Special Alloy Steel (Cast) Valves

KITZ CORPORATION

Approach to Corrosive Environment

KITZ High Corrosion Resistant Material

Special Alloy Steel

Customers with corrosion concern might be looking for following material.

Higher corrosion resistant material than current valve material at lower cost.

Valve material with longer valve replacement period to reduce maintenance cost.

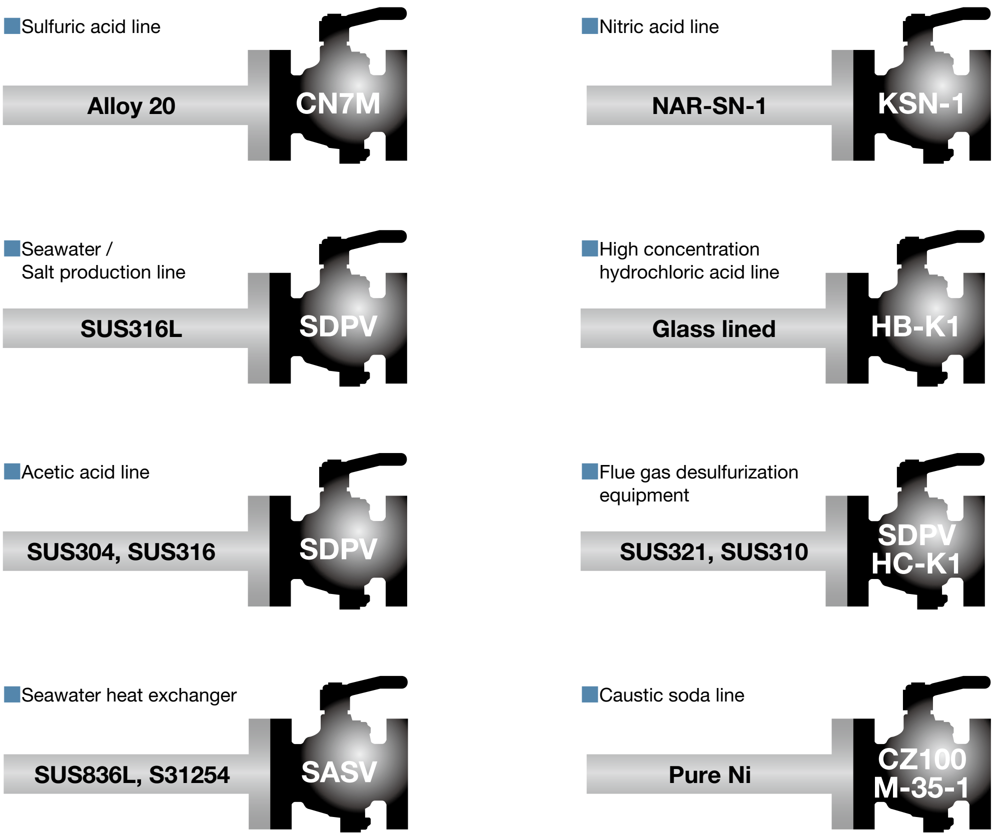
KITZ can supply customers with high corrosion resistant material to fit their corrosive environments by material selection based on own corrosion test data from wide range of lineups from stainless steel casting to high nickel alloy steel casting.

KITZ can meet customers' requirements with producing even 1piece of high nickel alloy valve at own casting facilities.

CONTENTS

1. KITZ Selects Proper Valve Material from Piping Material and Operating Environment.

Valve Material Selection Example



Point in selecting valve material

- Valves have more gaps than pipes.
- Valves have higher crevice corrosion risk than pipes.

It is required to select higher corrosion resistant valves than pipes depending on operating environment.

2. Is Cost Too High with the Valve Material Selection ?

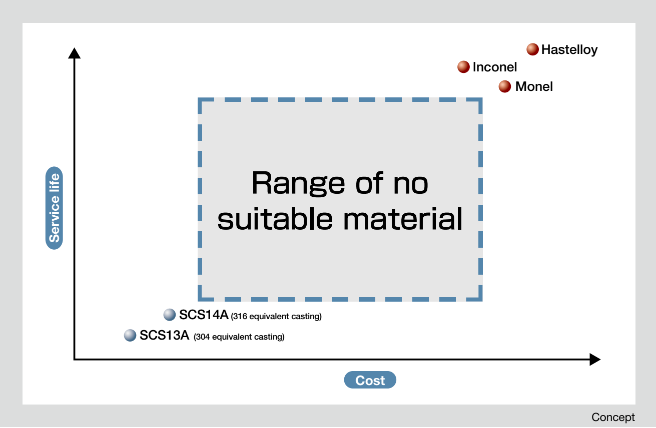
When you select valve material until now …?

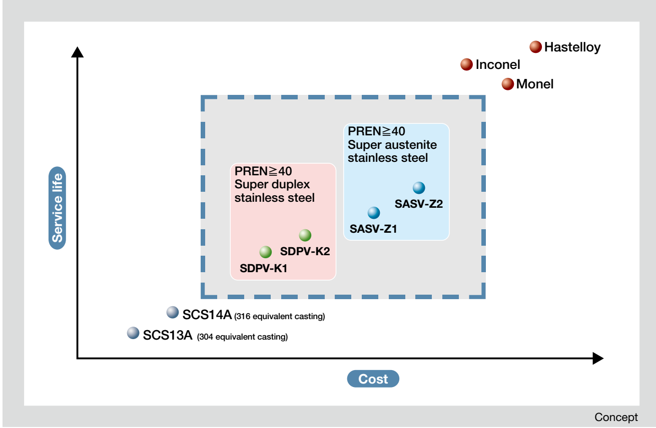
You had to select much higher cost material than SCS13A or SCS14A.

KITZ has wide variety of material to be selected.

KITZ collected wide variety of valve material.

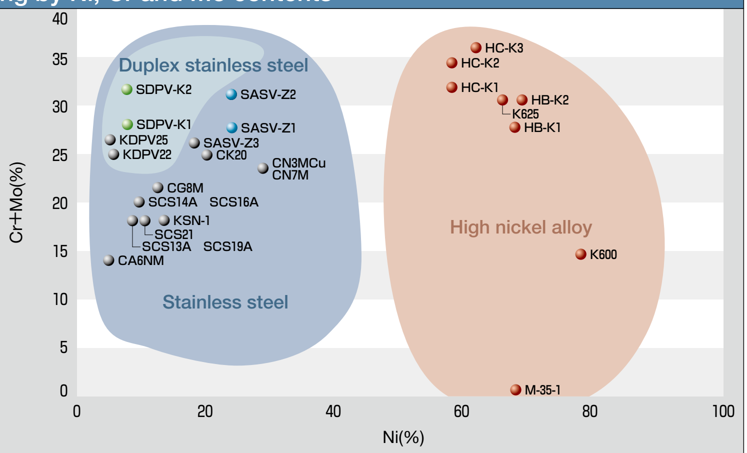
You can select material with high corrosion resistance at reasonable cost.





Material positioning by Ni, Cr and Mo contents

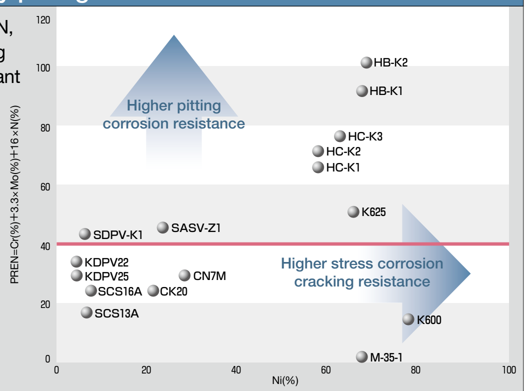
The more Ni, Cr and Mo contents, the more expensive material



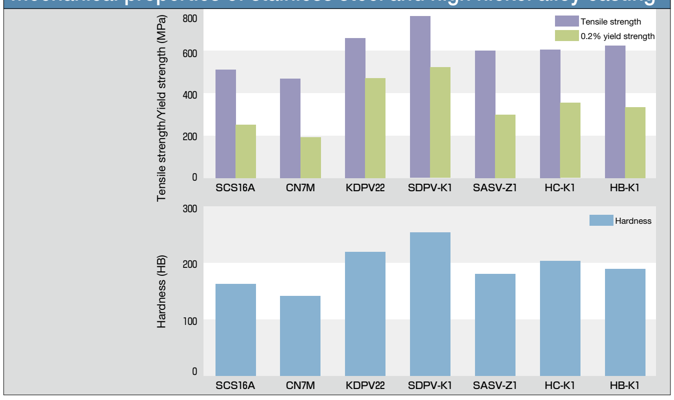
3. Material Positioning by Characteristics

Positioing by pitting corrosion resistance

The higher PREN, the higher pitting corrosion resistant material



Mechanical properties of stainless steel and high nickel alloy casting



PREN : Pitting Resistance Equivalent Number

PREN = Cr(%) + 3.3xMo(%) + 16xN(%) PREN is digitized pitting corrosion resistance.

●The higher PREN, the higher pitting corrosion resistant material. ●Material with PREN≧40 has "Super" as capital letter.

4. KITZ Valve Advantages

1 Quality

Integrated production from casting (material) with own casting facilities.

2 Variety

Wide range of material lineups from stainless steel to high nickel alloy casting.

3 Flexibility

Flexibility to produce even 1piece of special stainless steel and high nickel alloy valve.

4 Economy

The most suitable material valve can be offered for specific operating environment based on our internal corrosion test data.

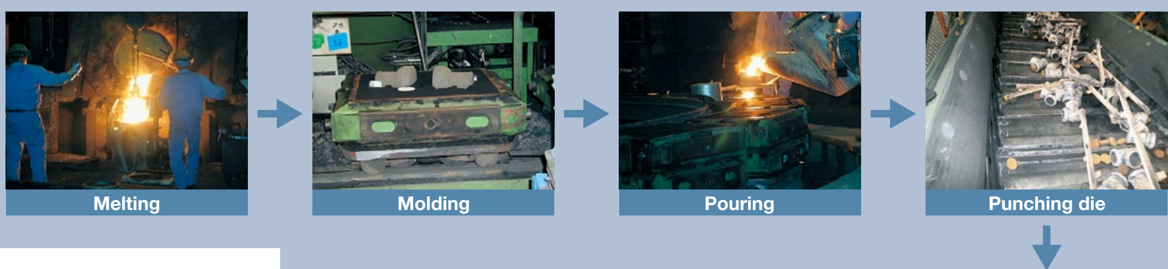
5. Production Location

Nagasaka Plant

Manufacturing plant exclusively for stainless steel to high nickel alloy cating valves.

6. Production Engineering

1 Melting/Casting Process



2 Point of Production Engineering

Casting plan
Solidification simulation

Melting
SRP furnace (KITZ original)
Stainless Refining Process

Heat treatment
EMF (Furnace exclusive for special stainless steel and high nickel alloy casting)
Exotic Material Furnace

7. Material List of KITZ Stainless Steel and High Nickel Alloy Steel Casting

Classification		KITZ material		Major components	Standard													
					Casting			Equivalent other than casting and forging			Chemical components (Wt%)							
General	KITZ	Name	Symbol		JIS	ASTM	UNS-No.	JIS	ASTM	UNS-No.	C	Si	Mn	P	S	Ni	Cr	Mo
Iron-based alloy	Standard material	**Austenitic stainless steel casting**																
		SCS13		18Cr-8Ni	SCS13A	-	-	SUS 304	-	-	~0.08	~2.00	~1.50	~0.040	~0.040	8.00~11.00	18.00~21.00	-
					-	A351 Gr.CF8	J92600		A312 304	S30400	~0.08	~2.00	~1.50	~0.040	~0.040	8.0~11.0	18.0~21.0	~0.50
		SCS19	V	18Cr-8Ni-LC[1]	SCS19A	-	-	SUS 304L	-	-	~0.03	~2.00	~1.50	~0.040	~0.040	8.00~12.00	17.00~21.00	-
					-	A351 Gr.CF3	J92500	-	A312 304L	S30403	~0.03	~2.00	~1.50	~0.040	~0.040	8.0~12.0	17.0~21.0	~0.50
		SCS14	M	18Cr-9Ni-2Mo	SCS14A	-	-	SUS 316	-	-	~0.08	~1.50	~1.50	~0.040	~0.040	9.00~12.00	18.00~21.00	2.00~3.00
					-	A351 Gr.CF8M	J92900	-	A312 316	S31600	~0.08	~1.50	~1.50	~0.040	~0.040	9.0~12.0	18.0~21.0	2.0~3.0
		SCS16	O	18Cr-9Ni-2Mo-LC[1]	SCS16A	-	-	SUS 316L	-	-	~0.03	~1.50	~1.50	~0.040	~0.040	9.00~13.00	17.00~21.00	2.00~3.00
					-	A351 Gr.CF3M	J92800		A312 316L	S31603	~0.03	~1.50	~1.50	~0.040	~0.040	9.0~13.0	17.0~21.0	2.0~3.0
	Special material	**SCS21**	CB	18Cr-10Ni-Nb	SCS21	-	-	SUS 347	-	-	~0.08	~2.00	~2.00	~0.040	~0.040	9.00~12.00	18.00~21.00	-
					-	A351 Gr.CF8C	J92710	-	A312 347	S34700	~0.08	~2.00	~1.50	~0.040	~0.040	9.0~12.0	18.0~21.0	~0.50
		CG8M	CG	18Cr-12Ni-3.5Mo	-	A351 Gr.CG8M	J93000	SUS 317	A312 317	S31700	~0.08	~1.50	~1.50	~0.040	~0.040	9.0~13.0	18.0~21.0	3.0~4.0
		CG3M	GM	18Cr-12Ni-3.5Mo-LC[1]	-	A351 Gr.CG3M	J92999	SUS 317L	A312 317L	S31703	~0.03	~1.50	~1.50	~0.040	~0.040	9.0~13.0	18.0~21.0	3.0~4.0
		KSN-1	SN	18Cr-13Ni-4.5Si	-	-	-	-	-	-	KITZ original material (no public standard)							
		CN7M	CN	21Cr-29Ni-2.5Mo-3.5Cu	SCS23	-	-	-	-	-	~0.07	~2.00	~2.00	~0.040	~0.040	27.50~30.00	19.00~19.9	2.00~3.00
					-	A351 Gr.CN7M	J95150	-	B474 N08020	N08020	~0.07	~1.50	~1.50	~0.040	~0.040	27.5~30.5	19.0~19.9	2.0~3.0
		CN3MCu	3M	21Cr-29Ni-2.7Mo-3.2Cu-LC[1]	SCS23 equiv.	A990 Gr.CN3MCu	-	-	-	-	~0.03	~1.00	~1.50	~0.030	~0.015	27.5~30.5	19.0~22.0	2.0~3.0
		CK20	CK	25Cr-20Ni	SCS18	-	-	SUS 310S	-	-	~0.20	~2.00	~2.00	~0.040	~0.040	19.00~22.00	23.00~27.00	-
					-	A351 Gr.CK20	J94202	-	A312 310S	S31008	0.04~0.20	~1.75	~1.50	~0.040	~0.040	19.0~22.0	23.0~27.0	~0.50
		Super austenitic stainless steel casting		High corrosion resistance with PREN≧40														
		SASV-Z1	SA	21Cr-24Ni-6.5Mo-N	-	A351 Gr.CN3MN	-	SUS 836L	B690 N08367	N08367	~0.03	~1.00	~2.00	~0.040	~0.010	23.5~25.5	20.0~22.0	6.0~7.0
		SASV-Z2	SA	25Cr-24Ni-6.5Mo-N	-	A351 Gr.CN3MN mod.	-	-	-	-	KITZ original material (no public standard)							
		SASV-Z3	SA	20Cr-18Ni-6.5Mo-N-Cu	-	A351 Gr.CK3MCuN	J93254	-	A312 S31254	S31254	~0.025	~1.00	~1.20	~0.045	~0.010	17.5~19.5	19.5~20.5	6.0~7.0
		Duplex stainless steel casting		High hardness and high corrosion resistance with PREN=30~40, ferrite≒50% and austenite≒50														
		KDPV22	4A	22Cr-5Ni-3Mo-N	-	A995 Gr.4A、CD3MN	J92205	SUS 329J3L	A790 S31803	S31803	~0.03	~1.00	~1.50	~0.040	~0.020	4.5~6.5	21.0~23.5	2.5~3.5
		KDPV25	1B	25Cr-5Ni-2Mo-3Cu-N	-	A995 Gr.1B、CD4MCuN	J93372	-	-	-	~0.040	~1.00	~1.00	~0.040	~0.040	4.7~6.0	24.5~26.5	1.70~2.30
		Super duplex stainless steel casting		High hardness and high corrosion resistance with PREN≧30~40, ferrite≒50% and austenite≒50														
		SDPV-K1	SD	25Cr-7Ni-3Mo-N	SCS10 equiv.	-	-	SUS 329J4L	A790 S32750	S32750	~0.03	~1.50	~1.50	~0.040	~0.030	4.50~8.50	21.00~26.00	2.50~4.00
		SDPV-K2	SD	28Cr-7Ni-4Mo-N	SCS10 mod.	-	-	-	-	-	KITZ original material (no public standard)							
		SDPV-K3	SD	25Cr-7Ni-3Mo-Cu-N-W	-	A890(995)Gr.6A、CD3MWCuN	J93380	-	A790 S32750	S32750	~0.030	~1.00	~1.00	~0.030	~0.025	6.5~8.5	24.0~26.0	3.0~4.0
		SDPV-K4	SD	25Cr-7Ni-4Mo-N	-	A890(995)Gr.5A、CE3MN	J93404	SUS 327L1	A790 S32750	S32750	~0.030	~1.00	~1.50	~0.040	~0.040	6.0~8.0	24.0~26.0	4.0~5.0
Nickel-based alloy	Special material	**Ni-Cu alloy casting**		Ni casting with 30% Cu														
		M-35-1	NC	67Ni-30Cu	NCuC	A494 Gr.M-35-1	N24135	-	B163 N04400	N04400	~0.35	~1.25	~1.50	~0.030	~0.030	Balance	-	-
		Ni-Cr alloy casting		Ni casting with 15% Cr														
		K600	CY	78Ni-15Cr-5Fe	NCrFC	A494 Gr.CY40	N06040	-	B166 N06600	N06600	~0.40	~3.00	~1.50	~0.030	~0.020	Balance	14.0~17.0	-
		Ni-Mo alloy casting		Ni casting with Mo with high corrosion resistance to reducing acid														
		HB-K1	HB	67Ni-28Mo-5Fe	NMC	A494 Gr.N12MV	N30012	-	B335 N10001	N10001	~0.12	~1.00	~1.00	~0.040	~0.030	Balance	~1.00	26.0~30.0
		HB-K2	HB	68Ni-31Mo-1Fe	-	A494 Gr.N7M	N30007	-	B335 N10665	N10665	~0.07	~1.00	~1.00	~0.040	~0.030	Balance	~1.00	30.0~33.0
		Ni-Cr-Mo alloy casting		Ni casting with Cr and Mo with high corrosion resistance to oxidizing acid and reducing acid														
		HC-K1	HC	58Ni-16Cr-16Mo-6Fe-4W	NMCrC	A494 Gr.CW12MW	N30002	-	B574 N10276	N10276	~0.12	~1.00	~1.00	~0.040	~0.030	Balance	15.5~17.5	16.0~18.0
		HC-K2	HC	58Ni-21Cr-14Mo-4Fe-3W	-	A494 Gr.CX2MW	N26022	-	B574 N06022	N06022	~0.02	~0.80	~1.00	~0.025	~0.025	Balance	20.0~22.5	12.5~14.5
		HC-K3	HC	62Ni-17Cr-17Mo-2Fe	-	A494 Gr.CW6M	N10002	-	-	-	~0.07	~1.00	~1.00	~0.040	~0.030	Balance	17.0~20.0	17.0~20.0
		HC-K4	HC	64Ni-16Cr-16Mo-1Fe	-	A494 Gr.CW2M	N26455	-	B574 N06455	N06455	~0.02	~0.08	~1.00	~0.030	~0.020	Balance	15.0~17.5	15.0~17.5
		K625	CW	65Ni-22Cr-9Mo-3.5Nb	-	A494 Gr.CW6MC	N26625	-	B446 N06625	N06625	~0.06	~1.00	~1.00	~0.015	~0.015	Balance	20.0~23.0	8.0~10.0
		K825	CU	43Ni-22Cr-3Mo-30Fe-Nb	-	A494 Gr.CU5MCuC	N08826	-	B425 N08825	N08825	~0.050	~1.00	~1.00	~0.030	~0.030	38.0~44.0	19.5~23.5	2.5~3.5
		Ni casting																
		CZ-100	CZ	97Ni	-	A494 Gr.CZ100	N02100	-	B160 N02200	N02200	~1.00	~2.00	~1.50	~0.030	~0.030	95.0~	-	-

Remarks
1. Materials mentioned above are applicable to cast body, bonnet, cover and body cap only.
2. (1) C≦0.03 mass%.
3. (2) PREN is digitized pitting corrosion resistance (PREN = Cr% + 3.3xMo% + 16xN%). The higher PREN, the higher pitting corrosion resistant material. Material with PREN≧40 has "Super" as capital letter.
4. SDPV/SASV/KSN are KITZ' trademarks.
5. NAR is Nippon Steel's trademark. 254SMO is Avesta Sheffield's trademark. SAF 2205/2507 are Sandvik's trademarks. Monel/Inconel/Incoloy/Nickel 200 are Special Metals' trademarks. Hastelloy is Haynes International's trademark.

Cu	Fe	V	W	N	PREN (2)	Mechanical properties: Tensile strength (N/mm²)	Mechanical properties: Yield strength (N/mm²)	Mechanical properties: Elongation (%)	Characteristics	Application	Equivalent (Trademark)
-	Balance	-	-	-	-	480~	205~	33~	High corrosion resistance to nitric acid, phosphoric acid and organic acid. Less corrosion resistance to sulfuric acid.	For corrosion resistance required process at various plants	-
-	Balance	-	-	-	-	485~	205~	35~			
-	Balance	-	-	-	-	480~	205~	33~	Upgraded intergranular corrosion resistance type of SCS13A.	For intergranular corrosion resistance process of SCS13A	-
-	Balance	-	-	-	-	485~	205~	35~			
-	Balance	-	-	-	-	480~	205~	33~	High corrosion resistance to environments other than hydrochloric acid, hydrofluoric acid, high temperature and high concentration of sulfuric acid and phosphoric acid.	For severer environments than SCS13A process	-
-	Balance	-	-	-	-	485~	205~	30~			
-	Balance	-	-	-	-	480~	205~	33~	Upgraded intergranular corrosion resistance type of SCS14A.	For intergranular corrosion resistance process of SCS14A	-
-	Balance	-	-	-	-	485~	205~	30~			
-	Balance	(Nb=10×C%~1.35)			-	480~	205~	28~	Higher intergranular corrosion resistance than SCS13A with stabilized carbide by adding Nb.	For hydrogenation desulfurizing equipment	-
-	Balance	(Nb= 8×C%~1.00)			-	485~	205~	30~			
-	Balance	-	-	-	-	515~	240~	25~	Upgraded pitting corrosion resistance and crevice corrosion resistance type of SCS14A.	For acetic acid process	-
-	Balance	-	-	-	-	515~	240~	25~	Upgraded intergranular corrosion resistance type of CG8M.	For intergranular corrosion resistance process of CG8M	-
						480~	230~	10~	High corrosion resistance to total concentration of nitric acid and fuming nitric acid environments.	For nitric acid process	NAR®-SN-1
3.00~4.00	Balance	-	-	-	-	390~	165~	30~	High corrosion resistance to all concentration of sulfuric acid below 60 degree C and heated solution of dilute oxide.	For sulfuric acid (the most common)	-
3.0~4.0	Balance	-	-	-	-	425~	170~	35~			
3.0~3.5	Balance	-	-	-	-	425~	170~	35~	Higher sulfuric acid corrosion resistance than CN7M with 95% or more of refined material such as AOD and VOD.	Longer life type of CN7M	-
-	Balance	-	-	-	-	450~	195~	28~	Higher Cr and Ni than SCS13A and used in environments such as sulfurous acid solution and nitric acid at room temperature.	For low concentration of alkali and nitric acid process	-
-	Balance	-	-	-	-	450~	195~	30~			
~0.75	Balance	-	-	0.18~0.26	45~	550~	260~	35~	The highest acid resistance and alkali resistance among general austenitic stainless steel. High pitting corrosion resistance and crevice corrosion resistance to chloride solution such as seawater.	Higher grade than SDPV (less hardness)	-
					50~	550~	260~	20~	Higher pitting factor than SASV-Z1 with high Cr and suitable for seawater resistant environments at high temperature.	Higher grade than SDPV (the highest grade SASV)	-
0.50~1.00	Balance	-	-	0.18~0.24	40~	550~	260~	35~	Steel corresponding to AVESTA 254SMO which is commonly used in the world.	Higher grade than SDPV (less hardness)	254SMO®
~1.00	Balance	-	-	0.10~0.30	-	620~	415~	25~	Higher SCC resistance and pitting corrosion resistance in intermediate concentration of chloride environments. Higher general corrosion resistance to environments such as dilute sulfuric acid and phosphoric acid.	For seawater environments and oil well (mild environments such as North Sea oil well)	SAF 2205®
2.7~3.3	Balance	-	-	0.10~0.25	-	690~	485~	16~	Suitable for nitric acid in oxidizing environments and sulfuric acid in reducing environments with higher addition of Cr and Cu than KDPV22.	For seawater environments and oil well sulfuric acid process	-
-	Balance	-	-	0.08~0.30	40~	620~	390~	15~	Higher SCC resistance than austenitic stainless steel and higher weldability than ferritic stainless steel. High mechanical strength and higher acid resistance, pitting corrosion resistance and crevice corrosion resistance than SCS16A.	For seawater environments, oil well and seawater desalination process (domestic)	-
					45~	620~	390~	15~	KITZ originally developed, the highest pitting factor among SDPV series and suitable for high temperature seawater environments. Suitable for methionine process in oxidizing environments with high Cr.	For seawater desalination process (the highest grade duplex stainless steel)	-
0.5~1.0	Balance	-	0.5~1.0	0.20~0.30	40~	700~	450~	25~	Used for overseas seawater desalination process.	For seawater environments, oil well and seawater desalination process (overseas)	-
-	Balance	-	-	0.10~0.30	40~	690~	515~	18~	Higher PREN than SDPV-K1 and K3 with high mechanical strength.	For seawater environments, oil well and seawater desalination process (overseas) (higher grade than SDPV-K3)	SAF 2507®
26.0~33.0	~3.5	(Nb= ~0.5)			-	450~	170~	25~	High corrosion resistance in reducing environments without local corrosion and insensitive to SCC by Cl^-.	For intermediate concentration of alkali and pure oxygen	Monel®400
-	~11.0	-	-	-	-	485~	195~	30~	High oxidation resistance at high temperature to oxidizing acid such as nitric acid. High SCC resistance by Cl^- and high corrosion resistance to high pure water and alkali.	For high temperature process and intermediate concentration of alkali	Inconel®600
-	4.0~6.0	0.20~0.60	-	-	-	525~	275~	6~	Corrosion resistant to hydrochloric acid at all concentrations to boiling point. Corrosion resistant to reducing acid such as sulfuric acid up to 60%, phosphoric acid and cupric chroide. High temperature resistant but not suitable for strong oxidizing environments such as nitric acid.	For high concentration of hydrochloric acid process (not suitable for nitric acid)	Hastelloy®B
-	~3.0	-	-	-	-	525~	275~	20~	High corrosion resistance at welded part with high weldability.	Higher grade type of HB	Hastelloy®B2
-	4.5~7.5	0.20~0.40	3.75~5.25	-	-	495~	275~	4~	High corrosion resistance in oxidizing environments such as wet chlorine gas and chlorine dioxide. High corrosion resistance to organic acid and salt such as acetic acid and seawater.	For seawater environments, oil well (high concentration of H_2S) and flue gas desulfurization process (not suitable for nitric acid)	Hastelloy®C276
-	2.0~6.0	~0.35	2.5~3.5	-	-	550~	310~	30~	High corrosion resistance in oxidizing environments by high Cr and low Mo with improved mechanical properties.	For mixed acid (sulfuric acid and nitric acid) Improved type of HC-K1	Hastelloy®C22
-	~3.00	-	-	-	-	495~	275~	25~	High corrosion resistance in oxidizing environments and reducing environments by high Cr and low Mo. Commonly used overseas.	Intermediate material between HC-K1 and HC-K2	-
-	~2.0	-	~1.0	-	-	495~	275~	20~	Equivalent material to HC-K1 and commonly used overseas.	Inexpensive type of HC-K1	Hastelloy®C4
-	~5.0	(Nb=3.15~4.50)			-	485~	275~	25~	High corrosion resistance in oxidizing environments at high temperature. High corrosion resistance in erosive environments.	For high temperature process, seawater environments and oil well (high concentration of H_2S)	Inconel®625
1.5~3.5	Balance	(Nb=0.60~1.20)			-	520~	240~	20~	High SCC resistance and crevice corrosion resistance to sulfuric acid and phosphoric acid.	For high temperature process, seawater environments and oil well	Incoloy®825
~1.25	~3.00	-	-	-	-	345~	125~	10~	High corrosion resistance to alkali hydroxide solution and fused alkali such as sodium hydroxide and kalium hydroxide.	For high concentration of alkali (for caustic soda)	Nickel 200®

8. Corrosion Resistance Evaluation of Material under Corrosive Environment

These evaluations are average values of laboratory test data and do not guarantee any maximum or minimum values and corrosion resistnace in the actual environment.

◉ Corrosion rate<0.127mm/year (5mpy)
● Corrosion rate<0.508mm/year(20mpy)
▲ Corrosion rate≧0.508mm/year

Ferric Chloride Crevice Corrosion Test (12.7% $FeCl_3 \cdot 6H_2O$:Temperature30℃)

Corrosion evaluation	SCS14A	SCS16A	CN7M	SASV-Z1	SDPV-K1	SDPV-K2	HC-K1
Corrosion rate	▲	▲	▲	◉	◉	◉	◉
Number of crevice corrosion	40/40	40/40	39/40	0/40	14/40	2/40	0/40

Hydrochloric Acid

Concentration	Temperature	SCS13A	SCS16A	CN7M	SASV-Z1	SDPV-K1	HB-K1	HC-K1
5%	Boiling	▲	–	–	▲	●	–	–
10%	Boiling	–	–	–	▲	–	◉	●
20%	40	–	◉	◉	◉	◉	◉	◉
	80℃	▲	▲	▲	◉	◉	◉	◉
40%	40℃	–	◉	◉	◉	◉	◉	◉
	80℃	▲	▲	●	▲	▲	◉	◉
60%	40℃	–	▲	◉	◉	◉	◉	◉
	60℃	▲	–	◉	●	▲	–	–
	80℃	–	▲	●	●	▲	◉	●
80%	40℃	▲	▲	●	●	▲	◉	◉
	80℃	–	▲	▲	▲	▲	◉	●
98%	40℃	●	◉	◉	◉	◉	–	–
	80℃	▲	▲	▲	▲	▲	◉	◉

Caustic Soda

Concentration	Temperature	M-35-1
20%	Boiling	◉
40%	100℃	◉
	Boiling	◉
60%	100℃	◉
	Boiling	◉
80%	100℃	◉
	150℃	●
	Boiling	●

Chlorine Dioxide

Concentration	Temperature	SCS14A	SASV-Z1	SDPV-K1	HB-K1	HC-K1	TI
2000ppm	95℃	●	●	●	▲	◉	◉

Sulfuric Acid

Concentration	Temperature	SCS13A	SASV-Z1	SDPV-K1	HB-K1	HC-K1	K625
0.5%	Boiling	▲	◉	◉	–	–	–
1.0%	60℃	–	–	◉	–	–	–
	Boiling	▲	–	▲	◉	●	▲
1.5%	60℃	–	◉	◉	–	–	–
	80℃	▲	–	▲	–	◉	◉
	Boiling	–	▲	▲	◉	–	–

Formic Acid

Concentration	Temperature	SCS14A	CN7M	SASV-Z1	SDPV-K1
40%	Boiling	▲	●	●	◉
60%		▲	●	▲	◉
80%		●	●	▲	▲

Acetic Acid

Concentration	Temperature	SCS14A	CN7M	SASV-Z1	SDPV-K1	HC-K1	HC-K2
10%	Boiling	–	◉	◉	◉	–	◉
20%		◉	◉	–	◉	◉	–
40%		◉	◉	–	◉	◉	–
50%		–	◉	◉	◉	–	◉
60%		◉	◉	–	◉	◉	–
80%		◉	◉	–	◉	◉	–
99.5%		–	◉	◉	◉	–	◉

Lactic Acid

Concentration	Temperature	SCS16A	SASV-Z1	SDPV-K1	HC-K1
90%	150℃	▲	●	◉	◉
	200℃	▲	▲	●	●

Acetic Acid with Hydrogen Bromide (HBr:1000ppm)

Concentration	Temperature	SCS16A	CN7M	SDPV-K1	M-35-1	HB-K1	HC-K2	K625
99.5%	120℃	▲	▲	▲	▲	◉	●	●
	150℃	▲	▲	▲	▲	◉	●	●
	183℃	▲	▲	▲	▲	◉	▲	▲

Test condition	Test solution	Concentration	Temperature	Permeation period
A	H_2SO_4	40%	80℃	24hr
B		60%		

General Corrosion Test Example

KITZ material name	SCS16A	SDPV-K1	SASV-Z1	CN7M	HC-K1	HB-K1
Standards / Test condition	JIS G5121 SCS 16A	JIS G5121 SCS 10	–	JIS G5121 SCS 23	JIS H5701 NMCrC	JIS H5701 NMC
	ASTM A351 CF3M	–	ASTM A351 CN3MN	ASTM A351 CN7M	ASTM A494 CW-12MW	ASTM A494 N-12MV
	UNS J92800	–	–	UNS J95150	UNS N30002	UNS N30012
A H_2SO_4:40%、80℃						
B H_2SO_4:60%、80℃						

9. KITZ Special Alloy Steel Valve Production Range

Actual production record and available.

No actual production record and will be available upon advanced consultation.

A series are available.
C series will be available upon advanced consultation.

No casting pattern and new pattern production is required.

KITZ material: Name	KITZ material: Symbol	Standard: JIS	Standard: ASTM	Type	Size A (B) / Class	15 (1/2)	20 (3/4)	25 (1)	32 (1 1/4)	40 (1 1/2)	50 (2)	65 (2 1/2)	80 (3)	100 (4)	125 (5)	150 (6)	200 (8)	250 (10)	300 (12)	350 (14)	400 (16)	450 (18)	500 (20)	600 (24)
SCS21	CB	G5121 SCS21	A351 Gr.CF8C	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
CG8M CG3M SCS13 SCS14	CG GM 13 M	– – G5121 SCS13A G5121 SCS14A	A351 Gr.CG8M A351 Gr.CG3M A351 Gr.CF8 A351 Gr.CF8M	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
KSN-1	SN	–	–	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
CN7M CN3MCu	CN 3M	G5121 SCS23 –	A351 Gr.CN7M A990 Gr.CN3MCu	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
CK20	CK	G5121 SCS18	A351 Gr.CK20	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					6010																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
SDPV-K1 SDPV-K2 SDPV-K3 SDPV-K4	SD SD SD SD	G5121 SCS10 G5121 SCS10 mod. – –	– – A995 Gr.6A, CD3MWCuN A995 Gr.5A, CE3MN	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
SASV-Z1 SASV-Z2 SASV-Z3	SA SA SA	– – –	A351 Gr.CN3MN A351 Gr.CN3MN mod. A351 Gr.CK3MCuN	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
HB-K1	HB	H5701 NMC	A494 Gr.N12MV	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			
HC-K1 HC-K2	HC HC	H5701 NMCrC –	A494 Gr.CW12MW A494 Gr.CX2MW	Gate valve	10K/Class150																			
					20K/Class300																			
					600																			
				Globe valve	10K/Class150																			
					20K/Class300																			
					600																			
				Check valve	10K/Class150																			
					20K/Class300																			
					600																			
				Ball valve	10K/Class150																			
					20K/Class300																			
					600																			

Notes
1. Applicable valve types are A series and C series stainless steel valves as gate, globe and check valves and floating flanged valves as ball valves. Consult KITZ for trunnion mounted flanged ball valves individually. Consult KITZ for production range of other type valves such as butterfly valves individually. Consult KITZ for production range of other materials of the above individually.
2. Consult KITZ for production range of SDPV-K2 and SDPV-K4 individually.
3. SDPV, SASV and KSN are KITZ trademark.

Memo

10. KITZ Special Alloy Steel Valve Range of Use

Pressure/Temperature Rating (P/T Rating)

The valve material strength changes by the temperature, which determines maximum allowable pressure of the valve.
Pressure/temperature rating shows relationship between valve temperature and maximum allowable pressure to be used.
The relationship is established in JIS B2220 (Steel pipe flanges) and JIS B2071 (Steel flanged valves) by material and structure.
The rating is defined in ANSI/ASME B16.34 (Valves-Flanged, Threaded and Welding End) as PRESSURE-TEMPERATURE RATING in USA.
It is also defined in JPI 7S-65 as steel valve pressure-temperature standatd.
These standards categorize many materials to be used by their properties and define maximum allowable pressure from ambient to high temperature.
It is required to select valves which meet operating conditions from the pressure/temperature rating with economical efficiency.

10-1. Pressure/Temperature Rating (JIS 10K/20K)

Size						10K							20K								
Material						Operating temperature															
Type	KITZ Name	KITZ Symbol	JIS	ASTM	℃	~120	220	260	300	350	400	425	~120	220	260	300	316	325	350	400	425
Iron-based alloy	Austenitic stainless steel casting																				
	SCS21	CB	SCS21	A351 Gr.CF8C	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	CG8M	CG	—	A351 Gr.CG8M	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	CG3M	GM	—	A351 Gr.CG3M	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	KSN-1	SN	—	—	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	CN7M	CN	SCS23	A351 Gr.CN7M	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9		2.8	—	—	—
	CN3MCu	3M	SCS23 equiv.	A990 Gr.CN3MCu	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9		2.8	—	—	—
	CK20	CK	SCS18	A351 CK20	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	Super austenitic/duplex/super duplex stainless steel casting																				
	SASV-Z1	SA	—	A351 Gr.CN3MN	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	KDPV22	4A	—	A995 Gr.4A、CD3MN	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	—	—
	SASV-Z2 SDPV-K1 SDPV-K2 SDPV-K4	SA SD SD SD	— SCS10 equiv. SCS10 mod. —	— — — A995 Gr.5A、CE3MN	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9	2.8	—	—	—	—
	SASV-Z3 KDPV 25 SDPV-K3	SA 1B SD	— — —	A351 Gr.CK3MCuN A995 Gr.1B、CD4MCuN A995 Gr.6A、CD3MWCuN	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	—
Nickel-based alloy	Ni-Cu/Ni-Cr/Ni-Mo/Ni-Cr-Mo alloy casting																				
	M-35-1	NC	NCuC	A494 Gr.M35-1	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	K600 K625	CY CW	NCrFC —	A494 Gr.CY40 A494 Gr.CW6MC	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	HB-K1 HC-K1	HB HC	NMCN MCrC	A494 Gr.N12MV A494 Gr.CW12MW	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	HB-K2 HC-K3	HB HC	— —	A494 Gr.N7M A494 Gr.CW6M	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	HC-K2 HC-K4	HC HC	— —	A494 Gr.CX2MW A494 Gr.CW2M	MPa	1.4	1.2	1.1	—	—	—	—	3.4	3.1	3.0	—	—	—	—	—	—
	K825	CU	—	A494 Gr.CU5MCuC	MPa	1.4	1.2		1.0	—	—	—	3.4	3.1		2.9			2.6	2.3	2.0
	Ni casting																				
					℃	−29 ~38	93	149	204	260	300	316	−29 ~38	93	149	204	260	316			
	CZ-100	CZ	—	A494 Gr.CZ100	MPa	1.13	1.10	1.03	1.03	0.99	0.97	—	2.99	2.89	2.75	2.75	2.62	2.55			

Notes
1. The above chart does not indicate JIS/ASME standards the latest values.
2. The range of use may be limited by valve structures and specifications.
It is required to consider operating temperature of packing and gasket and seat rating of ball seat.

10-2. Pressure/Temperature Rating (ASME Class 150/300)

Class	Type	Material: KITZ Name	Material: KITZ Symbol	Material: ASTM	Operating temperature ˚C	-29~38	-28.9~37.8	50	93	100	149	150	200	204	250	260	300	316	325		350		375		400	425
					˚F	-20.2~100.4	-20~100	122	200	212	300	302	392	400	482	500	572	600	617	650	662	700	707	750	752	797
150	Iron-based alloy	Austenitic stainless steel casting																								
		SCS21※4	CB	A351 Gr.CF8C	bar	19.0		18.7		17.4		15.8	13.8		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.90		1.87		1.74		1.58	1.38		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		275		255		230			200		170		140		125		110		95		
		CG8M	CG	A351 Gr.CG8M	bar	19.0		18.4		16.2		14.8	13.7		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.90		1.84		1.62		1.48	1.37		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		275		235		215			195		170		140		125		110		95		
		CG3M	GM	A351 Gr.CG3M	bar	19.0		18.4		16.2		14.8	13.7		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.90		1.84		1.62		1.48	1.37		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		275		235		215			195		170		140		125		110		95		
		KSN-1	SN	—	bar	19.0		18.3		15.7		14.2	13.2		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.90		1.83		1.57		1.42	1.32		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		275		230		205			190		170		140		125		110		95		
		CN7M	CN	A351 Gr.CN7M	bar	15.9		15.4		13.5		12.3	11.3		10.4		9.7		9.3							
					MPa※1	1.59		1.54		1.35		1.23	1.13		1.04		0.97		0.93	—	—	—	—	—	—	—
					psi※2		230		200		180			160		150		140								
		CN3MCu	3M	A990 Gr.CN3MCu	bar	15.9		14.6		10.9		9.9	9.0		8.4		7.9		7.7							
					MPa	1.59		1.46		1.09		0.99	0.90		0.84		0.79		0.77	—	—	—	—	—	—	—
					psi	230.6		211.7		158.1		143.6	130.5		121.8		114.6		111.7							
		CK20※4	CK	A351 CK20	bar	17.8		17.0		14.4		13.4	12.9		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.78		1.70		1.44		1.34	1.29		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		260		210		195			185		170		140		125		110		95		
		Super austenitic/duplex/super duplex stainless steel casting																								
		SASV-Z1	SA	A351 Gr.CN3MN	bar	17.8		17.5		16.3		15.4	13.8		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.78		1.75		1.63		1.54	1.38		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		260		240		225			200		170		140		125		110		95		
		KDPV22	4A	A995 Gr.4A、CD3MN	bar	20.0		19.5		17.7		15.8	13.8		12.1		10.2		9.3		8.4					
					MPa※1	2.00		1.95		1.77		1.58	1.38		1.21		1.02		0.93		0.84	—	—	—	—	—
					psi※2		290		260		230			200		170		140		125	121.8					
		SASV-Z2 SDPV-K1 SDPV-K2 SDPV-K4	SA SD SD SD	— — — A995 Gr.5A、CE3MN	bar	20.0		19.5		17.7		15.8	13.8		12.1		10.2	9.7								
					MPa※1	2.00		1.95		1.77		1.58	1.38		1.21		1.02	0.97	—	—	—	—	—	—	—	—
					psi※2		290		260		230			200		170		140								
		SASV-Z3 KDPV25 SDPV-K3	SA 1B SD	A351 Gr.CK3MCuN A995 Gr.1B、CD4MCuN A995 Gr.6A、CD3MWCuN	bar	20.0		19.5		17.7		15.8	13.8		12.1		10.2		9.3		8.4		7.4		6.5	—
					MPa※1	2.00		1.95		1.77		1.58	1.38		1.21		1.02		0.93		0.84		0.74		0.65	
					psi※2		290		260		230			200		170		140		125		110		95		
	Nickel-based alloy	Ni-Cu/Ni-Cr/Ni-Mo/Ni-Cr-Mo alloy casting																								
		M-35-1	NC	A494 Gr.M35-1	bar	15.9		15.4		13.8		12.9	12.5		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.59		1.54		1.38		1.29	1.25		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		230		200		190			180		170		140		125		110		95		
		K600 K625	CY CW	A494 Gr.CY40 A494 Gr.CW6MC	bar	15.9		15.6		14.5		13.7	13.0		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.59		1.56		1.45		1.37	1.30		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		230		210		200			190		170		140		125		110		95		
		HB-K1 HC-K1	HB HC	A494 Gr.N12MV A494 Gr.CW12MW	bar	15.9		15.6		14.5		13.7	13.0		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.59		1.56		1.45		1.37	1.30		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		230		210		200			190		170		140		125		110		95		
		HB-K2 HC-K3	HB HC	A494 Gr.N7M A494 Gr.CW6M	bar	15.9		15.6		14.5		13.7	13.0		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	1.59		1.56		1.45		1.37	1.30		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		230		210		200			190		170		140		125		110		95		
		HC-K2 HC-K4	HC HC	A494 Gr.CX2MW A494 Gr.CW2M	bar	15.9		15.6		14.5		13.7	13.0		12.1	11.7										
					MPa※1	1.59		1.56		1.45		1.37	1.30		1.21	1.17	—	—	—	—	—	—	—	—	—	—
					psi※2		230		210		200			190		170										
		K825	CU	A494 Gr.CU5MCuC	bar	20.0		19.5		17.7		15.8	13.8		12.1		10.2		9.3		8.4		7.4		6.5	5.5
					MPa※1	2.00		1.95		1.77		1.58	1.38		1.21		1.02		0.93		0.84		0.74		0.65	0.55
					psi※2		290		260		230			200		170		140		125		110		95		
		Ni casting																								
		CZ-100	CZ	A494 Gr.CZ100	bar		11.3		11.0		10.3			10.3		9.9		9.6								
					Mpa		1.13		1.10		1.03			1.03		0.99		0.96	—	—	—	—	—	—	—	—
					psi		165		160		150			150		145		140								
300	Iron-based alloy	Austenitic stainless steel casting																								
		SCS21※4	CB	A351 Gr.CF8C	bar	49.6		48.8		45.3		42.5	39.9		37.8		36.1		35.4		34.8		34.2		33.9	33.6
					MPa※1	4.96		4.88		4.53		4.25	3.99		3.78		3.61		3.54		3.48		3.42		3.39	3.36
					psi※2		720		660		615			575		540		515		505		495		490		
		CG8M	CG	A351 Gr.CG8M	bar	49.6		48.1		42.2		38.5	35.7		33.4		31.6		30.9		30.3		29.9		29.4	29.1
					MPa※1	4.96		4.81		4.22		3.85	3.57		3.34		3.16		3.09		3.03		2.99		2.94	2.91
					psi※2		720		620		560			515		480		450		440		435		425		
		CG3M	GM	A351 Gr.CG3M	bar	49.6		48.1		42.2		38.5	35.7		33.4		31.6		30.9		30.3		29.9		29.4	29.1
					MPa※1	4.96		4.81		4.22		3.85	3.57		3.34		3.16		3.09		3.03		2.99		2.94	2.91
					psi※2		720		620		560			515		480		450		440		435		425		
		KSN-1	SN	—	bar	49.6		47.8		40.9		37.0	34.5		32.5		30.9		30.2		29.6		29.0		28.4	28.0
					MPa※1	4.96		4.78		4.09		3.70	3.45		3.25		3.09		3.02		2.96		2.90		2.84	2.80
					psi※2		720		600		540			495		465		440		430		420		415		
		CN7M	CN	A351 Gr.CN7M	bar	41.4		40.1		35.3		32.0	29.4		27.2		25.4		24.4							
					MPa※1	4.14		4.01		3.53		3.20	2.94		2.72		2.54		2.44	—	—	—	—	—	—	—
					psi※2		600		520		465			420		390		360								
		CN3MCu	3M	A990 Gr.CN3MCu	bar	41.4		38.2		28.4		25.9	23.4		22.0		20.7		20.1							
					Mpa	4.14		3.82		2.84		2.59	2.34		2.20		2.07		2.01	—	—	—	—	—	—	—
					psi	600.3		553.9		411.8		375.6	339.3		319.0		300.2		291.5							
		CK20※4	CK	A351 CK20	bar	46.3		44.5		37.5		34.9	33.5		32.6		31.7		31.2		30.6		29.8		29.1	28.3
					MPa※1	4.63		4.45		3.75		3.49	3.35		3.26		3.17		3.12		3.06		2.98		2.91	2.83
					psi※2		670		550		505			485		470		455		445		435		420		
		Super austenitic/duplex/super duplex stainless steel casting																								
		SASV-Z1	SA	A351 Gr.CN3MN	bar	46.3		45.6		42.5		40.1	37.3		34.9		33.1		32.3		31.6		31.0		30.4	29.8
					MPa※1	4.63		4.56		4.25		4.01	3.73		3.49		3.31		3.23		3.16		3.10		3.04	2.98
					psi※2		670		620		585			540		500		475		460		450		440		
		KDPV22	4A	A995 Gr.4A、CD3MN	bar	51.7		51.7		50.7		45.9	42.7		40.5		38.9		38.2		37.6					
					MPa※1	5.17		5.17		5.07		4.59	4.27		4.05		3.89		3.82		3.76	—	—	—	—	—
					psi※2		750		745		665			615		580		555		545	545.2					
		SASV-Z2 SDPV-K1 SDPV-K2 SDPV-K4	SA SD SD SD	— — — A995 Gr.5A、CE3MN	bar	51.7		51.7		50.7		45.9	42.7		40.5		38.9	38.3								
					MPa※1	5.17		5.17		5.07		4.59	4.27		4.05		3.89	3.83	—	—	—	—	—	—	—	—
					psi※2		750		745		665			615		580		555								
		SASV-Z3 KDPV25 SDPV-K3	SA 1B SD	A351 Gr.CK3MCuN A995 Gr.1B、CD4MCuN A995 Gr.6A、CD3MWCuN	bar	51.7		51.7		50.7		45.9	42.7		40.5		38.9		38.2		37.6		37.4		36.5	—
					MPa※1	5.17		5.17		5.07		4.59	4.27		4.05		3.89		3.82		3.76		3.74		3.65	
					psi※2		750		745		665			615		580		555		545		540		530		
	Nickel-based alloy	Ni-Cu/Ni-Cr/Ni-Mo/Ni-Cr-Mo alloy casting																								
		M-35-1	NC	A494 Gr.M35-1	bar	41.4		40.2		35.9		33.7	32.7		32.6		32.6		32.6		32.6		32.4		32.1	31.6
					MPa※1	4.14		4.02		3.59		3.37	3.27		3.26		3.26		3.26		3.26		3.24		3.21	3.16
					psi※2		600		525		490			475		475		475		475		470		465		
		K600 K625	CY CW	A494 Gr.CY40 A494 Gr.CW6MC	bar	41.4		40.6		37.8		35.9	33.9		32.3		30.7		30.1		29.4		28.7		28.3	27.7
					MPa※1	4.14		4.06		3.78		3.59	3.39		3.23		3.07		3.01		2.94		2.87		2.83	2.77
					psi※2		600		550		520			490		465		440		430		420		410		
		HB-K1 HC-K1	HB HC	A494 Gr.N12MV A494 Gr.CW12MW	bar	41.4		40.6		37.8		35.9	33.9		32.3		30.7		30.1		29.4		28.7		28.3	27.7
					MPa※1	4.14		4.06		3.78		3.59	3.39		3.23		3.07		3.01		2.94		2.87		2.83	2.77
					psi※2		600		550		520			490		465		440		430		420		410		
		HB-K2 HC-K3	HB HC	A494 Gr.N7M A494 Gr.CW6M	bar	41.4		40.6		37.8		35.9	33.9		32.3		30.7		30.1		29.4		28.7		28.3	27.7
					MPa※1	4.14		4.06		3.78		3.59	3.39		3.23		3.07		3.01		2.94		2.87		2.83	2.77
					psi※2		600		550		520			490		465		440		430		420		410		
		HC-K2 HC-K4	HC HC	A494 Gr.CX2MW A494 Gr.CW2M	bar	41.4		40.6		37.8		35.9	33.9		32.3	32.1										
					MPa※1	4.14		4.06		3.78		3.59	3.39		3.23	3.21	—	—	—	—	—	—	—	—	—	—
					psi※2		600		550		520			490		465										
		K825	CU	A494 Gr.CU5MCuC	bar	51.7		51.7		51.5		50.3	48.3		46.3		42.9		41.4		40.3		38.9		36.5	35.2
					MPa※1	5.17		5.17		5.15		5.03	4.83		4.63		4.29		4.14		4.03		3.89		3.65	3.52
					psi※2		750		750		730			700		665		605		590		570		530		
		Ni casting																								
		CZ-100	CZ	A494 Gr.CZ100	bar		29.9		28.9		27.5			27.5		26.2		25.5								
					Mpa		2.99		2.89		2.75			2.75		2.62		2.55	—	—	—	—	—	—	—	—
					psi		435		420		400			400		380		370								

Notes
1. The above chart does not indicate ASME standards the latest values.
2. The range of use may be limited by valve structures and specifications. It is required to consider operating temperature of packing and gasket and seat rating of ball seat.
3. *1 Mpa is equivalent value. 4. *2 Psi is specified value of ASME B16.34 Table Ⅶ-2. 5. *3 KITZ original is material not specified in ASME B16.34. 6. *4 Maximum temperature of flanged valve is up to 538℃.

427 800	450 842	455 850	475 887	482 900	500 932	950	538 1000	550 1022	1050	575 1067	1100	600 1112	1150	625 1157	1200	650 1202	675 1247	1250	700 1292	1300	725 1337	1350	750 1382	1400	775 1427	1450	800 1472	816 1500	Applicable standards
80	4.6 0.46	65	3.7 0.37	50	2.8 0.28	35	1.4 0.14 20	1.4 0.14	20	1.4 0.14	20	1.4 0.14	20	1.4 0.14	20	1.4 0.14	1.4 0.14	20	1.4 0.14	20	1.4 0.14	20	1.2 0.12	15	0.9 0.09	10	0.8 0.08	0.7 0.07 10	ASME B16.34 Table 2-2.11A
80	4.6 0.46	65	3.7 0.37	50	2.8 0.28	35	1.4 0.14 20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
80	4.6 0.46	4.5 0.45 65	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
5.5 0.55 80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.1A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.17A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3
80	4.6 0.46	65	3.7 0.37	50	2.8 0.28	35	1.4 0.14 20	1.4 0.14	20	1.4 0.14	20	1.4 0.14	20	1.4 0.14	20	1.4 0.14	1.4 0.14	20	1.4 0.14	20	1.4 0.14	20	1.4 0.14	20	1.2 0.12	15	0.9 0.09	0.7 0.07 10	ASME B16.34 Table 2-2.12A
80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.12A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.8A
80	4.6 0.46	65	3.7 0.37	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.4A
80	4.6 0.46	65	3.7 0.37	50	2.8 0.28	35	1.4 0.14 20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
80	4.6 0.46	65	3.7 0.37	50	2.8 0.28	35	1.4 0.14 20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.15A
80	4.6 0.46	65	3.7 0.37	3.4 0.34 50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
80	4.6 0.46	65	3.7 0.37	50	2.8 0.28	35	1.4 0.14 20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3
485	33.5 3.35	485	31.7 3.17	450	28.2 2.82	385	25.2 2.52 365	25.0 2.50	360	24.0 2.40	310	19.8 1.98	210	13.9 1.39	150	10.3 1.03	8.0 0.80	115	5.6 0.56	75	4.0 0.40	50	3.1 0.31	40	2.5 0.25	30	2.0 0.20	1.9 0.19 25	ASME B16.34 Table 2-2.11A
420	28.8 2.88	420	28.7 2.87	415	28.2 2.82	385	25.2 2.52 365	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
420	28.8 2.88	28.8 2.88 420	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
27.9 2.79 405	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.1A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.17A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3
410	27.6 2.76	400	26.7 2.67	385	25.8 2.58	370	23.3 2.33 340	22.9 2.29	325	21.7 2.17	290	19.4 1.94	250	16.8 1.68	205	14.1 1.41	11.5 1.15	165	8.8 0.88	120	6.3 0.63	80	4.5 0.45	55	3.1 0.31	40	2.3 0.23	1.9 0.19 25	ASME B16.34 Table 2-2.12A
430	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.12A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.8A
460	26.9 2.69	375	20.8 2.08	275	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.4A
400	27.2 2.72	395	26.8 2.68	385	26.3 2.63	380	25.2 2.52 365	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
400	27.2 2.72	395	26.8 2.68	385	26.3 2.63	380	25.2 2.52 365	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.15A
400	27.2 2.72	395	26.8 2.68	26.5 2.65 385	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
510	33.7 3.37	485	31.7 3.17	450	28.2 2.82	385	25.2 2.52 365	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3

10-3. Pressure/Temperature Rating (ASME Class 600/900)

Class	Type	Material: KITZ Name	Material: KITZ Symbol	Material: ASTM	°C	-29~38	-28.9~37.8	50	93	100	149	150	200	204	250	260	300	316	325		350		375		400	425
					°F	-20.2~100.4	-20~100	122	200	212	300	302	392	400	482	500	572	600	617	650	662	700	707	750	752	797
600	Iron-based alloy	Austenitic stainless steel casting																								
		SCS21※4	CB	A351 Gr.CF8C	bar	99.3		97.5		90.6		84.9	79.9		75.6		72.2		70.7		69.5		68.4		67.8	67.2
					MPa※1	9.93		9.75		9.06		8.49	7.99		7.56		7.22		7.07		6.95		6.84		6.78	6.72
					psi※2		1,440		1,325		1,235			1,150		1,085		1,030		1,015		995		985		
		CG8M	CG	A351 Gr.CG8M	bar	99.3		96.2		84.4		77.0	71.3		66.8		63.2		61.8		60.7		59.8		58.9	58.3
					MPa※1	9.93		9.62		8.44		7.70	7.13		6.68		6.32		6.18		6.07		5.98		5.89	5.83
					psi※2		1,440		1,240		1,120			1,025		955		900		885		870		855		
		CG3M	GM	A351 Gr.CG3M	bar	99.3		96.2		84.4		77.0	71.3		66.8		63.2		61.8		60.7		59.8		58.9	58.3
					MPa※1	9.93		9.62		8.44		7.70	7.13		6.68		6.32		6.18		6.07		5.98		5.89	5.83
					psi※2		1,440		1,240		1,120			1,025		955		900		885		870		855		
		KSN-1	SN	—	bar	99.3		95.6		81.7		74.0	69.0		65.0		61.8		60.4		59.3		58.1		56.9	56.0
					MPa※1	9.93		9.56		8.17		7.40	6.90		6.50		6.18		6.04		5.93		5.81		5.69	5.60
					psi※2		1,440		1,200		1,075			995		930		885		865		845		825		
		CN7M	CN	A351 Gr.CN7M	bar	82.7		80.3		70.6		64.1	58.7		54.4		50.8		48.8							
					MPa※1	8.27		8.03		7.06		6.41	5.87		5.44		5.08		4.88	—	—	—	—	—	—	—
					psi※2		1,200		1,035		930			845		780		720								
		CN3MCu	3M	A990 Gr.CN3MCu	bar	82.7		76.3		56.8		51.8	46.8		44.0		41.3		40.1							
					MPa	8.27		7.63		5.68		5.18	4.68		4.40		4.13		4.01	—	—	—	—	—	—	—
					psi	1199.2		1106.4		823.6		751.1	678.6		638.0		598.9		581.5							
		CK20※4	CK	A351 CK20	bar	92.7		89.0		75.1		69.8	67.1		65.2		63.4		62.4		61.2		59.7		58.2	56.7
					MPa※1	9.27		8.90		7.51		6.98	6.71		6.52		6.34		6.24		6.12		5.97		5.82	5.67
					psi※2		1,345		1,100		1,015			970		940		910		895		870		845		
		Super austenitic/duplex/super duplex stainless steel casting																								
		SASV-Z1	SA	A351 Gr.CN3MN	bar	92.7		91.1		85.1		80.3	74.6		69.8		66.2		64.6		63.2		62.0		60.8	59.7
					MPa※1	9.27		9.11		8.51		8.03	7.46		6.98		6.62		6.46		6.32		6.20		6.08	5.97
					psi※2		1,345		1,245		1,165			1,075		1,000		945		920		900		885		
		KDPV22	4A	A995 Gr.4A、CD3MN	bar	103.4		103.4		101.3		91.9	85.3		80.9		77.7		76.3		75.3					
					MPa※1	10.34		10.34		10.13		9.19	8.53		8.09		7.77		7.63		7.53	—	—	—	—	—
					psi※2		1,500		1,490		1,335			1,230		1,160		1,115		1,095	1091.9					
		SASV-Z2 SDPV-K1 SDPV-K2 SDPV-K4	SA SD SD SD	— — — A995 Gr.5A、CE3MN	bar	103.4		103.4		101.3		91.9	85.3		80.9		77.7	77.0								
					MPa※1	10.34		10.34		10.13		9.19	8.53		8.09		7.77	8.00	—	—	—	—	—	—	—	—
					psi※2		1,500		1,490		1,335			1,230		1,160		1,115								
		SASV-Z3 KDPV25 SDPV-K3	SA 1B SD	A351 Gr.CK3MCuN A995 Gr.1B、CD4MCuN A995 Gr.6A、CD3MWCuN	bar	103.4		103.4		101.3		91.9	85.3		80.9		77.7		76.3		75.3		74.7		73.3	
					MPa※1	10.34		10.34		10.13		9.19	8.53		8.09		7.77		7.63		7.53		7.47		7.33	—
					psi※2		1,500		1,490		1,335			1,230		1,160		1,115		1,095		1,085		1,065		
	Nickel-based alloy	Ni-Cu/Ni-Cr/Ni-Mo/Ni-Cr-Mo alloy casting																								
		M-35-1	NC	A494 Gr.M35-1	bar	82.7		80.5		71.9		67.5	65.4		65.2		65.2		65.2		65.1		64.8		64.2	63.3
					MPa※1	8.27		8.05		7.19		6.75	6.54		6.52		6.52		6.52		6.51		6.48		6.42	6.33
					psi※2		1,200		1,050		980			945		945		945		945		940		930		
		K600 K625	CY CW	A494 Gr.CY40 A494 Gr.CW6MC	bar	82.7		81.3		75.6		71.7	67.9		64.5		61.5		60.1		58.8		57.4		56.5	55.3
					MPa※1	8.27		8.13		7.56		7.17	6.79		6.45		6.15		6.01		5.88		5.74		5.65	5.53
					psi※2		1,200		1,105		1,040			980		925		880		860		835		820		
		HB-K1 HC-K1	HB HC	A494 Gr.N12MV A494 Gr.CW12MW	bar	82.7		81.3		75.6		71.7	67.9		64.5		61.5		60.1		58.8		57.4		56.5	55.3
					MPa※1	8.27		8.13		7.56		7.17	6.79		6.45		6.15		6.01		5.88		5.74		5.65	5.53
					psi※2		1,200		1,105		1,040			980		925		880		860		835		820		
		HB-K2 HC-K3	HB HC	A494 Gr.N7M A494 Gr.CW6M	bar	82.7		81.3		75.6		71.7	67.9		64.5		61.5		60.1		58.8		57.4		56.5	55.3
					MPa※1	8.27		8.13		7.56		7.17	6.79		6.45		6.15		6.01		5.88		5.74		5.65	5.53
					psi※2		1,200		1,105		1,040			980		925		880		860		835		820		
		HC-K2 HC-K4	HC HC	A494 Gr.CX2MW A494 Gr.CW2M	bar	82.7		81.3		75.6		71.7	67.9		64.5	64.0										
					MPa※1	8.27		8.13		7.56		7.17	6.79		6.45	6.00	—	—	—	—	—	—	—	—	—	—
					psi※2		1,200		1,105		1,040			980		925										
		K825	CU	A494 Gr.CU5MCuC	bar	103.4		103.4		103.0		100.3	96.7		92.7		85.7		82.6		80.4		77.6		73.3	70.0
					MPa※1	10.34		10.34		10.30		10.03	9.67		9.27		8.57		8.26		8.04		7.76		7.33	7.00
					psi※2		1,500		1,500		1,455			1,395		1,330		1,210		1,175		1,135		1,065		
		Ni casting																								
		CZ-100	CZ	A494 Gr.CZ100	bar		60.0		58.0		55.0			55.0		53.0		51.0								
					Mpa		6.00		6.00		6.00			6.00		5.00		5.00	—	—	—	—	—	—	—	—
					psi		870		840		800			800		765		745								
900	Iron-based alloy	Austenitic stainless steel casting																								
		SCS21※4	CB	A351 Gr.CF8C	bar	148.9		146.3		135.9		127.4	119.8		113.4		108.3		106.1		104.3		102.6		101.7	100.8
					MPa※1	14.89		14.63		13.59		12.74	11.98		11.34		10.83		10.61		10.43		10.26		10.17	10.08
					psi※2		2,160		1,985		1,850			1,730		1,625		1,550		1,520		1,490		1,475		
		CG8M	CG	A351 Gr.CG8M	bar	148.9		144.3		126.6		115.5	107.0		100.1		94.9		92.7		91.0		89.6		88.3	87.4
					MPa※1	14.89		14.43		12.66		11.55	10.70		10.01		9.49		9.27		9.10		8.96		8.83	8.74
					psi※2		2,160		1,860		1,680			1,540		1,435		1,355		1,325		1,305		1,280		
		CG3M	GM	A351 Gr.CG3M	bar	148.9		144.3		126.6		115.5	107.0		100.1		94.9		92.7		91.0		89.6		88.3	87.4
					MPa※1	14.89		14.43		12.66		11.55	10.70		10.01		9.49		9.27		9.10		8.96		8.83	8.74
					psi※2		2,160		1,860		1,680			1,540		1,435		1,355		1,325		1,305		1,280		
		KSN-1	SN	—	bar	148.9		143.5		122.6		111.0	103.4		97.5		92.7		90.7		88.9		87.1		85.3	84.0
					MPa※1	14.89		14.35		12.26		11.10	10.34		9.75		9.27		9.07		8.89		8.71		8.53	8.40
					psi※2		2,160		1,800		1,615			1,490		1,395		1,325		1,295		1,265		1,240		
		CN7M	CN	A351 Gr.CN7M	bar	124.1		120.4		105.9		96.1	88.1		81.7		76.1		73.3							
					MPa※1	12.41		12.04		10.59		9.61	8.81		8.17		7.61		7.33	—	—	—	—	—	—	—
					psi※2		1,800		1,555		1,395			1,265		1,165		1,080								
		CN3MCu	3M	A990 Gr.CN3MCu	bar	124.1		114.5		85.2		77.7	70.2		66.0		62.0		60.2							
					Mpa	12.41		11.45		8.52		7.77	7.02		6.60		6.20		6.02	—	—	—	—	—	—	—
					psi	1799.5		1660.3		1235.4		1126.7	1017.9		957.0		899.0		872.9							
		CK20※4	CK	A351 CK20	bar	139.0		133.4		112.6		104.7	100.6		97.8		95.2		93.6		91.7		89.5		87.3	85.0
					MPa※1	13.90		13.34		11.26		10.47	10.06		9.78		9.52		9.36		9.17		8.95		8.73	8.50
					psi※2		2,015		1,650		1,520			1,455		1,410		1,370		1,340		1,305		1,265		
		Super austenitic/duplex/super duplex stainless steel casting																								
		SASV-Z1	SA	A351 Gr.CN3MN	bar	139.0		136.7		127.6		120.4	112.0		104.7		99.3		97.0		94.8		93.0		91.3	89.5
					MPa※1	13.90		13.67		12.76		12.04	11.20		10.47		9.93		9.70		9.48		9.30		9.13	8.95
					psi※2		2,015		1,865		1,750			1,615		1,500		1,420		1,380		1,355		1,325		
		KDPV22	4A	A995 Gr.4A、CD3MN	bar	155.1		155.1		152.0		137.8	128.0		121.4		116.6		114.5		112.9					
					MPa※1	15.51		15.51		15.20		13.78	12.80		12.14		11.66		11.45		11.29	—	—	—	—	—
					psi※2		2,250		2,230		2,000			1,845		1,740		1,670		1,640	1637.1					
		SASV-Z2 SDPV-K1 SDPV-K2 SDPV-K4	SA SD SD SD	— — — A995 Gr.5A、CE3MN	bar	155.1		155.1		152.0		137.8	128.0		121.4		116.6	115.0								
					MPa※1	15.51		15.51		15.20		13.78	12.80		12.14		11.66	12.00	—	—	—	—	—	—	—	—
					psi※2		2,250		2,230		2,000			1,845		1,740		1,670								
		SASV-Z3 KDPV25 SDPV-K3	SA 1B SD	A351 Gr.CK3MCuN A995 Gr.1B、CD4MCuN A995 Gr.6A、CD3MWCuN	bar	155.1		155.1		152.0		137.8	128.0		121.4		116.6		114.5		112.9		112.1		109.8	
					MPa※1	15.51		15.51		15.20		13.78	12.80		12.14		11.66		11.45		11.29		11.21		10.98	—
					psi※2		2,250		2,230		2,000			1,845		1,740		1,670		1,640		1,625		1,595		
	Nickel-based alloy	Ni-Cu/Ni-Cr/Ni-Mo/Ni-Cr-Mo alloy casting																								
		M-35-1	NC	A494 Gr.M35-1	bar	124.1		120.7		107.8		101.2	98.1		97.8		97.8		97.8		97.7		97.2		96.2	94.9
					MPa※1	12.41		12.07		10.78		10.12	9.81		9.78		9.78		9.78		9.77		9.72		9.62	9.49
					psi※2		1,800		1,575		1,470			1,420		1,420		1,420		1,420		1,410		1,395		
		K600 K625	CY CW	A494 Gr.CY40 A494 Gr.CW6MC	bar	124.1		121.9		113.4		107.6	101.8		96.8		92.2		90.2		88.3		86.2		84.8	83.0
					MPa※1	12.41		12.19		11.34		10.76	10.18		9.68		9.22		9.02		8.83		8.62		8.48	8.30
					psi※2		1,800		1,655		1,560			1,470		1,390		1,320		1,290		1,255		1,230		
		HB-K1 HC-K1	HB HC	A494 Gr.N12MV A494 Gr.CW12MW	bar	124.1		121.9		113.4		107.6	101.8		96.8		92.2		90.2		88.3		86.2		84.8	83.0
					MPa※1	12.41		12.19		11.34		10.76	10.18		9.68		9.22		9.02		8.83		8.62		8.48	8.30
					psi※2		1,800		1,655		1,560			1,470		1,390		1,320		1,290		1,255		1,230		
		HB-K2 HC-K3	HB HC	A494 Gr.N7M A494 Gr.CW6M	bar	124.1		121.9		113.4		107.6	101.8		96.8		92.2		90.2		88.3		86.2		84.8	83.0
					MPa※1	12.41		12.19		11.34		10.76	10.18		9.68		9.22		9.02		8.83		8.62		8.48	8.30
					psi※2		1,800		1,655		1,560			1,470		1,390		1,320		1,290		1,255		1,230		
		HC-K2 HC-K4	HC HC	A494 Gr.CX2MW A494 Gr.CW2M	bar	124.1		121.9		113.4		107.6	101.8		96.8	96.0										
					MPa※1	12.41		12.19		11.34		10.76	10.18		9.68	10.00	—	—	—	—	—	—	—	—	—	—
					psi※2		1,800		1,655		1,560			1,470		1,390										
		K825	CU	A494 Gr.CU5MCuC	bar	155.1		155.1		154.6		150.6	145.0		139.0		128.6		124.0		120.7		116.5		109.8	105.1
					MPa※1	15.51		15.51		15.46		15.06	14.50		13.90		12.86		12.40		12.07		11.65		10.98	10.51
					psi※2		2,250		2,250		2,185			2,095		1,995		1,815		1,765		1,705		1,595		

Notes
1. The above chart does not indicate ASME standards the latest values.
2. The range of use may be limited by valve structures and specifications. It is required to consider operating temperature of packing and gasket and seat rating of ball seat.
3. *1 Mpa is equivalent value.
4. *2 Psi is specified value of ASME B16.34 Table Ⅶ-2.
5. *3 KITZ original is material not specified in ASME B16.34.
6. *4 Maximum temperature of flanged valve is up to 538℃.

427 800	450 842	455 850	475 887	482 900	500 932	 950	538 1000	550 1022	 1050	575 1067	 1100	600 1112	 1150	625 1157	 1200	650 1202	675 1247	 1250	700 1292	 1300	725 1337	 1350	750 1382	 1400	775 1427	 1450	800 1472	816 1500	Applicable standards
975	66.9 6.69	970	63.4 6.34	900	56.5 5.65	775	50 5 725	49.8 4.98	720	47.9 4.79	625	39.6 3.96	420	27.7 2.77	300	20.6 2.06	15.9 1.59	225	11.2 1.12	150	8.0 0.80	105	6.2 0.62	80	4.9 0.49	60	4.0 0.40	3.8 0.38 55	ASME B16.34 Table 2-2.11A
845	57.7 5.77	835	57.3 5.73	830	56.5 5.65	775	50.0 5.00 725	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
845	57.7 5.77	58.0 6.00 835	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
56.0 6.00 810	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.1A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.17A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3
820	55.2 5.52	795	53.5 5.35	770	51.7 5.17	740	47 5 675	45.9 4.59	650	43.3 4.33	585	38.8 3.88	500	33.7 3.37	410	28.1 2.81	23.0 2.30	330	17.5 1.75	240	12.7 1.27	165	8.9 0.89	110	6.3 0.63	75	4.6 0.46	3.8 0.38 55	ASME B16.34 Table 2-2.12A
865	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	ASME B16.34 Table 2-3.12A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.8A
915	53.8 5.38	755	41.5 4.15	550	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.4A
800	54.4 5.44	785	53.5 5.35	775	52.6 5.26	760	50.0 5.00 725	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
800	54.4 5.44	785	53.5 5.35	775	52.6 5.26	760	50.0 5.00 725	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.15A
800	54.4 5.44	785	53.5 5.35	53 5 775	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
1,015	67.7 6.77	975	63.4 6.34	900	56.5 5.65	775	50.0 5.00 725	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3
1,460	100.4 10.04	1,455	95.1 9.51	1,350	84.7 8.47	1,160	75 8 1,090	74.8 7.48	1,080	71.8 7.18	935	59.4 5.94	625	41.6 4.16	455	30.9 3.09	23.9 2.39	340	16.8 1.68	225	11.9 1.19	155	9.3 0.93	125	7.4 0.74	95	6.1 0.61	5.7 0.57 80	ASME B16.34 Table 2-2.11A
1,265	86.5 8.65	1,255	86.0 8.60	1,245	84.7 8.47	1,160	75.0 8.00 1,090	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
1,265	86.5 8.65	87.0 9.00 1,255	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
84.0 8.00 1,215	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.1A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.17A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3
1,230	82.8 8.28	1,195	80.2 8.02	1,150	77.5 7.75	1,110	70 7 1,015	68.8 6.88	975	65.0 6.50	875	58.2 5.82	750	50.5 5.05	615	42.2 4.22	34.6 3.46	495	26.3 2.63	360	19.0 1.90	245	13.4 1.34	165	9.4 0.94	115	6.9 0.69	5.7 0.57 80	ASME B16.34 Table 2-2.12A
1,295	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.12A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.8A
1,375	80.7 8.07	1,130	62.3 6.23	825	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.4A
1,200	81.7 8.17	1,180	80.3 8.03	1,160	79.0 7.90	1,140	75.0 8.00 1,090	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
1,200	81.7 8.17	1,180	80.3 8.03	1,160	79.0 7.90	1,140	75.0 8.00 1,090	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.15A
1,200	81.7 8.17	1,180	80.3 8.03	80.0 8.00 1,160	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.15A conformity)
1,525	101.4 10.14	1,460	95.1 9.51	1,350	84.7 8.47	1,160	75.0 8.00 1,090	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original※3 (ASME B16.34 Table 2-3.8A conformity)

10-4. Pressure/Temperature Rating (ASME Class 1500)

Class	Type	Material KITZ Name	Material KITZ Symbol	ASTM	°C	-29~38	-28.9~37.8	50	93	100	149	150	200	204	250	260	300	316	325		350		375		400	425
					°F	-20.2~100.4	-20~100	122	200	212	300	302	392	400	482	500	572	600	617	650	662	700	707	750	752	797
1500	Iron-based alloy	Austenitic stainless steel casting																								
		SCS21 ※4	CB	A351 Gr.CF8C	bar	248.2		243.8		226.5		212.4	199.7		189.1		180.4		176.8		173.8		171.0		169.5	168.1
					MPa※1	24.82		24.38		22.65		21.24	19.97		18.91		18.04		17.68		17.38		17.10		16.95	16.81
					psi※2		3,600		3,310		3,085			2,880		2,710		2,580		2,530		2,485		2,460		
		CG8M	CG	A351 Gr.CG8M	bar	248.2		240.6		211.0		192.5	178.3		166.9		158.1		154.4		151.6		149.4		147.2	145.7
					MPa※1	24.82		24.06		21.10		19.25	17.83		16.69		15.81		15.44		15.16		14.94		14.72	14.57
					psi※2		3,600		3,095		2,795			2,570		2,390		2,255		2,210		2,170		2,135		
		CG3M	GM	A351 Gr.CG3M	bar	248.2		240.6		211.0		192.5	178.3		166.9		158.1		154.4		151.6		149.4		147.2	145.7
					MPa※1	24.82		24.06		21.10		19.25	17.83		16.69		15.81		15.44		15.16		14.94		14.72	14.57
					psi※2		3,600		3,095		2,795			2,570		2,390		2,255		2,210		2,170		2,135		
		KSN-1	SN	—	bar	248.2		239.1		204.3		185.0	172.4		162.4		154.6		151.1		148.1		145.2		142.2	140.0
					MPa※1	24.82		23.91		20.43		18.50	17.24		16.24		15.46		15.11		14.81		14.52		14.22	14.00
					psi※2		3,600		3,000		2,690			2,485		2,330		2,210		2,160		2,110		2,065		
		CN7M	CN	A351 Gr.CN7M	bar	206.8		200.7		176.5		160.2	146.8		136.1		126.9		122.1	—	—	—	—	—	—	—
					MPa※1	20.68		20.07		17.65		16.02	14.68		13.61		12.69		12.21							
					psi※2		3,000		2,590		2,330			2,110		1,945		1,800								
		CN3MCu	3M	A990 Gr.CN3MCu	bar	206.8		190.9		142.1		129.6	117.1		110.0		103.3		100.3	—	—	—	—	—	—	—
					MPa	20.68		19.09		14.21		12.96	11.71		11.00		10.33		10.03							
					psi	2998.6		2768.1		2060.5		1879.2	1698.0		1595.0		1497.9		1454.4							
		CK20 ※4	CK	A351 CK20	bar	231.7		222.4		187.7		174.4	167.7		163.1		158.6		156.1		152.9		149.2		145.5	141.7
					MPa※1	23.17		22.24		18.77		17.44	16.77		16.31		15.86		15.61		15.29		14.92		14.55	14.17
					psi※2		3,360		2,750		2,530			2,425		2,350		2,280		2,230		2,170		2,110		
		Super austenitic/duplex/super duplex stainless steel casting																								
		SASV-Z1	SA	A351 Gr.CN3MN	bar	231.7		227.8		212.7		200.7	186.6		174.5		165.5		161.6		158.1		155.1		152.1	149.1
					MPa※1	23.17		22.78		21.27		20.07	18.66		17.45		16.55		16.16		15.81		15.51		15.21	14.91
					psi※2		3,360		3,110		2,915			2,690		2,495		2,365		2,305		2,255		2,210		
		KDPV22	4A	A995 Gr.4A、CD3MN	bar	258.6		258.6		253.3		229.6	213.3		202.3		194.3		190.8		188.2	—	—	—	—	—
					MPa※1	25.86		25.86		25.33		22.96	21.33		20.23		19.43		19.08		18.82					
					psi※2		3,750		3,720		3,335			3,070		2,905		2,785		2,735	2728.9					
		SASV-Z2 SDPV-K1 SDPV-K2 SDPV-K4	SA SD SD SD	— — — A995 Gr.5A、CE3MN	bar	258.6		258.6		253.3		229.6	213.3		202.3		194.3	192.0	—	—	—	—	—	—	—	—
					MPa※1	25.86		25.86		25.33		22.96	21.33		20.23		19.43	19.00								
					psi※2		3,750		3,720		3,335			3,070		2,905		2,785								
		SASV-Z3 KDPV25 SDPV-K3	SA 1B SD	A351 Gr.CK3MCuN A995 Gr.1B、CD4MCuN A995 Gr.6A、CD3MWCuN	bar	258.6		258.6		253.3		229.6	213.3		202.3		194.3		190.8		188.2		186.8		183.1	—
					MPa※1	25.86		25.86		25.33		22.96	21.33		20.23		19.43		19.08		18.82		18.68		18.31	
					psi※2		3,750		3,720		3,335			3,070		2,905		2,785		2,735		2,710		2,660		
	Nickel-based alloy	Ni-Cu/Ni-Cr/Ni-Mo/Ni-Cr-Mo alloy casting																								
		M-35-1	NC	A494 Gr.M35-1	bar	206.8		201.2		179.7		168.7	163.5		163.0		163.0		163.0		162.8		161.9		160.4	158.2
					MPa※1	20.68		20.12		17.97		16.87	16.35		16.30		16.30		16.30		16.28		16.19		16.04	15.82
					psi※2		3,000		2,630		2,450			2,365		2,365		2,365		2,365		2,350		2,330		
		K600 K625	CY CW	A494 Gr.CY40 A494 Gr.CW6MC	bar	206.8		203.2		189.0		179.3	169.6		161.3		153.7		150.3		147.1		143.6		141.3	138.4
					MPa※1	20.68		20.32		18.90		17.93	16.96		16.13		15.37		15.03		14.71		14.36		14.13	13.84
					psi※2		3,000		2,760		2,605			2,450		2,315		2,195		2,150		2,090		2,050		
		HB-K1 HC-K1	HB HC	A494 Gr.N12MV A494 Gr.CW12MW	bar	206.8		203.2		189.0		179.3	169.6		161.3		153.7		150.3		147.1		143.6		141.3	138.4
					MPa※1	20.68		20.32		18.90		17.93	16.96		16.13		15.37		15.03		14.71		14.36		14.13	13.84
					psi※2		3,000		2,760		2,605			2,450		2,315		2,195		2,150		2,090		2,050		
		HB-K2 HC-K3	HB HC	A494 Gr.N7M A494 Gr.CW6M	bar	206.8		203.2		189.0		179.3	169.6		161.3		153.7		150.3		147.1		143.6		141.3	138.4
					MPa※1	20.68		20.32		18.90		17.93	16.96		16.13		15.37		15.03		14.71		14.36		14.13	13.84
					psi※2		3,000		2,760		2,605			2,450		2,315		2,195		2,150		2,090		2,050		
		HC-K2 HC-K4	HC HC	A494 Gr.CX2MW A494 Gr.CW2M	bar	206.8		203.2		189.0		179.3	169.6		161.3	160.0	—	—	—	—	—	—	—	—	—	—
					MPa※1	20.68		20.32		18.90		17.93	16.96		16.13	16.00										
					psi※2		3,000		2,760		2,605			2,450		2,315										
		K825	CU	A494 Gr.CU5MCuC	bar	258.6		258.6		257.6		250.8	241.7		231.8		214.4		206.6		201.1		194.1		183.1	175.1
					MPa※1	25.86		25.86		25.76		25.08	24.17		23.18		21.44		20.66		20.11		19.41		18.31	17.51
					psi※2		3,750		3,750		3,640			3,490		3,325		3,025		2,940		2,840		2,660		

Notes
1. The above chart does not indicate ASME standards the latest values.
2. The range of use may be limited by valve structures and specifications. It is required to consider operating temperature of packing and gasket and seat rating of ball seat.
3. *1 Mpa is equivalent value.
4. *2 Psi is specified value of ASME B16.34 Table Ⅶ-2.
5. *3 KITZ original is material not specified in ASME B16.34.
6. *4 Maximum temperature of flanged valve is up to 538℃.

427	450	455	475	482	500		538	550		575		600		625		650	675		700		725		750		775		800	816	Applicable standards
800	842	850	887	900	932	950	1000	1022	1050	1067	1100	1112	1150	1157	1200	1202	1247	1250	1292	1300	1337	1350	1382	1400	1427	1450	1472	1500	
2,435	167.3 16.73	2,425	158.2 15.82	2,245	140.9 14.09	1,930	126 13 1,820	124.9 12.49	1,800	119.7 11.97	1,560	99.0 9.90	1,045	69.3 6.93	755	51.5 5.15	39.8 3.98	565	28.1 2.81	375	19.9 1.99	255	15.5 1.55	205	12.3 1.23	155	10.1 1.01	9.5 0.95 135	ASME B16.34 Table 2-2.11A
2,110	144.2 14.42	2,090	143.4 14.34	2,075	140.9 14.09	1,930	126.0 13.00 1,820	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
2,110	144.2 14.42	144.0 14.00 2,090	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.2A
140 14 2,030	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3] (ASME B16.34 Table 2-2.1A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.17A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3]
2,050	138.0 13.80	1,990	133.7 13.37	1,920	129.2 12.92	1,850	117 12 1,690	114.7 11.47	1,630	108.3 10.83	1,455	97.1 9.71	1,250	84.1 8.41	1,030	70.4 7.04	57.6 5.76	825	43.8 4.38	600	31.7 3.17	410	22.3 2.23	275	15.7 1.57	190	11.4 1.14	9.5 0.95 135	ASME B16.34 Table 2-2.12A
2,160	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.12A
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3] (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3] (ASME B16.34 Table 2-2.8A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-2.8A
2,290	134.5 13.45	1,885	103.8 10.38	1,370	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.4A
2,005	136.1 13.61	1,970	133.9 13.39	1,930	131.6 13.16	1,895	126.0 13.00 1,820	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3] (ASME B16.34 Table 2-3.15A conformity)
2,005	136.1 13.61	1,970	133.9 13.39	1,930	131.6 13.16	1,895	126.0 13.00 1,820	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ASME B16.34 Table 2-3.15A
2,005	136.1 13.61	1,970	133.9 13.39	133.0 13.00 1,930	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3] (ASME B16.34 Table 2-3.15A conformity)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3] (ASME B16.34 Table 2-3.15A conformity)
2,540	169.0 16.90	2,435	158.2 15.82	2,245	140.9 14.09	1,930	126.0 13.00 1,820	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	KITZ original[※3] (ASME B16.34 Table 2-3.8A conformity)

Reference (Basic Terms)

Item	Description
Ferrite content calculation method and effect	1. ASTM A800 (applicable only to SUS304, SUS316 and their equivalent) 2. Q Factor (applicable only to duplex stainless steel) 3. Increased strength at room temperature and improved weldability (toughness is degraded when too much [impact value at room temperature : 250J at 20%, 235J at 60%, 185J at 70% and 70J at 80%]) (extremely less strength at high temperature)
475˚C embrittlement	1. Embrittlement when maintained at 300 to 500˚C and no microstructure change. (outstanding at 450 to 530˚C at electron microscope level) 2. Outstanding with high Cr. (a few minutes with 28Cr) 3. Solved when heated at ≒ 600˚C.
σ phase embrittlement	1. σ phase is separated when maintained at 800 to 1000˚C. Ourstanding at 850 to 950˚C. Dedected at x100 when KOH electrolytic etched. Composition is Fe+Ni ≒ 50%, Cr+Mo ≒ 50%. 2. Outstanding with high Cr. (1 minute with 28Cr) Separated for very short period with fine grain and highly distorted, which requires caution. 3. 5% separation makes toughness at room temperature zero, which requires caution. 4. Solved when heated at 1120˚C and up (high temperature is required for high Cr)
Intermetallic compound	1. Separation of higher concentration composition than base metal such as μ phase and P phase for HC material. (42Mo-10W-11Cr-33Ni for base metal 15Cr-16Mo-4W) 2. Laves phase (Fe_2Nb) and γ' phase Ni_3AL are common. 3. Solved with proper soaking.
Deformation induced martensite	1. SUS304 is metastable austenitic stainless steel rather than complete austenitic stainless steel. Therefore it is changed into its original stable martensitic steel when distorted at processing or maintained at low temperature. (Md30 : Temperature that 50% martensite is generated with 30% process distortion at) 2. Ms point : Martensite transformation start temperature. 3. Mf point : Martensite transformation finish temperature.
Weldability	1. Appropriate ferrite content : Ferrite improves weldability since it dissolves [S], which deteriorates weldability, and decreases segregation to grain boundary. (appropriate range is 4 to 15% considering grain refining effect)

Memo

⚠ CAUTION

Pressure-temperature ratings and other performance data published in this catalog have been developed from our design calculation, in-house testing, field reports provided by our customers, and/or published official standards or specifications. They are good only to cover typical applications as a general guideline to users of KITZ products introduced in this catalog.

For any specific application, users are kindly requested to contact KITZ Corporation for technical advice, or to carry out their own study and evaluation for proving the suitability of these products to such an application. Failure to follow this request could result in property damage and / or personal injury, for which we shall not be liable.

While this catalog has been compiled with the utmost care, we assume no responsibility for errors, impropriety, or inadequacy. Any information provided in this catalog is subject to from-time-to-time change without notice for error rectification, product discontinuation, design modification, new product introduction, or any other cause that KITZ Corporation considers necessary. This edition cancels all previous issues.

Read the instruction manual carefully before use.

⚠ NOTICE

If any products designated as strategic material in the Foreign Exchange and Foreign Trade Law, Cabinet Order Concerning Control of Export Trade, Cabinet order Concerning Control of Foreign Exchange, and other related laws and ordinances ("Foreign Exchange Laws") are exported to any foreign country or countries, an export license issued by the Japanese Government will be required under the Foreign Exchange Laws.

Further, there may be cases where an export license issued by the government of the United States or other country will be required under the applicable export-related laws and ordinances in such relevant countries.

The contract shall become effective subject to the fact that a relevant export license is obtained from the Japanese Government.

A chrysanthemum handle is a symbol of KITZ,
the brand of valve reliability

ISO 9001 certified since 1989

KITZ

KITZ CORPORATION

Tokyo Shiodome Building,
1-9-1, Higashi-Shimbashi, Minato-ku, Tokyo 105-7305, Japan
International Business Development Dept.
Phone : +81-50-3649-2202
URL : https://www.kitz.com/en/

— Distributed by —

2311②KZ