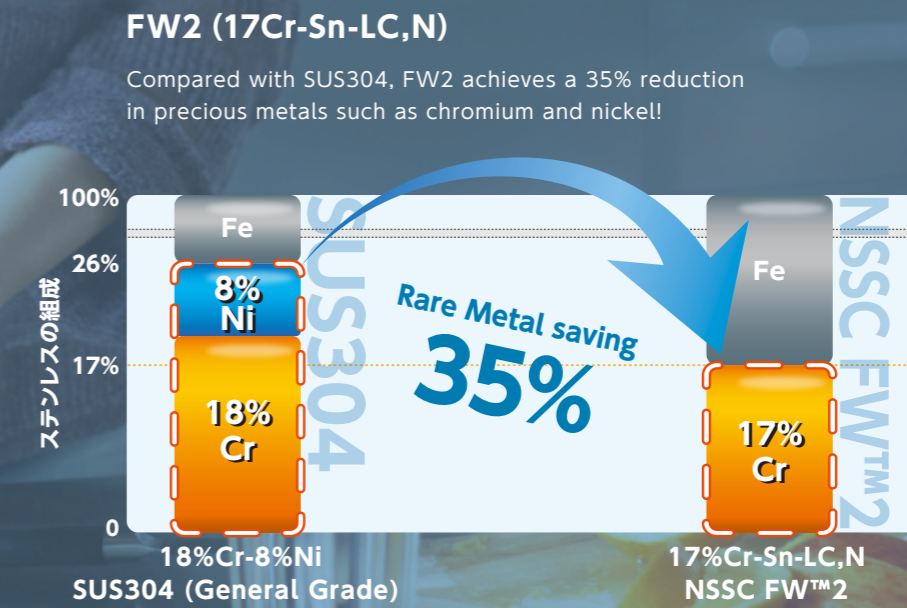
NET ZERO
NIPPON STEEL
Green Transformation
initiative

The world's first Sn added and Resource saving High-purity ferritic stainless steel



Reducing precious metals by up to 35%!

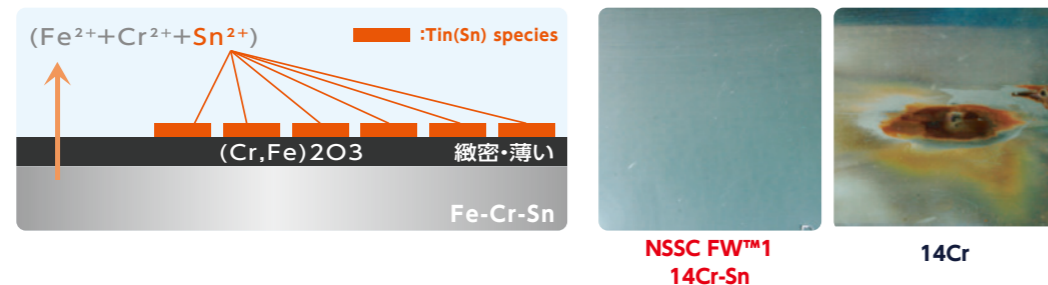
NSSC FW™ series are nickel- and molybdenum-free, and has significantly reduced chromium!



Adding Tin(Sn)

By adding a small amount of Tin, the FW series shows excellent corrosion resistance even in a saltwater environment by adsorbing Tin chemical species on the surface.

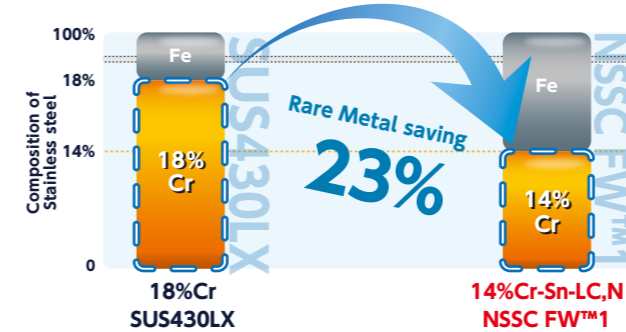
Low Cr+added Tin(Sn)



14Cr-Sn(左)と14Cr(右)で比較 (Sn添加により錆発生を抑制)

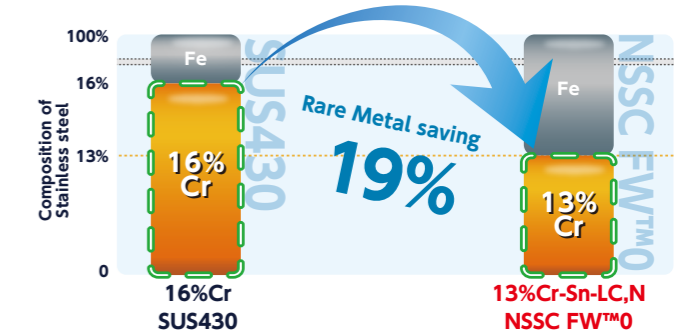
FW1 (14Cr-Sn-LC,N)

Compared with SUS430LX, FW1 achieves 23% reduction in precious metals!



FW0 (13Cr-Sn-LC,N)

Compared with SUS430, FW0 achieves 19% reduction in precious metals!

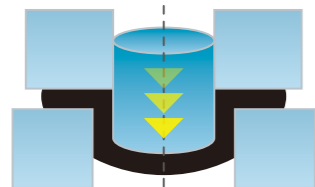


High workability

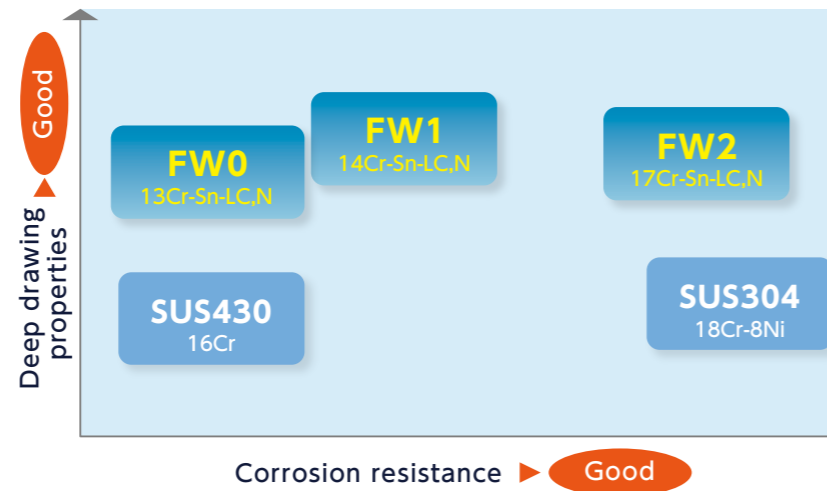
NSSC FW™ has the highest level of workability among the ferritic grades. By selecting the appropriate process conditions, it is possible to perform equivalent level of forming processing as of SUS304.

Deep drawing properties

A processing method in which a material is forced into a die (concave mold) using a punch (convex mold) to form various shapes.

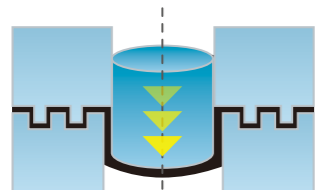


[Deep drawing] material flows

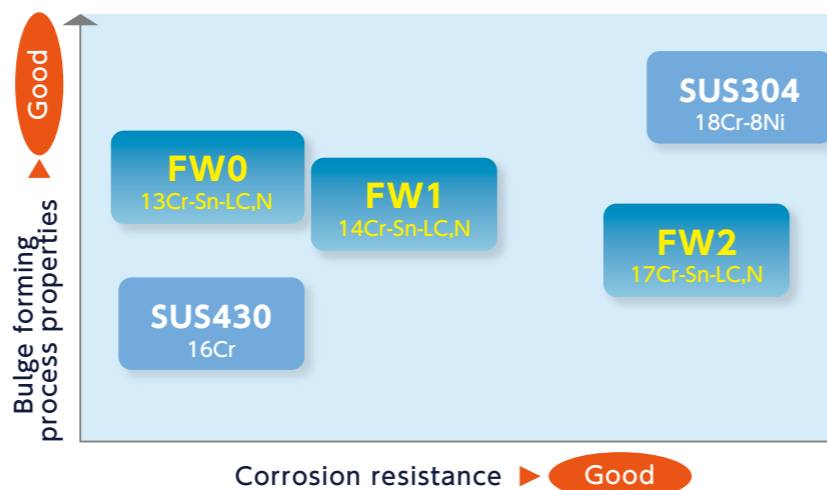


Bulging process properties

A processing method that suppresses the inflow of material using beads (for example), and transcribes the shape of the punch (convex mold) to the material for forming. The surface area increases as the processing progresses, but the thickness decreases.



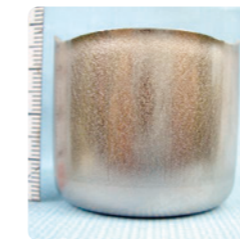
[Bulge forming process] Tensile deformation without inflow of material



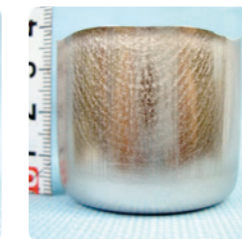
Processing properties (thickness 0.6mm)

Maintenance after processing can be reduced as a result of less ridging.

Multi-step deep drawing is possible without cracking, and does not occur any season cracking.



NSSC FW™1
(Single cold rolling, drawing ratio: 2.0)



SUS430LX



NSSC FW™2 SUS304
(Single cold rolling) Blank dia: φ80mm, Lubricant: JW#122
Punch dia (mm): 1st φ40→2nd φ35→3rd φ30→4th φ25

	Deep drawing properties		Bulging process properties	
	average r-value	LDR	n-value	hydraulic bulge Height (mm)
NSSC FW™1	1.7	2.3	0.22	31.5
NSSC FW™2	1.7	2.3	0.24	30.5
NSSC FW™0 (thickness 0.5mm)	1.6	2.2	0.25	—
SUS430	1.0	2.0	0.16	27.0
SUS304	1.1	2.1	0.42	40.5

Example of replacement solution from SUS304 to FW series

Simulation result

Workability comparison under the same conditions as SUS304

Blank: 240×240mm
Punch: 100×100mm, Corner r20mm, rp10mm
Die: 103×103mm, rd5mm
COF: 0.10, thickness: 0.8mm
Blank holding pressure: 20ton

NSSC FW™1; h=32mm

Crack

SUS304

SUS304; h=52mm

SOLUTION

Workability comparison under conditions suitable for the FW series

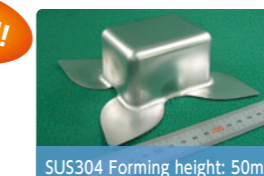
Blank holder: 10ton
COF: 0.06

NSSC FW™1; h=60mm

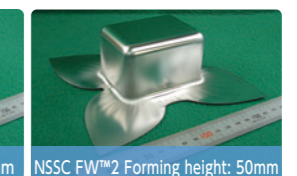
NSSC FW™1; h=60mm

Good!

Blank size: SUS304/150×150mm
NSSC FW™2/175×175mm
Thickness: 0.6mm, blank holding pressure: 500kN
Die: 82mm×62mm, rC/9mm, rd/5mm
Punch: 80mm×60mm, rC/8mm, rp/8mm
Lubricant: Die surface/PVC film, Punch surface/#122wax

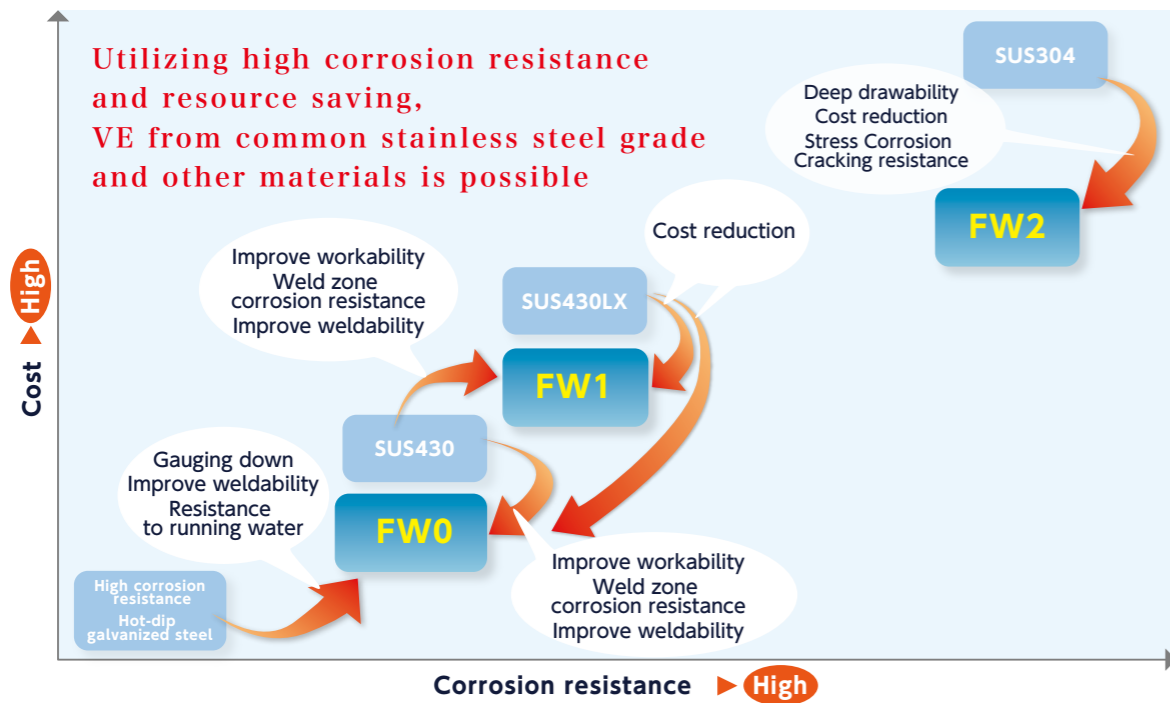


SUS304 Forming height: 50mm

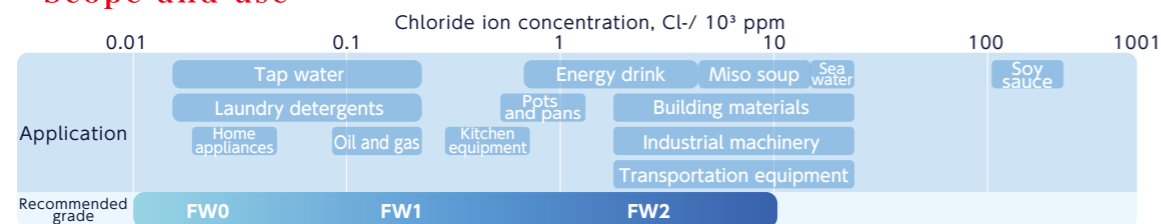


NSSC FW™2 Forming height: 50mm

High corrosion resistance



Scope and use



FW0
Corrosion resistance of SST is equivalent to or even higher than SUS430.

As TIG welding

NSSC FW™0 SUS430

TIG welding → #600 polishing

NSSC FW™0 SUS430

Test conditions: 5%NaCl, 35°C, 24hr

FW1
Corrosion resistance of SST is equivalent to SUS430LX.

NSSC FW™1 SUS430LX

Test conditions: 5%NaCl, 35°C, 168hr

Corrosion resistance including welded area is significantly superior compared to SUS430

TIG welding → #600 polishing

NSSC FW™1 SUS430

Immersion conditions: 0.5%NaCl, 80°C, 168hrs

FW2
Corrosion resistance of MST is equivalent to SUS304.

NSSC FW™2 SUS304

Test Conditions: 0.5%NaCl+2%H₂O₂, 35°C, 24hr

Corrosion resistance in exposure test is equivalent to SUS304.

NSSC FW™2 SUS304

Appearance of samples exposed for 2 years in Okinawa

Technical data

FW2 (17Cr-Sn-LC,N)

Specification

Mechanical properties

	0.2% proof stress (N/mm ²)	tensile strength (N/mm ²)	elongation (%)	Hardness (HV)
Specification	≥205	≥390	≥25	≤200
Representative value	279	463	32	144
Surface Finish: No.2B, Thickness: 0.6mm				
reference				
SUS304	297	675	61	173

Physical properties

Measured results

Item	Unit	value	reference
Density	kg/mm/m ² (room temperature)	7.70	SUS304 7.93
Specific electrical resistivity	10-8Ωm (room temperature)	54	72
Specific heat	kJ/kg/°C (0~100°C)	0.48	0.50
Heat conductivity	W/m/°C (100°C)	25.6	16.3
Heat expansion coefficient	10-6/°C (room temperature to 100°C)	10.8	16.9
Longitudinal elastic modulus	kN/mm ²	211	193

FW1 (14Cr-Sn-LC,N)

Specification

Mechanical properties

	0.2% proof stress (N/mm ²)	tensile strength (N/mm ²)	elongation (%)	Hardness (HV)
Specification	≥175	≥360	≥28	≤180
Representative value	260	420	35	130
Surface Finish: No.2B, Thickness: 0.6mm				
reference				
SUS430LX	296	436	32	144

Physical properties

Measured results

Item	Unit	value	reference
Density	kg/mm/m ² (room temperature)	7.70	SUS430LX 7.70
Specific electrical resistivity	10-8Ωm (room temperature)	51	60
Specific heat	kJ/kg/°C (0~100°C)	0.49	0.46
Heat conductivity	W/m/°C (100°C)	26.6	26.4
Heat expansion coefficient	10-6/°C (room temperature to 100°C)	10.8	10.4
Longitudinal elastic modulus	kN/mm ²	217	200

FW0 (13Cr-Sn-LC,N)

Specification

Mechanical properties

	0.2% proof stress (N/mm ²)	tensile strength (N/mm ²)	elongation (%)	Hardness (HV)
Specification	≥175	≥360	≥28	≤160
Representative value	253	449	32	144
Surface Finish: No.2B, Thickness: 0.5mm				
reference				
SUS430	308	516	26	155

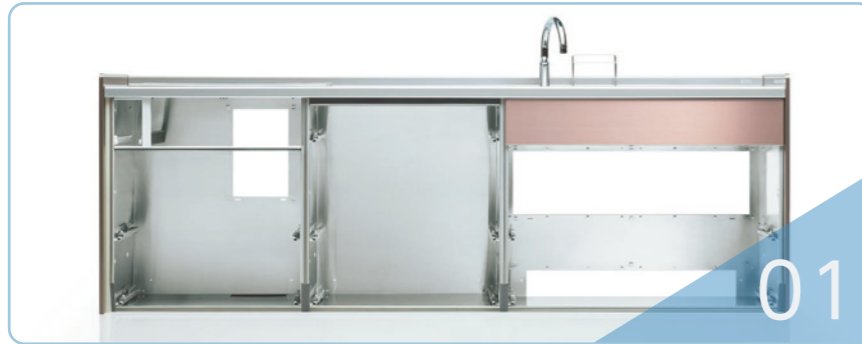
Physical properties

Measured results

Item	Unit	value	reference
Density	kg/mm/m ² (room temperature)	7.70	SUS430 7.70
Specific electrical resistivity	10-8Ωm (room temperature)	51	57
Specific heat	kJ/kg/°C (0~100°C)	0.49	0.46
Heat conductivity	W/m/°C (100°C)	26.6	24.2
Heat expansion coefficient	10-6/°C (room temperature to 100°C)	10.8	11
Longitudinal elastic modulus	kN/mm ²	217	200

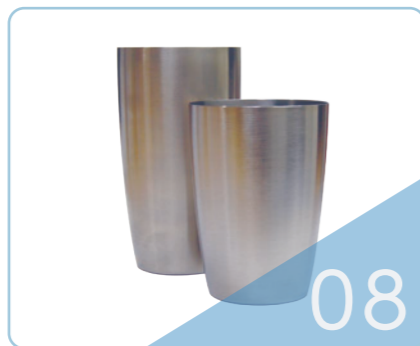
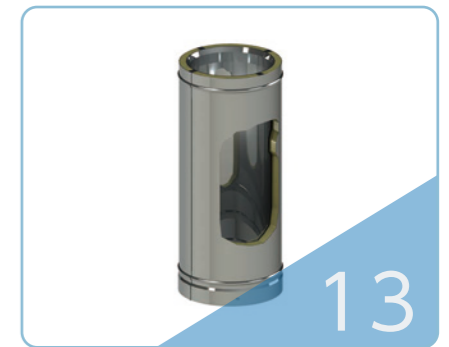
APPLICATION

Application example



- 01. Cabinet (FW1)
- 02. Knife cutting board sterilizer (FW1)
- 03. Large kitchen bat (FW2)
- 04. Kitchen sink (FW1)
- 05. Refrigerator door(FW1)
- 06. Grill plate (FW0)
- 07. Water tank (FW2)
- 08. Tumbler (FW2)
- 09. Washing tub (FW1)

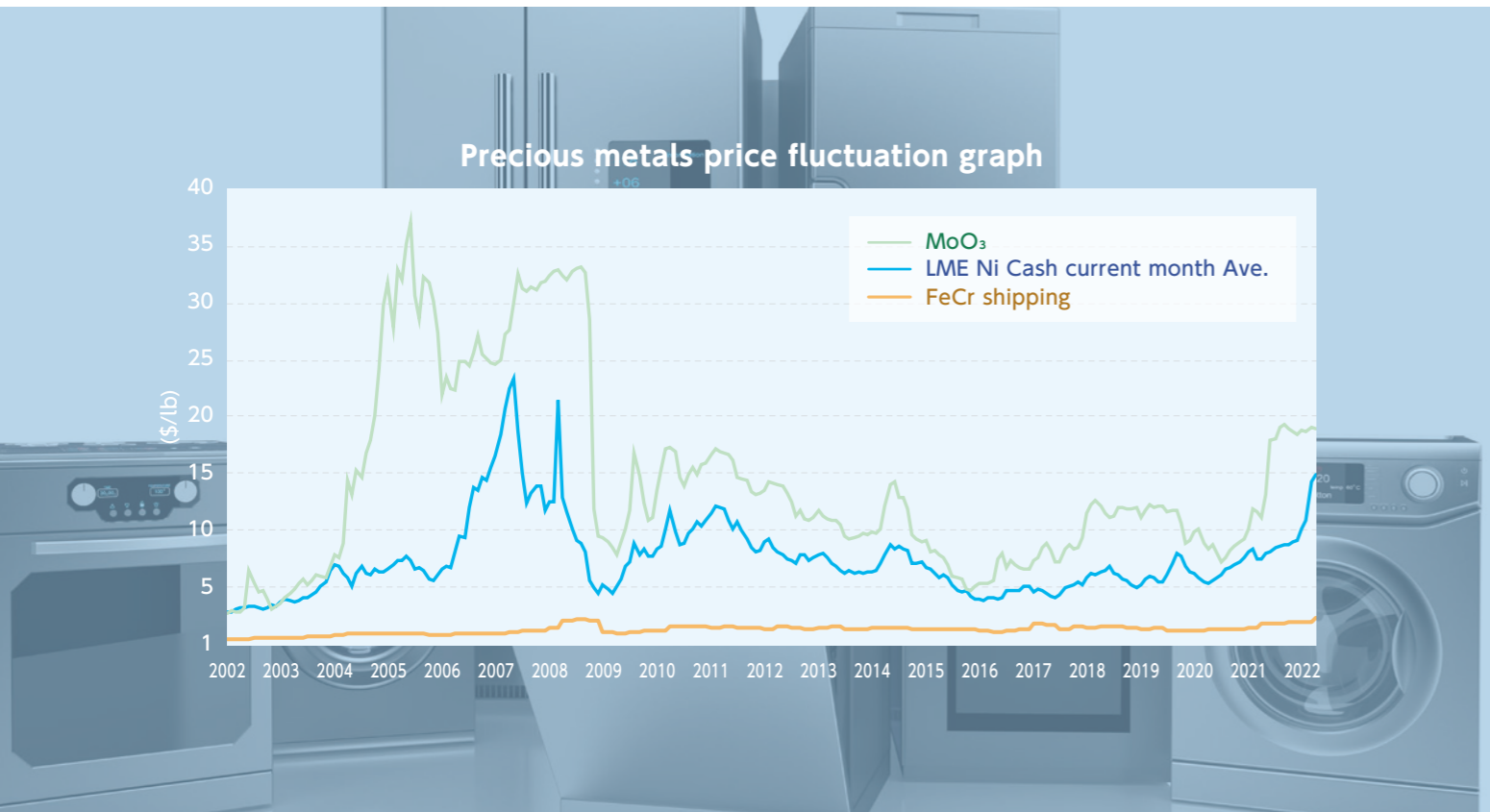
- 10. IH rice cooker (FW2)
- 11. Folding container (FW0)
- 12. Crystallizing dish (FW1)
- 13. Chimney (FW0)
- 14. Elevator lining (FW1)
- 15. Vacuum packaging machine (FW1)
- 16. Bread making equipment (FW1)
- 17. Garbage storage box (FW2)



Price stability

Price trends of raw materials : chromium, nickel, molybdenum

FW series restrain the cost and have a great price stability by thorough resource saving (no nickel/molybdenum added, reduced chromium) and minimizing the impact of fluctuations of raw material price.



Award

2010 Nikkei Excellent ProductService Award/Best Award
Nikkei Business Daily Award

2012 The Japan Institute of Metals and Materials
Technical Development Award

2012 Monozukuri Nippon Grand Award Prime Minister's Award

STAINLESS STEEL



Creating the future one step ahead

NSSC FW

Search

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