

大同特别钢介绍

1 产品构造

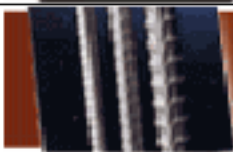
1.1 工具钢(Tool Steel)

Type	钢种分类	DAIDO	JIS	GB-YB	AISI	DIN	
		BRAND					
Cold Work Tool Steels	冷作工具钢	YK30	SKS93	-	-	-	-
		YK4	SK4	T9/T10	W1/W2	1.154	C100W1
		G0A	SKS3mod.	-	-	-	-
		G05	-	-	-	-	-
		DC11	SKD11	Cr12MoV	D2	1.2379	X165CrMoV12
		DC53	SKD11mod.	-	-	-	-
Hot Work Tool Steels	热作工具钢	DHA1	SKD61	4Cr5MoSiV1	H13	1.2344	X40CrMoV51
		DH2F	SKD61mod.	-	-	-	-
		GFA	SKT4mod.	5CrNiMo	L6	1.2714	55CrNiMoV6
High Speed Tool Steels	高速工具钢	MH51	SKH51	W6Mo5Cr4V2	M2	1.3343	S6-5-2
		MH85	-	-	-	-	-
Plastic Mold Steels	塑料模具钢	PXZ	-	-	-	-	-
		PX4	-	-	p20mod.	-	-
		PX5	-	-	p20mod.	-	-
		NAK55	-	-	-	-	-
		NAK80	-	-	-	-	-
		S-STAR	SUS420J2mod.	3Cr13	420mod.	1.4034	X40Cr13
		G-STAR	-	-	-	-	

1.2 不锈钢(stainless steel)

1.2.1 产品分类

产品	说明
 Stainless Steel Wire Rod	不锈钢盘条
 Stainless Angle	不锈钢角钢
 Stainless Flat Bar	不锈钢扁钢

	Stainless Steel Bar	不锈钢棒
	Stainless Channel	不锈钢槽钢
	H-section Stainless Steel	不锈钢H 型钢
	Compression Bar	加压条钢
	Stainless Rebar	不锈钢钢筋
	Stainless Rail	不锈钢钢轨

1.2.1.1 不锈钢盘条

Ultra free cutting	Added several free cutting elements									
Machinability and cold forging	Added Pb or Bi									
Cold deformability(cold forging, drawing, rolling and punching)	Ultra clean steel with extremely low C,N,S and etc.									
High hardness and non-magnetic	High hardness series (HV500 400 300)									
Standard size (mm)	5.5	5.75	6	6.25	6.5	6.75	7	7.25	7.5	8
	8.5	8.75	9	9.5	10	10.5	11	11.5	12	12.5
	13	13.49	14	14.5	15	15.5	16	16.27	16.5	16.67
	17	18	18.5	19	19.45	20	20.5	21	22	23
	24	25	26	27	28	30	32			

1.2.2 不锈钢角钢

		Thickness (i n)					
		1/8	3/16	1/4	5/16	3/8	1/2
Width (in)	3/4	.603	.833				
	1	.813	1.16	1.49			
	1 1/4	1.03	1.49	1.92			
	1 1/2	1.25	1.81	2.35	2.83		
	2	1.71	2.49	3.23	3.93	4.64	
	2 1/2		3.16	4.13	5.04	5.97	
	3			4.99	6.11	7.26	9.41
	4			6.79	8.27	9.88	13.0

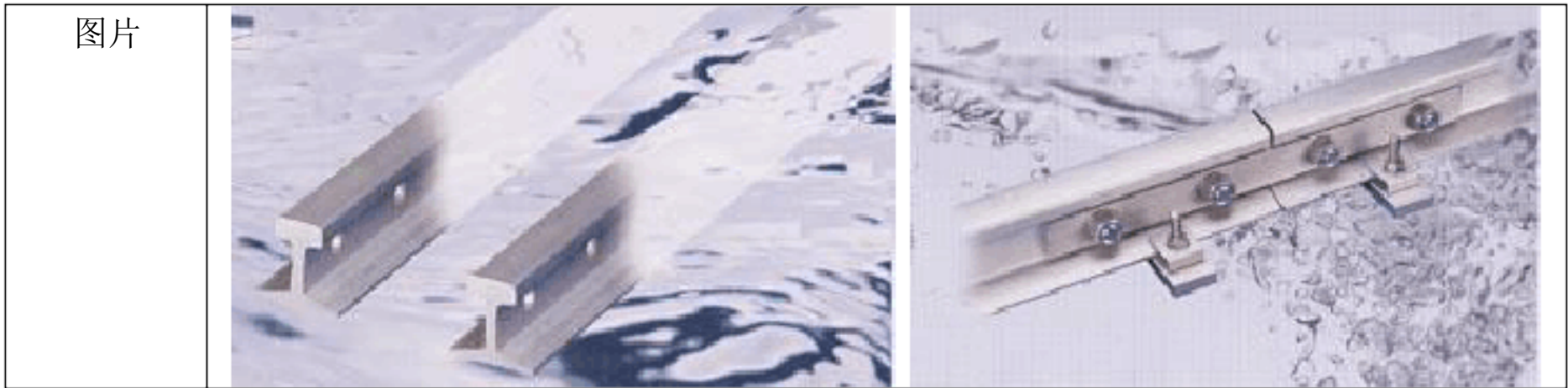
1.1.1.1 不锈钢棒

工艺路线	说明	说明
EAVAC	EAVAC“ process; the integrated process of EAF, AOD, Vacuum degasser and continuous caster.Homogeneous of molten with low gas content is achieved by vacuum treatment with great stir.	EAF+AOD+真空处理+连铸
VIF	VIF; Vacuum induction furnace	真空感应炉
VAR	VAR: Vacuum arc remelting	真空自耗
ESR	ESR; Electro slag remelting	电渣重熔

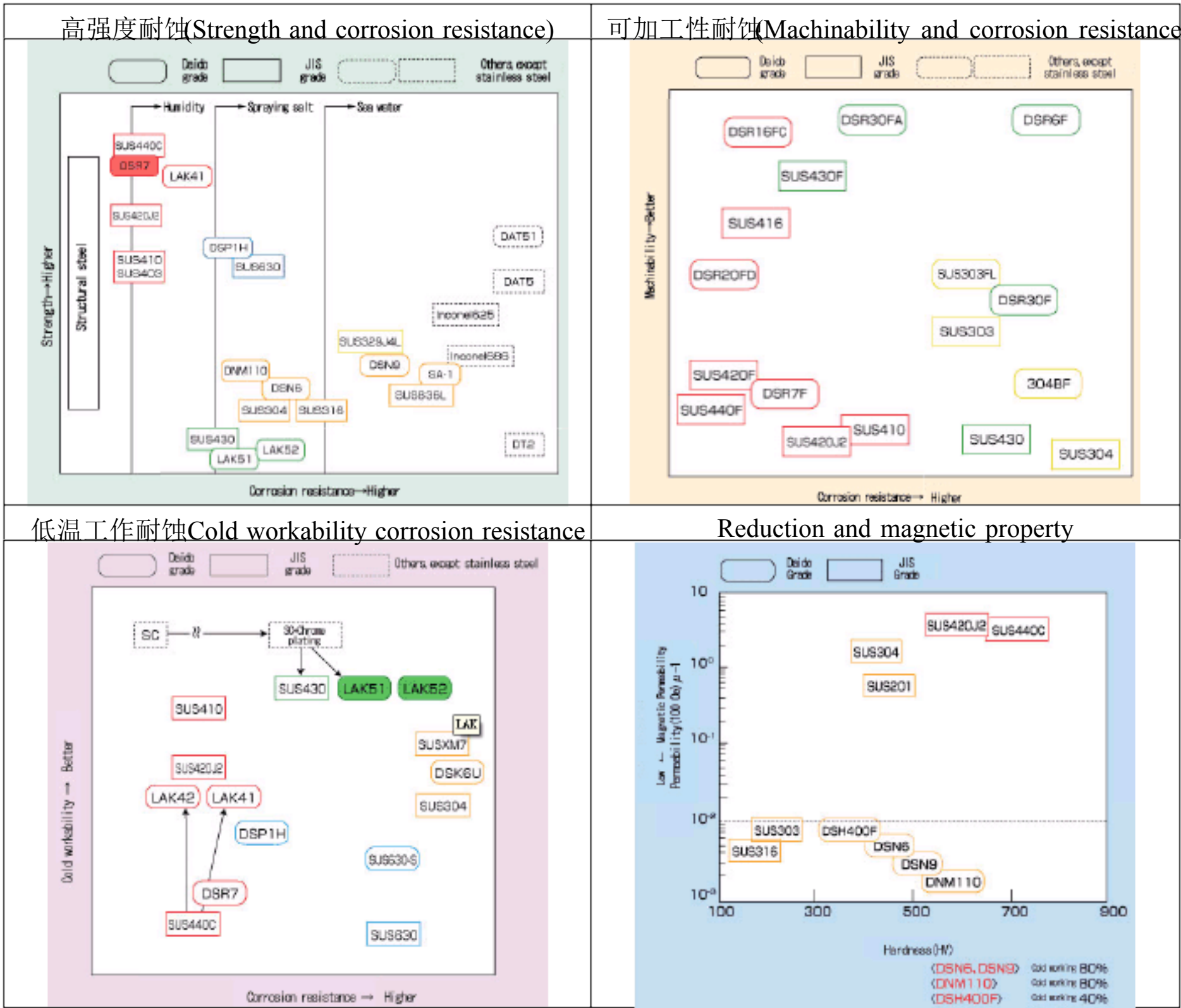
Classification by finish process	Dia. (mm)	Notes
Turned	80～600	Up to ϕ 1000 is applicable by specification.
Peeled	10～160	
Pickling	8～50	Up to ϕ 160 is applicable by specification.
Center-less ground	6～30	
Combined	6～25	

1.1.1.2 不锈钢钢轨

Shape and size tolerance	Shape and size tolerance are following JISE1103 (Light rail) .									
Chemical composition	It is following JIS G4303(stainless steel bar) .									
	Grade	C	Si	Mn	P	S	Ni	Cr	N	Nb
	304	≦0.08	≦1.00	≦2.00	≦0.045	≦0.030	8 ~ 10.50	18 ~ 20.00	-	-
Mechanical properties	Grade	Line-up			Tensile strength			Elongation(%)		
					(N/mm2)					
	304	9kg rail			≦637			≦12		
		15kg rail								
		22kg rail								
Mass/m	Grade	Line-up			Mass/m			Mass unit		
					(kg/m)			(kg/6m)		
	304	9kg rail			9.02			54		
		15kg rail			15.3			92		
		22kg rail			22.5			135		



1.2.3 钢种



Item	Classification	Application
Free cutting stainless steel 易切削不锈钢	Martensitic 马氏体	Parts for valve,electric appliance,machinery, high hardness cutter, screw, bolt, nut, precision parts, club head, shafts for water pump, motor, printer and etc. 机电用阀部件、高强度刀具、螺丝、螺栓、螺母、周密部件、杆头、水泵,发动机,打印机用轴。
	Ferritic 铁素体	Parts for watch, camera, gauge, precision equipment, automobile,machinery, home appliance, office automation equipment,screw, bolt, nut 手表、相机、量具、周密装备、汽车、机器、家用、办公室用自动化设备部件，螺丝、螺栓、螺母
	Austenitic 奥氏体	Parts for automobile, precision equipment,camera, watch Parts for food processor, precision machinery, container, bolt, nut 汽车、周密装备、相机、手表部件；食品处理、周密机器、容器，螺栓、螺母
Stainless steel for cold deformation 冷成型不锈钢	Martensitic 马氏体	Tables ware(hoop or sheet bar), scissors, solenoid valve parts, cold working, shaft, bearing, valve, screw, tapping screw, other screw (wire rod or bar), deforming rolling and drawing 餐桌器皿(、剪刀、电磁阀部件、冷加工、轴、轴承、阀门、螺丝、自攻螺钉、其它螺钉
	Ferritic 铁素体	electric window wiper, anchor bolt, slotted screw, screw for cold forging, seawater-resistant, high strength and automobile, small screw, rivet, parts for automobile and home appliance 电动窗刷、锚杆、有槽螺钉、冷锻螺丝、防海水、高强度汽车、小螺丝、铆钉、汽车和家庭用具部件
	Austenitic 奥氏体	Screw, bolt, nut 螺丝、螺栓、螺母
	Precipitation hardened 沉淀硬化	High strength bolt, shaft, medical equipment, cylinder, pin, shaft, sensor 高强度螺栓、轴、缸、医疗装备、销、传感器
High strength stainless steel 高强度不锈钢	Martensitic 马氏体	Heat and corrosion resistance spring, high strength and seawater-resistant machinery parts, shaft, bearing, turbine blade, tableware, nozzle, corrosion resistant bearing and shaft (hoop or sheet bar) 耐热耐蚀弹簧、高强度耐海水设备部件、轴、轴承、涡轮叶片、餐具、喷嘴、耐蚀轴承和轴
High strength and non magnetic stainless steel 高强度无磁不锈钢	Austenitic 奥氏体	Guide pin for VTR, gasket, drilling screw, non-magnetic drill collar, spring, machined parts for electric appliance VTR 导向销、无磁钻铤、弹簧、电气设备部件
High strength and corrosion resistance stainless steel 高强度耐蚀不锈钢	Austenitic, 奥氏体 ferritic 铁素体	Seawater pump, parts for chemical industry, bolt, nozzle, shaft 海水泵、化工用部件、螺栓、喷嘴、轴
High corrosion resistance stainless steel 高耐蚀不锈钢	Austenitic 奥氏体	Pump parts for nuclear power generation 核电生产用泵

1.1.1.1 易切削钢

1、马氏体系列

DAIDO Brand	Chemical composition (mass%)						JIS
	C	Si	Mn	S	Cr	Free-cutting	
DSR16FC	0.14	0.3	1.2	>0.15	12.4	Added	SUS416
DSR20FD	0.32	0.3	1	>0.15	12.3	Added	SUS420F2
DAIDO Brand	Characteristic						
DSR16FC	Ultra free-cutting stainless steel by adding free-cutting component to SUS416.Machinability is better than SUS416.Hardenability is equivalent to SUS416.						
DSR20FD	Ultra free-cutting stainless steel by adding free-cutting component to SUS420F2.Machinability is better than SUS420F and SUS420F2.Hardenability is equivalent to SUS420J2						

2、铁素体系列

DAIDO Brand	Chemical composition (mass%)							JIS
	C	Si	Mn	S	Cr	Mo	Free-cutting	
DSR6F	0.01	0.5	1.2	>0.15	20	2	Add	—
DAIDO Brand	Characteristic							
DSR6F	Machinability is about 8 times better comparing to SUS303 (Ultra hard tool life).Corrosion resistance is equivalent to SUS303.Cold workability is about twice better comparing to SUS303.							

3、奥氏体系列

DAIDO Brand	Chemical composition (mass%)							JIS
	C	Si	Mn	P	S	Ni	Cr	
DSN03FA	0.07	0.2	1.7	0.03	0.3	9	18	SUS303
DAIDO Brand	Characteristic							
DSN03FA	Superior finished surface is achieved by good machinability.Suitable for high speed machining of automatic board. Mechanical property (under normal and high temperature) is equivalent to SUS304.							

1.1.1.2 冷成型

不锈钢1、马氏

DAIDO Brand	Chemical composition (mass%)			JIS
	C	Cr	Mo	
LAK41	0.5	16	Added	—
LAK42	0.58	13	Added	—
DAIDO Brand	Characteristic			

LAK41	Hardness is HRC55～59 by low tempering. It is better than SUS420J2 and almost equivalent to SUS440C. Corrosion resistance is superior to SUS440C and SUS420J2. Cold and warm workablity is almost equivalent to SUS420J2.
LAK42	Stainless steel for cold forging focusing on hardness of quenching and tempering comapred to LAK41. Hardness is superior to LAK41, and HRC58～60 is achieved by low temperature tempering. Corrosion resistance is slightly inferior to LAK41. Cold workability is equivalent to SUS420J2 under spheroidizing annealed condition.

2、铁素体

DAIDO Brand	Chemical composition (mass%)					JIS
	C	Ni	Cr	Mo	Special element	
LAK51	0.01	—	19	—	Add	SUS430LX
LAK52	0.01	—	20	1	Add	—
DAIDO Brand	Characteristic					
LAK51	Cold workability is greatly superior to SUS304 and SUSXM7, exceeding SUS430. Corrosion resistance is superior to SUS430.					
LAK52	High corrosion resistance type of LAK51. Corrosion resistance is equivalent to SUS304. Cold workability is equal to LAK51.					

3、奥氏体

DAIDO Brand	Chemical composition (mass%)					JIS
	C	Ni	Cr	Mo	Cu	
DSK2U	0.04	9	18		3	SUSXM7
DSK3U	0.03	11	17	2.5	3	SUS316J1
DSK6U	0.05	10	18		3	—
DAIDO Brand	Characteristic					
DSK2U	Equivalent to SUSXM7					
DSK3U	Header property is better than SUSXM7. Corrosion resistance, especially sulfuric acid resistance, is superior to SUS316.					
DSK6U	Stainless steel for high strength header(About 10T strength is achieved by cold working.)					

4、沉淀硬化不锈钢

DAIDO Brand	Chemical composition (mass%)					JIS
	C	Ni	Cr	Cu	Special element	
SUS630-S	ULC	4.5	16	3	Added	SUS630
DSP1H	0.02	6.5	13	—	—	—
DAIDO Brand	Characteristic					
SUS630-S	Chemical composition is within JIS standard of SUS630 and modified to improve cold workability and machinability under solution heat treatment condition. Compression property is 15～20% lower than SUS630 regarding stress-strain. Hardness and corrosion resistance after precipitation hardening treatment is equivalent to SUS630.					
DSP1H	High hardness is achieved by short precipitation hardening treatment. Corrosion resistance is better than SUS420J2, lesser than SUS630.					

	Cold work hardening property is less and it is available for cold header.
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1.1.1.1高强度不锈钢

DAIDO Brand	Chemical composition (mass%)			JIS
	C	Cr	Mo	
DSR7	0.7	12	Added	—
DAIDO Brand	Characteristic			
DSK2U	Hardness is superior to SUS440C by quenching and tempering. Corrosion resistance is equivalent to SUS440C. Machining, grindability, cold workability is better than SUS440C. Good rolling fatigue strength			

1.1.1.2高强度无磁不锈钢

DAIDO Brand	Chemical composition						JIS
	C	Mn	S	Ni	Cr	Mo	
DSH400F	0.1	1.8	0.2	9.5	18	—	—
DSN6	0.09	1.5	—	12	18	—	—
DSN9	0.03	6	—	10	23	2	—
DAIDO Brand	Characteristic						
DSH400F	Hardness is higher than SUS303. Permeability at Hv400 is $\mu \leq 1.01$, and it is machinable. Corrosion resistance is equivalent to SUS303.						
DSN6	Hardness Hv500 is achieved by cold working. Hardness becomes higher by precipitation hardening treatment. Permeability at Hv480~500 is $\mu \leq 1.01$. Corrosion resistance is better than SUS304.						
DSN9	Proof strength is almost equivalent to duplex stainless steel (SUS329J1). It is available in the sea due to excellent seawater resistance. Hardness Hv500 is achieved by cold working. Hardness becomes higher by precipitation hardening treatment. Even 80% of cold working, permeability is low at $\mu \leq 1.01$. Heat resistance is equivalent to SUH660, better than SUS310.						

1.1.1.3高强度耐蚀双相不锈钢 High Strength and Corrosion Resistance duplex Stainless steel

DAIDO Brand	Chemical composition (mass%)				JIS
	Ni	Cr	Mo	Special element	
DSD1H	5.5	24	1.5	Added	SUS329J1
DSD5	5.5	24	2.8	Added	SUS329J4L
DAIDO Brand	Characteristic				
DSD1H	Mechanical property is 0.2% higher than SUS304. Proof strength is about 1.8 times. Corrosion resistance is better than SUS316. Machinability is superior to SUS316.				
DSD5	Mechanical property is 0.2% higher than SUS304. Proof strength is about twice of that. Corrosion resistance, especially pitting corrosion resistance, is superior to				

	SUS316. Machinability is superior to SUS316.
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1.2.3.1高耐蚀不锈钢

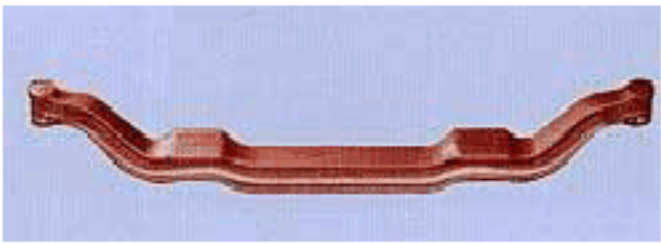
DAIDO Brand	Chemical composition (mass%)		
	Ni	Cr	Mo
SA-1	25	19	7
DAIDO Brand	Characteristic		
DSD1H	Excellent seawater corrosion resistance; in seawater, corrosion resistance is equivalent to Inconel625 and Ti.High strength;strength at normal temperature is 30% higher than SUS304 and SUS316		

1.3 模锻件(die forgings)

1、落锤锻造〔Drop Forging〕。2 条锻造线：8000T 螺旋压力机(8000T Screw Press);35MT 对击锻锤〔无底座式模锻锤〕35MT Counterblow Hammer



Crankshaft机轴



front-center

2、 锻锻与冷挤压(Upsetting and Cold Extrusion)

5 Upsetters : 9“, 7.5“2.7“, 4 5 台锻锻〔顶锻〕	3 Cold Extrusion Line : 570T, 300T2× 3 条冷挤压线：570T，300T×2
rear axle shaft后轴	main shaft主轴

3、 热挤压与壳体总成(Hot Extrusion and Housing Assy)

2500T Upsetter, 1500T Hydraulic Press 2500T锻锻,1500T液压压锻	Rear Axle Housing Manufacturing Line 后轴壳体生产线	
tube end	tool joint	axle housing轴壳

4、 热锻与温锻(Hatebur Forging and Warm Forging)

9 Hot formers, 28 Cold Roll Formers and 1 Press
HBP160, 120,1002, CRF22, 2500T Warm Press (in Chita Forging Plant)
AMP70, AMP50, AMP302, N3-4, CRF7 (in Kimitsu Plant)

	
bearingrace outer-innne轴承外圈、内圈	端面齿凸缘flange companion
侧面齿轮side gear	mission sleeve

1.4 锻件(forging product)

1.4.1 能源行业Energy

Products for power generation facilities which require semi-permanent durability in harsh environments, as well as high-temperature strength, high corrosion resistance, high toughness, etc.

We manufacture various highly reliable products, including gas turbine disks which can withstand high-speed rotations of several thousands to several tens of thousands of rotations per minute and temperatures of several hundred degreesC in high-pressure gas environments. They support the core of thermal power plants and important sections of nuclear power plants, and contribute to high-efficiency production and a stable supply of electric energy.

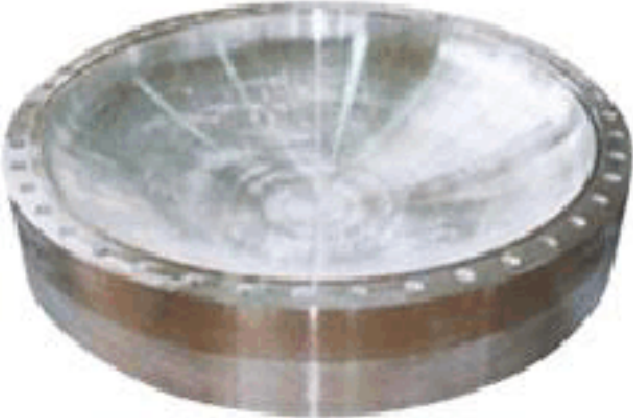
		
Turbine disk Inconel 718 φ750×170	Compressor disk ASTM A470Class5, Class8 φ2023×200	Material for blade Super12Cr, Precipitation hardening stainless steels
		

Strut SUS410J1	Steam valve body SUH616, 9%Cr	Steam valve Incoloy901, Inconel718
		
Parts of control rod drive SUS316L, Inconel690	Pump shaft SUS316L, SUS347	Parts for nuclear cycle equipment 316ULC

1.4.2 化工行业chemistry

Large-capacity compressors which are the cores of large-scale ethylene plants. Forged steel products with high corrosion resistance against hydrogen sulfide compounds and high strength that can withstand high-pressure environments are essential for their impellers.

Daido Steel products for petroleum and chemical plants are used not only in domestic plants but also in overseas petroleum resource development sites as products excelling in corrosion resistance, durability, etc. that can withstand various chemical substances and severe environments.

	
Floating head cover SUS304, ASTM182F44	
	
Impeller SUS630, 15-5PH, ASTMA182F6NM	Nozzle Incoloy 800H

1.4.3 航天Area Space

Jet engine shafts that are light-weight, high-strength, high-toughness and have high heat resistance have achieved certification for manufacturing by the 4 major aircraft engine manufacturers in the world.

We address strict control from the raw materials to the manufacturing process via a thorough quality assurance system. In addition, our aerospace technology grew to the level of world recognition by supplying materials for heat-resistant bearings to domestic and overseas manufacturers.

Our cutting-edge technology and know-how currently drives our other business fields.

		
Ring	Engine shaft	Jet engine disk AM355, 17-4PH
		
Premium bearing steel : Bearing race, ball/roller M50, M50-Ni1	Fastener Heat-resistant steel, Ni-based alloy, Titanium alloy	

1.4.4 工业industry

Daido Steel’s forging products are being used in the essential parts of many industrial machines. All parts are made-to-order, and we address various needs with appropriate application of advanced technology and know-how established in the aerospace and nuclear power generation fields. High-quality products are offered with high strength, high wear resistance, high corrosion resistance, etc. to support the essential parts of key industries.

	
Glass roll SUH660, Super12Cr	Printing roll SUS410
	
Nonmagnetic roll for continuous caster SUH660	Parts for centrifugal separator SUS317L, SUS329J4L

1.3.1 造船ship

Diesel engine exhaust valves for ships combine the different characteristics of wear resistance on the outer side and high temperature resistance on the inner side, while using the same high corrosion resistance material. This was made possible by the excellent cooperation between the large forging machine and the radial forging machine of which Daido Steel is proud.

Due to our original technology and reliability, our domestic share is 100%. We also have approximately a 60% share of the world market. Daido Steel’s ship products that excel in corrosionresistance and heat resistance sail the oceans of the world.

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