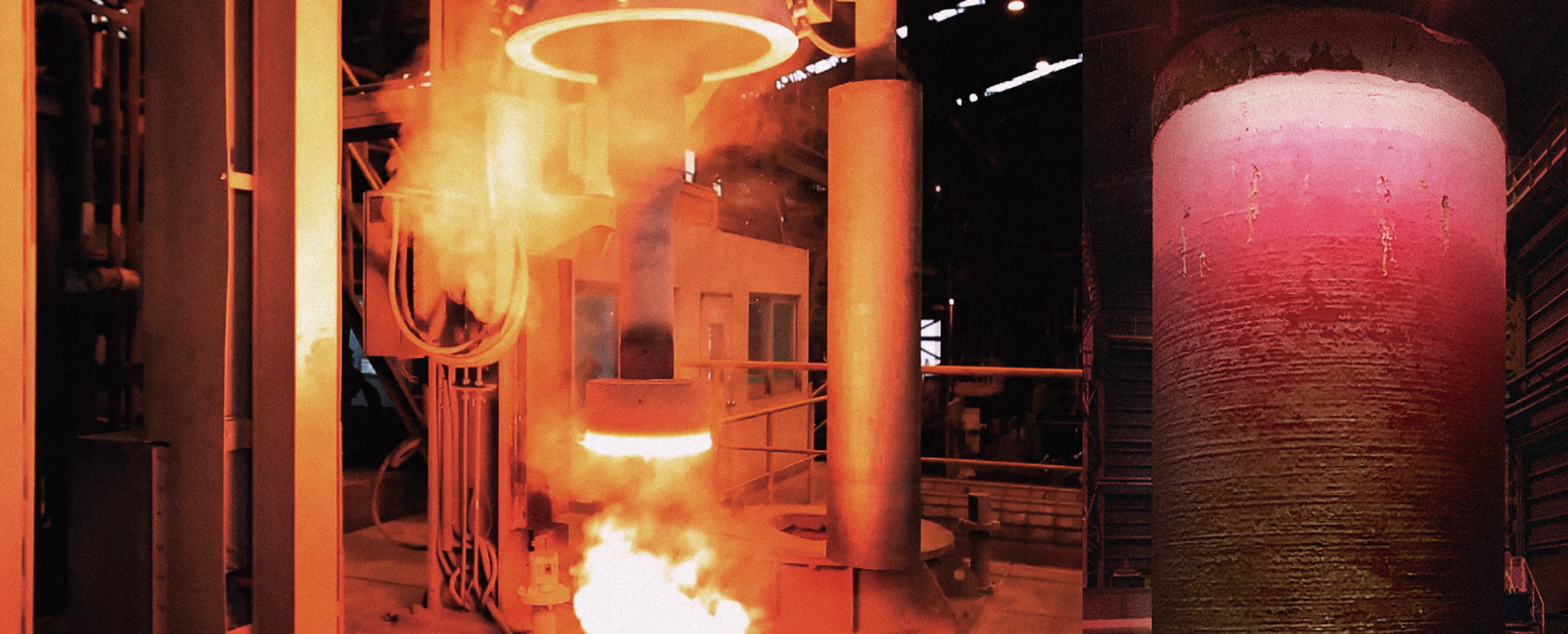


NICKEL ALLOYS

WIRE RODS, ROUND BARS, FLAT BARS,
PIPES & TUBES, MOTHER ALLOYS

1) Please note that the characteristic values listed in this catalog are representative data and are different from the guaranteed values.
2) The information in this catalog is a subject to change without notice.
3) Unauthorized reproduction of the contents in this catalog is prohibited.
4) For unclear matters, please consult with the person in charge.
5) The contents of this catalog are as of June 2021.



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Creating new values in special steel
the consistent goal of **SeAH CSS**

From high-tech industries such as energy plants, petrochemical, semiconductors to future industries such as nuclear power and aerospace, SeAH Changwon Integrated Special Steel is a global leader in stainless steel, tool steel, and Ni Alloy.

Opening up a new future for the global special steel industry is our consistent goal.

Look forward to the future of **SeAH Changwon Integrated Special Steel**.





SeAH Tower - Seoul



HISTORY

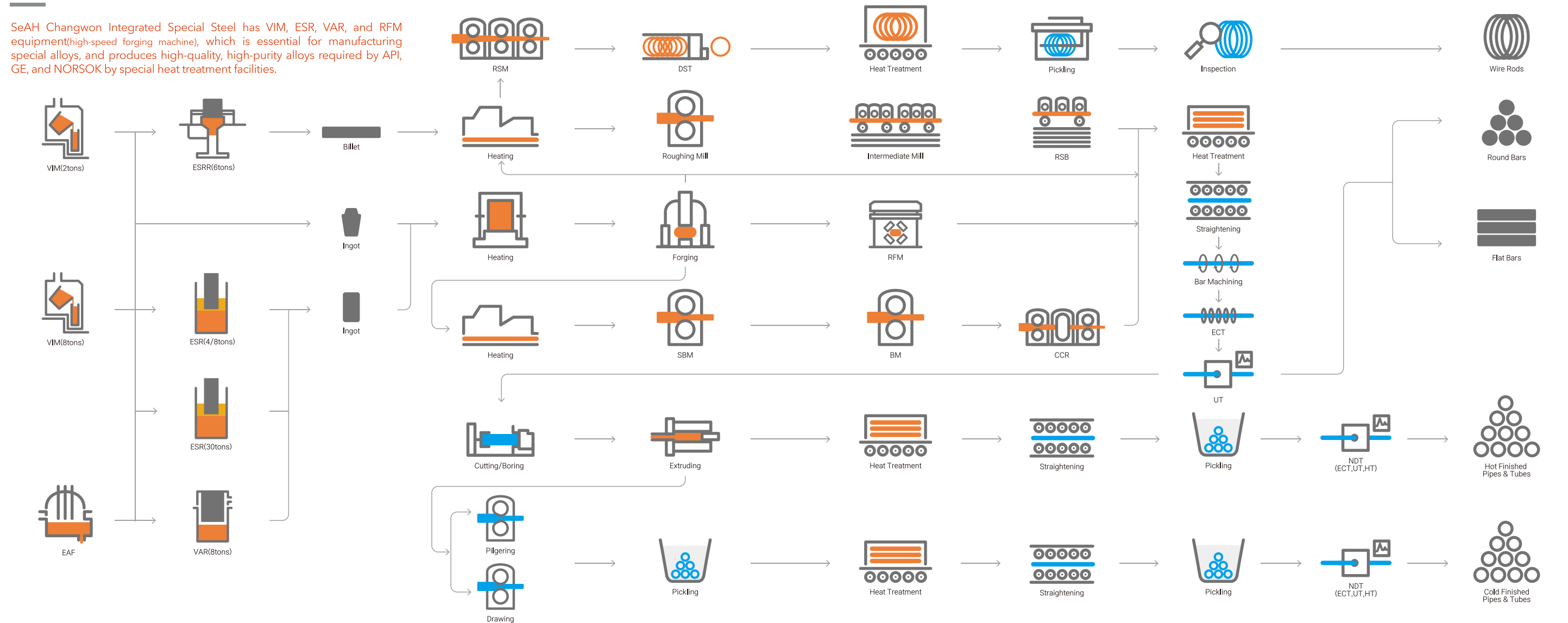
1966.04	Founded as Samyang Special Steel Co. Ltd.
1977.12	Establishment of Korea Specialty Steel Factory
1982.06	Change of company name to Sammi Special Steel Co., Ltd
1991.04	Opened its 2nd special steel plant (Steel making, rolling, processing)
1997.02	Incorporated into POSCO Group (Round Bar, Pipe)
2006.10	Completed the 1st phase of its facility rationalization (AOD, HV-Mill, 2nd Pickling plant)
2007.02	Change of company name to POSCO Specialty Steel Co.,Ltd.
2012.04	Completed the 2nd phase of its facility rationalization (60 Ton Electric Furnace, Bloom Caster, SBM, etc.)
2015.03	Acquired by SeAH Group and Changed the Company name to SeAH Changwon Integrated Special Steel Co., Ltd.
2015.05	10 billion Won investment agreement with Changwon City
2017.02	Completion of new facilities for special alloys (VIM, ESR, VAR)
	Completion of large-diameter steel pipe plant (5,000 Ton Press for seamless pipes)



SeAH CSS-Changwon View

Manufacturing Process & Facilities

SeAH Changwon Integrated Special Steel has VIM, ESR, VAR, and RFM equipment (high-speed forging machine), which is essential for manufacturing special alloys, and produces high-quality, high-purity alloys required by API, GE, and NORSOK by special heat treatment facilities.



VIM - 8ton



ESR - 8ton



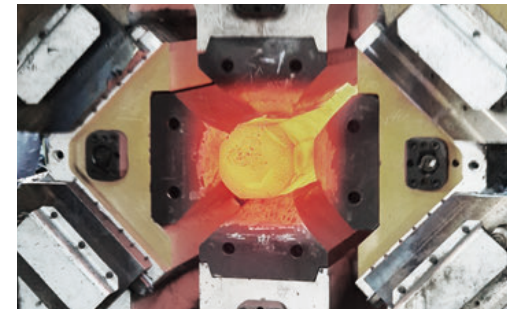
VAR - 8ton



RFM



FDFD



VIM(Vacuum Induction Melting) : Producing by melting raw materials by high-frequency induction in a vacuum state, which is necessary for the production of special alloys and reducing H, N, and O gases.

ESR(Electro Slag Remelting) : Produces high cleanliness steel through degassing and reduction of inclusions by remelting the ingots produce by VIM using the resistive heat of slag.

VAR(Vacuum Arc Remelting) : Produces high cleanliness steel ingots by remelting ingots coarse in VIM in a vacuum atmosphere and is advantageous for degassing, which is essential for materials requiring high-temperature properties.

RFM(Radial Forging Machine) : A forging machine with a 4-axis ram which can forge in 360 degree direction and can obtain the homogeneous structure by rapidly forging.

FDFD(Four Die Forging Device) : By complementing the shortcomings of the existing forging machine, you can expect the RFM 4-way forging effect from Open Die Forging Press, and it is a specialized equipment for medium and large-sized steel products and intermediate forgings of special alloys.

Classification & Characteristics of Ni-Alloy

Ni-Alloy Classification

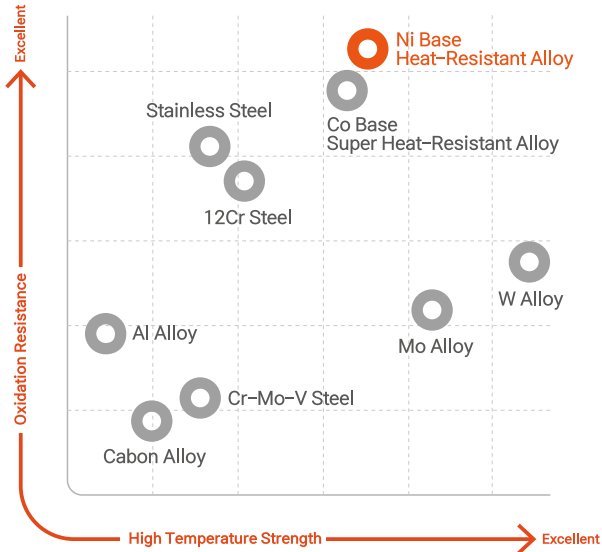
Pure Ni ALLOY 200 (99%Ni)	Ni-Cu Alloy (MONEI Gr.)	ALLOY 400	High corrosion resistance in seawater, acid, and alkaline environments
		ALLOY K500 (Al, Ti)	High hardness and strength added to ALLOY 400 properties
Ni-Fe-Cr Alloy (INCOLOY Gr.)		ALLOY 800H	Excellent oxidation and carburization resistance in high temperature environment
		ALLOY 330 (Cu)	Excellent oxidation, carburization, and nitrification resistance in high temperature environments
		ALLOY 367 (Mo)	High temperature strength and corrosion resistance
		ALLOY 20 (Mo, Cu)	Excellent corrosion resistance wide acid environments.
		ALLOY 901 (Mo)	Excellent toughness and strength up to 600 degrees, excellent hot workability
		ALLOY 825 (Mo, Cu)	High corrosion resistance in sulfuric acid and phosphoric acid
		ALLOY 925 ⁽⁹²⁶⁾ (Mo, Cu, Al, Ti)	Excellent corrosion resistance and strength equivalent to ALLOY 825
		ALLOY 904 (Mo, Cu)	Excellent strength and corrosion resistance in sea water
Ni-Cr Alloy (INCONEL Gr.)		ALLOY 600	Excellent high temperature strength and weldability
		ALLOY 601 (Al)	Excellent resistance to water soluble corrosion
		ALLOY 625 (Mo, Nb)	Solid solution strengthened alloy with excellent corrosion resistance in extreme environment
		ALLOY 718 (Mo, Nb, Ti, Al)	High temperature strength and corrosion resistance, excellent creep strength up to 700 degrees
		ALLOY 706 (Nb, Ti)	High strength and excellent creep properties
		ALLOY X750 (Ni, Ti, Al)	Excellent elasticity and corrosion resistance
Ni-Cr-Mo-W (HAST. Gr.)		ALLOY 80A (Ti, Al)	Excellent corrosion resistance and creep strength in high temperature environments up to 850 degrees Celsius
		ALLOY C276 (Mo, W)	High resistant to stress corrosion cracking, excellent weldability
		ALLOY C22 (Mo, W)	High resistant to stress corrosion cracking, excellent weldability
Ni-Fe Alloy (INVAR Gr.)		ALLOY 36/42/52	Low coefficient of thermal expansion at room temperature and low temperature
		ALLOY X, ALLOY 713C ^(LC) , ALLOY 738C ^(LC) , ALLOY 939W	
Mother Alloy		ALLOY X, ALLOY 713C ^(LC) , ALLOY 738C ^(LC) , ALLOY 939W	
		ALLOY X, ALLOY 713C ^(LC) , ALLOY 738C ^(LC) , ALLOY 939W	
Super STS		S 32750/32760	High strength, strong against stress corrosion and crevice corrosion at high salinity
		ALLOY A286 (ST660)	Excellent cold work hardening, low temperature high corrosion resistance

Ni-Base Super Alloy

Ni-Alloy with excellent oxidation resistance and high strength at high temperatures which used in jet engines and boiler valves for power generation and etc.

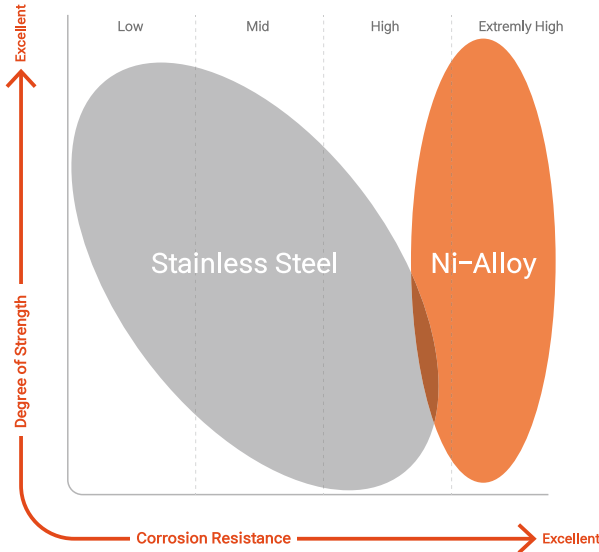
Heat-Oxidation Resistance

Excellent heat and oxidation resistance compared to other steel types such as carbon steel and stainless steel.



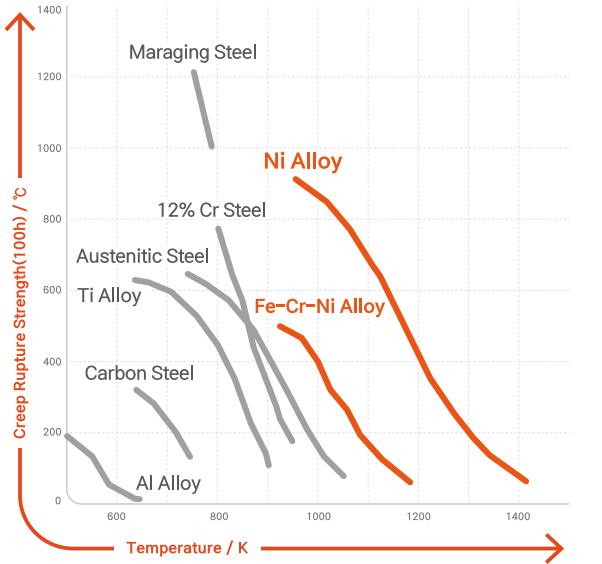
Corrosion Resistance

Excellent corrosion resistance and strength compared to stainless steel



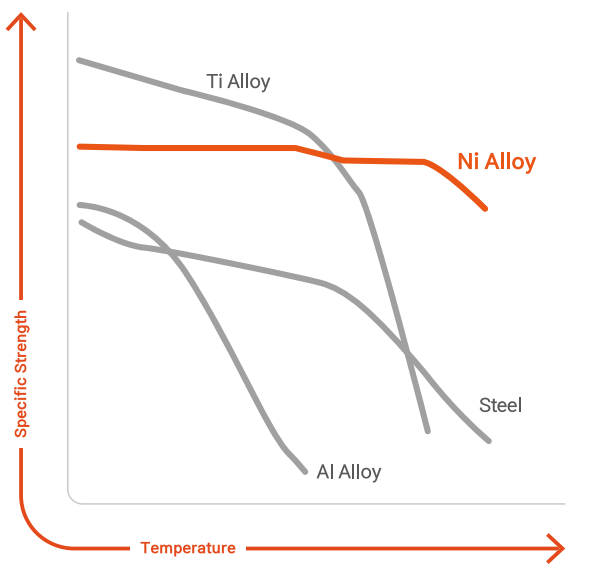
Creep Rupture

Excellent creep rupture characteristics compared to other steel types such as carbon steel and stainless steel



Thermal Strength

Excellent high temperature strength compared to Ti Alloy and general steel

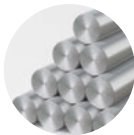


Main Products

Round Bars

● Main Production Steel Grades & Sizes

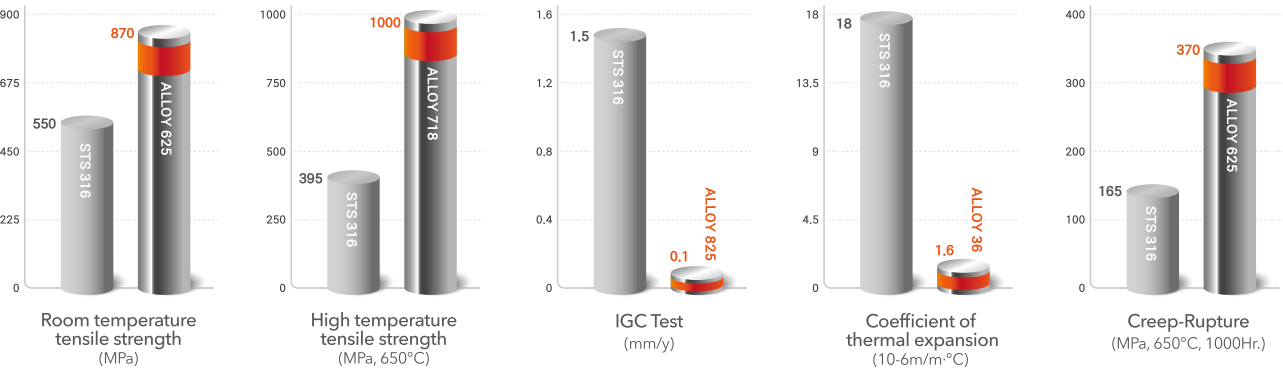
Grades	Application	Production				Size Range
		EAF	VIM	ESR	VAR	
ALLOY 718/750/706	Stud Bolts, Turbine Parts		●	●	●	Ø13~Ø250 Ø260~Need for Consultation
ALLOY 625/617/690/600	Petrochem-Parts, Turbine Blades	●	●	●		
ALLOY 825/800H/367	Petrochem-Parts, Bolts, Valves	●	●	●		
ALLOY 80A	Gas Turbine Parts, Exhaust Valves		●	●		
ALLOY C276/C22/C4	Stud Bolts, Turbine Parts		●	●		
ALLOY 901	Gas Turbine Shafts, Disc		●	●	●	
ALLOY 925/904L	Petrochem-Valves, Stud Bolts		●	●		
ALLOY K500/400	Pump Shafts, Pittings, Valves	●	●	●		
ALLOY A286(Gr. 660)	Stud Bolts, Turbine Parts	●	●	●		



● Casting Process

Casting(VIM or EAF) + ESR/VAR ➡ Forging/Rolling(Billet) ➡ Rolling or Forging(RFM/Free Forging) ➡ Heat Treatment ➡ Peeling

● Main Characteristics By Steel Type(STS 316 VS Ni-Alloy)



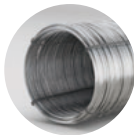
● Main Products & References

Industry	Products	Materials	Reference	Product Image
Power Plant	Stud Bolts & Nuts (Fasteners)	ALLOY 718 ALLOY 925 ALLOY 901	GE B50A809C API 6A GE B50A305B	
Off Shore Plant Heat Exchanger	DBB Valves/Fittings Stem Shafts Plug Bolts	ALLOY 625 ALLOY 400 ALLOY 825	ADMA-OPCO SNT Heavy Ind.	
Ship Building	Exhaust Valves For Shipbuilding Engines	ALLOY 80A (N07080)	MAN DT	

Wire Rods

● Main Production Steel Grades & Sizes

Grades	Application	Production				Size Range
		EAF	VIM	ESR	VAR	
ALLOY 625/600/601	Welding Solid Wire, CHQ, Mash	●	●	●		Ø5.5~Ø34
ALLOY 718/X750	Welding Solid Wire, Spring, Mash		●	●	●	
ALLOY 825/800H	Welding Solid Wire, Washer, CHQ	●	●	●		
ALLOY C276/C22/C4	Welding Solid Wire		●	●		
ALLOY 36/42	STACIR(Al Clad Invar Wire)	●	●			
ALLOY 200/201	Electronic Components		●	●		
ALLOY 400	Mesh, Spring	●	●			
ALLOY A286(Gr660)	Fastener, CHQ	●	●	●		



● Casting Process

Casting(VIM or EAF) + ESR/VAR ➡ Forging/Rolling(Billet) ➡ Rolling or Drawing ➡ Heat Treatment ➡ Pickling

● Application

Welding Solid Wire
ALLOY 625/718/C276

Mesh
ALLOY 601/400

STACIR
ALLOY 36/42

Spring
ALLOY 718/X750

● Main Products & References

Industry	End-Products	Materials	Reference
Ship Building & On/Off Shore Plant	Exhaust Valve Seat Welding Pipe Welding	ALLOY 625 ALLOY 718 ALLOY 825	Kowel(KumYong) Kiswel DSR
Automotive	Muffler Valve Spring	ALLOY 718 ALLOY C22 ALLOY X750	Kowel(HMC)
Power Plant	Exhaust Valves For Shipbuilding Engines	ALLOY 600	Kowel(DHI)
Electric Wire	STACIR (Al Clad Invar Wire)	ALLOY 36 (INVAR)	LSCNS

Main Products

Square(Flat) Bars

● Main Production Steel Grades & Sizes

Grades	Application	Production				Size Range
		EAF	VIM	ESR	VAR	
ALLOY 36/42	OLED Metal Mask Frame	●	●	●		10t ~ 200t 100W ~ 2700W 500L ~ 6000L
ALLOY 825/800H	Heat Exchanger Head Box	●	●	●		
ALLOY 80A/ALLOY625	Turbine Blades		●	●		
ALLOY 718	Turbine Blades		●		●	

● Application

OLED Metal Mask Frame
ALLOY 36



Heat Exchanger Head Box(Forged)
ALLOY 825 / 131t x 210W x 3,800L



Seamless Pipes & Tubes

● Main Production Steel Grades & Sizes

Grades	Application	Production				Size Range
		EAF	VIM	ESR	VAR	
ALLOY 200/201/600/601	Petrochemical/Oil & Gas	●	●	●		Ø10 ~ 273.1 Hot & Cold
ALLOY 825/800H/904L	Heat Exchanger/Oil & Gas	●	●	●		
ALLOY 718/X750/690	Oil & Gas/Power Plant		●	●	●	
ALLOY 400/K500	Petrochemical/Oil & Gas	●	●			

● Main Products & References

Industry	End-Products	Materials	Reference
Oil & Gas	Heat Exchanger Tube	ALLOY 825/904L	Clients in GCC (ADMA-OPCO, ZADCO)
Oil & Gas	API Pipe (Up & Down Stream)	ALLOY 400/ALLOY 20	ORPIC(CB&I)
Automotive	Sheath Thermocouple	ALLOY 600	HMC/GM
Petro Chemical	Spool	ALLOY 800H	SK Energy

Mother Alloys

● Main Production Steel Grades & Sizes

Grades	Application	Production				Size Range
		EAF	VIM	ESR	VAR	
ALLOY 713C/713LC	Casting(Turbo Charger Valve)		●			Mother Alloy Ø80 Ø100 Ø125
ALLOY X	Casting(Turbine Blade, EV Burner)		●			
ALLOY 738LC	Casting(Turbine Part, 3rd Vane)		●			
ALLOY 939W	Casting(Turbine Part, 3rd Vane)		●			
ALLOY 625/617/718	Forging	●	●	●	●	Forging Ingot Ø320~Ø670
ALLOY 825/800	Forging	●	●	●		
ALLOY C276/C22/C4	Forging		●	●		

● Casting Process

For Investment Casting and powder metallurgy : Casting(VIM) or VIM + Surface Processing
For re-forging : Steel Making(VIM) + ESR or VAR + Heat Treatment

● Application

Waste Gate Valve
ALLOY 713C

EV Burner
ALLOY X

Vane
ALLOY 738LC

Turbine Blade
ALLOY 738LC

● Main Products & References

Industry	End-Products	Materials	Reference
Automotive	Waste Gate Valve (Turbo Charger)	ALLOY 713C	MMT (Borg Warner)
Power Plant	Vane EV Burner Turbine Blade	ALLOY X ALLOY 738LC ALLOY 713C	S.I Turbine (Korea S.E Power)
Ship building	Compressor Wheel & Turbine Blade	ALLOY 713LC	S.I Turbine (MAN Diesel)
Power Plant	HSC Mock Up Rotor	ALLOY 617 ALLOY 282	Doosan Heavy Ind.

Production Size & Accredited Certification Status

Production Size



Wire Rods
-
Ø5.5~Ø34



Round Bars
-
Ø13~Ø250,
Ø260~: Need for
Consultation



Flat(SQ) Bars
-
10~200T
100~2,700W



Pipes & Tubes
-
Ø10 ~ Ø273.1
1 ~ 23t



Forgings
-
~15tons



Semi Products
-
Ingot : ~30ton

Size
Casting : Ø80, Ø100,
Ø125
Forging : Ø320~Ø670

ESR Ingot



Accredited Certification Status



ISO 9001:2015
International Organization
for Standardization
Quality Management System



IATF 16949:2016
International Standard
for Automotive
Quality Management System



ISO 14001:2015
International Organization
for Standardization
Environmental Management System



KOSHA18001
Korea Occupational Safety
and Health Agency Occupational Safety &
Health Management System



Changwon Plant
(Head Office)
Seoul Office
Busan Operation
Special Alloy Sales Team

Oversea Opeartions

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