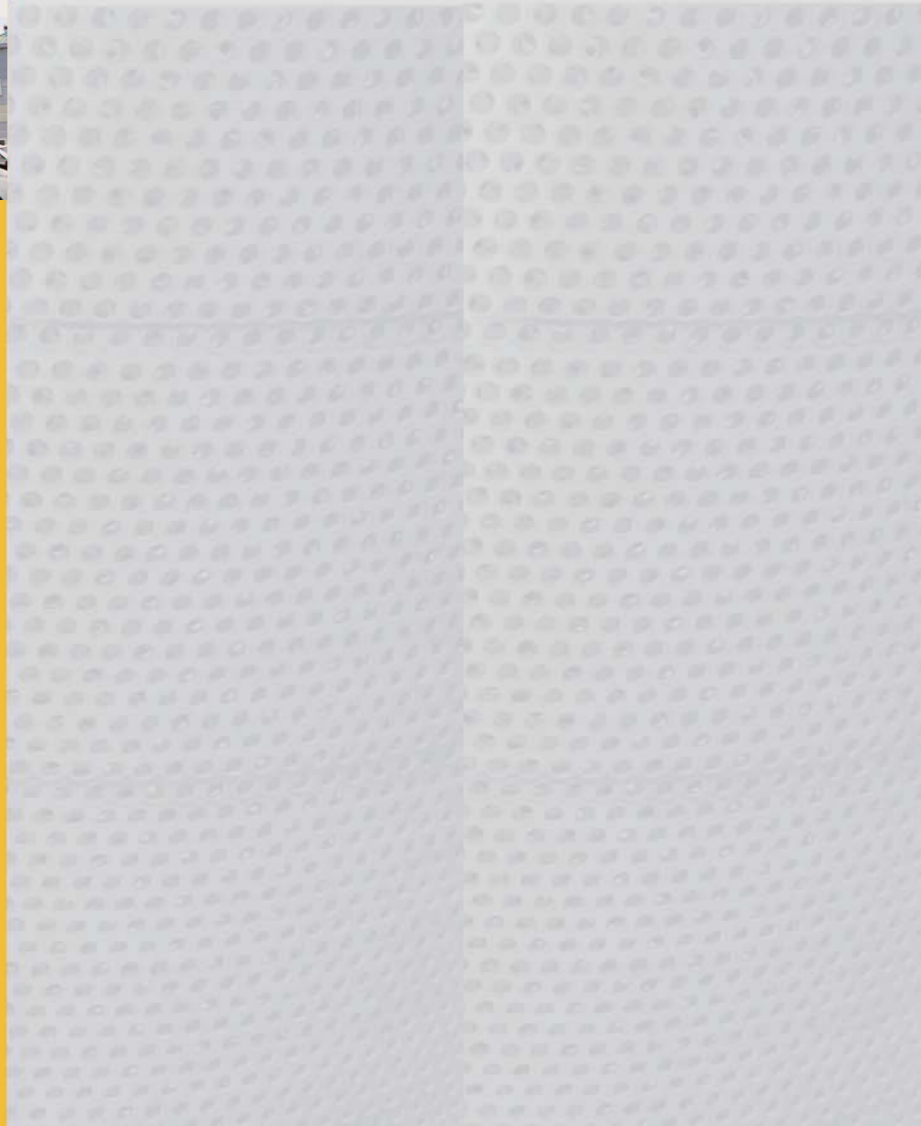




ISO / KSA 9001:2000

SEUNG JIN ENGINEERING_CATALOG 2016

Strainer & Filters



 **(주) 승진 엔지니어링** SEUNG JIN ENGINEERING CO., LTD.

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跳戰26年の歴史에서
跳躍100年の未來를 向한 革新

INDEX

- STRAINER
 - BUCKET TYPE STRAINER
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 - T-TYPE STRAINER
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 - DUPLEX TYPE STRAINER
 - AUTO-STRAINER
- SAMPLE COOLER UNIT
- FILTER HOUSING
- COALESCER / SEPARATOR
- TECHNICAL DATA

Figure Number

TYPE

SY : Y-STRAINER
 ST : T-STRAINER
 SB : BUCKET-STRAINER
 SC : CONE-STRAINER
 SD : DUPLEX STRAINER
 SS : SAMPLE COOLER
 SA : AUTO STRAINER

AF : AUTO FILTER
 BF : BAG FILTER
 CF : CARTRIDGE FILTER

RATINGS

ANSI B16.5/API 605
 A1 = 150LB
 A2 = 300LB
 A3 = 600LB
 A4 = 900LB
 A5 = 1500LB
 A6 = 2500LB

C1 = 10kg/ cm²
 C2 = 20kg/ cm²
 C3 = 40kg/ cm²
 C4 = 60kg/ cm²
 C5 = 100kg/ cm²

END CONNECTIONS

R.F : RAISED FACE
 F.F : FLAT FACE
 B.W : BUTT WELD
 R.J : RING JOINT
 S.W : SOCKET WELD
 T.E : THREAD END

SB 3102 A1 RF

BODY MATERIALS

11 A216 WCB	21 A105	31 A106 GR B
12 A217 WC1	22 A182 F1	32 A335 P1
13 A217 WC6	23 A182 F11	33 A335 P11
14 A217 WC9	24 A182 F22	34 A335 P22
15 A217 C5	25 A182 F5	35 A335 P5
16 A217 C12	26 A182 F9	36 A335 P9
17 A352 LCB	27 A350 LF1	37 A333 GR1
18 A352 LCC	28 A350 LF2	38 A333 GR6
41 A351 CF8	51 A182 F304	61 A312 TP304
42 A351 CF8M	52 A182 F304L	62 A312 TP304L
43 A351 CF3	53 A182 F316	63 A312 TP316
44 A351 CF3M	54 A182 F316L	64 A312 TP316L
45 A351 CG8M	55 A182 F317	65 A312 TP317
46 A351 CF8C	56 A182 F347	66 A312 TP347
47 A351 CG3M	57 A182 F317L	67 A312 TP347L
48 A351 CN7M	58 B564(N08800)	68 B407(N08800)
70 CAST IRON	91 HASTELLOY B	92 HASTELLOY C
90 MONEL		
93 TITANIUM		

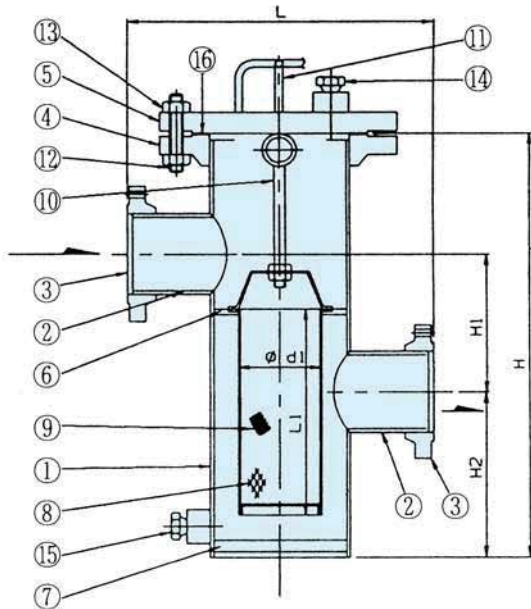
ELEMENT MATERIALS

02 304 SS
 09 MONEL
 10 316 SS
 13 ALLOY 20
 20 316L SS
 21 347 SS
 22 304L SS
 23 HASTELLOY B
 24 321SS
 27 HASTELLOY C
 30 317 SS
 33 317L SS
 39 TITANIUM
 40 TEFLON
 41 COTTON
 42 POLYESTER
 42 POLYPROPYLENE
 44 POLYETHYLENE
 45 PAPER
 46 R.B.C

● **EXAMPLE**

SB 6110 A1 RF STRAINER, BUCKET TYPE, A312 TP304 BODY, 316 SS ELEMENT, 150LB, RF

BUCKET TYPE STRAINER (SB-1)

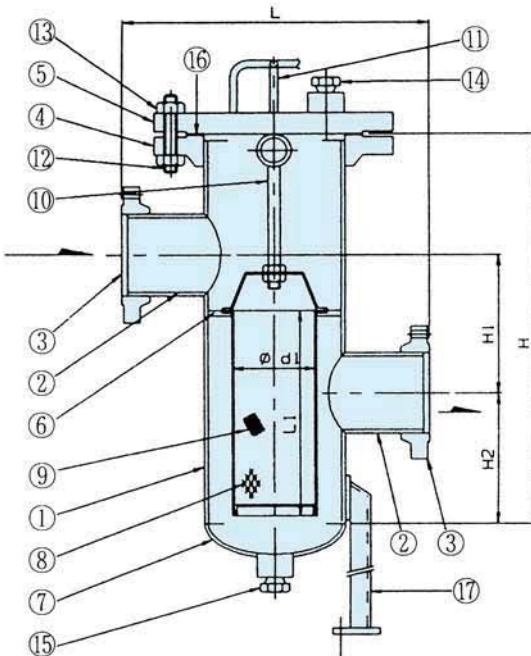


SB-1A

NO.	PART NAME	MATERIAL
1	SHELL	A53 Gr.B/A106 Gr.B
2	NOZZLE	A53 Gr.B/A106 Gr.B
3	NOZZLE FLANGE	A105
4	SHELL FLANGE	A105
5	COVER FLANGE	A105
6	ELEMENT SEAT	A516 Gr.60
7	BTM PLATE/HEAD	A516 Gr.60
8	HOLDER of SCREEN	A240-304
9	SCREEN	304SS
10	EYE BOLT	304SS
11	COVER HANDLE	A36
12	BOLT	A193 Gr.B7
13	NUT	A194 Gr.2H
14	VENT W/PLUG	A105
15	DRAIN W/PLUG	A105
16	GASKET	J#6000 or EQ
17	SUPPORT	A36

RATING : ANSI 150LB, 300LB

UNIT : mm

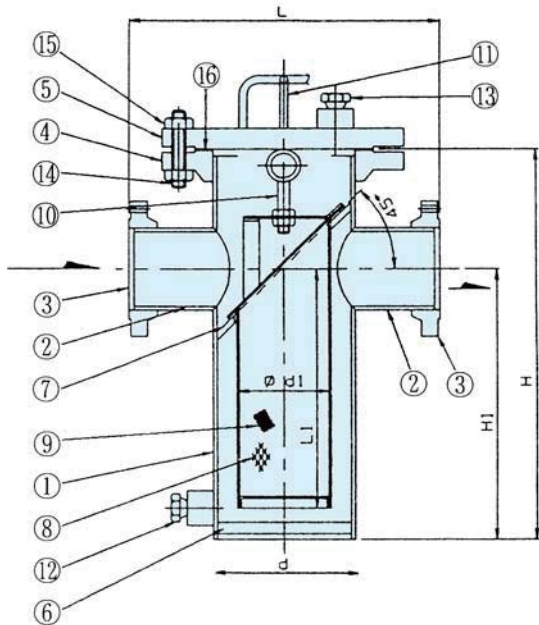


SB-1B

SIZE (INCH)	L	H	H1	H2	ELEMENT	
					∅d1	L1
2	350	360	140	110	60	130
2 1/2	380	400	160	120	110	160
3	400	470	190	150	110	220
4	460	540	210	170	140	275
5	480	620	250	210	150	300
6	520	700	280	230	180	310
8	600	950	340	350	220	470
10	750	1060	380	440	300	530
12	800	1310	430	620	300	500
14	900	1520	470	770	320	620
16	950	1640	520	800	380	680
18	1100	1840	600	900	500	1050
20	1100	1900	650	970	580	1120
24	1300	2390	750	1200	640	1370

※ 600LB, 900LB, 1500LB : AVAILABLE

BUCKET TYPE STRAINER (SB-2)

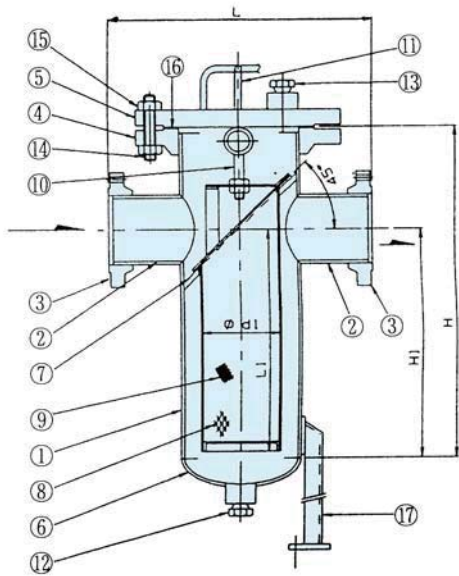


SB-2A

NO.	PART NAME	MATERIAL
1	SHELL	A53 Gr.B/A106 Gr.B
2	NOZZLE	A53 Gr.B/A106 Gr.B
3	NOZZLE FLANGE	A105
4	SHELL FLANGE	A105
5	COVER FLANGE	A105
6	BTM PLATE/HEAD	A516 Gr.60
7	ELEMENT SEAT	A516 Gr.60
8	HOLDER of SCREEN	A240-304
9	SCREEN	304SS
10	EYE BOLT	304SS
11	COVER HANDLE	A36
12	DRAIN W/PLUG	A105
13	VENT W/PLUG	A105
14	BOLT	A193 Gr.B7
15	NUT	A194 Gr.2H
16	GASKET	J#6000 or EQ
17	SUPPORT	A36

RATING : ANSI 150LB, 300LB

UNIT : mm

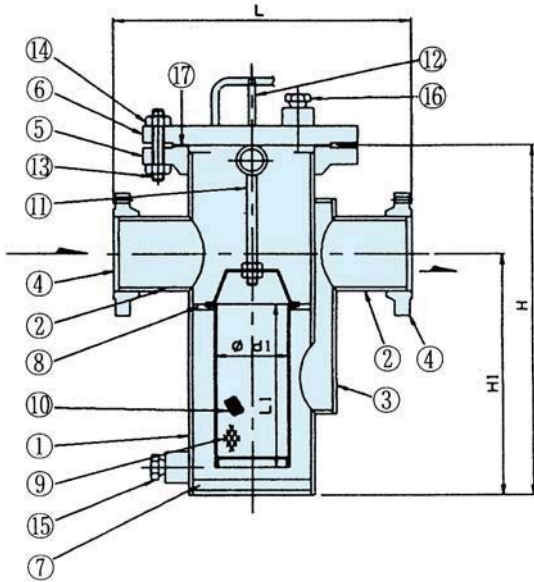


SB-2B

SIZE (INCH)	L	H	H1	C	ELEMENT	
					Ød1	L1
2	350	430	300	-	60	250
3	400	520	350	-	110	300
4	500	600	400	-	140	350
6	550	800	550	-	180	500
8	650	1040	760	-	220	700
10	800	1200	850	380	300	675
12	850	1420	1020	420	300	675
14	950	1600	1150	460	320	630
16	1000	1900	1400	510	400	800
18	1100	2100	1550	560	460	850
20	1100	2200	1600	660	550	1450
24	1400	2450	1800	760	620	1600

※ 600LB, 900LB, 1500LB : AVAILABLE

BUCKET TYPE STRAINER (SB-3)

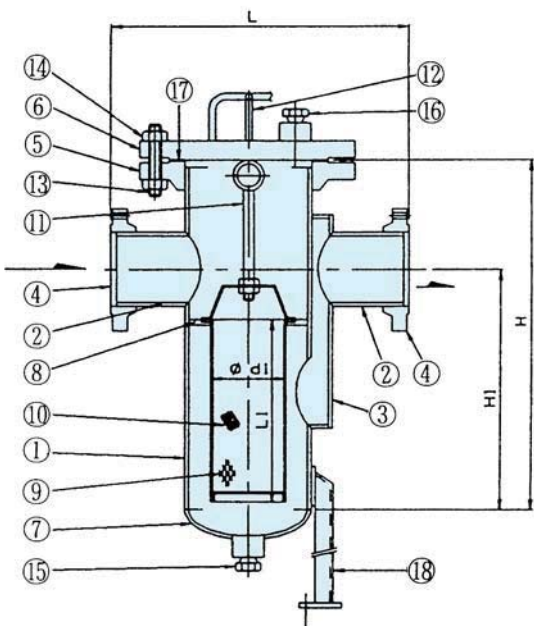


SB-3A

NO.	PART NAME	MATERIAL
1	SHELL	A53 Gr.B/A106 Gr.B
2	NOZZLE	A53 Gr.B/A106 Gr.B
3	SIDE SHELL	A53 Gr.B/A106 Gr.B
4	NOZZLE FLANGE	A105
5	SHELL FLANGE	A105
6	COVER FLANGE	A105
7	BTM PLATE/HEAD	A516 Gr.60
8	ELEMENT SEAT	A516 Gr.60
9	HOLDER OF SCREEN	A240-304
10	SCREEN	304SS
11	EYE BOLT	304SS
12	COVER HANDLE	A36
13	BOLT	A193 Gr.B7
14	NUT	A194 Gr.2H
15	DRAIN W/PLUG	A105
16	VENT W/PLUG	A105
17	GASKET	J#6000 or EQ
18	SUPPORT	A36

RATING : ANSI 150LB, 300LB

UNIT : mm

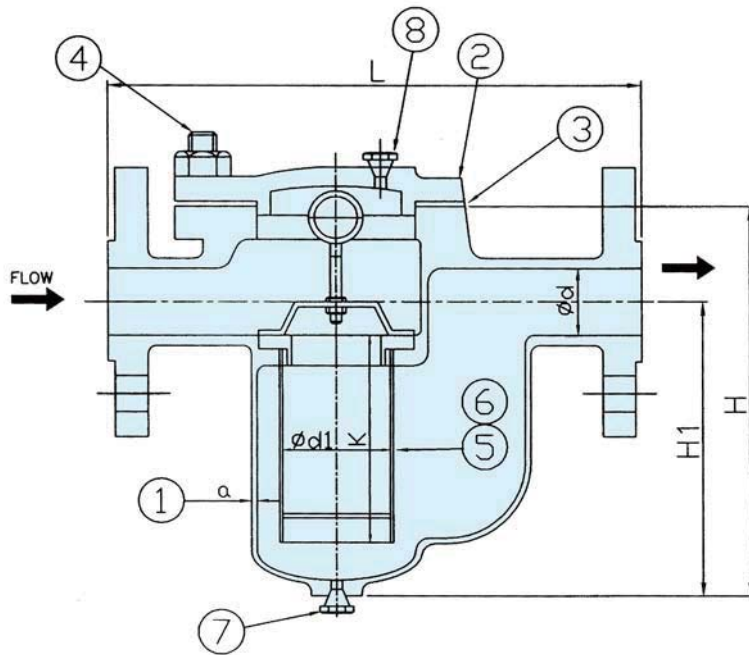


SB-3B

SIZE (INCH)	L	H	H1	ELEMENT	
				$\phi d1$	L1
2	370	375	235	60	130
2 1/2	410	440	280	110	160
3	450	530	360	110	220
4	520	590	400	140	240
5	560	695	485	150	300
6	620	760	540	180	330
8	710	1000	740	220	470
10	860	1140	840	300	530
12	950	1410	1060	300	530
14	1000	1550	1170	320	800
16	1100	1720	1320	380	920
18	1200	1940	1510	420	1050
20	1360	2130	1670	580	1120
24	1550	2460	1950	640	1370

※ 600LB, 900LB, 1500LB : AVAILABLE

BUCKET TYPE STRAINER (SB-4)



SB-4A

RATING : ANSI 150LB, 300LB

UNIT : mm

NO.	DESCRIPTION	MATERIAL
1	SHELL	A216 WCB
2	BLIND FLANGE	A216 WCB
3	GASKET	J#3834-SF or EQ.
4	STUD BOLT/NUT	A193-B7/A194-2H
5	SCREEN	304SS
6	ELEMENT	304SS
7	DRAIN W/PLUG	A105
8	VENT W/PLUG	A105

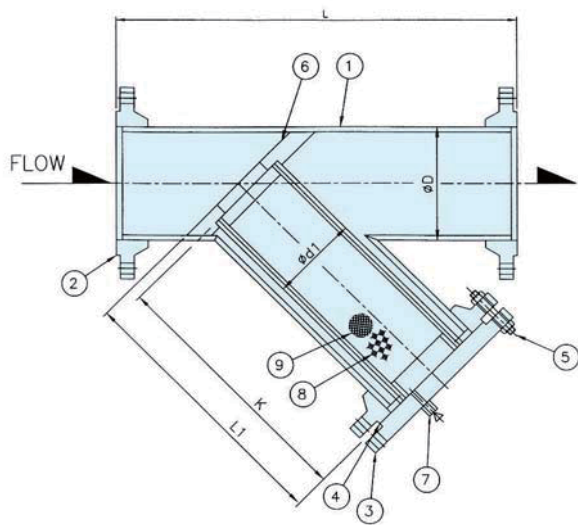
SIZE (INCH)	BODY					ELEMENT	
	L	H	H1	ϕd	a	$\phi d1$	k
1/2"	180	120	80	15	3	30	65
3/4"	180	120	80	20	3	30	65
1"	190	140	120	26	3	40	75
1 1/2"	230	195	160	40	4	50	85
2"	230	210	160	50	5	60	85
2 1/2"	290	240	190	65	6	85	145
3"	300	370	310	80	8	85	145
4"	365	400	330	100	10	110	160
6"	500	510	410	150	12	170	280
8"	630	680	550	200	14	200	350
10"	710	870	650	250	16	250	450
12"	790	1030	780	300	18	300	550
14"	900	1200	850	350	20	350	600

※ 600LB, 900LB, 1500LB : AVAILABLE

Y-TYPE STRAINER (SY-1, SY-2)

WROUGHT

NO.	DESCRIPTION	MATERIAL
1	SHELL	A106 Gr.B
2	SHELL FLANGE	A105
3	BLIND FLANGE	A105
4	GASKET	J/#3834-SF or EQ.
5	STUD BOLT/NUT	A193-B7/A194-2H
6	SEAT PLATE	A516 GR 60
7	DRAIN W/PLUG	A105
8	ELEMENT	304SS
9	SCREEN	304SS



SY-1

CASTING

RATING : ANSI 150LB

UNIT : mm

SIZE (INCH)	L		H	ØD	ELEMENT	
	150LB	300LB			Ød1	L1
1/2"	140	144	100	15	25	60
3/4"	140	144	110	20	30	68
1"	160	175	125	25	34	73
1-1/2"	220	229	160	40	55	100
2"	250	267	170	50	58	120
2-1/2"	280	292	180	65	83	120
3"	318	335	220	80	92	163
4"	344	400	310	100	130	230
5"	394	460		125	140	225
6"	442	520	580	150	200	293
8"	575	582		200	250	400
10"	673	673		250	300	475
12"	775	810		300	350	645

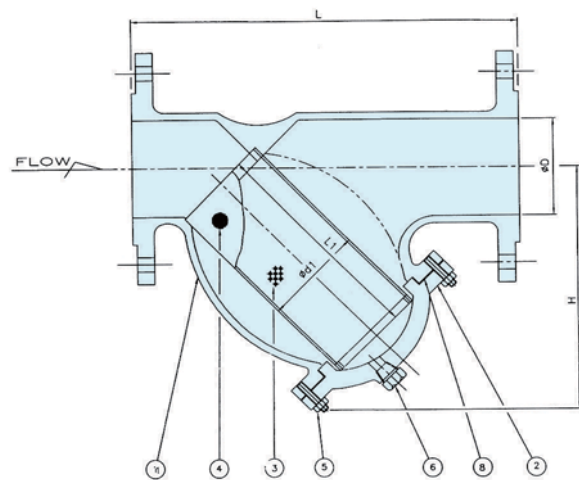
※ 600LB, 900LB, 1500LB : AVAILABLE

RATING : ANSI 150LB, 300LB

UNIT : mm

SIZE (INCH)	BODY			ELEMENT	
	L	ØD	L1	Ød1	K
2"	305	60.3	240	35	237
2 1/2"	330	73.0	250	50	247
3"	345	88.9	310	60	307
4"	430	114.3	350	80	347
5"	485	141.3	400	100	397
6"	525	168.3	440	120	437
8"	630	219.1	525	160	522
10"	730	273.1	630	210	627
12"	855	323.8	730	250	727
14"	985	355.6	850	290	847
16"	1050	406.4	890	340	887
18"	1140	457.2	950	380	947
20"	1220	508.0	1020	440	1017
24"	1425	609.6	1200	530	1197

※ 600LB, 900LB, 1500LB : AVAILABLE

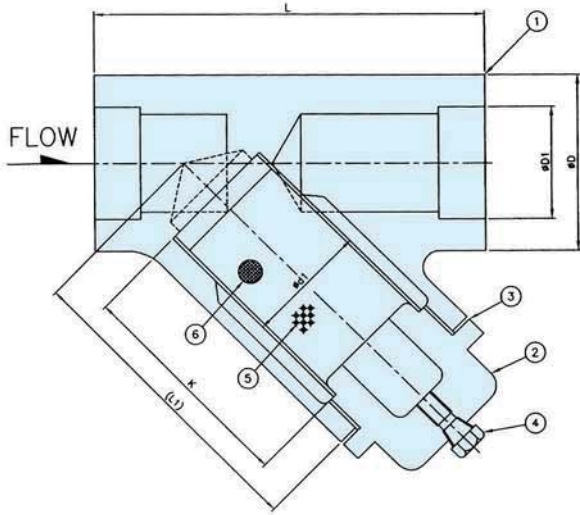


SY-2

NO.	DESCRIPTION	MATERIAL
1	BODY	A216 WCB
2	COVER	A216 WCB
3	ELEMENT	304SS
4	SCREEN	304SS
5	STUD BOLT/NUT	A193-B7/A194-2H
6	DRAIN W/PLUG	A105
7	GASKET	J#3834 SF or EQ.

Y-TYPE STRAINER (SY-3)

FORGED S.W



SY-3A

RATING : ANSI 1500LB

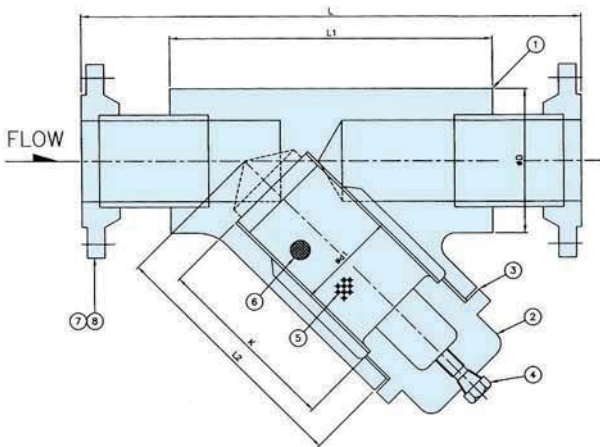
UNIT : mm

SIZE (INCH)	L	L1	ØD	ØD1	ELEMENT		DRAIN
					Ød1	Ød2	
1/2"	110	46	22.2	40	19	40	3/8"
3/4"	120	58	27.8	48	30	55	3/8"
1"	130	125	34.5	63	36	60	1/2"
1-1/2"	200	160	49.5	83	53	78	3/4"
2"	200	170	61.9	83	53	78	3/4"

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

NO.	DESCRIPTION	MATERIAL
1	BODY	A105
2	COVER	A105
3	GASKET	J#3834 SF or EQ.
4	DRAIN W/PLUG	A105
5	ELEMENT	304SS
6	SCREEN	304SS
7	FLANGE	A105
8	PIPE	A106 GR B

FORGED FLANGE



SY-3B

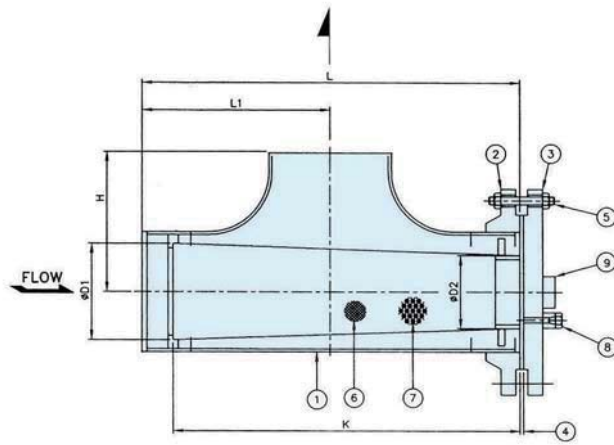
RATING : ANSI 150LB

UNIT : mm

SIZE (INCH)	L	L1	L2	ØD	ØD1	ELEMENT		DRAIN
						Ød1	Ød2	
1/2"	205	110	46	22.2	40	19	40	3/8"
3/4"	225	120	58	27.8	48	30	55	3/8"
1"	240	130	125	34.5	63	36	60	1/2"
1-1/2"	325	200	160	49.5	83	53	78	3/4"
2"	330	200	170	61.9	83	53	78	3/4"

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

T- TYPE STRAINER (ST-1)



ST-1A

RATING : ANSI 150LB

UNIT : mm

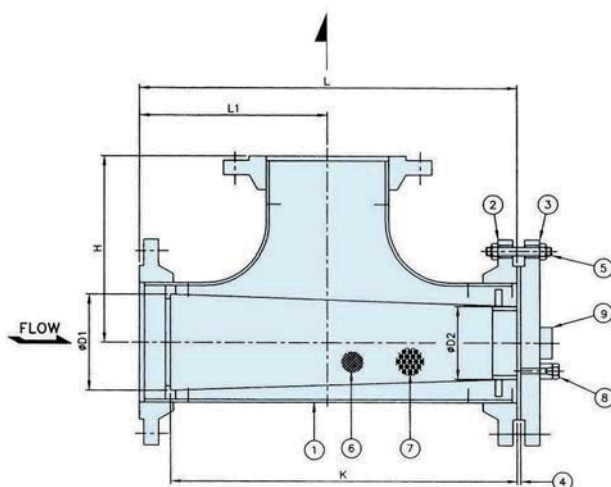
SIZE (INCH)	BODY			ELEMENT		
	L	L1	H	ØD1	ØD2	K
2"	260	63.5	63.5	38	26	230
2 1/2"	298	76.2	76.2	52	34	270
3"	318	85.7	85.7	60	40	290
4"	368	104.8	104.8	80	54	340
5"	432	123.8	123.8	110	74	400
6"	470	142.9	142.9	120	80	440
8"	564	177.8	177.8	170	114	535
10"	642	215.9	215.9	220	148	600
12"	742	254.0	254.0	250	166	700
14"	818	279.4	279.4	300	200	780
16"	870	304.8	304.8	340	226	830
18"	972	342.9	342.9	380	254	930
20"	1058	381.0	381.0	430	288	1010
24"	1174	431.8	431.8	530	354	1130

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

NO.	DESCRIPTION	MATERIAL
1	SHELL	A234-WPB
2	SHELL FLANGE	A105
3	BLIND FLANGE	A105
4	GASKET	J#3834 SF or EQ.
5	STUD BOLT/NUT	A193-B7/A194-2H
6	SCREEN	304SS
7	ELEMENT	304SS
8	DRAIN	A105
9	NAME PLATE BRACKET	A283 Gr. C or EQ

RATING : ANSI 150LB

UNIT : mm



ST-1B

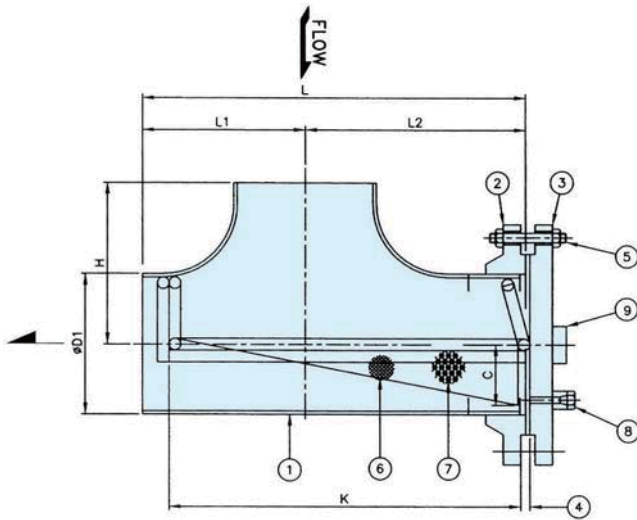
SIZE (INCH)	BODY			ELEMENT		
	L	L1	H	ØD1	ØD2	K
2"	260	130	130	38	26	230
2 1/2"	298	149	149	52	34	270
3"	318	159	159	60	40	290
4"	368	184	184	80	54	340
5"	432	216	216	110	74	400
6"	470	235	235	120	80	440
8"	564	282	282	170	114	535
10"	642	321	321	220	148	600
12"	742	371	371	250	166	700
14"	818	409	409	300	200	780
16"	870	435	435	340	226	830
18"	972	486	486	380	254	930
20"	1058	529	529	430	288	1010
24"	1174	587	587	530	354	1130

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

T-TYPE STRAINER (ST-2)

RATING : ANSI 150LB

UNIT : mm



ST-2A

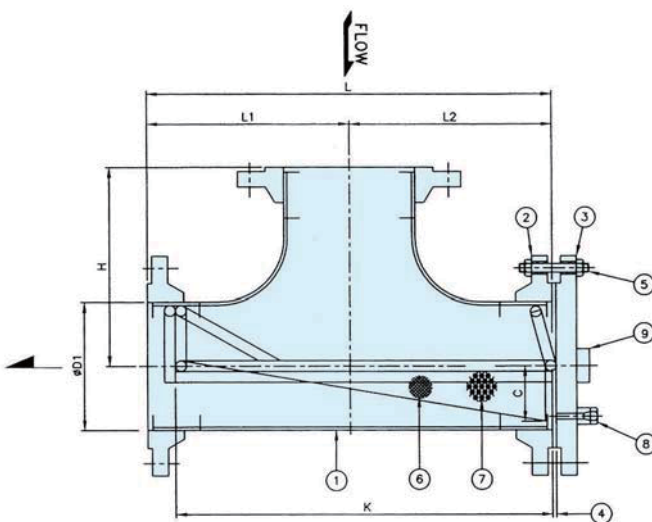
SIZE (INCH)	BODY					ELEMENT	
	L	L1	L2	H	ØD1	C	K
2"	194	63.5	130	63.5	60.3	26	170
2 1/2"	225	76.2	149	76.2	73.0	31	200
3"	245	85.7	159	85.7	88.9	39	220
4"	289	104.8	184	104.8	114.3	51	265
5"	340	123.8	216	123.8	141.3	64	315
6"	378	142.9	235	142.9	168.3	77	350
8"	460	177.8	282	177.8	219.1	101	430
10"	537	215.9	321	215.9	273.1	127	505
12"	625	254.0	371	254.0	323.8	152	595
14"	688	279.4	409	279.4	355.6	168	650
16"	740	304.8	435	304.8	406.4	193	700
18"	829	342.9	486	342.9	457.2	219	790
20"	910	381.0	529	381.0	508.0	244	870
24"	1019	431.8	587	431.8	609.6	295	980

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

NO.	DESCRIPTION	MATERIAL
1	SHELL	A234-WPB
2	SHELL FLANGE	A105
3	BLIND FLANGE	A105
4	GASKET	J/#3834 SF or EQ.
5	STUD BOLT/NUT	A193-B7/A194-2H
6	SCREEN	304SS
7	ELEMENT	304SS
8	DRAIN	A105
9	NAME PLATE BRACKET	A283 Gr.C or EQ.

RATING : ANSI 150LB

UNIT : mm

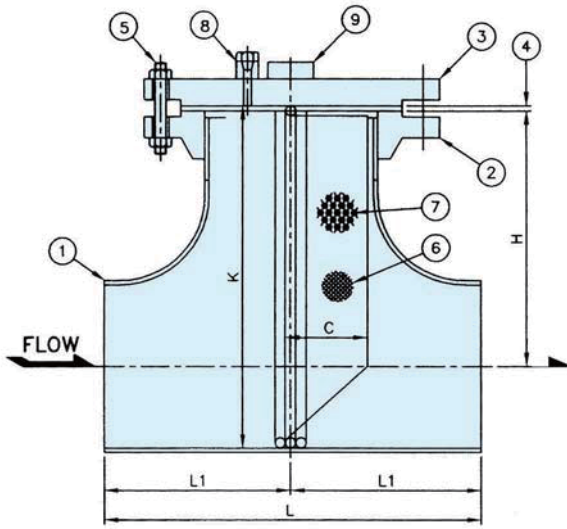


ST-2B

SIZE (INCH)	BODY					ELEMENT	
	L	L1	L2	H	ØD1	C	K
2"	260	130	130	130	60.3	26	230
2 1/2"	298	149	149	149	73.0	31	270
3"	318	159	159	159	88.9	39	290
4"	368	184	184	184	114.3	51	340
5"	432	216	216	216	141.3	64	400
6"	470	235	235	235	168.3	77	440
8"	564	282	282	282	219.1	101	535
10"	642	321	321	321	273.1	127	600
12"	742	371	371	371	323.8	152	700
14"	818	409	409	409	355.6	168	780
16"	870	435	435	435	406.4	193	830
18"	972	486	486	486	457.2	219	930
20"	1058	529	529	529	508.0	244	1010
24"	1174	587	587	587	609.6	295	1130

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

T- TYPE STRAINER (ST-3)



ST-3A

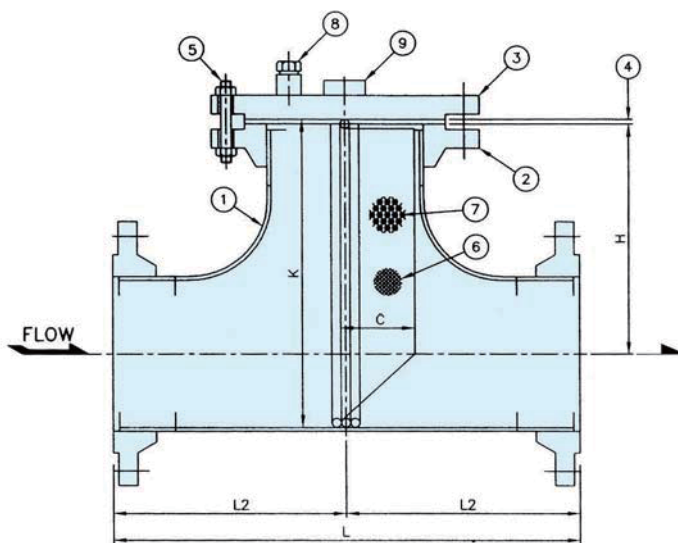
NO.	DESCRIPTION	MATERIAL
1	SHELL	A234-WPB
2	SHELL FLANGE	A105
3	BLIND FLANGE	A105
4	GASKET	J#3834 SF or EQ.
5	STUD BOLT/NUT	A193-B7/A194-2H
6	SCREEN	304SS
7	ELEMENT	304SS
8	DRAIN W/PLUG	A105
9	NAME PLATE BRACKET	EQ.

RATING : ANSI 150LB

UNIT : mm

SIZE (INCH)	BODY			ELEMENT	
	L	L1	H	C	K
2"	127.0	63.5	130	20	156
2 1/2"	152.4	76.2	149	25	180
3"	171.4	85.7	159	30	198
4"	209.6	104.8	184	40	235
5"	247.6	123.8	216	50	280
6"	285.8	142.9	235	65	312
8"	355.6	177.8	282	90	383
10"	431.8	215.9	321	115	448
12"	508.0	254.0	371	140	523
14"	558.8	279.4	409	155	577
16"	609.6	304.8	435	180	629
18"	683.8	342.9	486	195	706
20"	762.0	381.0	529	215	774
24"	833.6	431.8	587	260	882

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE



ST-3B

RATING : ANSI 150LB

UNIT : mm

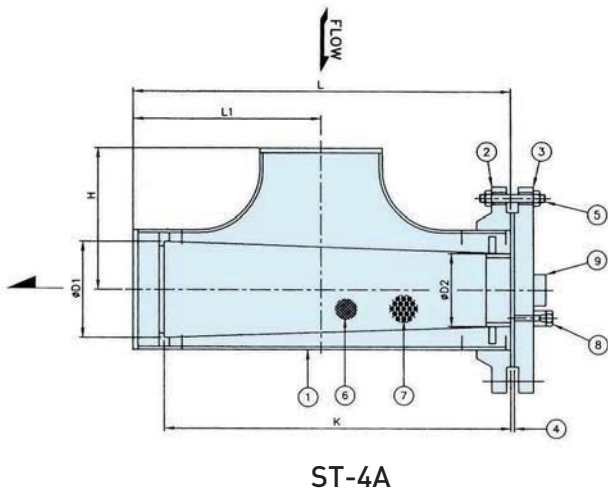
SIZE (INCH)	BODY			ELEMENT	
	L	L1	H	C	K
2"	260	130	130	26	156
2 1/2"	298	149	149	31	180
3"	318	159	159	39	198
4"	368	184	184	51	235
5"	432	216	216	64	280
6"	470	235	235	77	312
8"	564	282	282	101	383
10"	642	321	321	127	448
12"	742	371	371	152	523
14"	818	409	409	168	577
16"	870	435	435	194	629
18"	972	486	486	220	706
20"	1058	529	529	245	774
24"	1174	587	587	295	882

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

T-TYPE STRAINER (ST-4)

RATING : ANSI 150LB

UNIT : mm



ST-4A

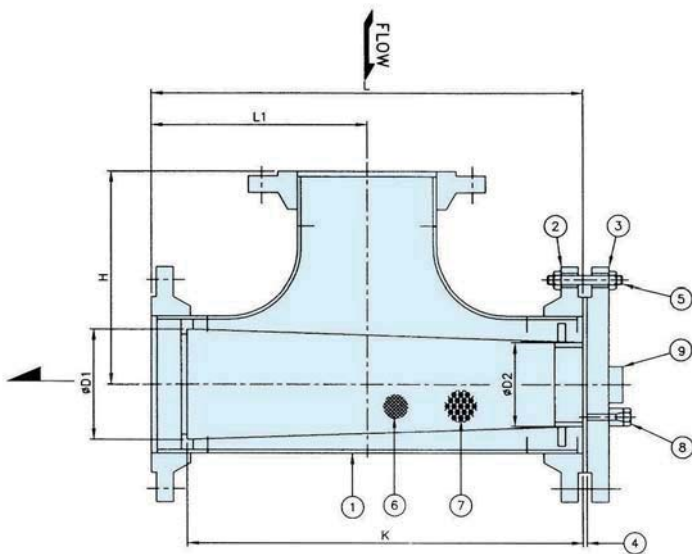
SIZE (INCH)	BODY			ELEMENT		
	L	L1	H	ØD1	ØD2	K
2"	260	63.5	63.5	38	26	230
2 1/2"	298	76.2	76.2	52	34	270
3"	318	85.7	85.7	60	40	290
4"	368	104.8	104.8	80	54	340
5"	432	123.8	123.8	110	74	400
6"	470	142.9	142.9	120	80	440
8"	564	177.8	177.8	170	114	535
10"	642	215.9	215.9	220	148	600
12"	742	254.0	254.0	250	166	700
14"	818	279.4	279.4	300	200	780
16"	870	304.8	304.8	340	226	830
18"	972	342.9	342.9	380	254	930
20"	1058	381.0	381.0	430	288	1010
24"	1174	431.8	431.8	530	354	1130

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

NO.	DESCRIPTION	MATERIAL
1	SHELL	A234-WPB
2	SHELL FLANGE	A105
3	BLIND FLANGE	A105
4	GASKET	J#3834 SF or EQ.
5	STUD BOLT/NUT	A193-B7/A194-2H
6	SCREEN	304SS
7	ELEMENT	304SS
8	DRAIN W/PLUG	A105
9	NAME PLATE BRACKET	A283 Gr.C or EQ.

RATING : ANSI 150LB

UNIT : mm

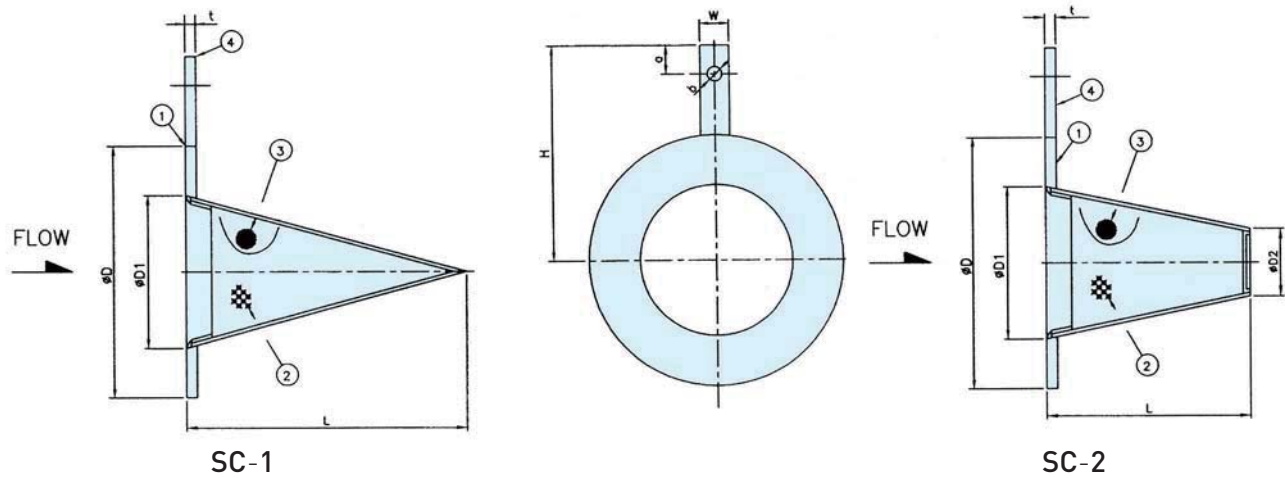


ST-4B

SIZE (INCH)	BODY			ELEMENT		
	L	L1	H	ØD1	ØD2	K
2"	260	130	130	38	26	230
2 1/2"	298	149	149	52	34	270
3"	318	159	159	60	40	290
4"	368	184	184	80	54	340
5"	432	216	216	110	74	400
6"	470	235	235	120	80	440
8"	564	282	282	170	114	535
10"	642	321	321	220	148	600
12"	742	371	371	250	166	700
14"	818	409	409	300	200	780
16"	870	435	435	340	226	830
18"	972	486	486	380	254	930
20"	1058	529	529	430	288	1010
24"	1174	587	587	530	354	1130

※ 300LB, 600LB, 900LB, 1500LB : AVAILABLE

TEMPORARY(CONE-TYPE) STRAINER



NO.	DESCRIPTION	MATERIAL
1	PLATE	A240-304
2	ELEMENT	304SS
3	SCREEN	304SS
4	HANDLE	304SS
5	SPACER RING	A240-304

※ TEMPORARY STRAINER : SPACER RING INCLUDED

RATING : ANSI 150LB, 300LB

UNIT : mm

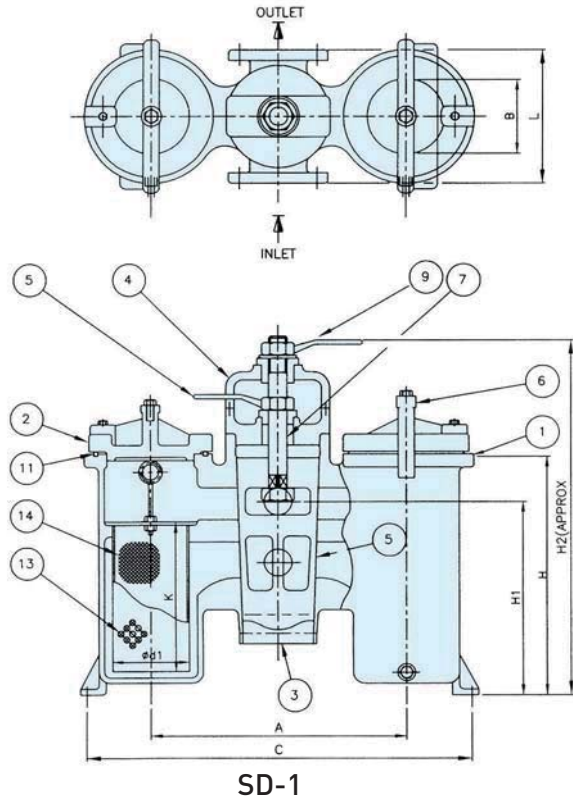
SIZE (INCH)	L		ØD		ØD1	ØD2	t	W	H		a
	SHORT	LONG	150LB	300LB					150LB	300LB	
1/2"	22	35	45	53	13	-	2	20	75	90	10
3/4"	26	45	55	66	18	9	2	20	85	90	10
1"	35	55	64	72	24	12	2	20	90	100	10
1 1/2"	42	78	83	94	36	18	2	20	100	110	10
2"	52	100	102	110	48	24	2	20	120	130	10
2 1/2"	62	122	121	130	60	30	2	20	140	150	10
3"	74	145	134	149	72	36	3	25	150	160	12
4"	95	190	172	180	95	48	3	25	160	170	12
5"	115	235	195	215	118	60	3	25	180	190	12
6"	140	280	220	250	142	71	3	25	200	220	12
8"	175	360	277	307	188	94	4	25	230	250	12
10"	220	455	338	361	235	118	4	25	280	300	12
12"	260	540	408	421	280	140	4	25	310	330	12
14"	300	620	449	485	325	163	6	40	345	360	12
16"	340	715	512	539	375	188	6	40	380	400	12
18"	385	810	547	596	425	213	6	40	410	420	12
20"	425	895	604	653	470	235	6	40	450	480	12
24"	510	1070	715	774	570	285	6	40	510	550	12

※ 600LB, 900LB, 1500LB AVAILABLE

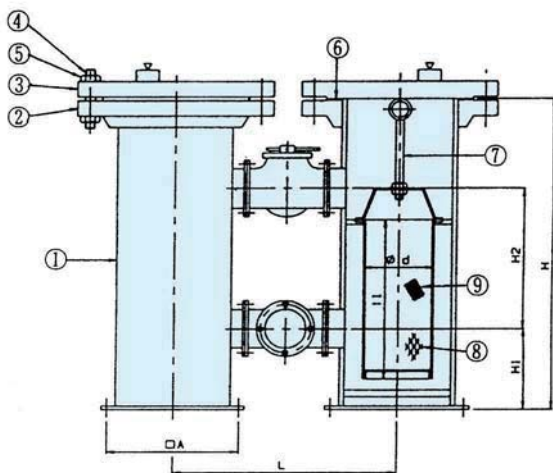
DUPLIX TYPE STRAINER (SD-1, SD-2)

RATING : ANSI 150LB, 300LB

UNIT : mm



SD-1



SD-2

SIZE (INCH)	DIMENSION						
	L	H	H1	H2	A	C	B
1"	250		210	460		295	45
1 1/2"	270		215	480	295	435	45
2"	300		220	500	435	425	45
2 1/2"	344		225	546	425	527	64
3"	344		225	546	527	527	64
4"	406		336	765	527	546	76
5"	510		400	1050	546	895	85
6"	570		550	1140	895	1080	85
8"	580		550	1140	1080	1080	85
10"	750		875	1630	1080	1130	110

※ 600LB, 900LB, 1500LB AVAILABLE

NO.	DESCRIPTION	MATERIAL
1	BODY	A216-WCB
2	COVER	A216-WCB
3	COKE	A216-WCB
4	COVER HANDLE	A216-WCB
5	COCK	BRONZE
6	LIFTING HANDLE	A216 WCB
7	STEM	C/S
8	HEX BOLT	A193-B7/A194-2H
9	LIFTING HANDLE	A216 WCB
10	COCK PLUG	A105
11	O-RING	N.B.R
12	DRAIN PLUG	A105
13	ELEMENT	304SS
14	SCREEN	304SS

NO.	DESCRIPTION	MATERIAL
1	BODY	A53 Gr. B
2	SHELL FLANGE	A105
3	COVER FLANGE	A105
4	BOLT	A193 Gr. B7
5	NUT	A194 Gr. 2H
6	GASKET	J#6000 or EQ.
7	EYE BOLT	304SS
8	HOLDER of SCREEN	A240-304
9	SCREEN	304SS

RATING : ANSI 150LB

UNIT : mm

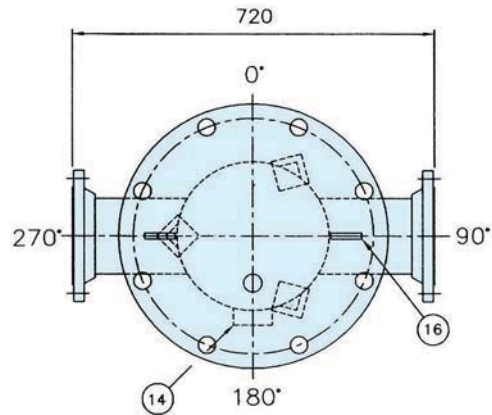
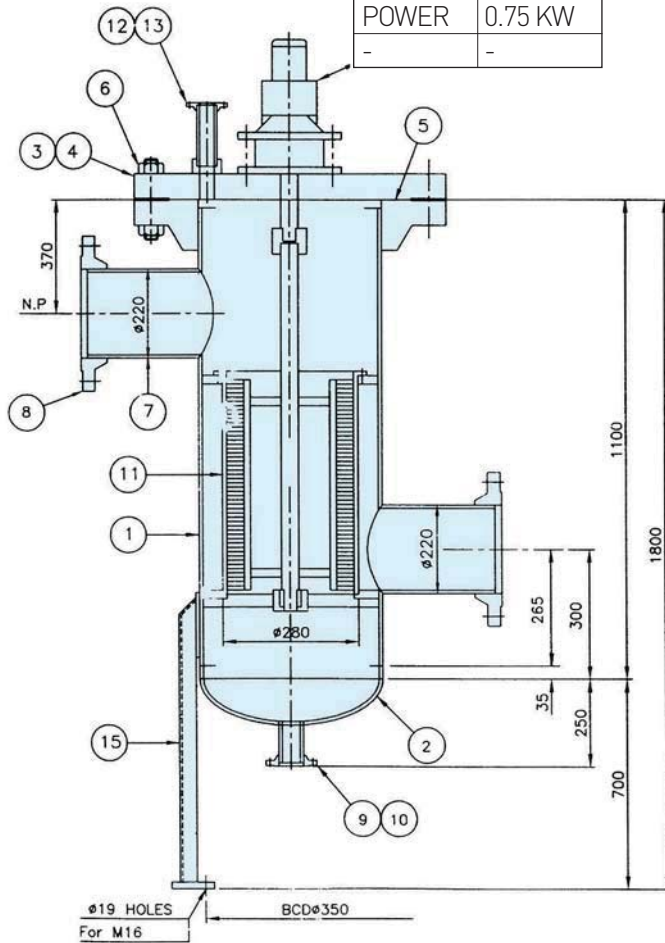
SIZE (INCH)	DIMENSION							
	L	H	H1	H2	OA	ØD	l 1	
1"	470	700	200	300	140	50	350	
1 1/2"	470	700	200	300	140	50	350	
2"	800	800	250	350	180	80	450	
3"	800	800	250	350	180	80	450	

※ 300LB, 600LB, 900LB, 1500LB AVAILABLE

AUTO STRAINER

MOTOR SPEC.

TAG NO.	AF-01
VOLTAGE	380 V
HERTZ	60 HZ
PHASE	3 PH
POWER	0.75 KW
-	-



AF-01

RATING : ANSI 150LB

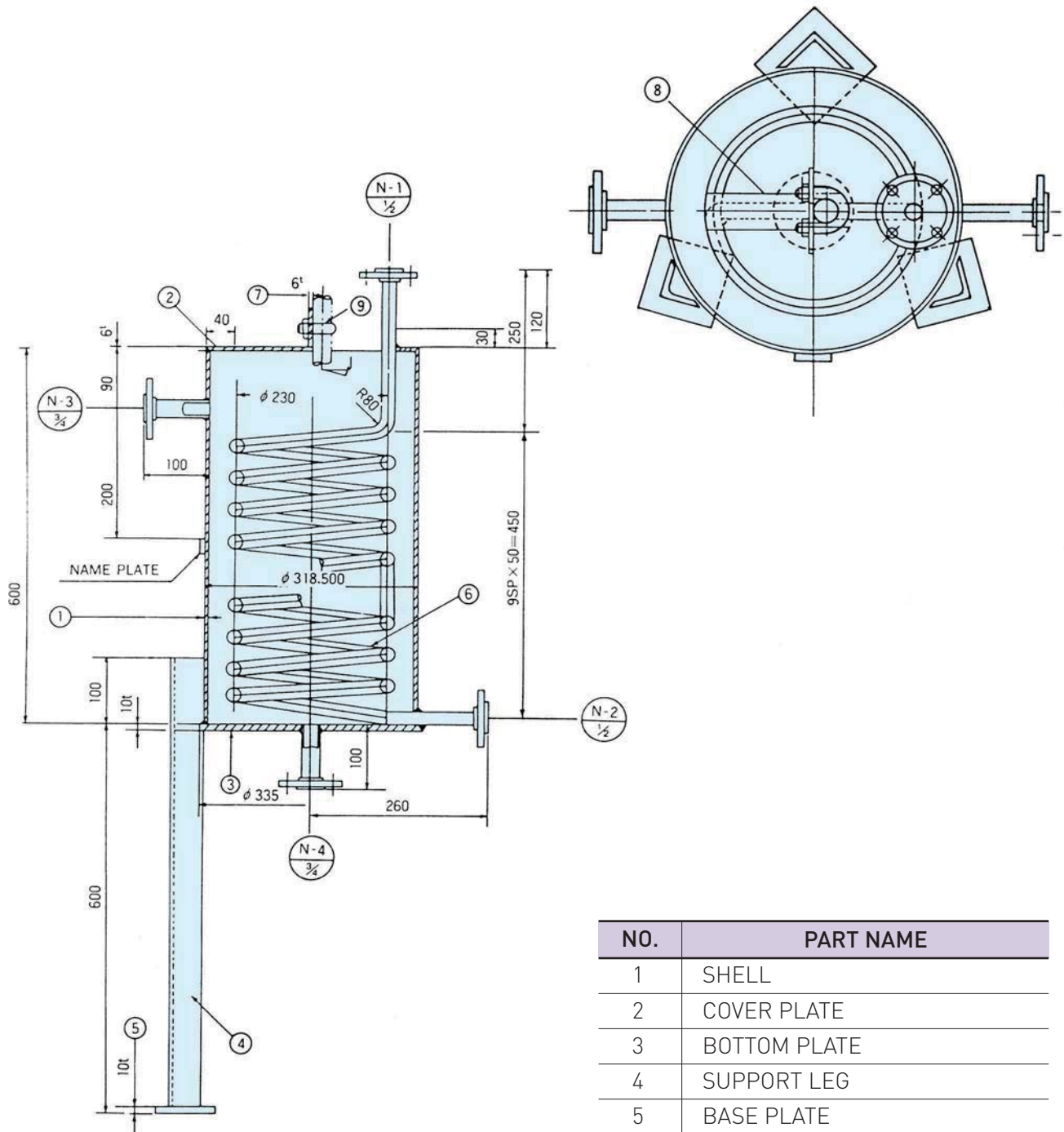
UNIT : mm

NO.	DESCRIPTION	MATERIAL
1	SHELL	304 S.S
2	HEAD(2:1 ELLIPS)	304 S.S
3	SHELL FLANGE	A182 F304
4	BLIND FLANGE	A182 F304
5	GASKET	J#3834 SF or EQ.
6	STUD BOLT/NUT	A193 B8
7	NOZZLE NECK	A312 TP304-EFW
8	NOZZLE FLANGE	A182 F304
9	NOZZLE NECK	A312 TP304-EFW
10	NOZZLE FLANGE	A182 F304
11	ELEMENT(SCREEN)	304 S.S
12	NOZZLE NECK	A312 TP304-EFW
13	NOZZLE FLANGE	A182 F304
14	NAME PLATE BRACKET	304 S.S
15	SUPPORT LEG	A36 or 304 S.S
16	LIFTING LUG	C/S or S/S

※ 300LB, 600LB, 900LB, 1500LB AVAILABLE

SAMPLE COOLER UNIT

Sample cooler is used for cooling of the sampling hot liquid or gas from process line.



- Material Application
 - Carbon Steel
 - Stainless Steel
 - Alloy Steel

NO.	PART NAME
1	SHELL
2	COVER PLATE
3	BOTTOM PLATE
4	SUPPORT LEG
5	BASE PLATE
6	COOLING COIL
7	BRACKET
8	SUPPORT PLATE
9	U-BOLT
N-1	SAMPLE INLET
N-2	SAMPLE OUTLET
N-3	COOLING WATER OVER FLOW
N-4	COOLING WATER DRAIN

1. FILTER HOUSING MATERIAL : CARBON STEEL, STAINLESS STEEL,
OTHER MATERIALS.

2. DESIGN CODE : ASME SEC.VIII DIV. I
JIS B 8243
KS B 6231

3. COVER OPENING TYPE

- STUD BOLT & NUT WITH DAVIT (OR TOP DAVIT)
- SWING BOLT & EYE WITH HINGE
- SWING BOLT & EYE NUT WITH DAVIT (OR TOP DAVIT)
- QUICK OPENING CLOSURE
- HYDRAULIC COVER LIFT

4. DESIGN CONDITION

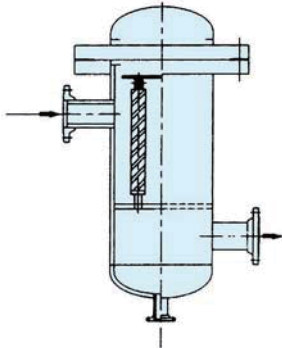
- DESIGN PRESSURE : kg/cm².G(Mpa)
- OPERATING PRESSURE : kg/cm².G(Mpa)
- DESIGN TEMP. : °C
- OPERATING TEMP. : °C
- FLOW RATE : M³/HR, GPH
- FILTRATION RATING : #MESH, MM, INCH
- FLUID NAME : WATER, OIL, COMPRESSED AIR
- SPECIFIC GRAVITY OR DENSITY : g/cm³
- CONNECTION SIZE & RATING
- OPERATION MODE : BATCH OR CONTINUOUS

5. DARCY'S THEORY FOR FILTER

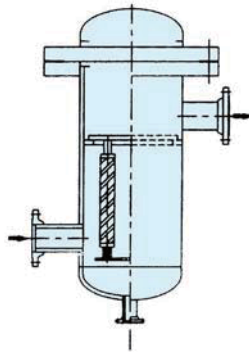
$$Q = \frac{\Delta P \cdot A}{\mu \cdot R}$$

- * A = FILTRATION AREA
- * Q = FLOW RATE
- * ΔP = PRESSURE DROP
- * μ = VISCOSITY
- * R = MEDIA RESISTANCE

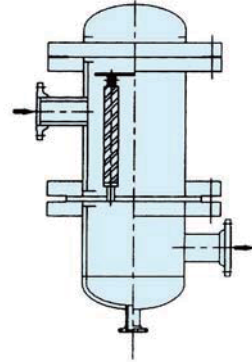
SFC-A



SFC-B

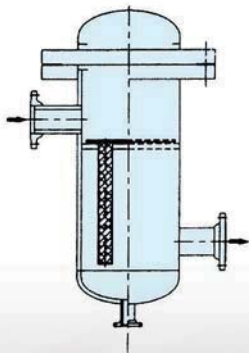


SFC-C

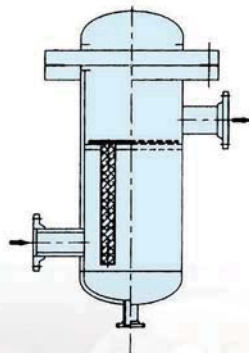


CARTRIDGE FILTER HOUSING

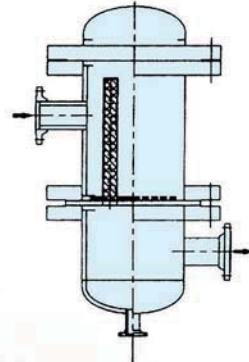
SFB-A



SFB-B



SFB-C

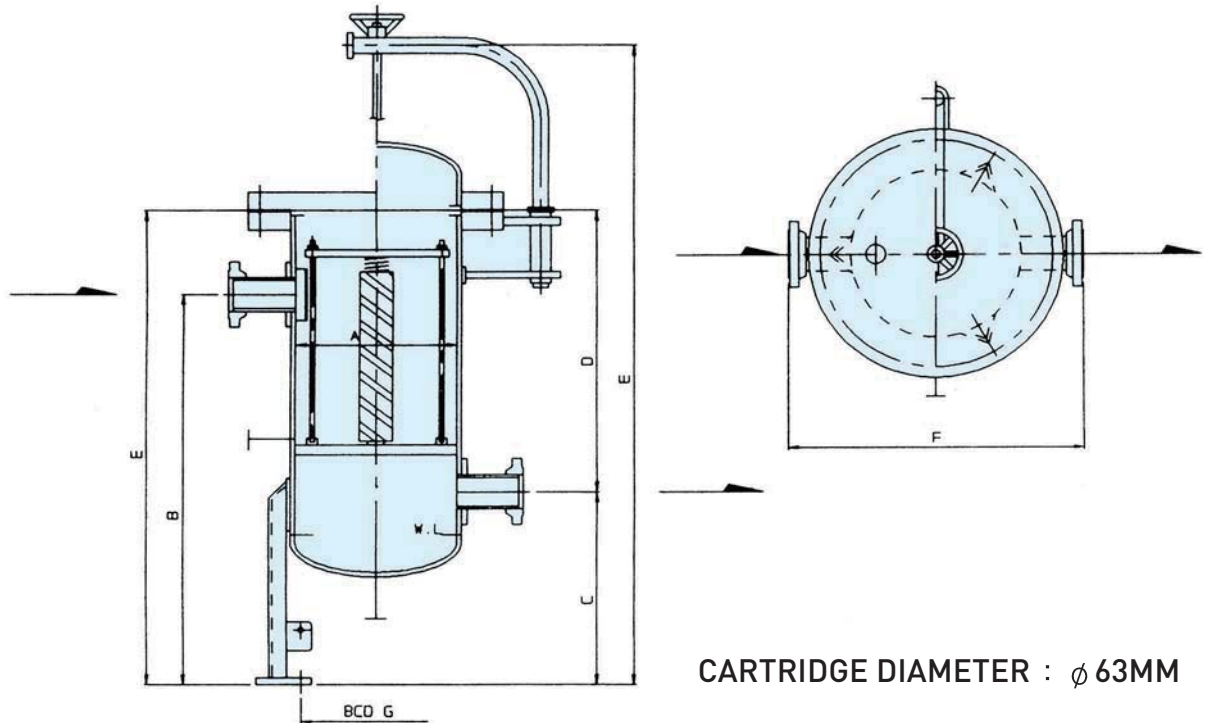


BAG FILTER HOUSING



FILTER HOUSING

CFH-20-3
 FILTER CARTRIDGE QUANTITY
 FILTER CARTRIDGE LENGTH
 CARTRIDGE FILTER HOUSING TYPE



RATING : ANSI 150LB, 300LB

UNIT : mm

MODEL NO.	IN/OUT CONN.SIZE (INCH)	FLOW RATE (M ³ /HR)	A	B	C	D	E	F	G
SKA-20-3	1 ½	5-8	200	920	500	630	1130	500	190
SKA-20-6	2	12-8	250	950	530	630	1130	550	190
SKA-30-12	3	25-35	350	1210	570	870	1440	650	280
SKA-30-19	4	40-70	450	1270	690	870	1990	750	380
SKA-30-27	4	60-90	500	1300	690	870	2020	800	420
SKA-30-33	5	80-120	550	1290	710	890	2080	850	480
SKA-30-40	6	100-150	600	1350	760	900	2160	960	520
SKA-30-50	6	130-180	700	1380	790	900	2190	1060	630
SKA-30-60	8	150-200	750	1420	880	900	2380	1110	680
SKA-30-80	8	220-300	800	1420	880	900	2380	1160	730
SKA-30-100	10	300-400	900	1510	980	940	2470	1300	830
SKA-30-150	12	450-550	1100	1560	1110	970	2730	1500	1030
SKA-30-200	12	550-700	1250	1640	1130	970	2780	1650	1180

※ 600LB, 900LB, 1500LB AVAILABLE

● COALESCER CARTRIDGE

Coalescer cartridges are employed as the first stage in coalescer/separator vessels for hydrocarbon fluids. They perform two functions:(1) coalesce (combine) highly dispersed, emulsified water particles into larger water drops and (2) filter-out particulate contaminants.

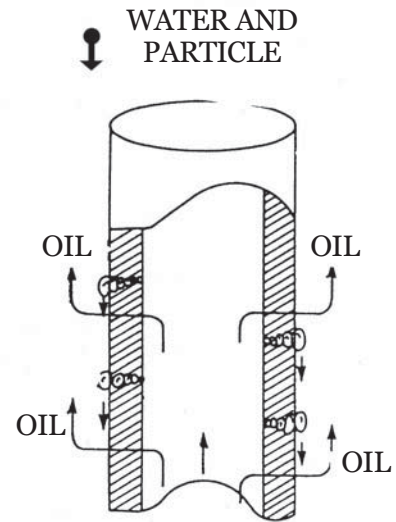
Coalescer cartridges are used primarily to coalesce emulsified water and remove particles from hydrocarbon fluids. The largest single application is the filtration of aviation jet fuel. They are also used with other types of fuels, process streams in refineries and petrochemical plants, and condensate streams where natural gas is produced.

Other liquids can be separated if they are immiscible, the specific gravities differ, and high concentrations of surface active agents are not present. As a rule of thumb, if a sample of the mixture readily separates in an hour or two, a coalescer can probably be used, If the mixture hasn't separated after 24hours, coalescing probably won't work

The top photo shows a highly magnified view of the coalescing process. Tiny droplets of water contact and adhere to stands of fiberglass. Flow pushes the droplets along the stand until they reach an intersection of strands where they combine with other droplets(coalesce)into large drops.

These large drops are then carried to the outside surface of the cartridge. fluid, they release and settle to the bottom of the vessel. The larger the drops, the faster and more efficiently they fall out. In general, particle removal efficiency increases with coalescing efficiency. This is accomplished by employing a tighter, finer filtration media.

Flow direction is from inside to outside of the cartridge. This minimizes surface velocity and helps prevent the water drops from breaking up and being carried downstream.



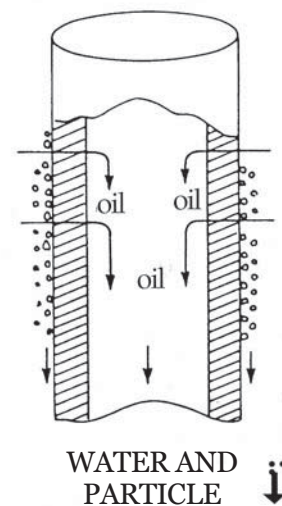
● SEPARATOR CARTRIDGE

Separator Cartridges are employed as the second stage in coalescer/separator vessels. Their sole function is to repel coalesced water drops produced by the first stage cartridges while allowing hydrocarbon fluids to pass through. Water drops settle into the coalescer/separator sump and are not carried downstream. All particle filtering is done by the first stage coalescer cartridge.

Flow direction is from outside-to-inside.

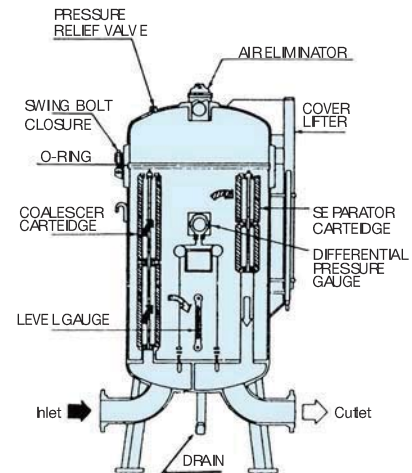
Maintaining a uniform flow along the length of the cartridge optimizes performance and reduces the number of cartridges required. Flow is controlled by a tube, inside each cartridge, through which the hydrocarbon fluid exits the cartridge and the coalescer/separator vessel. Two styles of inner tube are offered.

Cartridges with uniform hole pattern inner tubes are adequate for many applications. However, where optimum flow distribution is required, cartridges with variable hole pattern inner tubes are recommended. When converting older equipment, a lesser number of variable hole pattern cartridges is usually required, Operating costs will be reduced.



- VERTICAL TYPE TWO STAGE
 - FIRST STAGE : COALESCER
 - SECOND STAGE : SEPARATOR
- CARTRIDGE TYPE
- ASME SEC.VIII CODE CONSTRUCTION
- ANSI B16.5 FLANGED CONNECTIONS
- SWING BOLT CLOSURE WITH O-RING SEAL
- EPOXY-COATED INTERIOR
PRIMED EXTERIOR

Optional Accessories. The accessory items marked with an (R) are recommended for safe, effective operation of all installations.



Automatic Air Vent (R)
Pressure Relief Valve (R)
Differential Pressure Gauge (R)
Manual Drain Valve (R)

Water Slug Valve (R)
Water Interface Control (R)
Sampling Probes (R)

Automatic Drain Valve
Sump Heater
Sight Glass

FUNCTION OF COALESCER/SEPARATOR ACCESSORIES

Air Eliminator - Provides air vent to permit escape of trapped air during of vessel. When unit is completely filled with fuel, air eliminator automatically closes.

Check Valve - Prevents air from siphoning into the vessel through the air eliminator.

Pressure Relief Valve - This valve can be set to open at a desired pressure to exhaust excess pressure built up in the system.

Coalescer Element - Designed to remove solid contaminants, to break the emulsion of water in the product into droplets, and to enlarge these droplets so that they will drop out of the product. The flow is from the inside to the outside of the coalescer.

Separator Element - Repels coalesced water droplets and prevents them from going downstream. The flow is from the outside to the inside.

Pressure Gauge - The direct reading differential pressure gauge is used to measure the pressure difference between the inlet and outlet of a coalescer/separator, thus providing an indication of element condition.

Float Control - Rides the interface between fuel and water, and by its up and down movement, opens and closes ports to generate hydraulic signals to automatic valves.

Slug Valve - In the event of excessive water build-up, the slug valve, on signal from the float control, will shut down all flow through the system until excess water can be drained off. The slug valve can be provided with a rate-of flow control which will prevent excessive flow rates through the coalescer/separator.

Sampling Probe - The purpose of the probe is to insure that fuel samples are representative of the fuel in the pipe. The probe penetrates through the pipe coupling that is welded to the pipe. There is no possibility of rust and dirt that usually collects in stagnant pockets reaching the filter membrane test capsule.

Manual Drain - Opened daily to remove any accumulated water and to sample the fuel in the sump. This also helps to evaluate the condition of the coalescer. It is also opened to completely drain the vessel when changing elements.

The definition of Effective Filtering Area Ratio is as follows :

$$\text{Effective Filtering Area Ratio} = \frac{S}{A} \times \frac{e1}{100} \times \frac{e2}{100}$$

S : Surface Area of Screen.

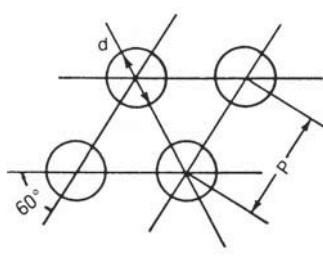
A : Sectional Area of Nominal Pipe.

e1 : Percentage of Open Area of Wire Cloth.

e2 : Percentage of Open Area of Perforation Plate.

■ POROUS RATIO OF PERFORATED PLATE

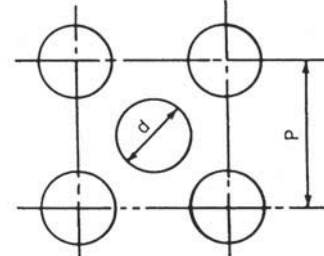
60° ZIG ZAG



d : Pore diameter
 N : Porous ratio
 P : Pitch 60° dp

$$N = \frac{\pi}{4} d^2 \div \frac{\sqrt{3}}{2} p^2 = \frac{2}{4} \frac{\pi}{3} \times \left(\frac{d}{p}\right)^2 = 0.91 \left(\frac{d}{p}\right)^2$$

45° ZIG ZAG

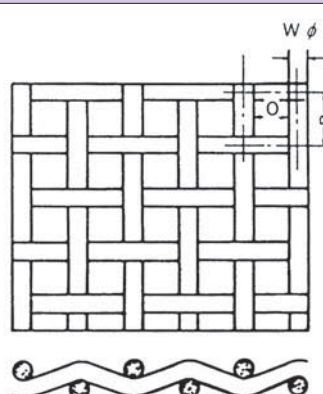


d : Pore diameter
 N : Pitch
 P : Porous ratio

$$N = 2 \times \frac{\pi}{4} d^2 \div p^2 = \frac{\pi}{2} \left(\frac{d}{p}\right)^2 = 1.57 \left(\frac{d}{p}\right)^2$$

■ POROUS RATIO OF SCREEN

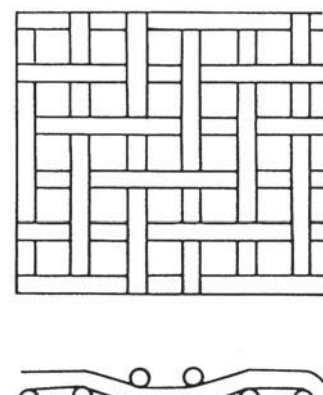
SCREEN PLAIN WEAVE



N : Mesh
 P : Pitch
 W : Wire diameter
 O : Opening
 N : Porous ratio

$$P = \frac{25.4}{M} \quad N = \left(\frac{O}{p}\right)^2 = \left(\frac{p-W}{p}\right)^2$$

SCREEN FANCY WEAVE



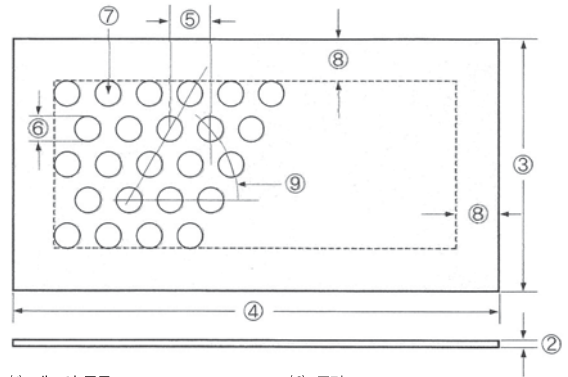
타공망 PUNCHING SCREEN

주문 및 상담을 필요로 하실 경우에는 다음의 도형과 타공구조 항목을 보신 다음 문의하여 주십시오.

아래 기재된 도형은 타기형의 일부를 표시한 것이며, 이 외에도 다종류의 형공을 제작해 드릴 수 있습니다.

Please refer to the following figure and punching conformation if you need to order or receive additional explanation.

Followings figures are just part of punching screen and it is possible to manufacture different kind of punching screen upon request.



- (1) 재료의 종류 Kind of material
- (2) 판의 두께 Thickness of plate
- (3) 판의 폭 Width of plate
- (4) 판의 장 Length of plate
- (5) 피치(P) Pitch
- (6) 공경 Hole diameter
- (7) 공의 형태 Type of hole
- (8) 여백 손법(남는 부분) Margin
- (9) 공열의 도수 Angle of hole line

① D 0.5mm 22.7% P 1.0mm	② D 0.7mm 27.4% P 1.5mm	③ D 1.0mm 22.7% P 2.0mm	④ D 1.0mm 28.0% P 1.8mm	⑤ D 1.2mm 27.0% P 2.2mm	⑥ D 1.0mm 12.6% P 2.5mm
⑦ D 1.3mm 24.6% P 2.5mm	⑧ D 1.5mm 22.6% P 3.0mm	⑨ D 1.6mm 22.6% P 3.2mm	⑩ D 1.8mm 27.0% P 3.3mm	⑪ D 2.0mm 40.6% P 3.0mm	⑫ D 2.0mm 35.4% P 3.2mm
⑬ D 2.0mm 29.6% P 3.5mm	⑭ D 2.0mm 31.3% P 4.5mm	⑮ D 2.0mm 7.4% P 7.0mm	⑯ D 2.5mm 22.6% P 5.0mm	⑰ D 3.0mm 32.6% P 4.0mm	⑱ D 3.0mm 26.9% P 5.5mm
⑲ D 3.2mm 25.8% P 6.0mm	⑳ D 4.0mm 16.6% P 7.0mm	㉑ D 4.5mm 37.4% P 7.0mm	㉒ D 4.5mm 22.7% P 9.0mm	㉓ D 5.0mm 35.4% P 8.0mm	㉔ D 5.0mm 22.7% P 10.0mm
㉕ D 6.0mm 40.2% P 9.0mm	㉖ D 9.0mm 32.6% P 15.0mm	㉗ D 8.0mm 58.0% P 10.0mm	㉘ D 9.0mm 51.0% P 12.0mm	㉙ D 16.0mm 52.4% P 21.0mm	㉚ D 25.0mm 62.9% P 30.0mm

Wire Cloth Comparison Chart

Absolute Micron Rating	TWILL DUTCH WEAVE	PLAIN DUTCH WEAVE	SQUARE WEAVE
5	510 × 3600 MESH • D=0.025/0.015 • AMR:5 - 6 μm 450 × 2750 MESH • D=0.025/0.020 • AMR:6 - 7 μm		
6			
7			
8	325 × 2300 MESH • D=0.038/0.025 • AMR:8 - 9 μm		
9			
10			
12	250 × 1400 MESH • D=0.055/0.04 • AMR:11 - 12 μm 200 × 1400 MESH • D=0.07/0.04 • AMR:12 - 14 μm 165 × 1400 MESH • D=0.07/0.04 • AMR:16 - 18 μm		
14			
16			
18			
20			635 MESH • D=0.02 • O=20 μm 510 MESH • D=0.025 • O=25 450 MESH • D=0.025 • O=30 μm 400 MESH • D=0.025 • O=38 μm
25			
30			
35			
40	120 × 600 MESH • D=0.10/0.06 • AMR:40 - 45 μm	80 × 400 MESH • D=0.12/0.07 • AMR:40 - 45 μm	325 MESH • D=0.035 • O=43 μm
45			
50	120 × 400 MESH • D=0.10/0.06 • AMR:50 - 55 μm	50 × 250 MESH • D=0.14/0.11 • AMR:58 - 63 μm	270 MESH • D=0.04 • O=53 μm
55			
60			250 MESH • D=0.04 • O=61 μm
65			
70	40 × 560 MESH • D=0.18/0.10 • AMR:70 - 75 μm	40 × 200 MESH • D=0.18/0.14 • AMR:70 - 75 μm	200 MESH • D=0.053 • O=74 μm
75			
80			
85			
90			
95			
100	32 × 360 MESH • D=0.23/0.15 • AMR:90 - 100 μm	30 × 150 MESH • D=0.23/0.18 • AMR:90 - 100 μm	150 MESH • D=0.065 • O=104 μm
110			
120	20 × 250 MESH • D=0.25/0.20 • AMR:110 - 120 μm	24 × 100 MESH • D=0.38/0.25 • AMR:115 - 125 μm	120 MESH • D=0.10 • O=117 μm
125			

AMR= Absolute Micron Rating • D = Wire Diameter • O = Opening

Wire Gauge & Gravity Chart

선 번 Wire No.	B. W. G				S. W. G				선 번 Wire No.
	Diameter		Cross Cut Area m ²	1kg의 길이 m	Diameter		Cross Cut Area m ²	1kg의 길이 m	
	mm	in			mm	in			
0	8.654	0.340	58.630	2.17	8.23	0.324	53.197	2.39	0
1	7.628	0.300	45.604	2.79	7.62	0.300	45.604	2.79	1
2	7.216	0.284	40.828	3.12	7.01	0.276	38.595	3.29	2
3	6.582	0.259	34.005	3.74	6.40	0.252	32.170	3.96	3
4	6.0415	0.238	28.700	4.43	5.892	0.232	27.275	4.67	4
5	5.5898	0.220	24.525	5.19	5.384	0.212	22.775	5.58	5
6	5.1546	0.203	20.879	6.09	4.876	0.192	18.680	6.81	6
7	4.5702	0.180	16.417	7.74	4.470	0.176	15.693	8.11	7
8	4.1981	0.165	13.795	9.22	4.064	0.160	10.972	9.81	8
9	3.7599	0.148	11.098	11.46	3.657	0.144	12.509	12.11	9
10	3.4034	0.134	9.100	13.97	3.25	0.128	8.301	15.33	10
11	3.0498	0.120	7.297	17.43	2.946	0.116	6.816	18.67	11
12	2.7619	0.109	6.022	21.12	2.641	0.104	5.482	23.21	12
13	2.4133	0.095	4.572	28.09	2.336	0.092	4.290	29.66	13
14	2.1058	0.083	3.490	36.46	2.032	0.080	3.243	39.23	14
15	1.8279	0.072	2.627	48.43	1.829	0.072	2.627	48.43	15
16	1.651	0.065	2.141	59.42	1.625	0.064	2.076	61.29	16
17	1.473	0.058	1.704	74.66	1.421	0.056	1.583	80.37	17
18	1.245	0.49	1.517	104.50	1.218	0.049	1.167	109.00	18
19	1.067	0.042	0.894	141.30	1.016	0.040	0.8107	157.20	19
20	0.889	0.035	0.614	207.20	0.9144	0.036	0.6567	193.70	20
21	0.8128	0.032	0.5189	245.10	0.8128	0.032	0.5189	245.10	21
22	0.7112	0.028	0.3973	320.20	0.7112	0.028	0.3973	320.20	22
23	0.6350	0.025	0.3167	401.70	0.6096	0.024	0.2919	435.90	23
24	0.5588	0.022	0.2452	518.80	0.5588	0.022	0.2452	518.80	24
25	0.5080	0.020	0.2027	627.60	0.5080	0.020	0.2027	627.60	25
26	0.4572	0.018	0.1642	774.80	0.4572	0.018	0.1642	774.80	26
27	0.4064	0.016	0.1297	980.90	0.4166	0.0164	0.1363	933.40	27
28	0.3556	0.014	0.0993	1,281.90	0.3759	0.0148	0.1110	1,146.00	28
29	0.3302	0.013	0.0856	1,486.00	0.3454	0.0136	0.0937	1,358.00	29
30	0.3048	0.012	0.0730	1,743.00	0.3150	0.0124	0.0780	1,681.00	30
31	0.2540	0.010	0.0507	2,509.00	0.2946	0.0116	0.0682	1,865.00	31
32	0.2286	0.009	0.0410	3,103.00	0.2743	0.0108	0.0591	2,153.00	32
33	0.2032	0.008	0.0324	3,923.00	0.2540	0.0100	0.0507	2,509.00	33
34	0.1778	0.007	0.0248	5,130.00	0.2337	0.0092	0.0429	2,965.00	34
35	0.2170	0.005	0.0127	10,020.00	0.2134	0.0084	0.0358	3,553.00	35
36	0.1016	0.004	0.0081	15,720.00	0.1930	0.0076	0.0293	4,347.00	36
					0.1727	0.0068	0.0234	5,437.00	37
					0.1524	0.0060	0.0182	6,990.00	38
					0.1321	0.0052	0.0137	9,287.00	39
					0.1219	0.0048	0.0117	10,900.00	40
도량형 환산표(길이) LENGTH COMPARISON LIST									
길이 Length		meter							
1 inch		0.0254m							
1 foot		0.3048m							
1 yard		0.9144m							
1 mile		1609.4m							
					0.1118	0.0044	0.0098	13,920.00	41
					0.1016	0.0040	0.0081	15,770.00	42
					0.0914	0.0036	0.0066	19,360.00	43
					0.0813	0.0032	0.0052	24,410.00	44
					0.0711	0.0028	0.0040	31,870.00	45
					0.0610	0.0024	0.0029	43,810.00	46
					0.0508	0.0020	0.0020	63,660.00	47
					0.0406	0.0016	0.0013	97,800.00	48
					0.0305	0.0012	0.0007	181,800.00	49
					0.0224	0.0010	0.0005	254,500.00	50

※ SWG : british imperial ligul standard wire gauge BWG : birmingham wire gauge

PIPE FLOW AREA

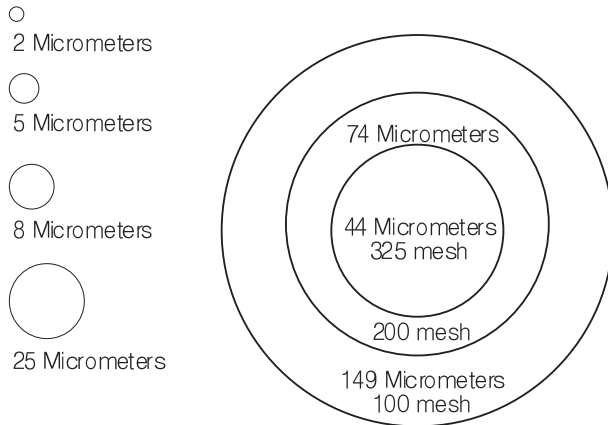
**ANSI B36.10
ANSI B36.19**

Nom. Pipe Size	All Dim's ara inchs Except Flow Area Which is SO in's	5S	10S	10	20	30	STD	40S	40	60	80S	80	100	120	140	160	XS	XXS	
$\frac{1}{2}$.840 O.D	Wall Thk Inside Dia Flow Area		.083 .674 .357				.109 .622 .304	.109 .622 .304	.109 .622 .304		.147 .546 .234	.147 .546 .234				.187 .466 .171	.147 .543 .234	294 252 050	
$\frac{3}{4}$ 1.05 O.D	Wall Thk Inside Dia Flow Area	.065 .920 .664	.083 .884 .614				.113 .824 .533	.113 .824 .533	.113 .824 .533		.154 .742 .432	.154 .742 .432				.218 .614 .296	.154 .742 .432	304 434 148	
1 1.315 O.D	Wall Thk Inside Dia Flow Area	.065 1.185 1.103	.109 1.097 .945				.133 1.049 .864	.133 1.049 .864	.133 1.049 .864		.179 .957 .719	.179 .957 .719				.250 .815 .522	.179 .957 .719	358 599 282	
$1\frac{1}{4}$ 1.660 O.D	Wall Thk Inside Dia Flow Area	.065 1.530 1.839	.109 1.442 1.633				.140 1.380 1.496	.140 1.380 1.496	.140 1.380 1.496		.191 1.278 1.283	.191 1.278 1.283				.250 1.160 1.057	.191 1.278 1.283	382 896 630	
$1\frac{1}{2}$ 1.900 O.D	Wall Thk Inside Dia Flow Area	.065 1.770 2.461	.109 1.682 2.222				.145 1.610 2.036	.145 1.610 2.036	.145 1.610 2.036		.200 1.500 1.767	.200 1.500 1.767				.281 1.337 1.404	.200 1.500 1.767	400 1100 950	
2 2.375 O.D	Wall Thk Inside Dia Flow Area	.065 2.245 3.958	.109 2.157 3.654				.154 2.067 3.356	.154 2.067 3.356	.154 2.067 3.356		.218 1.939 2.953	.218 1.939 2.953				.343 1.689 2.240	.218 1.939 2.953	436 1503 1774	
$2\frac{1}{2}$ 2.875 O.D	Wall Thk Inside Dia Flow Area	.083 2.709 5.760	.120 2.635 5.450				.203 2.469 4.790	.203 2.469 4.790	.203 2.469 4.790		.276 2.323 4.240	.276 2.323 4.240				.375 2.125 3.550	.276 2.323 4.240	552 1771 2460	
3 3.500 O.D	Wall Thk Inside Dia Flow Area	.083 3.334 8.730	.120 3.260 8.350				.216 3.068 7.390	.216 3.068 7.390	.216 3.068 7.390		.300 2.900 6.600	.300 2.900 6.600				.438 2.624 5.410	.300 2.900 6.600	600 2300 4150	
$3\frac{1}{2}$ 4.000 O.D	Wall Thk Inside Dia Flow Area	.080 3.834 11.55	.120 3.760 11.010				.226 3.548 9.89	.226 3.548 9.89	.226 3.548 9.89		.318 3.364 8.89	.318 3.364 8.89					.318 3.364 8.89	674 3152 780	
4 4.500 O.D	Wall Thk Inside Dia Flow Area	.083 4.334 14.75	.120 4.260 14.25				.237 4.026 12.73	.237 4.026 12.73	.237 4.026 12.73		.337 3.826 11.50	.337 3.826 11.50		.438 3.624 10.31		.531 3.438 9.28	.337 3.826 11.50	674 3152 780	
5 5.563 O.D	Wall Thk Inside Dia Flow Area	.109 5.345 22.43	.134 5.295 22.02				.258 5.047 20.01	.258 5.047 20.01	.258 5.047 20.01		.375 4.813 18.19	.375 4.813 18.19		.500 4.563 16.35		.625 4.313 14.61	.375 4.813 18.19	750 4063 12.97	
6 6.625 O.D	Wall Thk Inside Dia Flow Area	.109 6.407 32.20	.134 6.357 31.70				.280 6.065 28.90	.280 6.065 28.90	.280 6.065 28.90		.432 5.761 26.10	.432 5.761 26.10		.562 5.501 23.80		.718 5.189 21.10	.432 5.761 26.10	864 4987 18.80	
8 8.625 O.D	Wall Thk Inside Dia Flow Area	.109 8.407 55.50	.148 8.329 54.50	.250 8.125 51.80	.277 8.071 51.20	.322 7.981 50.00	.322 7.981 50.00	.322 7.981 50.00	.406 7.813 47.90	.500 7.625 45.70	.500 7.439 45.70	.593 7.189 43.50	.718 7.001 40.60	.812 6.813 38.50	.906 6.625 36.50	.906 6.437 34.50	.500 4.750 9.750	875 37.10	
10 10.75 O.D	Wall Thk Inside Dia Flow Area	.134 10.482 86.30	.165 10.420 85.30	.250 10.250 82.50	.307 10.136 80.70	.365 10.020 78.90	.365 10.020 78.90	.365 10.020 78.90	.500 9.750 9.750	.500 9.564 9.564	.593 9.314 9.064	.718 9.064 9.064	.812 8.843 8.500	.906 8.613 8.500	.906 8.437 8.500	.500 4.750 9.750	500 9.750		
12 12.75 O.D	Wall Thk Inside Dia Flow Area	.156 12.438 121.50	.180 12.390 120.60	.250 12.250 117.90	.330 12.090 114.80	.375 12.000 113.10	.375 12.000 113.10	.406 11.938 111.90	.562 11.626 106.20	.500 11.750 108.40	.687 11.376 101.60	.843 11.064 96.10	1.000 10.750 86.60	1.125 10.500 86.60	1.312 10.126 80.50	.500 11.750 108.40			
14 14.0 O.D	Wall Thk Inside Dia Flow Area	.156 13.688 147.20	.188 13.624 145.80	.250 13.500 143.10	.337 13.375 140.50	.375 13.250 137.90	.375 13.250 137.90	.438 13.125 135.30	.593 12.814 129.00	.500 12.625 124.80	.656 12.437 121.90	.750 12.250 115.50	.937 12.125 115.50	1.093 11.814 109.60	1.250 11.500 103.90	1.406 11.188 98.30	.500 13.000 132.70		
16 16.0 O.D	Wall Thk Inside Dia Flow Area	.169 15.670 192.90	.188 18.624 191.70	.250 15.500 188.70	.312 15.375 185.70	.375 15.250 182.70	.375 15.250 182.70	.500 15.000 176.70	.656 14.688 169.40	.500 14.314 140.90	.718 13.938 135.30	.843 13.564 135.30	1.031 13.124 129.00	1.218 12.814 129.00	1.438 12.487 129.00	1.593 12.181 116.70	.500 15.000 176.70		
18 18.0 O.D	Wall Thk Inside Dia Flow Area	.165 17.670 245.20	.188 17.624 243.90	.250 17.500 240.50	.312 17.375 237.10	.375 17.250 233.70	.375 17.250 233.70	.562 16.876 223.70	.750 16.500 213.80	.500 16.126 204.20	.687 15.750 193.30	.843 15.376 193.30	1.031 14.876 182.70	1.156 14.626 182.70	1.375 14.276 173.80	1.562 13.826 163.70	.500 17.000 227.00		
20 20.0 O.D	Wall Thk Inside Dia Flow Area	.188 19.624 302.50	.218 19.564 300.60	.250 19.500 298.60	.375 19.250 291.00	.500 19.000 284.50	.375 19.250 291.00	.593 18.814 278.00	.812 18.376 265.20	.500 18.500 252.70	.687 18.126 238.80	.843 17.876 238.80	1.031 17.438 213.80	1.281 17.002 213.80	1.500 16.500 202.70	1.750 16.064 202.70	.500 19.000 283.50		
22 22.0 O.D	Wall Thk Inside Dia Flow Area			.250 21.500 363.00			.375 21.250 355.00											.500 21.000 346.00	
24 24.0 O.D	Wall Thk Inside Dia Flow Area	.218 23.564 436.00	.250 23.500 434.00	.250 23.500 434.00	.375 23.250 425.00	.562 22.876 411.00	.375 23.250 425.00	.687 22.625 402.00	.968 22.064 328.00	.500 21.876 365.00	.687 21.626 344.00	.843 21.276 326.00	1.031 20.938 310.00	1.281 20.376 310.00	1.500 19.876 293.00	1.750 19.314 293.00	.500 23.000 415.00		
26 26.0 O.D	Wall Thk Inside Dia Flow Area						.375 25.250 501.00											.500 25.000 491.00	
28 28.0 O.D	Wall Thk Inside Dia Flow Area						.375 27.250 583.00											.500 27.000 573.00	
30 30.0 O.D	Wall Thk Inside Dia Flow Area	.250 29.500 683.00	.312 29.376 678.00	.312 29.376 678.00	.500 29.000 661.00	.625 28.750 649.00	.375 29.250 672.00											.500 29.000 661.00	
32 32.0 O.D	Wall Thk Inside Dia Flow Area						.375 31.250 767.00											.500 31.000 755.00	
34 34.0 O.D	Wall Thk Inside Dia Flow Area						.375 33.250 868.00											.500 33.000 855.00	
36 36.0 O.D	Wall Thk Inside Dia Flow Area						.375 35.250 976.00											.500 35.000 962.00	
42 42.0 O.D	Wall Thk Inside Dia Flow Area						.375 41.250 1336.00											.500 41.000 132.00	

CONVERSION TABLE

Relative Size of Particles

Magnification 500 times



Micrometer Comparisons

Substance	Micrometers
Table salt	100
Human hair (average dia.)	50-70
White blood cell	25
Talcum powder	10
Cocoa	8-10
Red blood cell	8
Bacteria(cocci)	2

Note : Lower limit of visibility(naked eye) - 40 microns.

Linear Equivalents

1 inch = 25.4 millimeters = 25,400 micrometers
 1 millimeter = .0394 inches = 1,000 micrometers
 1 micrometer = $\frac{1}{25,400}$ of an inch = 0.01 millimeters
 1 micrometer = 3.94×10^{-5} inches = .000039 inches

Conversion Rates

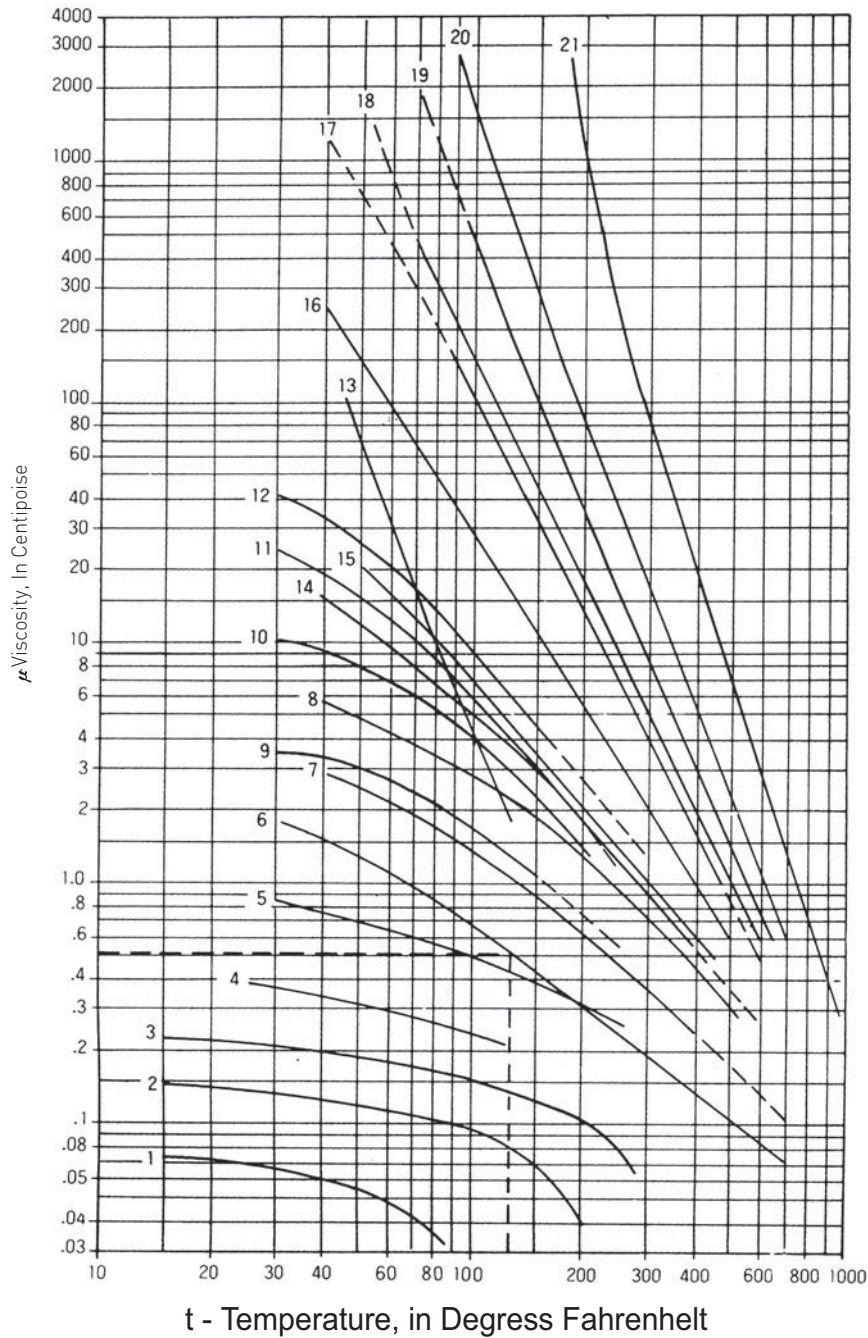
1 cu.ft. = 7.48 gal.
 1 gal. = 231 cu. in.
 1 cu. ft. water = 62.42 lb
 1 gal. water = 8.34 lb
 1 lb. water = 27.7 cu.in.
 1 u.s. gal. = 0.833 Imp.gal
 1 lb. / in² = 2.31 ft. of water = 2.036 in. Hg.
 oF = $9/5^{\circ}\text{C} + 32$

Metric Conversion Formulas

mm = inches $\times 25.4$
 m = feet $\times .3048$
 cm³ = cu. in. $\times 16.39$
 m³ = cu. ft. $\times .028$
 kg = pounds $\times .454$
 k · pa = psi $\times 6.895$
 lpm = gpm $\times 3.785$
 $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times \frac{5}{9}$

Kinematic Viscosity Centistokes	Equivalent Saybolt Universal Viscosity, Sec	
	At 100F Basic Values	At 210F
1.83	32.01	32.23
2.0	32.62	32.85
4.0	39.14	39.41
6.0	45.56	45.88
8.0	52.09	52.45
10.0	58.91	59.32
15.0	77.39	77.93
20.0	97.77	98.45
25.0	119.3	120.1
30.0	141.3	142.3
35.0	163.7	164.9
40.0	186.3	187.6
45.0	209.1	210.5
50.0	232.1	233.8
55.0	255.2	257.0
60.0	278.3	280.2
65.0	301.4	303.5
70.0	324.4	326.7
75.0	347.6	350.0
80.0	370.8	373.4
85.0	393.9	396.7
90.0	417.1	420.0
95.0	440.3	443.4
100.0	463.5	446.7
120.0	556.2	560.1
140.0	648.9	653.4
160.0	741.6	
180.0	834.2	
200.0	926.9	
220.0	1019.6	
240.0	1112.3	
260.0	1205.0	
280.0	1292.7	
300.0	1390.4	
320.0	1483.1	
340.0	1575.8	
360.0	1668.5	
380.0	1761.2	
400.0	1853.9	
420.0	1946.6	
440.0	2039.3	
460.0	2132.0	
480.0	2224.7	
500.0	2317.4	

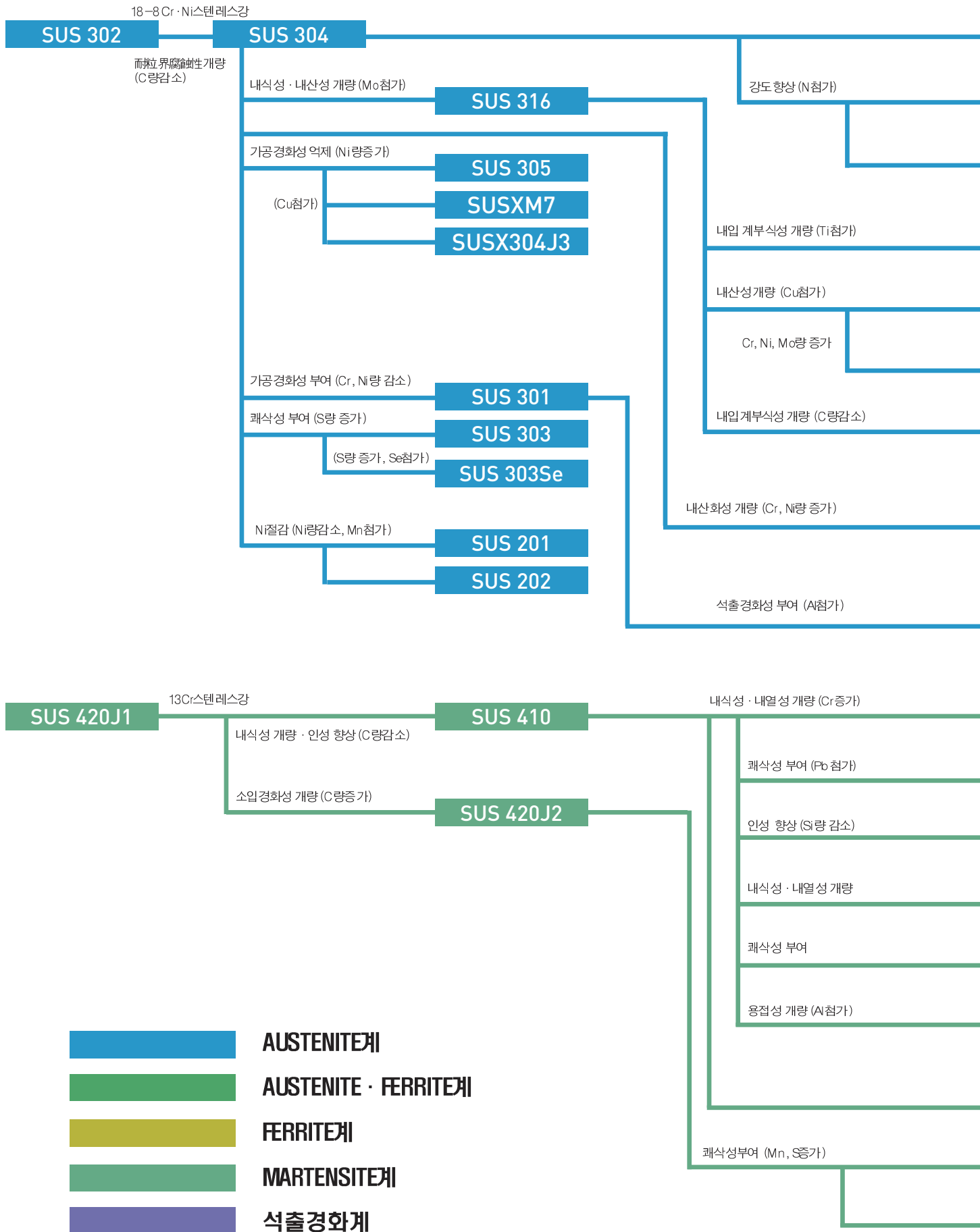
Saybolt Seconds equal Centistokes times 4.6673

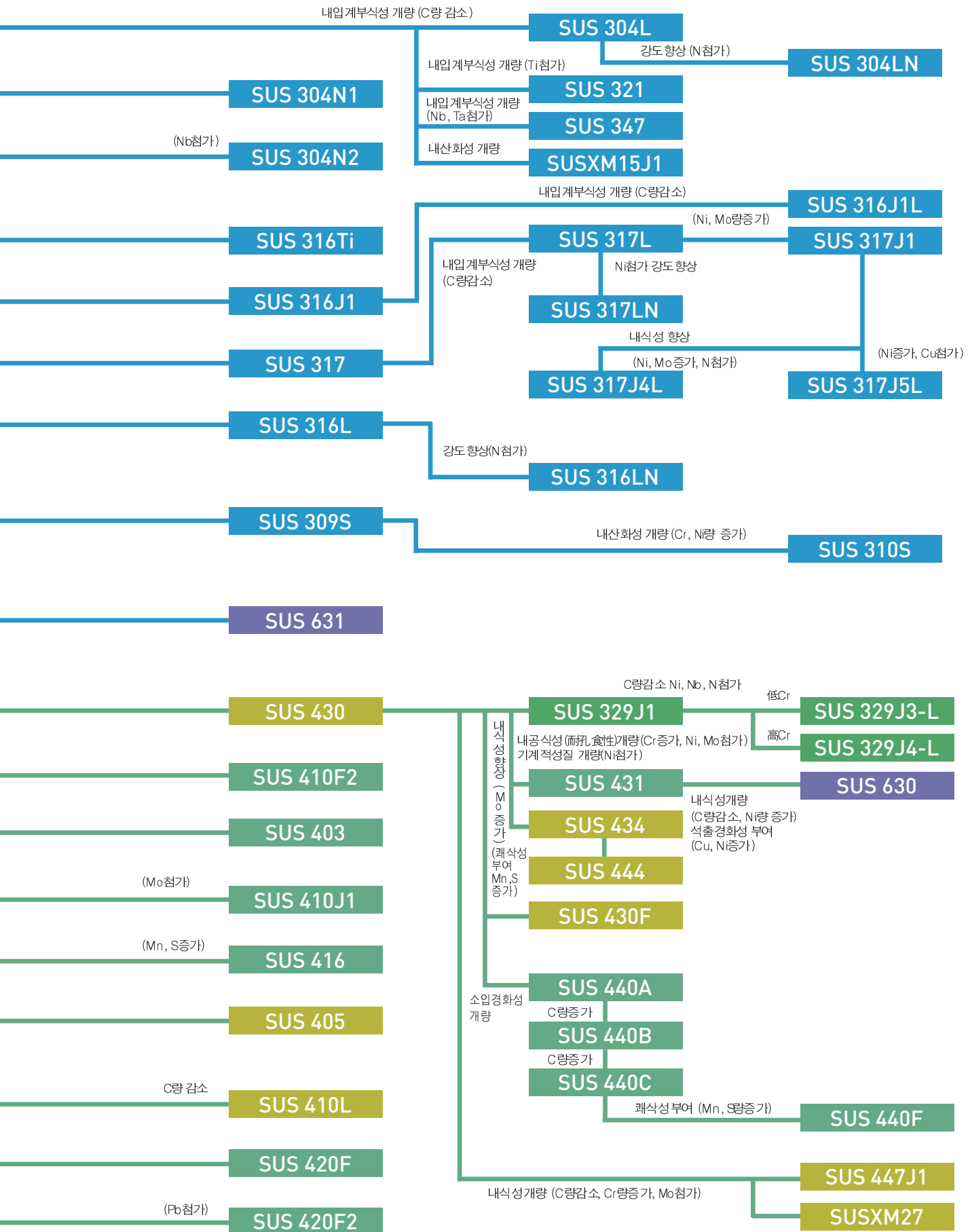


1. Ethane(C₂H₆)
2. propane(C₃H₈)
3. Butane(C₄H₁₀)
4. Natural Gasoline
5. Gasoline
6. Water
7. Kerosene
8. Distillate
9. 48 Deg. API Crude
10. 40 Deg. API Crude
11. 35.6 Deg. API Crude
12. 32.6 Deg. API Crude
13. Salt Creek Crude
14. Fuel 3 (Max.)
15. Fuel 5 (Min.)
16. SAE 10 Lube(100 V.I.)
17. SAE 30 Lube(100 V.I.)
18. Fuel 5 (Max.) or Fuel 6 (Min.)
19. SAE 70 Lube(100 V.I.)
20. Bunker C Fuel(Max.) and M.C. Residuum
21. Asphalt

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[스텐레스강의 분류]





[화학성분 및 특성과 용도 I]

KS(STS) JIS(SUS) 기호	화 학 성 분 (%)								
	C	Si	Mn	P	S	Ni	Cr	Mo	기 타
201	≤0.15	≤1.00	5.50~7.50	≤0.060	≤0.030	3.50~5.50	16.00~18.00	-	N≤0.25N
202	≤0.15	≤1.00	7.50~10.00	≤0.060	≤0.030	4.00~6.00	17.00~19.00	-	N≤0.25
301	≤0.15	≤1.00	≤2.00	≤0.045	≤0.030	6.00~8.00	16.00~18.00	-	-
302	≤0.15	≤1.00	≤2.00	≤0.045	≤0.030	8.00~10.00	17.00~19.00	-	-
303	≤0.15	≤1.00	≤2.00	≤0.20	≥0.15	8.00~10.00	17.00~19.00	≤0.60	-
303Se	≤0.15	≤1.00	≤2.00	≤0.20	≤0.060	8.00~10.00	17.00~19.00	-	Se≥0.15
304	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	8.00~10.50	18.00~20.00	-	-
304L	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	9.00~13.00	18.00~20.00	-	-
304N1	≤0.08	≤1.00	≤2.50	≤0.045	≤0.030	7.00~10.50	18.00~20.00	-	N:0.10~0.25
304N2	≤0.08	≤1.00	≤2.50	≤0.045	≤0.030	7.50~10.50	18.00~20.00	-	N:0.15~0.30 Nb≤0.15
304LN	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	8.50~11.50	17.00~19.00	-	N:0.12~0.22
304J3	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	8.00~10.50	17.00~19.00	-	Cu:1.00~3.00
305	≤0.12	≤1.00	≤2.00	≤0.045	≤0.030	10.50~13.00	17.00~19.00	-	-
309S	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	12.00~15.00	22.00~24.00	-	-
310S	≤0.08	≤1.50	≤2.00	≤0.045	≤0.030	19.00~22.00	24.00~26.00	-	-
316	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	10.00~14.00	16.00~18.00	2.00~3.00	-
316L	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	12.00~15.00	16.00~18.00	2.00~3.00	-
316LN	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	10.50~14.50	16.50~18.50	2.00~3.00	N:0.12~0.22
316J1	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	10.00~14.00	17.00~19.00	1.20~2.75	Cu:1.00~2.50
316J1L	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	12.00~16.00	17.00~19.00	1.20~2.75	Cu:1.00~2.50
316Ti	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	10.00~14.00	16.00~18.00	2.00~3.00	Ti ≥5 × C%
317	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	11.00~15.00	18.00~20.00	3.00~4.00	-
317L	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	11.00~15.00	18.00~20.00	3.00~4.00	-
317LN	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	11.00~15.00	18.00~20.00	3.00~4.00	N:0.10~0.22
317J1	≤0.040	≤1.00	≤2.50	≤0.045	≤0.030	15.00~17.00	16.00~19.00	4.00~6.00	-
317J4-L	≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	24.00~26.00	19.00~24.00	5.00~7.00	N≤0.25
317J5-L	≤0.020	≤1.00	≤2.00	≤0.045	≤0.030	23.00~28.00	19.00~23.00	4.00~5.00	Cu:1.00~2.00
321	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	9.00~13.00	17.00~19.00	-	Ti ≥5 × C%
347	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	9.00~13.00	17.00~19.00	-	Nb ≥10 × C%

특 성	용 도
18Cr-8Ni강의 Ni을 Mn과 N으로 대체해서 저렴하게 만든 강이다. SUS301, SUS302에 비해서 내산성은 약간 떨어지나 내식성은 동일하고 기계적 성질은 개선되어 있다.	SUS301, SUS302와 유사하게 사용된다.
SUS304보다 Cr, Ni량이 약간 적어 가공경화성이 크다. 따라서 냉간가공으로 큰 인장강도를 얻을 수 있다.	기계 구조용에 사용됨
18Cr-8Ni강의 기준형으로 Ni첨가하여 내식성, 기계적 성질이 좋다. 단, 탄소량이 많으므로 가열부나 용접부는 부적당하다.	일반용, 화학, 식품, 刀物 등 임
SUS303은 S를 첨가하여 18Cr-8Ni강에 피삭성을 개량한 것이다. 단 내식성은 조금 나쁘다. Mo의 첨가는 내식성을 개선하기 위한 것이다. SUS303Se은 SUS303과 같은 것인데 Se, P를 첨가 한 것이다.	선반가공부품, 샤프트, 너트 등이다.
SUS302의 개량형인데 탄소량이 적어서 내식성, 용접성이 좋으므로, 고급 스테인레스 강으로 광범위하게 사용된다. SUS304L은 극저탄소강이므로 입계부식을 방지해 준다. 따라서 용접상태에서 내입계부식성(耐粒界腐食性)이 필요한 곳에 사용된다.	화학공업설비, 건축재료, 식품제조설비, 제지공업, 차량공업, 주방기구 등에 사용됨
SUS304에 N을 첨가하여 연성의 저하를 억제하면서 강도를 높였으며, 재료의 경량화에 효과가 있다.	주로 구조용 강도부(強度部)재료로 사용됨
SUS304에 N과 Nb를 첨가하여 SUS304N1와 같은 특성을 갖는다.	SUS304N1과 같다.
SUS304L에 N을 첨가하여 상동의 특성을 갖는다.	SUS304N1과 같으나, 내입계부식성(耐粒界腐食性)이 좋다.
SUS304에 Cu를 첨가하여 냉간 가공성과 비자성을 개선한 것이다.	볼트, 너트 등이다.
Ni량을 늘려서 가공경화성을 감소 시킨 것이다. 따라서 냉간성형가공용 부품에 적합하다.	
Cr, Ni량을 많아서 내열성, 내식성이 매우 좋고 고온강도도 양호하다. SUS310S는 Cr, Ni량을 늘려서 내열성을 향상시킨 것이다.	열교환기, 연소실부품, 배기장치, 젯 엔진진부품, 가스터빈부품 등에 사용된다.
Mo을 첨가하여 내식성, 내산성이 양호하고 고온강도가 크다. SUS316L은 극저탄소강이므로 용접한 상태에서 내입계내식성을 필요하는 곳에 사용된다.	석유화학공업, 염색공업, 섬유공업, 식품공업에 사용된다.
SUS316에 N을 첨가하여 上同의 특성을 갖게 한다.	316N과 같으며, 耐粒界腐食性이 우수하다.
SUS316에 Cu를 첨가하여 내식성 특히 내유산성(耐硫酸性)을 개선한 제품이다.	
SUS316JIL은 극저탄소형이므로 용접상태로 사용이 가능하다.	내산성이 필요한 화학공업 설비에 이용 될 수 있다.
SUS316에 Ti을 첨가하였기 때문에 내입계내식성이 필요한 곳에 이용 될 수 있다.	
SUS316에 Mo량을 높여 내산성을 개선한 제품이다.	내산성이 요구되는 화학공업 설비에 이용된다.
SUS316에 Mo양을 높여서 내산성을 개량한 제품이다. 저탄소형이므로 용접상태로 사용이 가능하다.	내산성이 필요한 화학공업설비 등에 사용
SU317L에 Ni을 첨가하여 고강도, 고내식성을 갖춘 제품이다.	각종 탱크, 용기 등에 사용
염소이온을 함유한 액체를 다루는 열교환기, 인산플랜트, 표백장치 등에 사용되며 316L, 317L을 쓰기 어려운 곳에 사용 될 수 있다.	
염화물, 유기산등이 함유된 환경에 사용될 수 있으며, 밸브, 제지공업, 해수용 열교환기, 배기가스의 정화장치 등에 사용된다.	
내해수성이 우수하므로 각종 해수 사용기기 등에 사용 될 수 있다.	
SUS321에는 탄화 불안정 원소인 Ti, SUS347에는 Nb, Ta가 첨가되어 있어 용접상태로 사용이 가능하며 450~850℃의 가열온도에서 사용이 가능하다.	열교환기, 증발기 등

[화학성분 및 특성과 용도 II]

KS(STS) JIS(SUS) 기호	화 학 성 분 (%)								
	C	Si	Mn	P	S	Ni	Cr	Mo	기 타
XM7	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	8.50~10.50	17.00~19.00	-	Cu:3.00~4.00
XM15J1	≤0.08	3.00~5.00	≤2.00	≤0.045	≤0.030	11.50~15.00	15.00~20.00	-	* -
329J1	≤0.08	≤1.00	≤1.50	≤0.040	≤0.030	3.00~6.00	23.00~28.00	1.00~3.00	* -
329J3-L	≤0.030	≤1.00	≤2.00	≤0.040	≤0.030	4.50~6.50	21.00~24.00	2.50~3.50	* N:0.08~0.20
329J4-L	≤0.030	≤1.00	≤1.50	≤0.040	≤0.030	5.50~7.50	24.00~26.00	2.50~3.50	* N:0.08~0.30
405	≤0.08	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	11.50~14.50	-	A ℓ:0.10~0.30
410L	≤0.030	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	11.00~13.50	-	-
430	≤0.12	≤0.75	≤1.00	≤0.040	≤0.030	≤0.60	16.00~18.00	-	-
430F	≤0.12	≤1.00	≤1.25	≤0.060	≥0.15	≤0.60	16.00~18.00	≤0.60	-
434	≤0.12	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	16.00~18.00	0.75~1.25	-
444	≤0.025	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	17.00~20.00	1.75~2.50	N≤0.025 Ti,Nb,Zr
447J1	≤0.010	≤0.40	≤0.40	≤0.030	≤0.020	≤0.50	28.50~32.00	1.50~2.50	* Cu≤0.20 N≤0.015 Ni+Cu≤0.50
XM27	≤0.010	≤0.40	≤0.40	≤0.030	≤0.020	≤0.50	25.00~27.50	0.75~1.50	* Cu≤0.20 N≤0.015 Ni+Cu≤0.50
403	≤0.15	≤0.50	≤1.00	≤0.040	≤0.030	≤0.60	11.50~13.00	-	-
410	≤0.15	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	11.50~13.50	-	-
410J1	0.08~0.18	≤0.60	≤1.00	≤0.040	≤0.030	≤0.60	11.50~14.00	0.30~0.60	-
410F2	≤0.15	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	11.50~13.50	-	Pb:0.50~0.30
416	≤0.15	≤1.00	≤1.25	≤0.060	≥0.15	≤0.60	12.00~14.00	≤0.60	-
420J1	0.16~0.25	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	12.00~14.00	-	-
420J2	0.26~0.40	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	12.00~14.00	-	-
420F	0.26~0.40	≤1.00	≤1.25	≤0.060	≥0.15	≤0.60	12.00~14.00	≤0.60	-
420F2	0.26~0.40	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	12.00~14.00	-	Pb:0.05~0.30
431	≤0.20	≤1.00	≤1.00	≤0.040	≤0.030	1.25~2.50	15.00~17.00	-	-
440A	0.60~0.75	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	16.00~18.00	≤0.75	-
440B	0.75~0.95	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	16.00~18.00	≤0.75	-
440C	0.95~1.20	≤1.00	≤1.00	≤0.040	≤0.030	≤0.60	16.00~18.00	≤0.75	-
440F	0.95~1.20	≤1.00	≤1.25	≤0.060	≥0.15	≤0.60	16.00~18.00	≤0.75	-
630	≤0.07	≤1.00	≤1.00	≤0.040	≤0.030	3.00~5.00	15.00~17.50	-	Cu:3.00~5.00 Nb:0.15~0.45
631	≤0.09	≤1.00	≤1.00	≤0.040	≤0.030	6.50~7.75	16.00~18.00	-	A ℓ:0.75~1.50

특 성	용 도
SUS304에 Cu를 첨가하여 냉간성형성과 내산성을 개량한 제품이다. 냉간 가공성이 극히 양호하다.	
응력부식에 대해 우수한 특성을 갖는다. 특히 Si량이 높기 때문에 고온에서 내산화성이 우수하다.	
내식성과 내응력 부식성을 겸비하여 해수등의 염화물용액중에서 잘 사용될 수 있는 특성이 있다.	선박의 부품등
22Cr계의 二相鋼으로서 H ₂ S, CO ₂ 가스, 염화물들을 함유한 환경에 대한 저항성이 있다.	정유관, 각종 화학장치용에 사용
25Cr계의 二相鋼으로서 해수등 고농도 염화물 환경에서 우수한 對孔蝕性, 耐SCC성을 갖추고 있다.	해수사용 열교환기, 제염플랜트 등으로 사용된다.
13Cr강에 Aℓ을 첨가하여 자경성을 감소시킨 제품이다. 13Cr정도의 내식성이 요구되고, 용접하여 사용되는 곳에 이용된다.	
SUS410에 비해 C를 낮추어서, 용접부 곡면성, 가공성, 내고온산화성이 우수하다.	자동차 배기가스 처리 장치, 보일러 연소실, 버너 등이다.
18Cr강의 기준형으로서 냉간 가공성, 내식성 등이 좋으며 특징에 비해 가격이 저렴해 광범위하게 사용될 수 있다.	건축재료, 주방기기, 초산공업, 일반 가정기구등에 사용된다.
S, P의 첨가로 SUS430에 피삭성을 개선한 제품이다. 단 내식성, 내산성등의 성질이 SUS430에 비해 열세이다.	볼트, 너트, 연료분사노즐 등에 사용
SUS430에 Mo를 첨가하여 내식성을 개선한 제품이다.	SUS430등과 같다.
SUS430에 Mo를 첨가하여 (C+N)량을 최저로 하고, Nb등의 탄소 질화물 생성원소를 첨가하여 내식성을 SUS316급에 상당하게 만든 제품이다.	저수조등 판넬재등에 사용된다.
고Cr-Mo상태에서 C, N을 극소화시켜 내응력 내식성, 내공식성이 우수하다.	젯산등의 유기산 관계 플랜트, 가성소다 제조플랜트, 공해 방지기기등에 사용된다.
SUS447J1과 유사한 성질을 가지고 있으며, SUS447J1과 같은 용도로 사용된다.	
SUS420J1의 C량을 줄여서 내식성의 향상과 열처리후 인성을 개량한 제품이다.	밸브, 펌프샤프트 칼제품, 볼트, 너트, 증기터빈, 날개, 젯트엔진 등의 부품
SUS420J1의 C량을 낮추어서 내식성의 향상과 열처리후 인성을 개량한 제품이다.	밸브, 펌프샤프트 칼제품(刀物), 볼트, 너트, 증기터빈, 젯트엔진 부품등이다.
13Cr강에 Mo를 첨가하여 내식성, 抗Creep성을 향상시킨 것이다.	증기터빈등의 고온에서 사용되는 부품에 사용된다.
SUS410에 Pb를 첨가하여 내식성을 열화시키고 절삭성을 개량한 제품이다.	밸브, 펌프샤프트, 가전, OA기기부품, 일반 기계 부품 등이다.
S, P의 첨가하여 13Cr강의 피삭성을 개량한 제품이다. 단, 내식성은 기준형에 비해 떨어진다.	볼트 너트, 기화기 부품, 밸브, 복사기의 샤프트 등이다.
13Cr강의 기준형으로서 기계적 성질을 이용하여 광범위하게 사용될 수 있다. 특히, SUS420J2는 C량이 높기 때문에 열처리후 고강도를 얻을 수 있다.	각종 샤프트류, 칼제품(刀物), 의료기기등에 이용된다.
SUS420J2에 S, P를 첨가하여 피삭성을 개량한 제품이다.	SUS420J2와 같다.
SUS420J2에 Pb를 첨가하여 절삭성을 개선한 제품이나, 내식성은 나쁘다.	밸브, 펌프샤프트, 가전, OA기기부품, 일반기계 부품등이다.
Ni첨가로 인성을 개량하고, Cr의 첨가로 내식성을 개량한 것이므로, 열처리에서의 Martensite계에서는 내식성이 극히 양호하다.	제지기계, 선박용샤프트, 항공기 부품등에 사용된다.
내식성과 내마모성을 겸비한 강종으로, SUS440A, SUS440B, SUS440C의 순으로 내마모성이 좋아진다.	칼제품, 베어링, 펌프부품 등에 사용된다.
SUS420C에 S, P를 첨가하여 피삭성을 개량한 제품이다.	
저C의 Martensite에 Cu의 풍부한 화합물을 석출시켜 강도(SUS304의 2배)를 높인 동시에 내식성도 SUS304에 가까운 석출경화형 스텐레스강이다.	샤프트, 고급금형에 사용된다.
SUS630에 Aℓ를 첨가하여, 석출 경화에 의해 탄성한계치를 높인 강이다. 부식 환경에서 특성이 요구되는 부품에 사용된다.	샤프트, 고급금형에 사용된다.

[물리적 성질]

분류	KS(STS) JIS(SUS) 기호	용 점 kg/m ²	최대사용 (온도) GPa	비전기저항 (상온) μΩ·cm	비열 (0~100℃) KJ/kg·K	열전도도 (100℃) W/m·K	열팽창계수 (0~100℃) ×10 ⁻⁶	자 성
오스테인이트	301	7930	193	72	0.50	16.3	17.0	상자성
	302	7930	193	72	0.50	16.3	17.2	상자성
	303	7930	193	72	0.50	16.3	17.2	상자성
	303Se	7930	193	72	0.50	16.3	17.2	상자성
	304	7930	193	72	0.50	16.3	17.3	상자성
	304L	7930	193	72	0.50	16.3	17.3	상자성
	305	7930	193	72	0.50	16.3	17.3	상자성
	309S	7980	200	78	0.50	15.6	15.0	상자성
	310S	7980	200	78	0.50	14.3	15.9	상자성
	316	7980	193	74	0.50	16.3	15.9	상자성
	316L	7980	193	74	0.50	16.3	15.9	상자성
	321	7930	193	72	0.50	16.2	16.6	상자성
	347	7980	193	73	0.50	16.2	16.6	상자성
A※ F계	329J1	7800	193	75	0.50	21.0	12.5	강자성
웨어이트	405	7750	200	60	0.46	27.1	10.8	강자성
	430	7700	200	60	0.46	26.3	10.4	강자성
	430F	7700	200	60	0.46	26.3	10.4	강자성
말텐사이트	403	7750	200	57	0.46	25.1	9.9	강자성
	410	7750	200	57	0.46	25.1	9.9	강자성
	416	7750	200	57	0.46	25.1	9.9	강자성
	420J1	7750	200	55	0.46	25.0	10.3	강자성
	420J2	7750	200	55	0.46	25.0	10.3	강자성
	431	7750	200	72	0.46	20.3	10.2	강자성
	440A	7700	200	60	0.46	24.4	10.2	강자성
	440B	7700	200	60	0.46	24.4	10.2	강자성
	440C	7700	200	60	0.46	24.4	10.2	강자성
석경화출계	630	7930	196	80	0.46	18.3	10.8	강자성강
	631	7930	204	83	0.46	16.4	11.0	자성

※ 오스테인이트·웨어이트계

[기계적 성질 I]

분류	KS(STS) JIS(SUS) 기호	열처리(℃) 고용화열처리	기계적				성질		
			내력 N/mm ²	인장강도 N/mm ²	신율 %	수축율 %	경도		
							HB	HRB	HV
오스테나이트	201	1010~1120 급냉	≥275	≥520	≥40	≥45	≤241	≤100	≤253
	202	1010~1120 급냉	≥275	≥520	≥40	≥45	≤207	≤95	≤218
	301	1010~1150 급냉	≥205	≥520	≥40	≥60	≤207	≤95	≤218
	302	1010~1150 급냉	≥205	≥520	≥40	≥60	≤187	≤90	≤200
	303	1010~1150 급냉	≥205	≥520	≥40	≥50	≤187	≤90	≤200
	303Se	1010~1150 급냉	≥205	≥520	≥40	≥50	≤187	≤90	≤200
	304	1010~1150 급냉	≥205	≥520	≥40	≥60	≤187	≤90	≤200
	304L	1010~1150 급냉	≥175	≥480	≥40	≥60	≤187	≤90	≤200
	304N1	1010~1150 급냉	≥275	≥550	≥35	≥50	≤217	≤95	≤220
	304N2	1010~1150 급냉	≥345	≥690	≥35	≥50	≤250	≤100	≤260
	304LN	1010~1150 급냉	≥245	≥550	≥40	≥50	≤217	≤95	≤220
	305	1010~1150 급냉	≥175	≥480	≥40	≥60	≤187	≤90	≤200
	309S	1030~1150 급냉	≥205	≥520	≥40	≥60	≤187	≤90	≤200
	310S	1030~1180 급냉	≥205	≥520	≥40	≥50	≤187	≤90	≤200
	316	1010~1150 급냉	≥205	≥520	≥40	≥60	≤187	≤90	≤200
	316L	1010~1150 급냉	≥175	≥480	≥40	≥60	≤187	≤90	≤200
	316N	1010~1150 급냉	≥275	≥550	≥35	≥50	≤217	≤95	≤220
	316LN	1010~1150 급냉	≥245	≥550	≥40	≥50	≤217	≤95	≤220
	316J1	1010~1150 급냉	≥205	≥520	≥40	≥60	≤187	≤90	≤200
	316J1L	1010~1150 급냉	≥175	≥480	≥40	≥60	≤187	≤90	≤200
	317	1010~1150 급냉	≥205	≥520	≥40	≥60	≤187	≤90	≤200
	317L	1010~1150 급냉	≥175	≥480	≥40	≥60	≤187	≤90	≤200
	317J1	1030~1180 급냉	≥175	≥480	≥40	≥45	≤187	≤90	≤200
	321	920~1150 급냉	≥205	≥520	≥40	≥50	≤187	≤90	≤200
347	980~1150 급냉	≥205	≥520	≥40	≥50	≤187	≤90	≤200	
XM7	1010~1150 급냉	≥175	≥480	≥40	≥60	≤187	≤90	≤200	
XM15J1	1010~1150 급냉	≥205	≥520	≥40	≥60	≤207	≤90	≤218	
A※ F계	329J1	950~1100 급냉	≥390	≥590	≥18	≥40	≤277	(HRC) ≤29	≤292

※ 오스테나이트 · 웨라이트계

[기계적 성질 II]

분류	KS(STS) JIS(SUS) 기호	열 처리 (°C)		
		ANNE ALING	HARDENING QUENCHING	TEMPERING
웨이트계	405	780~830 공냉 혹은 서냉	-	-
	410L	700~820 공냉 혹은 서냉	-	-
	430	780~850 공냉 혹은 서냉	-	-
	430F	680~820 공냉 혹은 서냉	-	-
	434	780~850 공냉 혹은 서냉	-	-
	447J1	900~1050 급냉	-	-
	XM27	900~1050 급냉	-	-
말텐사이트계	403	800~900 서냉 또는 약 750급냉	950~1000 유냉	700~750 급냉
	410	800~900 서냉 또는 약 750급냉	970~1000 유냉	700~750 급냉
	410J1	803~900 서냉 또는 약 750급냉	970~1020 유냉	650~750 급냉
	416	800~900 서냉 또는 약 750급냉	970~1000 유냉	700~750 급냉
	420J1	800~900 서냉 또는 약 750급냉	920~980 유냉	600~750 급냉
	420J2	800~900 서냉 또는 약 750급냉	920~980 유냉	600~750 급냉
	420F	800~900 서냉 또는 약 750급냉	920~980 유냉	600~750 급냉
	431	일차 : 약 750 급냉, 이차 : 약 650 급냉	1000~1050 유냉	630~700 급냉
	440A	800~920 서냉	1010~1070 유냉	100~180 공냉
	440B	800~920 서냉	1010~1070 유냉	100~180 공냉
	440C	800~920 서냉	1010~1070 유냉	100~180 공냉
	440F	800~920 서냉	1010~1070 유냉	100~180 공냉
석출경화계	630	고 용 화 열 처 리	S	1020~1060 급냉
		석 출 경 화 열 처 리	H 900	S처리부 470~490 공냉
			H 1025	S처리부 540~560 공냉
			H 1075	S처리부 570~590 공냉
	H 1150		S처리부 610~630 공냉	
	631	고 용 화 열 처 리	S	1000~1100 급냉
		석 출 경 화 열 처 리	TH 1050	S처리 후 760 ± 15°C에 90분유지, 1시간이내에 15°C이하에서 냉각, 30분유지 565 ± 10°C에서 90분 유지 후 공냉
			RH 950	S처리 후 955 ± 10°C에 10분, 실온에서 공냉, 24시간이내에 -73 ± 6°C에서 8시간유지, 510 ± 10°C에서 60분 유지 후 공냉

기계적성질						
내 력 N/mm ²	인장강도 N/mm ²	신 율 %	수 축 율 %	CHARPY IMPACT TEST J/cm ²	경 도	
					HB	HRC
≥ 175	≥ 410	≥ 20	≥ 60	≥ 98	≤ 183	-
≥ 195	≥ 360	≥ 22	≥ 60	-	≤ 183	-
≥ 205	≥ 450	≥ 22	≥ 50	-	≤ 183	-
≥ 205	≥ 450	≥ 22	≥ 50	-	≤ 183	-
≥ 205	≥ 450	≥ 22	≥ 60	-	≤ 183	-
≥ 295	≥ 450	≥ 20	≥ 45	-	≤ 228	-
≥ 245	≥ 410	≥ 20	≥ 45	-	≤ 219	-
≥ 390	≥ 590	≥ 25	≥ 55	≥ 147	≥ 170	-
≥ 345	≥ 540	≥ 25	≥ 55	≥ 98	≥ 159	-
≥ 490	≥ 690	≥ 20	≥ 60	≥ 98	≥ 192	-
≥ 345	≥ 540	≥ 17	≥ 45	≥ 69	≥ 159	-
≥ 440	≥ 640	≥ 20	≥ 50	≥ 78	≥ 192	-
≥ 540	≥ 740	≥ 12	≥ 40	≥ 29	≥ 217	-
≥ 540	≥ 740	≥ 8	≥ 35	≥ 29	≥ 217	-
≥ 590	≥ 780	≥ 15	≥ 40	≥ 39	≥ 229	-
-	-	-	-	-	-	≥ 54
-	-	-	-	-	-	≥ 56
-	-	-	-	-	-	≥ 58
-	-	-	-	-	-	≥ 58
-	-	-	-	-	≤ 363	≤ 38
≥ 1175	≥ 1310	≥ 10	≥ 40	-	≥ 375	≥ 40
≥ 1000	≥ 1070	≥ 12	≥ 45	-	≥ 331	≥ 35
≥ 860	≥ 1000	≥ 13	≥ 45	-	≥ 302	≥ 31
≥ 725	≥ 930	≥ 16	≥ 50	-	≥ 277	≥ 28
≥ 380	≥ 1030	≥ 20	-	-	≤ 229	-
≥ 960	≥ 1140	≥ 5	≥ 25	-	≥ 363	-
≥ 1030	≥ 1230	≥ 4	≥ 10	-	≥ 388	-

(주) 말텐사이트계의 기계적성질 수치는 소입 소려(Q · T)상태의 수치임.

STELLITE

Those materials are Cobalt-Base, Nickel-Base and Tungsten Carbide Compounds which have outstanding wear resistance not only at room temperature but also at high temperature.

These alloys are used in several industries such as Engines, Lumber and Wood Pulp, Petrochemical, ↗

TYPE and GENERAL DESCRIPTION	HARD-FACING ALLOY	AVAILABLE FORMS
COBALT-BASE ALLOYS Best All-Purpose Hard-Facing Alloys Best Choice for Metal-to-Metal Wear Resist Heat, Abrasion, Corosion, Galling, Oxidation, Erosion Retain Hardness Up to 800°C	BISHILITE® No.1	BARE CAST ROD COVERED ELECTRODE
	BISHILITE® No.6	BARE CAST ROD COVERED ELECTRODE
	BISHILITE® No.12	BARE CAST ROD COVERED ELECTRODE
	BISHILITE® No.21	BARE CAST ROD(TIG) COVERED ELECTRODE
	BISHILITE® No.32	BARE CAST ROD COVERED ELECTRODE
	BISHILITE® No.1016	BARE CAST ROD
	O-Metal	BARE CAST ROD
NICKEL-BASE ALLOYS No.40 and No.41 Resist Abrasion, Galling, Corrosion Low Melting Point...Flow easily Making Smooth Deposit Retain Hardness Up to 650°C No.726W Co free alloy best for wear resistance	BISHILITE® No.40	BARE CAST ROD
	BISHILITE® No.41	BARE CAST ROD
	BISHILITE® No.726W	BARE CAST ROD(TIG)
TUNGSTEN CARBIDE Just About The Hardest Substance; Used where Extermely Abrasive Wear is major Problem	BISHILITE® No.501	BARE CAST ROD
	BISHILITE® No.502	BARE CAST ROD

Applicable Standard

BISHILITE® No.1 : AWS A5.13 R Co Cr-C, E Co Cr-C

BISHILITE® No.6 : AWS A5.13 R Co Cr-A, E Co Cr-A

BISHILITE® No.12 : AWS A5.13 R Co Cr-B, E Co Cr-B

HARD - FACING ALLOYS

↗ Nuclear, Cement and Ceramics, Earth Moving and Construction, Glass, Steel Making, Metal Processing, Mining and Quarrying and others.

Surfaces which are wear-resistant, corrosion-resistant, heat-resistant, and when finished, low friction, are provided when these alloys are deposited on critical areas. Thereby, long life and low cost are realized, using high alloys only in the necessary places.

	AVERAGE HARDNESS ROCKWELL	NOMINAL CHEMICAL COMPOSITION							
		Co	Ni	Cr	W	Mo	Fe	C	Others
RC-54 RC-46	Bal	≤3	30	12	-	≤3	2.5		
RC-44 RC-37	Bal	≤3	28	4	-	≤3	1.0		
RC-47 RC-40	Bal	≤3	29	8	-	≤3	1.4		
RC-20 RC-33	Bal	2.5	27	-	5	≤2	0.25		
RC-44	Bal	2.2	26	12	-	≤2	1.8		
RC-58	Bal	≤3	32	17	-	≤3	2.5		
RC-61	Bal	-	30	14	4	≤3	2.2		
RC-57	-	Bal	15	-	-	4	0.75	B 3.5 Si 4.0	
RC-51	-	Bal	12	-	-	3	0.35	B 2.5 Si 3.5	
RC-45	-	Bal	33	17	-	6	1.5	-	
RA-91	60% Tungsten Carbide, +40% Alloy B								
RA-91	60% Tungsten Carbide, +40% BISHILITE® No.6								

합금명 (UNS NO)	주성분 (%)	밀도 (g/cm ³)	기계적 성질(상온)				관련 규격
			상태	인장강도 1000psi(MPa)	항복강도 1000psi(MPa)at 0.2% Offset	경도 Brinell (rockwell)	
HASTELLOY B-2 (N10665)	Ni BAL Cr 1.0 Mo 28 Mn 1.0 Fe 2.0 Si 0.10 Co 1.0 C 0.01	9.22	Annealed	132.5 (914)	57.5 (396)	228 (B-98)	ASTM B(ASME SB-) 333, 335 619, 622, 626 AWS A5, 14, A5, 11
HASTELLOY C-276 (N10276)	Ni BAL W 4 Mo 16 Co 2.5 Cr 15.5 Mn 1.0 Fe 5.5 C 0.01	8.89	Annealed	114.9 (792)	51.6 (356)	184 (B-90)	ASTM B(ASME SB-) 574, 575 619, 622, 626, DIN 17744, 17750 17751, 17752, W.Nr. 2.4819
HASTELLOY C-4 (N06455)	Ni BAL Co 2.0 Cr 16 Mn 1.0 Mo 15.5 Ti 0.7 Fe 3.0 C 0.01	8.64	Annealed	116.2 (801)	61.0 (421)	194 (B-92)	ASTM B(ASME SB-) 574, 575 619, 622, 626 AWS A5, 14, A5, 11
HASTELLOY C-22 (N06022)	Ni BAL Cr 20-22.5 Mo 12.5-14.5 W 2.5-3.5 Co 2.5 C 0.01	8.69	Annealed	116.3 (802)	58.5 (403)	184 (B-90)	ASTM B(ASME SB-) 574, 575 619, 622, 626 AWS A5, 14, A5, 11
HASTELLOY G (N06007)	Ni BAL Co 2.5 Cr 22 Cb+Ta 2 Fe 19.5 Cu 2 Mo 6.5 Mn 1.5 W 1 Si 1	8.30	Annealed	102.0 (703)	46.2 (319)	161 (B-84)	ASTM B(ASME SB-) 581, 582 619, 622, 626 AWS A5, 14, A5, 11
HASTELLOY G-3 (N06985)	Ni BAL Co 5 Cr 21-23.5 Cu 1.5-2.5 Fe 18-21 W 1.5 Mo 6-8 Si 1 Mn 1 C 0.015	8.30	Annealed	99.0 (683)	44.0 (303)	158 (B-83)	ASTM B(ASME SB-) 581, 582 619, 622, 626 AWS A5, 14, A5, 11
HASTELLOY G-30 (N06030)	Ni BAL Mo 5.0 Cr 29.5 W 2.5 Fe 15.0 Mn 2.0 Cu 1.7 Co 5.0 Si 1.0	8.22	Annealed	100 (690)	47 (324)	176 (B-88)	ASTM B(ASME SB-): CODE CASE 1979
HASTELLOY X (N06002)	Ni BAL Co 1.5 Cr 22 Si 1 Fe 18.5 Mn 1 Mo 9 W 0.6 C 0.1 Al 0.5 Ti 0.15	8.22	Annealed	109.5 (755)	55.9 (385)	194 (B-92)	ASTM B(ASME SB-) 435, 572 619, 622, 626, AMS 5390, 5536, 5798, 7237 AWS A5.14, A5.11
CARPENTER 20 cb-3 (N08020)	Ni 35 Mo 2.5 Fe 37 Cr 20 Cu 3.5	8.0	Annealed	90 (620)	45 (310)	183 (B-90)	ASTM B(ASME SB-) 462, 463, 464, 468, 472-474
NICKEL 200 (N02200)	Ni 99.6 C 0.15 Max.	8.89	Annealed	55-80 (380-550)	15-30 (110-210)	90-120	ASME SB 160, 161, 162, 163 ASTM B 160, 161, 162, 163, 366
NICKEL 201 (N02201)	Ni 99.6 C 0.02 Max.	8.89	Annealed	55-80 (380-550)	15-30 (100-210)	90-120	ASME SB 160, 161, 162, 163 ASTM B 160, 161, 162, 163, 366 AMS 5553
NICKEL 400 (N04400)	Ni 66.5 Cu 31.5	8.83	Annealed	70-90 (480-620)	25-50 (170-340)	110-149	BS 3072-3076(NA13)/ASTM B (ASME SB-) 127, 163-165, 564/ ASME Code Sec. III, IV, VIII, IX/ AMS 4544, 4574, 4575, 4730, 4731, 7233/DIN 17743, 17750- 17754/W.Nr. 2.4360, 2.4361/ QQ-N-281/AFNOR NU30
NICKEL K-500 (N05500)	Ni 65.5 Cu 29.5 Al 2.7 Ti 0.6	8.46	Aged	140-190 (970-1310)	110-150 (760-1030)	265-346	BS 3072-3076(NA18)/ASME Code Sec. VIII/AMS 4676/DIN 17743, 17752, 17754/W.Nr. 2.4375/ QQ-N-281

※ HASTELLOY IS REGISTERED TRADEMARK OF HAYNES INTERNATIONAL, INC.

합금명 (UNS NO)	주성분 (%)	밀도 (g/cm ³)	기계적 성질(상온)				관련규격
			상태	인장강도 1000psi(MPa)	항복강도 1000psi(MPa)at 0.2% Offset	경도 Brinell (rockwell)	
INCONEL 600 (N06600)	Ni 76.0 Cr 15.5 Fe 8.0	8.42	Annealed	80-100 (550-6900)	30-50 (210-340)	120-170	BS 3072-3076(NA14)/ASTM B [ASME SB-]163, 166-168, 564/ ASME Code Sec. I, III, VIII, IX/AMS 5540, 5580, 5665, 5687, 7232/DIN 2.4816/AFNOR NC 15 Fe
INCONEL 601 (N06601)	Ni 60.5 Cr 23.0 Fe 14.0 Al 1.4	8.06	Annealed	80-115 (550-790)	30-60 (210-340)	110-150	ASME Code Sec. VIII/AMS 5715, 5870/DIN 17742, 17750-17752/ W.Nr. 2.4851
INCONEL 617 (N06617)	Ni 52 Mo 9 Cr 22 Al 1.2 Co 12.5	8.36	Annealed	110 (760)	51 (350)	173	ASME Code Sec. I, VIII
INCONEL 625 (N06625)	Ni 61 Cr 21.5 Mo 9 Nb+Ta 3.6	8.44	Annealed	135 (930)	75 (520)	180	BS 3072, 3074, 3076(NA21)/ASTM B(ASME SB-) 443, 444, 446, 564/ASME Code Sec. I, III, VIII, IX/AMS 5581, 5599, 5666, 5837/ DIN 17744, 17750-17752, 17754/ W.Nr. 2.4856/AFNOR 22 D Nb
INCONEL 690 (N06690)	Ni 60 Cr 30 Fe 9.5	8.19	Annealed	100 (690)	55 (379)	184	ASME CODE CASE N-20(1484)
INCONEL 718 (N07718)	Ni 52.5 Mo 3 Cr 19 Fe 18.5 Nb+Ta 5.1	8.19	Aged	196 (1350)	171 (1180)	382	ASTM B 637, B 670/ASME CODE SEC. I, III/AMS 5589, 5590, 5596 5597, 5662-5664, 5832/W, Nr. 2.4668/LW Nr. 2.4668/AECMA Pr EN 2404, 2407, 2408
INCONEL X-750 (N07750)	Ni 73 Ti 2.5 Cr 15.5 Al 0.7 Fe 7 Nb+Ta 1.0	8.25	Aged	162-193 (1120-1330)	115-142 (790-980)	300-390	BS HR505/ASTM B 637/ASME SB-637, CODE SEC. III/AMS 5542, 5582, 5583, 5598, 5667-5671, 5698, 5699, 5747, 5749, 7246/ AFNOR NC 15 Fe T
INCOLOY 800 (N08800)	Ni 32.5 Fe 46.0 Cr 21.0	7.95	Annealed	75-100 (520-690)	30-60 (210-410)	120-184	BS 3072-3076(NA15)/ASTM B(ASME SB-) 163, 407-409, 564/ ASME CODE SEC. I, III, VIII, IX/ AMS 5766, 5871/S.E.W. 470/W.Nr 1.4876
INCOLOY 800HT (N08811)	Ni 32.5 C 0.08 Fe 46.0 Cr 21 Al+Ti 1.0	7.95	Annealed	65-95 (450-660)	20-50 (140-340)	100-184	ASTM B(ASME SB-) 163, 407-409, 564/ASME CODE SEC. I, VIII/ W.Nr. 1.4876/BS 3072, 3074, 3076(NA15H) S.E.W 470
INCOLOY 825 (N08825)	Ni 42 Cu 2.2 Fe 30 Cr 21.5 Mo 3	8.14	Annealed	85-105 (590-720)	35-65 (240-450)	120-180	BS 3072-3074, 3076(NA 14)/ ASTM B(ASME SB-) 163, 423-425/ ASME CODE SEC. I, III, VIII, IX / DIN 17744, 17750-17752, 17754/ W.Nr. 2.4858
INVAR (K93600)	Ni 36 Fe 64	8.13	Annealed	72 (490)	36 (250)	139	ASTM B 388/DIN 1715/S.E.W.385/ W.Nr. 1.3912/AFNOR A54-301
ALLOY42 (K94100)	Ni 42 Fe 58	8.13	Annealed	72 (490)	37 (255)	139	ASTM F 30/DIN 17745/S.E.W. 385/ W.Nr. 1.3922, 1.3926, 1.3927/ AFNOR A54-301
KOVAR (K94610)	Ni 29.5 Fe 53 Co 17	8.16	Annealed	76 (525)	49 (340)	158	ASTM F 15/AMS 7726-7728/DIN 17745/S.E.W. 385/AFNOR A54-301

[니켈합금 성분분석표]

합금명 (UNS NO)	주성분 (%)	밀도 (g/cm ³)	기계적 성질(상온)				특 성
			상태	인장강도 1000psi(MPa)	항복강도 1000psi(MPa)at 0.2% Offset	경도 Brinell (rockwell)	
HASTELLOY B-2 (N10665)	Ni BAL Cr 1.0 Mo 28 Mn 1.0 Fe 2.0 Si 0.10 Co 1.0 C 0.01	9.22	Annealed	132.5 (914)	57.5 (396)	228 (B-98)	용접열 영향부의 내식성을 향상시킨 합금
HASTELLOY C-276 (N10276)	Ni BAL W 4 Mo 15 Co 2.5 Cr 15.5 Mn 1.0 Fe 5.5 C 0.01	8.89	Annealed	114.9 (792)	51.6 (356)	184 (B-90)	용접열 영향부의 내식성을 향상시킨 합금
HASTELLOY C-4 (N06455)	Ni BAL Co 2.0 Cr 16 Mn 1.0 Mo 15.5 Ti 0.7 Fe 3.0 C 0.01	8.64	Annealed	116.2 (801)	61.0 (421)	194 (B-92)	고온 안전성을 개량한 합금
HASTELLOY C-22 (N06022)	Ni BAL Cr 20-22.5 Mo 12.5-14.5 W 2.5-3.5 Co 2.5 C 0.01	8.69	Annealed	116.3 (802)	58.5 (403)	184 (B-90)	C-276보다도 산화성 환경에서의 내식성 및 내국부부식성이 우수함
HASTELLOY G (N06007)	Ni BAL Co 2.5 Cr 22 Cb+Ta 2 Fe 19.5 Cu 2 Mo 6.5 Mn 1.5 W 1 Si 1	8.30	Annealed	102.0 (703)	46.2 (319)	161 (B-84)	고온의 황산이나 인산에 우수한 내식성을 나타냄
HASTELLOY G-3 (N06985)	Ni BAL Co 5 Cr 21-23.5 Cu 1.5-2.5 Fe 18-21 W 1.5 Mo 6-8 Si 1 Mn 1 C 0.015	8.30	Annealed	99.0 (683)	44.0 (303)	158 (B-83)	고온의 황산이나 인산에 우수한 내식성을 나타냄
HASTELLOY G-30 (N06030)	Ni BAL Mo 5.0 Cr 29.5 W 2.5 Fe 15.0 Mn 2.0 Cu 1.7 Co 5.0 Si 1.0	8.22	Annealed	100 (690)	47 (324)	176 (B-88)	공업용 인산이나 강산화성산에 우수한 내식성을 나타냄
HASTELLOY X (N06002)	Ni BAL Co 1.5 Cr 22 Si 1 Fe 18.5 Mn 1 Mo 9 W 0.6 Cu 0.1 Al 0.5 Ti 0.15	8.22	Annealed	109.5 (755)	55.9 (385)	194 (B-92)	높은 고온 강도와 우수한 내식성을 갖는 합금
ALLOY 20 (N08020)	Ni 35 Mo 2.5 Fe 37 Cr 20 Cu 3.5	8.0	Annealed	90 (620)	45 (310)	183 (B-90)	산화성 및 환원성 환경에 좋은 내식성을 나타냄
NICKEL 200 (N02200)	Ni 99.6 C 0.15 Max.	8.89	Annealed	55-80 (380-550)	15-30 (110-210)	90-120	순수 니켈로 양호한 기계적 성질과 우수한 내식성을 갖는다.
NICKEL 201 (N02201)	Ni 99.6 C 0.02 Max.	8.89	Annealed	55-80 (380-550)	15-30 (100-210)	90-120	NICKEL 200과 같은 성질이나 탄소가 낮아 300°C 이상의 용도로 적합함

합금명 (UNS NO)	주성분 (%)	밀도 (g/cm ³)	기계적 성질(상온)				특 성
			상태	인장강도 1000psi(MPa)	항복강도 1000psi(MPa)at 0.2% Offset	경도 Brinell (rockwell)	
MONEL 400 (N04400)	Ni 66.5 Cu 31.5	8.83	Annealed	70-90 (480-620)	25-50 (170-340)	110-149	강도가 있고 용접성이 좋으며 광범위하게 적용될 수 있는 내식성이 우수한 합금
MONEL R-405 (N04405)	Ni 65.5 Cu 31.5 S 0.04	8.83	Annealed	70-85 (480-590)	25-40 (170-280)	110-140	MONEL 400에 비해 기계 가공성이 우수
MONEL 450 (C71500)	Cu 68 Ni 30 Fe 0.7		Annealed	56 (385)	24 (165)	90	용접성과 내식성이 우수
MONEL K-500 (N05500)	Ni 65.5 Cu 29.5 Al 2.7 Ti 0.6	8.46	Aged	140-190 (970-1310)	110-150 (760-1030)	265-346	MONEL 400과 같은 성질로 시효경화형의 합금으로 고강도가 얻어진다.
INCONEL 600 (N06600)	Ni 76.0 Cr 15.5 Fe 8	8.42	Annealed	80-100 (550-6900)	30-50 (210-340)	120-170	고니켈, 고크롬 합금으로 산화성 및 환원성 분위기, 고온에서의 내식성이 우수
INCONEL 601 (N06601)	Ni 60.5 Cr 23 Fe 14 Al 1.4	8.06	Annealed	80-115 (550-790)	30-60 (210-340)	110-150	고온, 내산화성이 우수
INCONEL 617 (N06617)	Ni 52 Mo 9 Cr 22 Al 1.2 Co 12.5	8.36	Annealed	110 (760)	51 (350)	173	고온, 내산화성이 우수
INCONEL 625 (N06625)	Ni 61 Cr 21.5 Mo 9 Nb+Ta 3.6	8.44	Annealed	135 (930)	75 (520)	180	극저온에서 980°C의 고온까지 높은 강도와 인성, 내산화성 피로 강도를 갖는 내식성이 우수한 합금
INCONEL 690 (N06690)	Ni 60 Cr 30 Fe 9.5	8.19	Annealed	100 (690)	55 (379)	184	산화성의 화학약품과 유황을 함유한 가스에 우수한 내식성을 나타냄
INCONEL 718 (N07718)	Ni 52.5 Mo 3 Cr 19 Fe 18.5 Nb+Ta 5.1	8.19	Aged	196 (1350)	171 (1180)	382	-250°C의 저온에서 700°C의 고온까 지 우수한 강도를 나타내는 시효경 화 합금으로 시효상태에서의 용접이 가 능하며 980°C까지 내산화성이 우수
INCONEL X-750 (N07750)	Ni 73 Ti 2.5 Cr 15.5 Al 0.7 Fe 7 Nb+Ta 1.0	8.25	Aged	162-193 (1120-1330)	115-142 (790-980)	300-390	내식성과 내산화성이 우수한 시효경화형의 합금
INCOLOY 800 (N08800)	Ni 32.5 Fe 46.0 Cr 21	7.95	Annealed	75-100 (520-690)	30-60 (210-410)	120-184	고온 강도가 우수
INCOLOY 800HT (N08811)	Ni 32.5 C 0.08 Fe 46.0 Cr 21 Al+Ti 1.0	7.95	Annealed	65-95 (450-660)	20-50 (140-340)	100-184	고온 강도가 우수
INCOLOY 825 (N08825)	Ni 42 Cu 2.2 Fe 30 Cr 21.5 Mo 3	8.14	Annealed	85-105 (590-720)	35-65 (240-450)	120-180	광범위한 분야에서의 내식성이 풍부하고, 특히 입계부식, 환원성산 에 대해서 양호한 성질을 나타냄

[관련 외국규격과의 비교표]

KS(STS) JIS(SUS)	국제규격		외 국 규 격					유럽규격	
	ISO	미국		영국	독일	프랑스	러시아	EN	
		UNS	ASI	BS	DIN	NF	ROCT	분 류	번호
201	A-2	S20100	201			Z12CMN17-07Az		X12CrMnNiN17-7-5	1.4372
202	A-3	S20200	202	284S16				X12CrMnNiN18-9-5	1.4373
301	14	S30100	301	301S21		Z11CN17-08	12X17T9AH4 07X16H6	X10CrNi18-8 X2CrNi18-7	1.4310 1.4318
301L					X12CrNi17 7 X2CrNi18 7 X12CrNi17 7				
301J1									
302	12,10(1)	S30200	302	302S25		Z12CN18-09	12X18H9		
302B		S30215	302B						
303	17	S30300	303	303S21	X10CrNiS18 9	Z8CNF18-09		X8CrNiS18-9	1.4305
303Se	17a	S30323	303Se	303S41			12X18H10E		
304	11	S30400	304	304S31	X5CrNi18 10	Z7CN18-09	08X18H10	X4CrNi18-10	1.4301
304L	10	S30403	304L	304S11	X2CrNi19 11	Z3CN19-11	03X18H11	X2CrNi19-11	1.4307
304N1		S30451	304N			Z6CN19-09Az		X2CrNi18-9	1.4306
304N2		S30452							
304LN	10N	S30453	304LN		X2CrNi18 10	Z3CN18-10Az		X2CrNi18-10	1.4311
304J3		S30431	S30431						
305	13	S30500	305	305S19	X5CrNi18 12	Z8CN18-12	06X18H11	X4CrNi18-12	1.4303
309S	13(1)	S30908	309S			Z10CN24-13			
310S	16(1)	S31008	310S	310S31		Z8CN25-20	10X23H18	X6CrNi25-20	
316	20	S31600	316	316S31	X5CrNiMo17 122 X5CrNiMo17 133	Z7CND17-12-02 Z6CND18-12-03		X4CrNiMo17-12-2 X4CrNiMo17-13-3	1.4401 1.4436
316L	19	S31603	316L	316S11	X2CrNiMo17 132 X2CrNiMo17 143	Z3CND17-12-02 Z3CND17-13-03		X2CrNiMo17-12-2 X2CrNiMo17-13-3	1.4404 1.4432
	19a						03X17H14M3	X2CrNiMo18-14-3	1.4435
316N		S31651	316N						
316LN	19N 19aN	S31653	316LN		X2CrNiMoN17 122 X2CrNiMoN17 132 X6CrNiMoTi17 122	Z3CND17-11Az Z3CND17-12Az Z6CND17-12	08X17H13M2T	X2CrNiMoN17-11-2 X2CrNiMoN17-13-3 X6CrNiMoN17-11-2	1.4406 1.4429 1.4571
316Ti		S31635							
317		S31700	317	317S16					
317L	24	S31703	317L	317S12	X2CrNiMo18 164	Z3CND19-15-04 Z3CND19-14Az		X2CrNiMo18-15-4 X2CrNiMoN18-12-4 X2CrNiMoN17-13-5	1.4438 1.4434 1.4439
317LN		S31753							
317J1									
317J4L		N08367							
317J5L	A-4	N08904	N08904	904S14		Z2NCU25-20		X1CrNiMoCuN25-25-5	1.4539
321	15,11(1)	S32100	321	321S31	X6CrNiTi18 10	Z6CNT18-10	08X18H10T	X6CrNiTi18 10	1.4541
347	16,12(1)	S34700	347	347S31	X6CrNiNb18 10	Z6CENNb18-10	08X18H12B	X6CrNiNb18 10	1.4550
384	D25(2)	S38400	384			Z6CN18-16			
XM7	D26(2)	S30430	304Cu	394S17		Z2CNU18-10 Z15CNS20-12		X3CrNiCu18-9-4 X1CrNiSi18-15-4	1.4587 1.4381
XM15J1		S38100							
329J1		S32900	329						
329J3L		S39240	S31803			Z3CNDU22-05Az	08X21H6M2T	X2CrNiMoN22-5-3	1.4462
329J4L		S39275	S31260			Z3CNDU25-07Az		X2CrNiMoCuN25-6-3	1.4507
405	2	S40500	405	405S17	X6CrAl13	Z8CA12 Z3C14		X6CrAl13	1.4002
410L									
429		S42900	429						
430	8,4(1)	S43000	430	430S17	X6Cr17	Z8C17	12X17	X6Cr17	1.4016
430F	8a	S43020	430F		X7CrMoS18	Z8CF17		X6CrMoS17	1.4105
430LX	8b	S43035			X6CrTi17 X6CrNb17	Z4CT17		X3CrTi17 X2CrTi17 X3CrNb17	1.4510 1.4520 1.4511
430J1L						Z4CNb17		X6CrMo17-1	1.4113
434	9c	S43400	434	434S17	X6CrMo17 1	Z8CD17-01		X1CrMoTi16-1	1.4513
436L		S43600	436					X2CrMoTi18-2	1.4521
444	F1	S44400	444			Z3CDT18-02			
447J1		S44700							
XM27		S44627				Z1CD26-01			
403		S40300	403						
410	3	S41000	410	410S21	X10Cr13	Z13C13		X12Cr13	1.4006
410S	1	S41008	410S	403S17	X6Cr13	Z8C12	08X13	X6Cr13	1.4000
410J1		S41025							
416	7	S41600	416	416S21		Z11CF13		X12CrS13	1.4005
420J1	4	S42000	420	420S29	X20Cr13	Z20C13	20X13	X20Cr13	1.4021
420J2	5	S42000	420	420S37	X30Cr13	Z33C13	30X13	X30Cr13	1.4028
420F		S42020	420F			Z30CF13		X29CrS13	1.4029
431	9b	S43100	431	431S29	X20CrNi17 2	Z15CN16-02	20X17H2	X19CrNi17 2	1.4057
440A		S44002	440A			Z70C15		X70CrMo15	1.4109
440B		S44003	440B						
440C	A-1b	S44004	440C			Z100CD17	95X18	X105CrMo17	1.4125
440F		S44020	S44020						
630	1(3)	S17400	S17400			Z6CNU17-04		X5CrNiCuNb16-4	1.4542
631	2(3)	S17700	S17700		X7CrNiAl117 7	Z9CNA17-07	09X17H7 10	X7CrNiAl17-7	1.4568

[강관 중량표]

외경m/m \ 두께	2.0	2.5	3.0	3.5	4.0	5.0	6.0
10.5	0.423						
13.8	0.588						
17.3	0.762	0.922	1.07				
21.7	0.981	1.20	1.40				
27.2	1.26	1.54	1.81				
34	1.59	1.96	2.32	2.66	2.99		
42.7	2.03	2.50	2.97	3.42	3.86		
48.6	2.32	2.87	3.41	3.93	4.44		
60.5	2.91	3.61	4.30	4.97	5.63	6.91	8.15
76.3	3.70	4.60	5.48	6.35	7.20	8.88	10.5
89.1	4.34	5.39	6.43	7.46	8.48	10.5	12.4
101.6	4.96	6.17	7.37	8.55	9.72	12.0	14.3
114.3	5.59	6.96	8.32	9.66	11.0	13.6	16.2
139.8	6.87	8.55	10.2	11.9	13.5	16.8	20.0
165.2	8.13	10.1	12.1	14.2	16.1	20.0	23.8
216.3	10.7	13.3	15.9	18.6	21.2	26.3	31.4
267.4	13.2	16.5	19.8	23.0	26.2	32.7	39.1
318.5	15.81	19.7	23.6	27.5	31.3	39.0	46.7

[배관용 스텐레스 강관의 표준중량(304)]

공칭외경		외경	SCH5S		SCH10S		SCH20S		SCH40		SCH80		SCH120		SCH160	
A	B	(mm)	두께 (mm)	중량 (kg/m)	두께 (mm)	중량 (kg/m)	두께 (mm)	중량 (kg/m)	두께 (mm)	중량 (kg/m)	두께 (mm)	중량 (kg/m)	두께 (mm)	중량 (kg/m)	두께 (mm)	중량 (kg/m)
6	1/8	10.5	1.0	0.237	1.2	0.278	1.5	0.336	1.7	0.373	2.4	0.484	-	-	-	-
8	1/4	13.8	1.2	0.377	1.65	0.499	2.0	0.588	2.2	0.636	3.0	0.807	-	-	-	-
10	1/8	17.3	1.2	0.481	1.65	0.643	2.0	0.762	2.3	0.859	3.2	1.12	-	-	-	-
15	1/2	21.7	1.65	0.824	2.1	1.03	2.5	1.20	2.8	1.32	3.7	1.66	-	-	4.7	1.99
20	3/4	27.2	1.65	1.05	2.1	1.31	2.5	1.54	2.9	1.76	3.9	2.26	-	-	5.5	2.97
25	1	34.0	1.65	1.33	2.8	2.18	3.0	2.32	3.4	2.59	4.5	3.31	-	-	6.4	4.40
32	1 1/4	42.7	1.65	1.69	2.8	2.78	3.0	2.97	3.6	3.51	4.9	4.61	-	-	6.4	5.79
40	1 1/2	48.6	1.65	1.93	2.8	3.19	3.0	3.41	3.7	4.14	5.1	5.53	-	-	7.1	7.34
50	2	60.5	1.65	2.42	2.8	4.02	3.5	4.97	3.9	5.50	5.5	7.54	-	-	8.7	11.2
65	2 1/2	76.3	2.1	3.88	3.0	5.48	3.5	6.35	5.2	9.21	7.0	12.1	-	-	9.5	15.8
80	3	89.1	2.1	4.55	3.0	6.43	4.0	8.48	5.5	11.5	7.6	15.4	-	-	11.1	21.6
90	3 1/2	101.6	2.1	5.20	3.0	7.37	4.0	9.72	5.7	13.6	8.1	18.9	-	-	12.7	28.1
100	4	114.3	2.1	5.87	3.0	8.32	4.0	11.0	6.0	16.2	8.7	22.6	11.1	28.5	13.5	33.9
125	5	139.8	2.8	9.56	3.4	11.6	5.0	16.8	6.6	21.9	9.5	30.8	12.7	40.2	15.9	49.1
150	6	165.2	2.8	11.3	3.4	13.7	5.0	20.0	7.1	28.0	11.0	42.3	14.3	53.8	18.2	66.6
200	8	216.3	2.8	14.9	4.0	21.2	6.5	34.0	8.2	42.5	12.7	64.4	18.2	89.8	23.0	111
250	10	267.4	3.4	22.4	4.0	26.2	6.5	42.2	9.3	59.8	15.1	94.9	21.4	131	28.6	170
300	12	318.5	4.0	31.3	4.5	35.2	6.5	50.5	10.3	79.1	17.4	131	25.4	185	-	-

[스텐레스 강판 중량표]

강종별기록	비 중	적용강종
A	7.93	304, 304L, 321
B	7.98	316, 316L, 316JI, 316JIL, 309S, 310S, S347
C	7.70	430

幅×長mm 鋼種別記錄 厚別mm	1,000×2,000 (3.3×6.6)			1,219×2,438 (4×8)			1,524×3,048 (5×10)		
	A	B	C	A	B	C	A	B	C
0.3	4.76	4.79	4.62	7.07	7.11	6.87	11.05	11.12	10.73
0.4	6.34	6.38	6.16	9.43	9.49	9.15	14.73	14.83	14.31
0.5	7.93	7.98	7.70	11.78	11.86	11.44	18.42	18.53	17.88
0.6	9.52	9.58	9.24	14.14	14.22	13.73	22.10	22.24	21.46
0.7	11.10	11.17	10.78	16.49	16.60	16.02	25.79	25.95	25.04
0.8	12.69	12.77	12.32	18.85	18.97	18.31	29.47	29.65	28.61
0.9	14.27	14.36	13.86	21.21	21.34	209.60	33.15	33.36	32.19
1.0	15.86	15.96	15.40	23.57	23.72	22.88	36.84	37.07	35.77
1.2	19.03	19.15	18.48	28.28	28.46	27.46	44.20	44.48	42.92
1.5	23.79	23.94	23.10	35.35	35.57	34.33	55.25	55.60	53.65
2.0	31.72	31.92	30.80	47.13	47.43	45.77	73.67	74.14	71.54
2.5	39.65	39.90	38.50	58.92	59.29	57.21	92.09	92.67	89.42
3.0	47.58	47.88	46.20	70.70	71.15	68.65	110.51	111.20	107.30
3.2	57.75	51.07	49.28	75.42	75.89	73.23	117.88	118.62	114.46
3.5	55.51	55.86	53.90	82.49	83.01	80.19	128.93	129.74	125.19
4.0	63.44	63.84	61.60	94.27	94.86	91.53	147.34	148.27	143.07
4.5	71.37	71.82	69.30	106.05	106.72	102.98	165.76	166.81	160.95
5.0	79.30	79.80	77.00	117.84	118.58	114.42	184.18	185.34	178.84
6.0	95.16	95.76	92.40	141.40	142.30	137.30	221.01	222.41	214.61
7.0	111.02	111.72	107.80	164.97	166.01	160.19	257.85	259.48	250.37
8.0	126.88	127.68	123.20	188.54	189.72	183.07	294.69	296.55	286.14
9.0	142.74	143.64	138.60	212.11	213.44	205.95	331.52	333.61	321.91
10.0	158.60	159.60	154.00	235.67	237.16	228.84	368.36	370.68	357.68
12.0	190.32	191.52	184.80	282.81	284.59	274.61	442.03	444.82	429.21
15.0	237.90	239.40	231.00	353.51	356.74	343.26	552.54	556.02	536.52
16.0	253.76	255.36	246.40	377.07	379.46	366.14	589.38	593.09	572.28
18.0	285.48	287.28	277.20	424.21	426.89	411.91	663.05	667.23	643.82
20.0	317.20	319.20	308.00	471.34	474.31	457.68	736.72	741.37	715.35
22.0	348.92	351.12	338.80	516.48	521.75	503.44	810.39	815.50	786.89
25.0	396.50	399.00	385.00	589.18	592.90	572.09	920.90	926.71	894.19
28.0	444.08	446.88	431.20	659.89	664.05	640.75	1031.41	1037.91	1001.49
30.0	475.80	478.80	462.00	707.02	711.48	686.51	1105.08	1112.05	1037.03
32.0	507.52	510.72	492.80	754.15	758.91	732.28	1178.75	1186.19	1144.57
35.0	555.10	558.60	539.00	824.86	830.06	800.93	1289.26	1297.39	1251.87
38.0	602.68	606.48	585.20	895.60	901.21	869.58	1399.77	1408.60	1359.17
40.0	634.40	638.40	616.00	942.69	948.64	915.35	1473.44	1482.73	1430.71
45.0	713.30	718.20	693.00	1060.53	1067.22	1029.77	1657.62	1668.07	1609.55
50.0	793.33	798.00	770.00	1178.37	1185.80	1144.19	1841.80	1853.42	1788.38
55.0	872.30	877.80		1296.20	1304.38		2025.98	2038.76	
60.0	951.60	957.60		1414.04	1422.96		2210.16	2224.10	
65.0	1030.90	1037.40		1531.88	1541.54		2394.34	2409.44	
70.0	1110.20	1117.20		1649.71	1660.12		2578.52	2594.78	
80.0	1268.80	1276.80		1885.39	1897.28		2946.88	2965.47	
90.0	1427.40	1436.40		2121.06	2134.43				
100.0	1586.00	1596.00		2356.73	2371.59				

중량산출방법 : 두께(mm)×세로(m)×비중=kg/枚

[스텐레스봉 중량표]

[스텐레스앵글 중량표]

단위 kg/m

형상	환봉	4각봉	육각봉	형상	환봉	4각봉	육각봉	A×B	t	단면적 cm ²	단위중량kg/m		
	○	□	⬡		○	□	⬡				STS302	STS316	
	단면적	0.7854D ²	D ²		0.8666D ²	단면적	0.7854D ²				D ²	0.8666D ²	STS304
규격mm	0.7854D ²	D ²	0.8666D ²	규격mm	0.7854D ²	D ²	0.8666D ²						
SIZE	1	0.006	0.008	0.007	31.75	6.278	7.994	6.923	20×20	3	1.127	0.894	0.899
	2	0.025	0.032	0.027	32	6.378	8.120	7.032	25×25	3	1.427	1.13	1.14
	3	0.056	0.071	0.062	35	7.630	9.714	8.413	25×25	4	1.836	1.46	1.47
	4	0.010	0.127	0.110	38.10	9.041	11.51	9.967	30×30	3	1.727	1.37	1.38
	5	0.156	0.198	0.172	40	9.965	12.69	10.99	30×30	4	2.236	1.77	1.78
	6	0.224	1.776	0.247	42	10.97	13.99	12.11	30×30	5	2.746	2.18	2.19
	7	0.305	0.389	0.337	44	12.30	15.67	13.57	30×30	6	3.206	2.54	2.56
	8	0.399	0.508	0.440	45	12.61	16.06	13.91	40×40	3	2.336	1.85	1.86
	9	0.504	0.642	0.556	48	14.35	18.27	15.82	40×40	4	3.045	2.45	2.46
	9.52	0.574	0.731	0.622	50	15.57	19.83	17.17	40×40	5	3.755	2.98	3.00
	10	0.623	0.793	0.687	50.8	16.07	20.46	17.72	40×40	6	4.415	3.61	3.63
	11	0.754	0.960	0.831	52	16.84	21.44	18.57	50×50	4	3.892	3.09	3.11
	12	0.897	1.142	0.989	55	18.84	23.99	20.77	50×50	5	4.802	3.81	3.83
	12.7	1005	1.279	1.108	55	18.84	23.99	20.77	50×50	6	5.644	4.48	4.50
	13	1.053	1.340	1.161	60	22.42	28.55	24.72	50×50	6	5.802	4.60	4.63
	14	1.221	1.554	1.346	63.50	25.11	31.98	27.69	60×60	6	6.862	5.44	5.48
	15	1.401	1.784	1.545	65	26.31	33.50	29.01	60×60	6	6.862	5.44	5.48
	15.88	1.571	2.000	1.732	70	30.52	38.86	33.65	65×65	5	6.367	5.05	5.08
	16	1.590	2.030	1.758	70	30.52	38.86	33.65	65×65	6	7.527	5.97	6.01
	17	1.800	2.292	1.985	75	35.03	44.61	38.63	65×65	7	8.658	6.87	6.91
	18	2.018	2.569	2.225	80	39.86	50.75	43.95	65×65	8	9.761	7.74	7.79
	19	2.248	2.863	2.479	85	45.00	57.29	49.62	70×70	6	8.127	6.44	6.49
	19.05	2.260	2.878	2.492	85	45.00	57.29	49.62	70×70	7	9.358	7.42	7.47
	20	2.491	3.172	2.747	90	50.45	64.23	55.63	70×70	8	10.56	8.37	8.43
	21	2.747	3.497	3.029	95	56.21	71.57	61.98	75×75	6	8.727	6.92	6.96
	22	3.014	3.838	3.324	100	62.28	79.30	68.67	75×75	7	10.06	7.98	8.03
	22.22	3.075	3.915	3.391	100	62.28	79.30	68.67	75×75	8	11.36	9.01	9.07
	23	3.295	4.195	3.633	110	75.36	95.95	83.10	75×75	9	12.69	10.1	10.1
	24	6.882	4.568	3.956	120	89.67	114.2	98.89	80×80	6	9.327	7.40	7.44
	25	3.893	4.956	4.292	130	105.3	134.0	116.1	80×80	7	10.76	8.53	8.59
25.40	4.048	5.116	4.431	140	122.0	155.4	134.6	80×80	8	12.16	9.64	9.70	
26	4.210	5.361	4.642	150	140.1	178.4	154.5	80×80	9	13.59	10.8	10.8	
27	4.540	5.781	5.006	200	249.1	317.2	247.7	90×90	8	13.82	11.0	11.0	
28	4.883	6.217	5.384	250	389.3	495.6	429.2	90×90	9	15.45	12.3	12.3	
30	5.605	7.137	6.181	300	560.5	713.7	618.1	90×90	10	17.00	13.5	13.6	
				350	763.0	971.4	841.3	100×100	8	15.42	12.2	12.3	
				400	996.5	1269	1099	100×100	9	17.25	13.7	13.8	
								100×100	10	19.00	15.1	15.2	

CONVERSION TABLE

VICKEYS	BRINELL 3000KG 10mm BALL	ROCKWELL			SUPERFICIAL			SHORE
		C 150KG DIAMOND	A 60KG DIAMOND	D 100KG DIAMOND	15-N 15KG DIAMOND	30-N 30KG DIAMOND	45-N 45KG DIAMOND	
940	-	68.0	85.6	76.9	93.2	84.4	75.4	97.6
920	-	67.5	85.3	76.5	93.0	84.0	74.8	96.4
900	-	67.0	85.0	76.1	92.9	83.6	74.2	95.2
880	-	66.4	84.7	75.7	92.7	83.1	73.6	94.0
860	-	65.9	84.4	75.3	92.5	82.7	73.1	92.8
840	-	65.3	84.1	74.8	92.3	82.2	72.2	91.5
820	-	64.7	83.8	74.3	92.1	81.7	71.8	90.2
800	-	64.0	83.4	73.8	91.8	81.1	71.0	88.9
780	-	63.3	83.0	73.3	91.5	80.4	70.2	87.6
760	-	62.5	82.6	72.6	91.2	79.7	69.4	86.2
740	-	61.8	82.2	72.1	91.0	79.1	68.6	84.8
720	-	61.0	81.8	71.5	90.7	78.4	67.7	83.3
700	-	60.1	81.3	70.8	90.3	77.6	66.7	81.8
690	-	59.7	81.1	70.5	90.1	77.2	66.2	81.1
680	-	59.2	80.8	70.1	89.8	76.8	65.7	80.3
670	-	58.8	80.6	69.8	89.7	76.4	65.3	79.6
660	-	58.3	80.3	69.4	89.5	75.9	64.7	78.8
650	-	57.8	80.0	69.0	89.2	75.5	64.1	78.0
640	-	57.3	79.8	68.7	89.0	75.1	63.5	77.2
630	-	56.8	79.5	68.3	88.8	74.6	63.0	76.4
620	-	56.3	79.2	67.9	88.5	74.2	62.4	75.6
610	-	55.7	78.9	67.5	88.2	73.6	61.7	74.7
600	-	55.2	78.6	67.0	88.0	73.2	61.2	73.9
590	-	54.7	78.4	66.7	87.8	72.7	60.5	73.1
580	-	54.1	78.0	66.2	87.5	72.1	59.9	72.2
570	-	53.6	77.8	65.8	87.2	71.7	59.3	71.3
560	-	53.0	77.4	65.4	86.9	71.2	58.6	70.4
550	505	52.3	77.0	64.8	86.6	70.5	57.8	69.6
540	496	51.7	76.7	64.4	86.3	70.0	57.0	68.7
530	488	51.1	76.4	63.9	86.0	69.5	56.2	67.7
520	480	50.5	76.1	63.5	85.7	69.0	55.6	66.8
510	473	49.8	75.7	62.9	85.4	68.4	54.7	65.9
500	465	49.1	75.3	62.2	85.0	67.7	53.9	64.9
490	456	48.4	74.9	61.6	84.7	67.1	53.1	64.0
480	448	47.7	74.5	61.3	84.3	66.4	52.2	63.0
470	441	46.9	74.1	60.7	83.9	65.7	51.3	62.0
460	433	46.1	73.6	60.1	83.6	64.9	50.4	61.0
450	425	45.3	73.3	59.4	83.2	64.3	49.4	60.0
440	415	44.5	72.8	58.8	82.8	63.5	48.4	59.0
430	405	43.6	72.3	58.2	82.3	62.7	47.4	58.0
420	397	42.7	71.8	57.5	81.8	61.9	46.4	56.9
410	388	41.8	71.4	56.8	81.4	61.1	45.3	55.9
400	379	40.8	70.8	56.0	80.8	60.2	44.1	54.8
390	369	39.8	70.3	55.2	80.3	59.3	42.9	53.7
380	360	38.8	69.8	54.4	79.8	58.4	41.7	52.6
370	350	37.7	69.2	53.6	79.2	57.4	40.4	51.5
360	341	36.6	68.7	52.8	78.6	56.4	39.1	50.4
350	331	35.5	68.1	51.9	78.0	55.4	37.8	49.3
340	322	34.4	67.6	51.1	77.4	54.4	36.5	48.1
330	313	33.3	67.0	50.2	76.8	53.6	35.2	47.0
320	303	32.2	66.4	49.4	76.2	52.3	33.9	45.8
310	294	31.0	65.8	48.4	75.6	51.3	32.5	44.6
300	284	29.8	65.2	47.5	74.9	50.2	31.1	43.4
295	280	29.2	64.8	47.1	74.6	49.7	30.4	42.8
290	275	28.5	64.5	46.5	74.2	49.0	29.5	42.2
285	270	27.8	64.2	46.0	73.8	48.4	28.7	41.6
280	265	27.1	63.8	45.3	73.4	47.8	27.9	40.9
275	261	26.4	63.5	44.9	73.0	47.2	27.1	40.3
270	256	25.6	63.1	44.3	72.6	46.4	26.2	39.7
265	252	24.8	62.7	43.7	72.1	45.7	25.2	39.1
260	247	24.0	62.4	43.1	71.6	45.0	24.3	38.4
255	243	23.1	62.0	42.2	71.1	44.2	23.2	37.8
250	238	22.2	61.6	41.7	70.6	43.4	22.2	37.2
245	233	21.3	61.2	41.1	70.1	42.5	21.1	36.5
240	228	20.3	60.7	40.3	69.6	41.7	19.9	35.9

VICKEYS	BRINELL 3000KG 10mm BALL	ROCKWELL			SUPERFICIAL			SHORE			
		A 60KG DIAMOND	B 100KG 1/16 BALL	C 150KG DIAMOND	D 100KG DIAMOND	E 100KG 1/8 BALL	K 150KG 1/88BALL				
513	479	75.5	-	50.0	63.0	-	-	85.5	68.0	54.5	66.2
481	450	74.5	-	48.0	61.5	-	-	84.5	66.5	52.5	63.1
452	425	73.5	-	46.0	60.0	-	-	83.5	64.5	50.0	60.2
427	403	72.5	-	44.0	58.5	-	-	82.5	63.0	47.5	57.7
404	382	71.5	-	42.0	57.0	-	-	81.5	61.0	45.5	55.2
382	363	70.5	-	40.0	55.5	-	-	80.5	59.5	43.0	52.8
362	346	69.5	-	38.0	54.0	-	-	79.5	58.0	41.0	50.6
344	329	68.5	-	36.0	52.5	-	-	78.5	56.0	38.5	48.6
326	313	67.5	-	34.0	50.5	-	-	77.5	54.5	36.0	46.5
309	298	66.5	[106]	32.0	49.5	-	-	76.5	52.5	34.0	44.5
285	275	64.5	[104]	28.5	46.5	-	-	75.0	49.5	30.0	41.6
266	258	63.0	[102]	25.5	44.5	-	-	73.5	47.0	26.5	39.2
248	241	61.5	[100]	22.5	42.0	-	-	72.0	44.5	23.0	36.9
234	228	60.5	98.0	20.0	40.0	-	-	70.5	42.0	20.0	35.1
220	215	59.0	96.0	17.0	38.0	-	[100.0]	69.0	39.5	17.0	33.2
209	204	57.5	94.0	14.5	36.0	-	98.0	68.0	37.5	14.0	31.8
198	194	56.5	92.0	12.0	34.0	-	96.5	66.5	35.5	11.0	30.3
188	184	55.0	90.0	9.0	32.0	[108.5]	94.5	65.0	32.5	7.5	28.9
179	176	53.5	88.0	6.5	30.0	[107.0]	93.0	64.0	30.5	5.0	27.7
171	168	52.5	86.0	4.0	28.0	[106.0]	91.0	62.5	28.5	2.0	26.5
164	161	51.5	84.0	2.0	26.5	[104.5]	89.0	61.5	26.5	0.5	25.5
157	155	50.0	82.0	-	24.5	[103.0]	87.5	-	-	-	24.5
151	149	49.0	80.0	-	22.5	[102.0]	85.5	-	-	-	23.7
145	144	47.5	78.0	-	21.0	[100.5]	83.5	-	-	-	22.8
140	139	46.5	76.0	-	19.0	99.5	82.0	-	-	-	22.1
135	134	45.5	74.0	-	17.5	98.0	80.0	-	-	-	21.4
130	129	44.0	72.0	-	16.0	97.0	78.0	-	-	-	20.6
126	125	43.0	70.0	-	14.5	95.5	76.5	-	-	-	20.0
122	121	42.0	68.0	-	13.0	94.5	74.5	-	-	-	19.4
119	118	41.0	66.0	-	11.5	93.0	72.5	-	-	-	19.0
115	114	40.0	64.0	-	10.0	91.5	71.0	-	-	-	18.4
112	111	39.0	62.0	-	8.0	90.5	69.0	-	-	-	17.9
108	108	-	-	-	-	-	67.5	-	-	-	17.3
106	106	-	-	-	-	-	65.5	-	-	-	17.0
103	103	-	-	-	-	-	63.5	-	-	-	16.6
100	100	-	-	-	-	-	62.0	-	-	-	16.1
98	98	-	-	-	-	-	60.0	-	-	-	15.8
95	95	-	-	-	-	-	58.0	-	-	-	-
93	93	-	-	-	-	-	56.5	-	-	-	-
91	91	-	-	-	-	-	54.5	-	-	-	-
89	89	-	-	-	-	-	52.5	-	-	-	-
87	87	-	-	-	-	-	51.0	-	-	-	-
85	85	-	-	-	-	-	49.0	-	-	-	-
83	83	-	-	-	-	-	47.0	-	-	-	-
81	81	-	-	-	-	-	45.5	-	-	-	-
79	79	-	-	-	-	-	43.5	-	-	-	-
78	78	-	-	-	-	-	42.0	-	-	-	-
77	77	-	-	-	-	-	40.0	-	-	-	-

VICKERS	ROCKWELL		SUPERFICIAL		
	B 100KG 1/16BALL	F 60KG 1/16BALL	15-T 15KG 1/16BALL	30-T 30KG 1/16BALL	45-T 15KG 1/16BALL
144	77.5	(101.5)	86.0	68.0	51.5
146	78.0	(102.0)	-	68.5	53.0
148	79.0	(102.5)	-	69.0	53.0
152	80.0	(103.0)	-	-	54.0
150	80.0	-	86.5	69.5	53.5
154	81.5	(103.5)	-	70.0	54.5
156	82.0	(104.0)	87.0	70.5	55.5
158	83.0	(104.5)	-	71.0	56.0
160	83.5	(104.0)	87.0	71.5	56.5
162	84.0	(105.0)	87.5	-	57.5
164	85.0	(105.5)	-	72.0	58.0
166	85.5	-	-	72.5	58.5
168	86.0	(106.0)	88.0	73.0	59.0
170	87.0	-	-	-	59.5
172	87.5	(106.5)	-	73.5	60.0
174	88.0	-	88.5	74.0	60.5
176	88.5	(107.0)	-	-	61.0
178	89.0	-	-	74.5	61.5
180	90.0	(107.5)	-	75.0	62.0
182	90.5	(108.0)	89.0	-	62.5
184	91.0	-	-	75.5	63.0
186	91.5	(108.5)	-	76.0	63.5
188	92.0	-	89.5	-	64.0
190	92.5	(109.0)	-	76.5	64.5
192	93.0	-	-	77.0	65.0
196	93.5	(110.0)	90.0	77.5	66.0
194	-	(109.5)	-	-	65.5

VICKERS	ROCKWELL		SUPERFICIAL		
	B 100KG 1/16BALL	F 60KG 1/16BALL	15-T 15KG 1/16BALL	30-T 30KG 1/16BALL	45-T 15KG 1/16BALL
142	77.0	(101.0)	-	67.5	51.0
140	76.0	(100.5)	85.5	67.0	50.0
138	75.0	(100.0)	-	66.5	49.0
136	74.5	99.5	85.0	66.0	48.0
134	73.5	99.0	-	65.5	47.5
132	73.0	98.5	84.5	65.0	46.5
130	72.0	98.0	84.0	64.5	45.5
128	71.0	97.5	-	63.5	45.0
126	70.0	97.0	83.5	63.0	44.0
124	69.0	96.5	-	62.5	43.0
122	68.0	96.0	83.0	62.0	42.0
120	67.0	95.5	-	61.0	41.0
118	66.0	95.0	82.5	60.5	40.0
116	65.0	94.5	82.0	60.0	39.0
114	64.0	94.0	81.5	59.5	38.0
112	63.0	93.0	81.0	58.5	37.0
110	62.0	92.6	80.5	58.0	35.5
108	61.0	92.0	-	57.0	34.5
106	59.5	91.2	80.0	56.0	33.0
104	58.0	90.5	79.5	55.0	32.0
102	57.0	89.8	79.0	54.5	30.5
100	56.0	89.0	78.5	53.5	29.5
98	54.0	88.0	78.0	52.5	28.0
96	53.0	87.2	77.5	51.5	26.5
94	51.0	86.3	77.0	50.5	24.5
92	49.5	85.4	76.5	49.0	23.0
90	47.5	84.4	75.5	48.0	21.0

VICKERS	ROCKWELL		SUPERFICIAL		
	B 100KG 1/16BALL	F 60KG 1/16BALL	15-T 15KG 1/16BALL	30-T 30KG 1/16BALL	45-T 15KG 1/16BALL
88	46.0	83.5	75.0	47.0	19.0
86	44.0	82.3	74.5	45.5	17.0
84	42.0	81.2	73.5	44.0	14.5
82	40.0	80.0	73.0	43.0	12.5
80	37.5	78.6	72.0	41.0	10.0
78	35.0	77.4	71.5	39.5	7.5
76	32.5	76.0	70.5	38.0	4.5
74	30.0	74.8	70.0	36.0	1.0
72	27.5	73.2	69.0	34.0	-
70	24.5	71.8	68.0	32.0	-
68	21.5	70.0	67.0	30.0	-
66	18.5	68.5	66.0	28.0	-
64	15.5	66.8	65.0	25.5	-
62	12.5	65.0	63.5	23.0	-
60	10.0	63.0	62.5	20.5	-
58	-	61.0	61.0	18.0	-
56	-	58.8	60.0	15.0	-
54	-	56.5	58.5	12.0	-
52	-	53.5	57.0	-	-
50	-	50.5	55.5	-	-
49	-	49.0	54.5	-	-
48	-	47.0	53.5	-	-
47	-	45.0	-	-	-
46	-	43.0	-	-	-
45	-	40.0	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

[STUD BOLT LENGTH]

NOZZ. SIZE	ANSI 150# RF. (G:t4.5)		
	B.C.D	Q'TY-HOLE	STUDBOLT LENGTH
1/2	60.3	4- ø15	1/2-13UNC × 65L
3/4	69.9	4- ø15	1/2-13UNC × 65L
1	79.4	4- ø15	1/2-13UNC × 70L
1 1/2	98.4	4- ø15	1/2-13UNC × 75L
2	120.7	4- ø19	5/8-11UNC × 85L
2 1/2	139.7	4- ø19	5/8-11UNC × 95L
3	152.4	4- ø19	5/8-11UNC × 95L
3 1/2	177.8	8- ø19	5/8-11UNC × 95L
4	190.5	8- ø19	5/8-11UNC × 95L
5	215.9	8- ø22	3/4-10UNC × 105L
6	241.3	8- ø22	3/4-10UNC × 105L
8	298.5	8- ø22	3/4-10UNC × 110L
10	362	12- ø25	7/8-9UNC × 120L
12	431.8	12- ø25	7/8-9UNC × 125L
14	476.3	12- ø29	1-8UNC × 135L
16	539.8	16- ø29	1-8UNC × 140L
18	577.9	16- ø32	1 1/8-8UNC × 155L
20	635	20- ø32	1 1/8-8UNC × 160L
24	749.3	20- ø35	1 1/4-8UNC × 180L

[STUD BOLT LENGTH]

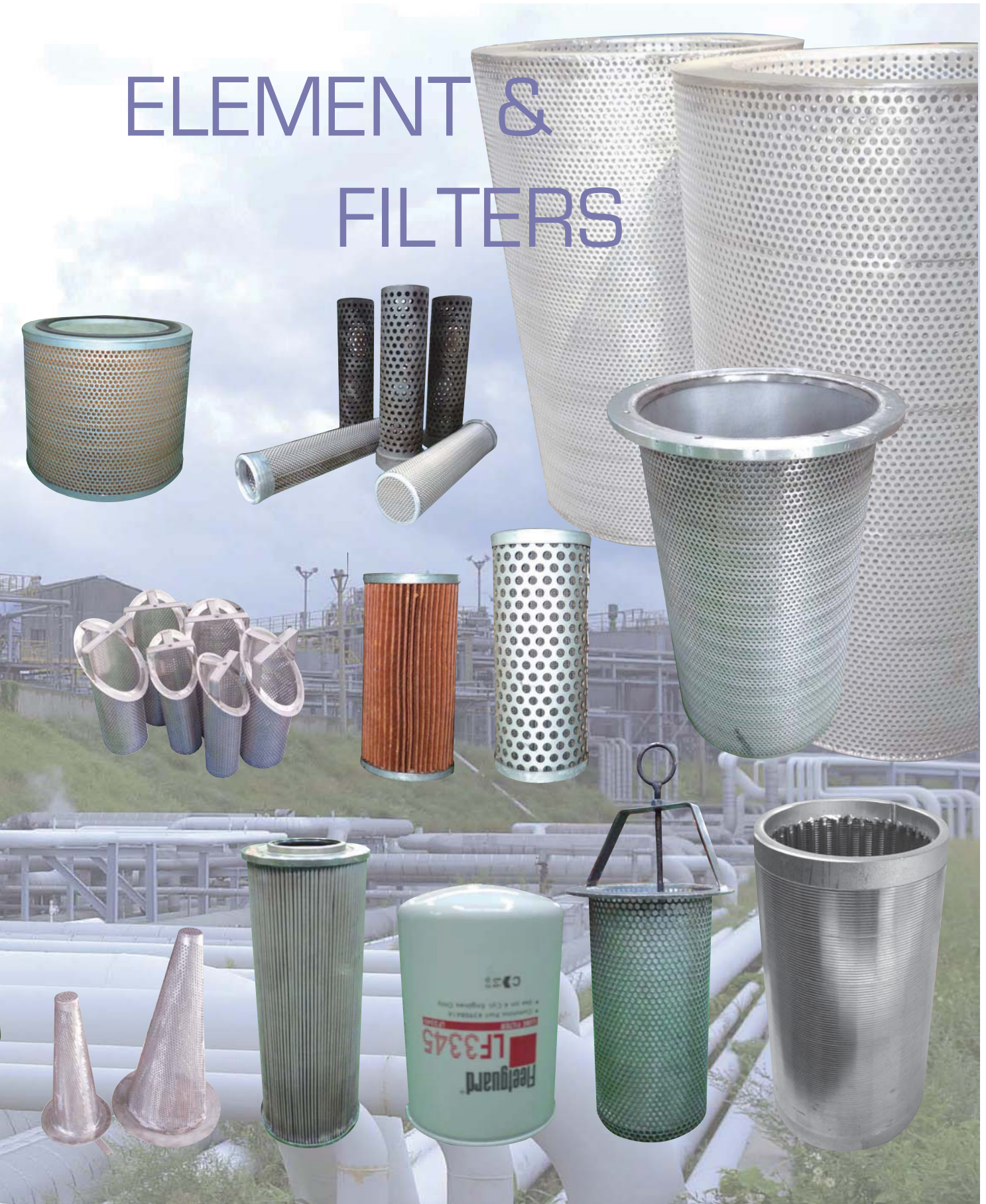
NOZZ. SIZE	ANSI 300# RF. (G:t4.5)		
	B.C.D	Q'TY-HOLE	STUDBOLT LENGTH
1/2	66.7	4- ø15	1/2-13UNC × 70L
3/4	82.6	4- ø19	5/8-11UNC × 80L
1	88.9	4- ø19	5/8-11UNC × 85L
1 1/2	114.3	4- ø22	3/4-10UNC × 95L
2	127	8- ø19	5/8-11UNC × 95L
2 1/2	149.2	8- ø22	3/4-10UNC × 105L
3	168.3	8- ø22	3/4-10UNC × 110L
3 1/2	184.2	8- ø22	3/4-10UNC × 115L
4	200	8- ø22	3/4-10UNC × 120L
5	235	8- ø22	3/4-10UNC × 125L
6	269.9	12- ø22	3/4-10UNC × 125L
8	330.2	12- ø25	7/8-9UNC × 145L
10	387.4	16- ø29	1-8UNC × 160L
12	450.9	16- ø32	1 1/8-8UNC × 175L
14	514.4	20- ø32	1 1/8-8UNC × 180L
16	571.5	20- ø35	1 1/4-8UNC × 195L
18	628.7	24- ø35	1 1/4-8UNC × 200L
20	685.8	24- ø35	1 1/4-8UNC × 205L
24	812.8	24- ø41	1 1/2-8UNC × 230L

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We Do Not Merely Produce Products,
But Provide Solution for Customers.



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