

# DUCTILE IRON

# What is Ductile Iron ?

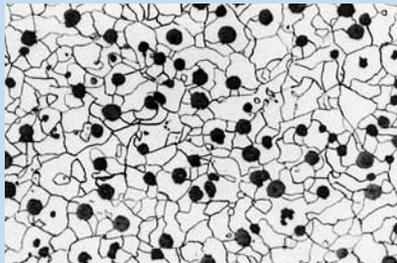
Gray iron, ductile iron, and malleable iron are the three kinds of iron used for valve construction. Unlike gray iron, which has thin, flake-like molecular formations, the metallic structures of both ductile and malleable iron contain nodular graphite. (Refer to the microscopic views shown here.) Ductile and malleable iron have superior mechanical properties compared to gray iron. They have properties almost equivalent to cast steel, which is an expensive material for industrial valves. Furthermore, their superior casting characteristics and ease of machining help to increase their suitability as a valve material.

Ductile iron outperforms malleable iron owing to its better mechanical characteristics for building the valve body, which is a kind of pressure-containing device. For example, ductile iron has a 20% higher tensile strength and 70% to 80% better elongation than malleable iron. This difference is attributed to the different formation processes of nodulated graphite molecules.

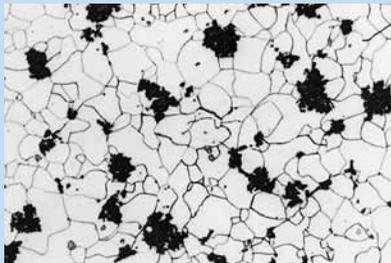
KITZ ductile iron valves are made of JIS FCD-S or ASTM A395 ductile iron. The history of the introduction of ductile iron valves on the market is rather short; however, their demand is steadily increasing owing to their economic advantage as well as the fact that their wide range of service applications is comparable to that of cast steel valves.

This catalog serves to provide the design specifications, construction materials, and external dimensions of the following ductile iron valves and strainers manufactured by KITZ Corporation :

- JIS 10K, 16K, and 20K Gate, Globe, and Check Valves
- JIS 10K and 20K Ball Valves
- JIS 10K, 16K, and 20K Strainers
- ASME 150 and 300 Gate, Globe, and Check Valves



Ductile iron



Malleable iron



Gray iron

### Service Recommendation

For achieving higher mechanical shock resistance under high or low temperature and for achieving better tensile strength and elongation characteristics than those of ordinary gray iron valves, the use of ductile iron valves is highly recommended for the following services, sometimes, in place of cast:

- Piping for steam supply
- Air-conditioning and heating systems
- High-pressure gaseous service in general
- Piping for poisonous gas service

The range of high-pressure gaseous service for iron valves is specified by the Ministry of Economy, Trade and Industry of Japan as follows :

Valve material	Poisonous gas*	Inflammable gas	Other gas
Ductile iron (JIS FCD-S)		2.4 MPa maximum -5°C to + 350°C	
Ductile iron (JIS FCD400)	not recommended	1.6 MPa maximum 0°C to + 250°C	
Gray iron (JIS FC200)	not recommended		0.2 MPa maximum 0°C to + 250°C

\*Phosgene and hydrogen cyanide are excluded.

## Material Specifications of JIS FCD-S

### 1. Chemical composites:

Carbon : 3.00% minimum  
 Phosphor : 0.08% maximum  
 Silicon : 2.50% maximum; however, 0.08% may be added for every decrease of 0.01% phosphor within the total maximum of 2.75%

### 2. Mechanical properties:

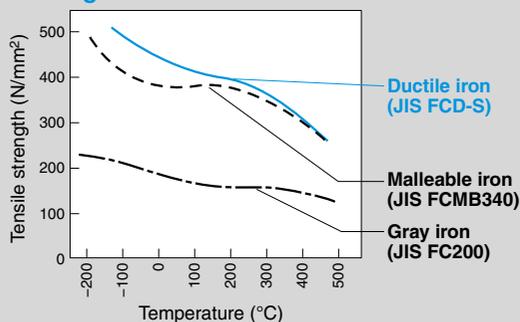
Tensile strength : 412 N/mm<sup>2</sup> (42 kgf/mm<sup>2</sup>) minimum  
 Yield strength : 275 N/mm<sup>2</sup> (28 kgf/mm<sup>2</sup>) minimum  
 Elongation : 18% minimum  
 Brinell hardness : 143 to 187

Charpy impact value:

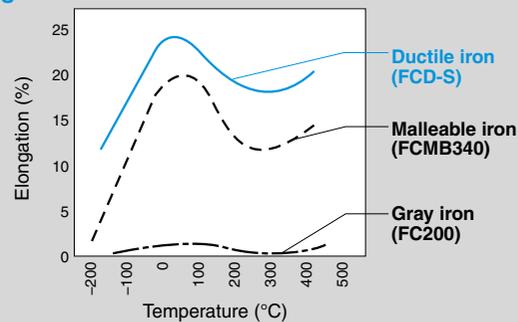
- for ambient temperature service;
  - 17 N-m/cm<sup>2</sup> (1.7 kgf-m/cm<sup>2</sup>) minimum in an average of three test pieces.
  - 15 N-m/cm<sup>2</sup> (1.5 kgf-m/cm<sup>2</sup>) minimum for the lowest impact value.
- for -10°C or lower temperature service;
  - 15.3 N-m/cm<sup>2</sup> (1.53 kgf-m/cm<sup>2</sup>) minimum in an average of three test pieces.
  - 13.3 N-m/cm<sup>2</sup> (1.33 kgf-m/cm<sup>2</sup>) minimum for the lowest impact value.

## Compared Mechanical Properties of JIS Materials

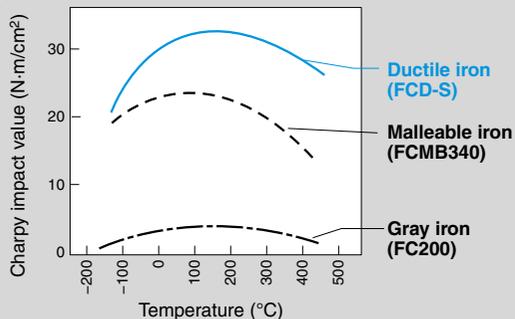
### Tensile strength



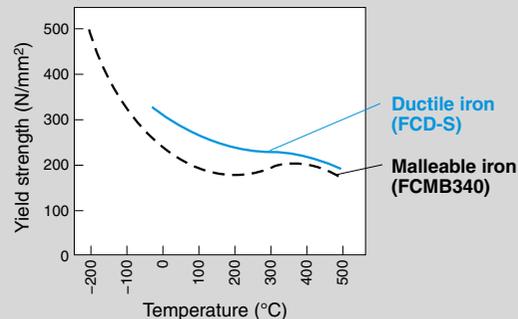
### Elongation



### Charpy impact value

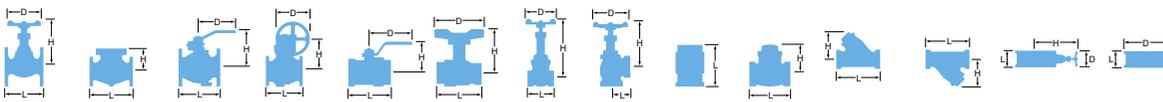


### Yield strength



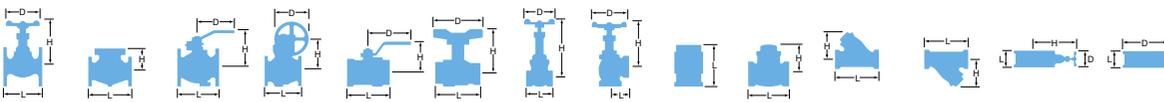
## Design Specifications (Please refer to our website ([www.kitz.co.jp](http://www.kitz.co.jp)) or contact KITZ for details.)

Class	JIS 10K/16K/20K	ASME 150/300
Face to face dimension	JIS B 2011, B 2002, or KITZ Std.	ASME B16. 10
End to end dimension	JIS B 2051 or KITZ Std.	—
End flange dimension	JIS B 2239	ASME B16. 5
End thread dimension	JIS B 0203	—
Shell wall thickness	KITZ standard, unless otherwise indicated on the following pages	



TYPE		GATE			GATE			GATE			GATE			GATE			
Ductile Iron																	
FIG		10SMS			10SMBF			10SMBOF			16SMB			16SMBO			
PRESSURE		10K			10K			10K			16K			16K			
END CONNECTION		BS21 (JIS B0203)			JIS B2239			JIS B2239			JIS B2239			JIS B2239			
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D
	1/2	15	60	150	60	90	164	70	—	—	—	108	163	70	—	—	—
	3/4	20	70	171	70	100	165	70	—	—	—	117	164	70	—	—	—
	1	25	75	198	80	110	188	80	—	—	—	127	187	80	—	—	—
	1 1/4	32	85	233	90	120	219	90	—	—	—	140	219	90	—	—	—
	1 1/2	40	95	274	100	130	253	100	165	300	160	165	253	100	165	300	160
	2	50	105	318	115	140	285	115	178	352	200	178	285	115	178	352	200
	2 1/2	65	—	—	—	—	—	—	190	410	200	—	—	—	190	410	200
	3	80	—	—	—	—	—	—	203	479	250	—	—	—	203	479	250
	4	100	—	—	—	—	—	—	229	566	250	—	—	—	229	566	250
	5	125	—	—	—	—	—	—	254	667	300	—	—	—	254	667	300
	6	150	—	—	—	—	—	—	267	779	300	—	—	—	267	779	300
	8	200	—	—	—	—	—	—	292	969	350	—	—	—	292	969	350
	10	250	—	—	—	—	—	—	330	1181	400	—	—	—	330	1181	400
	12	300	—	—	—	—	—	—	356	1404	450	—	—	—	356	1404	450
BODY		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
BONNET		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
STEM		SUS420J2			SUS420J2			SUS403			SUS420J2			SUS403			
DISC		SCS1			SCS1			SUS403 / SCS1			SCS1			SUS403 / SCS1			

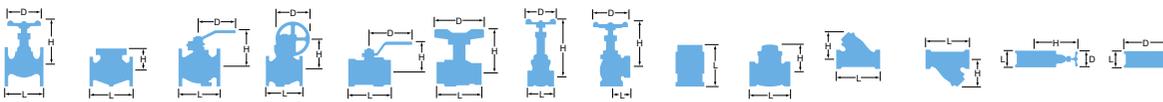
TYPE		GATE			GATE			GATE			GLOBE			GLOBE			
Ductile Iron																	
FIG		16SMS			20SLS			150SMBO			10SJ			10SJBF			
PRESSURE		16K			20K			Class 150			10K			10K			
END CONNECTION		BS21 (JIS B0203)			BS21 (JIS B0203)			ASME B16.1			BS21 (JIS B0203)			JIS B2239			
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D
	1/4	8	—	—	—	—	—	—	—	—	—	50	108	60	—	—	—
	3/8	10	—	—	—	—	—	—	—	—	—	55	108	60	85	108	60
	1/2	15	65	163	70	70	175	90	—	—	—	65	122	70	85	122	70
	3/4	20	75	182	80	75	177	90	—	—	—	80	125	80	95	125	80
	1	25	80	212	90	85	214	100	—	—	—	90	146	90	110	146	90
	1 1/4	32	90	245	100	95	241	115	—	—	—	105	160	100	130	160	100
	1 1/2	40	100	285	115	105	277	135	165	300	160	120	180	115	150	180	115
	2	50	110	330	135	115	301	135	178	352	200	140	198	135	180	198	135
	2 1/2	65	—	—	—	—	—	—	190	408	200	180	250	180	210	250	180
	3	80	—	—	—	—	—	—	203	473	250	200	280	225	240	280	225
	4	100	—	—	—	—	—	—	229	566	250	—	—	—	—	—	—
	5	125	—	—	—	—	—	—	254	667	300	—	—	—	—	—	—
	6	150	—	—	—	—	—	—	267	779	300	—	—	—	—	—	—
	8	200	—	—	—	—	—	—	292	969	350	—	—	—	—	—	—
	10	250	—	—	—	—	—	—	330	1181	400	—	—	—	—	—	—
	12	300	—	—	—	—	—	—	356	1404	450	—	—	—	—	—	—
BODY		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
BONNET		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
STEM		SUS420J2			SUS420J2			SUS403			SUS420J2			SUS420J2			
DISC		SCS1			SCS1			SUS403 / SCS1			SUS403			SUS403			



TYPE		GLOBE			GLOBE			GLOBE			GLOBE			GLOBE			
Ductile Iron																	
FIG		10SP			10SPBF			10SPBOF			10SPD			10SPDBF			
PRESSURE		10K			10K			10K			10K			10K			
END CONNECTION		BS21 (JIS B0203)			JIS B2239			JIS B2239			BS21 (JIS B0203)			JIS B2239			
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D
	3/8	10	64	107	60	108	107	60	-	-	-	-	-	-	-	-	-
	1/2	15	70	125	80	108	125	80	-	-	-	70	125	80	108	125	80
	3/4	20	80	125	80	117	125	80	-	-	-	80	125	80	117	125	80
	1	25	90	145	100	127	145	100	-	-	-	90	146	100	127	145	100
	1 1/4	32	110	162	115	140	162	115	-	-	-	110	162	115	140	162	115
	1 1/2	40	120	180	115	165	180	115	-	-	-	120	180	115	165	180	115
	2	50	140	198	135	203	198	135	203	302	200	140	198	135	203	198	135
	2 1/2	65	-	-	-	-	-	-	216	317	225	-	-	-	-	-	-
	3	80	-	-	-	-	-	-	241	356	250	-	-	-	-	-	-
	4	100	-	-	-	-	-	-	292	377	250	-	-	-	-	-	-
	5	125	-	-	-	-	-	-	356	460	300	-	-	-	-	-	-
	6	150	-	-	-	-	-	-	406	524	350	-	-	-	-	-	-
	8	200	-	-	-	-	-	-	495	585	400	-	-	-	-	-	-
BODY		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
#ONNET		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
STEM		SUS420J2			SUS420J2			SUS420J2			SUS420J2			SUS420J2			
#DISC		SUS403			SUS403			SUS403			G/F PTFE			G/F PTFE			
											Soft Seated disc			Soft Seated disc			

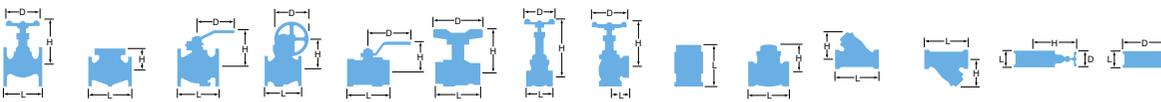
TYPE		GLOBE			GLOBE			GLOBE			GLOBE			GLOBE			
Ductile Iron																	
FIG		10SPDBOF			10SD			10SDBF			10SDL			10SDLBF			
PRESSURE		10K			10K			10K			10K			10K			
END CONNECTION		JIS B2239			BS21 (JIS B0203)			JIS B2239			BS21 (JIS B0203)			JIS B2239			
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D
	1/4	8	-	-	-	50	108	60	-	-	-	-	-	-	-	-	-
	3/8	10	-	-	-	55	108	60	85	108	60	55	112	55	85	112	55
	1/2	15	-	-	-	65	123	70	85	123	70	65	122	60	85	122	60
	3/4	20	-	-	-	80	123	80	95	123	80	80	130	70	95	130	70
	1	25	-	-	-	90	144	90	110	144	90	90	149	80	110	149	80
	1 1/4	32	-	-	-	105	159	100	130	159	100	105	169	90	130	169	90
	1 1/2	40	-	-	-	120	178	115	150	178	115	120	187	100	150	187	100
	2	50	203	302	200	140	197	135	180	197	135	140	205	115	180	205	115
	2 1/2	65	216	317	225	180	262	180	210	262	180	-	-	-	-	-	-
	3	80	241	356	250	200	295	225	240	295	225	-	-	-	-	-	-
	4	100	292	377	250	-	-	-	-	-	-	-	-	-	-	-	-
	5	125	356	460	300	-	-	-	-	-	-	-	-	-	-	-	-
	6	150	406	527	350	-	-	-	-	-	-	-	-	-	-	-	-
	8	200	495	600	400	-	-	-	-	-	-	-	-	-	-	-	-
BODY		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
#ONNET		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
STEM		SUS403			SUS420J2			SUS420J2			SUS420J2			SUS420J2			
#DISC		G/F PTFE			G/F PTFE			G/F PTFE			G/F PTFE			G/F PTFE			
		Soft Seated disc			Soft Seated disc			Soft Seated disc			Soft Seated disc			Soft Seated disc			

Brass & Bronze  
Cast Iron  
Ductile Iron  
Stainless Steel  
Carbon Steel  
Butterfly Valve  
Ball Valve  
Ball Valve Seat  
Actuated Valve



TYPE		GLOBE			GLOBE			GLOBE			GLOBE			GLOBE			
Ductile Iron																	
FIG		16SP			16SPB			16SPBO			20SY			20SYB			
PRESSURE		16K			16K			16K			20K			20K			
END CONNECTION		BS21 (JIS B0203)			JIS B2239			JIS B2239			BS21 (JIS B0203)			JIS B2239			
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D
	3/8	10	64	110	60	108	111	60	-	-	-	75	136	70	110	136	70
	1/2	15	70	122	80	108	122	80	-	-	-	78	138	80	110	138	80
	3/4	20	85	128	80	117	128	80	-	-	-	91	157	100	120	157	100
	1	25	95	147	100	127	146	100	-	-	-	105	178	115	130	178	115
	1 1/4	32	110	165	115	140	165	115	-	-	-	122	202	135	160	202	135
	1 1/2	40	125	182	115	165	182	115	-	-	-	135	210	135	180	210	135
	2	50	145	196	135	203	198	135	203	302	200	160	239	180	230	239	180
	2 1/2	65	-	-	-	-	-	-	216	313	225	-	-	-	-	-	-
	3	80	-	-	-	-	-	-	241	356	250	-	-	-	-	-	-
	4	100	-	-	-	-	-	-	292	377	250	-	-	-	-	-	-
	5	125	-	-	-	-	-	-	356	460	300	-	-	-	-	-	-
	6	150	-	-	-	-	-	-	406	524	350	-	-	-	-	-	-
	8	200	-	-	-	-	-	-	495	585	400	-	-	-	-	-	-
BODY		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
BONNET		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
STEM		SUS420J2			SUS420J2			SUS403			SUS420J2			SUS420J2			
DISC		SUS403			SUS403			SUS403			SUS403+HF			SUS403+HF			

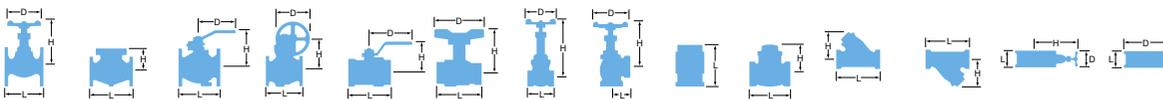
TYPE		GLOBE			GLOBE			LIFT CHECK			LIFT CHECK			LIFT CHECK			
Ductile Iron																	
FIG		150SPB			150SPDB			10SF			10SFBF			10SN			
PRESSURE		Class 150			Class 150			10K			10K			10K			
END CONNECTION		ASME B16.1			ASME B16.1			BS21 (JIS B0203)			JIS B2239			BS21 (JIS B0203)			
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D
	3/8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1/2	15	108	122	80	108	127	70	65	39	28	85	39	95	70	50	30
	3/4	20	117	128	80	117	135	70	80	42	34	95	42	100	80	53	36
	1	25	127	146	100	127	155	90	90	48	42	110	48	125	90	61	45
	1 1/4	32	140	165	115	140	172	100	105	56	52	130	56	135	110	69	55
	1 1/2	40	165	179	115	165	193	115	120	65	58	150	65	140	120	75	60
	2	50	203	198	135	203	208	135	140	73	72	180	73	155	140	87	78
	2 1/2	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BODY		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
BONNET		Ductile Iron			Ductile Iron			-			-			CF8 / TYPE304			
CAP		-			-			TYPE 403 / SCS1			TYPE 403 / SCS1			-			
STEM		SUS420J2			SUS420J2			-			-			-			
DISC		SUS403			G/F PTFE			SUS403			SUS403			SUS403 / SCS1			
					Soft Seated disc												



TYPE		LIFT CHECK					LIFT CHECK			LIFT CHECK			LIFT CHECK			SWING CHECK		
Ductile Iron																		
FIG		10SNBF					16SF			16SFB			20SN			10SRBF		
PRESSURE		10K					16K			16K			20K			10K		
END CONNECTION		JIS B2239					BS21 (JIS B0203)			JIS B2239			BS21 (JIS B0203)			JIS B2239		
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D	
	1/2	15	108	50	95	70	50	30	108	50	95	78	56	32	—	—	—	
	3/4	20	117	53	100	85	53	36	117	53	100	91	60	38	—	—	—	
	1	25	127	61	125	95	61	45	127	61	125	105	68	47	—	—	—	
	1 1/4	32	140	69	135	110	69	55	140	69	135	122	80	57	—	—	—	
	1 1/2	40	165	75	140	125	75	60	165	75	140	135	85	62	165	115	140	
	2	50	203	87	155	145	87	78	203	87	155	160	99	79	203	120	155	
	2 1/2	65	—	—	—	—	—	—	—	—	—	—	—	—	216	130	175	
	3	80	—	—	—	—	—	—	—	—	—	—	—	—	241	145	185	
	4	100	—	—	—	—	—	—	—	—	—	—	—	—	292	160	210	
	5	125	—	—	—	—	—	—	—	—	—	—	—	—	330	195	250	
	6	150	—	—	—	—	—	—	—	—	—	—	—	—	356	215	280	
	8	200	—	—	—	—	—	—	—	—	—	—	—	—	495	255	330	
	10	250	—	—	—	—	—	—	—	—	—	—	—	—	622	310	400	
	12	300	—	—	—	—	—	—	—	—	—	—	—	—	698	350	445	
BODY		Ductile Iron					Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron		
BONNET		CF8 / TYPE304					CF8 / TYPE304			CF8 / TYPE304			TYPE 403 / SCS1			Ductile Iron		
COVER		—					—			—			—			Ductile Iron		
HINGE PIN		—					—			—			—			SUS403		
DISC		SUS403 / SCS1					SUS403 / SCS1			SUS403 / SCS1			SCS13A+HF			SUS403		
SEAT		—					—			—			Stainless Steel+HF			—		

TYPE		SWING CHECK					SWING CHECK			SWING CHECK		
Ductile Iron												
FIG		16SRB					20SOB			150SRB		
PRESSURE		16K					20K			Class 150		
END CONNECTION		JIS B2239					JIS B2239			ASME B16.1		
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	
	1 1/2	40	—	—	—	—	—	—	165	115	127	
	2	50	203	120	155	267	135	155	203	120	152	
	2 1/2	65	216	135	175	292	145	175	216	130	178	
	3	80	241	145	200	318	160	200	241	145	190	
	4	100	292	165	225	356	185	225	292	165	229	
	5	125	330	200	270	400	220	270	330	200	254	
	6	150	356	220	305	444	240	305	356	220	279	
	8	200	495	265	350	533	275	350	495	260	343	
	10	250	622	320	430	622	335	430	622	320	406	
	12	300	698	360	480	711	370	480	698	360	483	
	14	350	—	—	—	—	—	—	—	—	—	
	16	400	—	—	—	—	—	—	—	—	—	
	18	450	—	—	—	—	—	—	—	—	—	
BODY		Ductile Iron					Ductile Iron			Ductile Iron		
COVER		Ductile Iron					Ductile Iron			Ductile Iron		
HINGE PIN		SUS403					SUS403			SUS403		
DISC		SUS403					SUS403			SUS403		

Bronze & Brass  
 Cast Iron  
 Ductile Iron  
 Stainless Steel  
 Carbon Steel  
 Butterfly Valve  
 Ball Valve  
 Ball Valve Seat  
 Actuated Valve



TYPE		WAFER CHECK				WAFER CHECK			WAFER CHECK		
Ductile Iron											
FIG		10SWZU				20SWZ			20SWZU		
PRESSURE		10K				20K			20K		
END CONNECTION		Wafer Type				Wafer Type			Wafer Type		
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D
	1 1/2	40	—	—	—	54	128	55	—	—	—
	2	50	56	161	70	56	133	60	56	146	60
	2 1/2	65	56	168	70	60	150	70	60	168	70
	3	80	59	174	70	67	156	70	67	174	70
	4	100	66	187	70	68	169	70	68	187	70
	5	125	72	201	70	83	183	70	83	201	70
	6	150	78	220	80	95	216	80	95	219	80
	8	200	96	247	80	127	243	80	127	246	90
	10	250	109	298	90	140	290	90	140	293	90
	12	300	145	324	90	181	315	90	181	318	90
	14	350	184	337	90	184	330	90	184	337	90
	16	400	191	365	90	191	355	90	191	365	90
	18	450	204	394	90	204	388	90	204	394	90
BODY		Ductile Iron+NBR				Ductile Iron+NBR			Ductile Iron+NBR		
BOWNET		—				—			—		
HINGE PIN		SUS304				SUS304			SUS304		
DISC		SCS13				Cast Bronze			SCS13		

TYPE		Y TYPE STRAINER			Y TYPE STRAINER			Y TYPE STRAINER			Y TYPE STRAINER			Y TYPE STRAINER			
Ductile Iron																	
FIG		10FDY			10FDYBF			16FDY			16FDYB			20FDY			
PRESSURE		10K			10K			16K			16K			20K			
END CONNECTION		BS21 (JIS B0203)			JIS B2239			BS21 (JIS B0203)			JIS 2239			BS21 (JIS B0203)			
DIMENSIONS	inch	mm	L	H	D	L	H	D	L	H	D	L	H	D	L	H	D
	1/4	8	65	46	21	—	—	—	—	—	—	—	—	—	—	—	—
	3/8	10	70	46	23	—	—	—	—	—	—	—	—	—	80	65	27
	1/2	15	85	60	30	125	57	95	85	60	32	125	57	95	85	65	32
	3/4	20	100	65	36	140	63	100	100	65	38	140	63	100	100	70	38
	1	25	115	75	45	150	77	125	115	75	47	150	77	125	115	83	47
	1 1/4	32	135	90	55	170	90	135	135	90	57	170	90	135	135	120	57
	1 1/2	40	150	100	60	190	100	140	150	100	62	190	100	140	150	130	62
	2	50	180	115	78	230	138	155	180	115	79	250	158	155	180	152	79
	2 1/2	65	220	191	90	305	212	175	—	—	—	305	212	175	—	—	—
	3	80	250	215	105	360	242	185	—	—	—	360	242	200	—	—	—
	4	100	—	—	—	415	284	210	—	—	—	415	284	225	—	—	—
	5	125	—	—	—	465	325	250	—	—	—	465	325	270	—	—	—
	6	150	—	—	—	515	370	280	—	—	—	515	370	305	—	—	—
	8	200	—	—	—	580	462	330	—	—	—	580	462	350	—	—	—
	10	250	—	—	—	680	536	400	—	—	—	680	536	430	—	—	—
	12	300	—	—	—	800	625	445	—	—	—	800	625	480	—	—	—
BODY		Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			Ductile Iron			
CAP		Ductile Iron			—			Brass			—			Ductile Iron			
COVER		—			Ductile Iron			—			Ductile Iron			Ductile Iron			
DISC		—			—			—			—			—			
SCREEN		SUS304			SUS304			SUS304			SUS304			SUS304			