

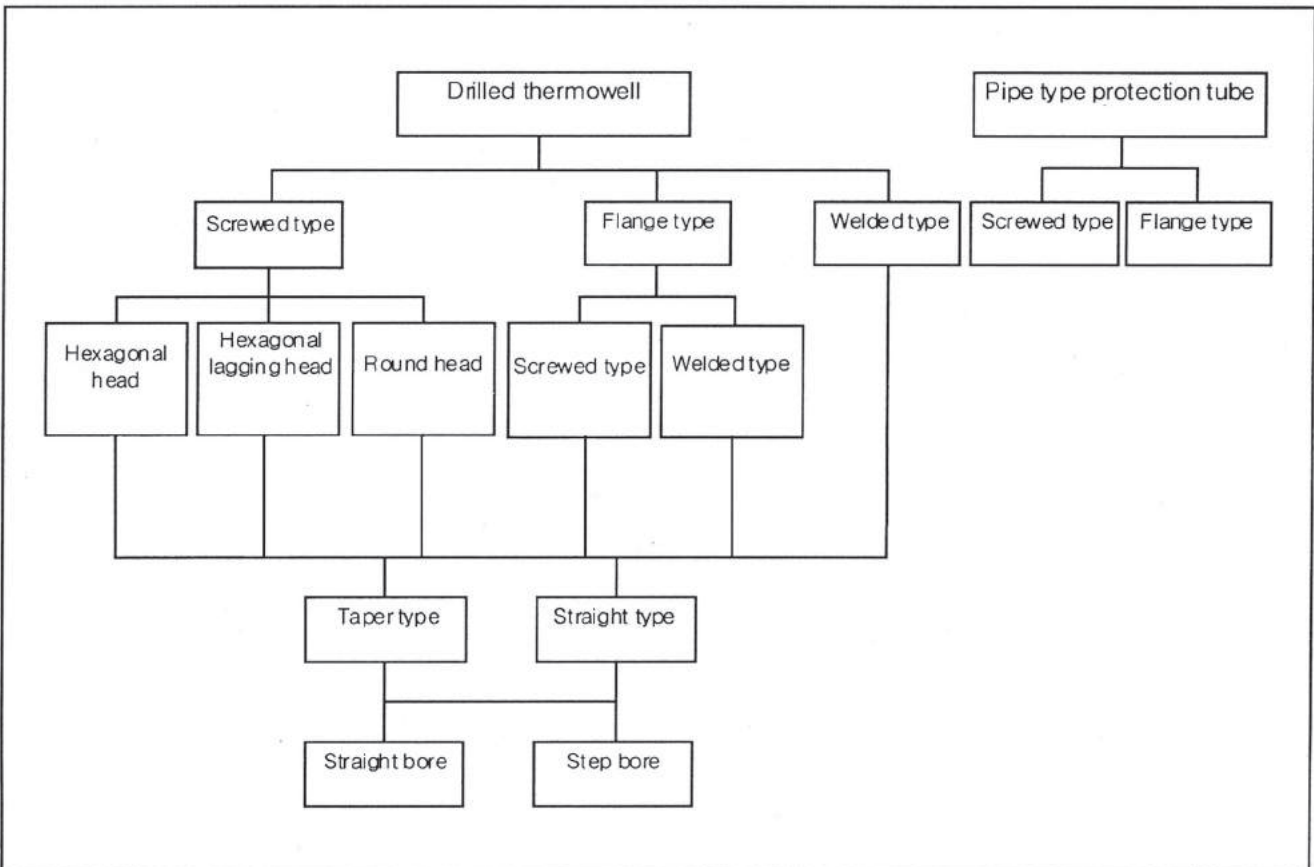
METALLIC PROTECTION TUBE AND THERMOWELL FOR TEMPERATURE ELEMENT

측온체용 금속 보호관 . 환봉보호관

측온체용 보호관은 열전대나 측온저항체등의 온도검출단의 보호를 목적으로 하기 때문에 측온 장소 분위기나 측정정도에 대응하여 용도에 적합한 것을 선정 할 필요가 있습니다. 그러기 위하여 측정물의 온도, 압력, 진동, 충격에도 강하고 장기간 안정하게 사용할 수 있지 않으면 안된다. 금속파이프 끝단을 용접한 보호관과 금속봉에 하나의 구멍을 뚫은 보호관을 준비 하고 있습니다. 일반적으로 파이프식 보호관은 저압 장소에, 드릴바보호관은 고압가스나 고속 유체, 큰 응력을 받는 장소에, 여러가지 조합되는 측온체와 사용조건에 적합한 형태, 크기, 재질등을 선정하여 주십시오.

Since the protection tube for the temperature element is responsible for protecting the temperature detecting elements such as thermocouples and resistance thermometer sensors, it is necessary to select one suitable for applications in accordance with temperature measuring point conditions and desired measurement accuracy. Therefore, this protection tube should withstand the temperature and pressure of measured objects, vibration and shock for long and stable operation. OKAZAKI can offer a protection tube weld sealed at the end of metal pipe and a monolithic drilled well of bar material. In general, the drawn protection tube is used in a low pressure place, and the drilled well in applications subjected to significantly large stresses such as high-pressure gas and high speed fluids, with strictly selected shape, size and material fitting to the combined temperature element and operating conditions.

A PRODUCTION SERIES OF OKAZAKI METALLIC PROTECTION TUBE AND THERMOWELL



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보호관

PROTECTION TUBE & WELL

Standard Models of Metal Protection Tube and Thermowell

보호관 표준사양

Sensing Area 측정부	Outer dia. 외경	Inner dia. 내경	Length 길이 (MAX.)	Shape of tip 선단형태	
				Straight	Taper
Drilled thermowell	> $\phi 9$	$\phi 4$	100		
	> $\phi 10$	$\phi 5$	350		
	> $\phi 12$	$\phi 6 \sim \phi 7$	600	Step bore	Step bore
	> $\phi 15$	$\phi 8 \sim \phi 10$	1500		
	> $\phi 22$	$\phi 11 \sim \phi 16$	2000		
Pipe type	$\phi 8 \sim \phi 27.2$	$\phi 6 \sim \phi 21.4$	3950		

Process Connection 공정연결	Standard 규격	Facing 규격	Upper face			Construction	
			Blind (BL)	Slip on (SO)	Shape		
Flange	JIS Rating: 5K, 10K, 20K Size: 20A, 25A, 40A, 50A	RF				TW20A TW20B TW40B T 크기 $t \leq 15$ T=35 $t > 15$ T=t+20 5mm단위로 선정	
		FF					
Screwed	JPI ANSI Rating: 150LB, 300LB, 600LB Size: 3/4B, 1B, 1-1/2B, 2B	RJ				TW10A TW30A (Welded)	
		Type	1/2	3/4	1		
		S	PT NPT	16	20		23
			PF NPS	20	20		25
		Hex.	PT NPT	26×30	30×34.6		36×41.6
	PF NPS	26×30	32×37	38×43.9			
Welded	ϕH	28			TW10E 		
		34					

Material 소재	Drilled thermowell	
	Pipe type	SUS304, SUS316, SUS310S, SANDVIK P4(4C54), NCF600(Inconel 600), UMC050

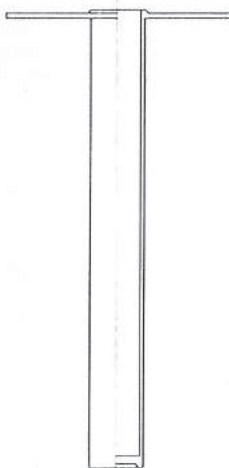
Main Materials and Characteristics of Metallic Protection Tubes and Thermowells

Material	Fabric		Max. Temp. Limit (°C)		Features
	Pipe	Bar Stock	Nor.	Max.	
SUS304	○	○	850	950	내열, 내산, 내알칼리에 우수, 유황, 환원가스에 약하다. Having high heat resistance, acid resistance, and alkali resistance.
SUS316	○	○	850	950	내열, 내산, 내알칼리에는 SUS304와 변함없지만 고온에 있어서는 내식성은 우수하다. Almost same as SUS304 in heat resistance, acid resistance and alkali resistance, but corrosion resistance is higher than SUS304 at high temperature.
SUS316L	○	○	850	950	SUS316의 C량을 적게 한 것으로 내립계 부식성 재료이다. C amount decreased from SUS316. Intergranular corrosion resistant material.
SUS310S	○	○	1050	1100	Ni-Cr 함유율이 높고 고온에서의 산화성이 강한 내열강이다. Having high Ni-Cr content. High heat resistant steel which has high oxidation resistance at high temperature.
UMCo50	○	○	1150	1200	코발트 기함금으로 내열, 내마모에 강하고 유황가스에도 강하다. Co base alloy. High heat resistant alloy which has abrasion resistance and sulfuric resistance.
NCF600 (INCONEL 600)	○	○	1000	1250	많은 산화성, 환원성, 쌍방향의 산, 알칼리에 우수한 내식성을 갖고 응력 부식 균열에 대한 감수성이 극도로 낮다. Having good corrosion resistance against oxidizing or reducing atmosphere and extremely low sensibility against cracking by stress and corrosion
NCF800H (INCOLOY 800H)		○	1100	1260	고온내산화성 내침탄성 및 열충격에 우수'또 고온부식에 강함. Having good resistance against at high temperature, cementation and creep, and also against corrosion at high temperature.
(HASTELLOY B)		○	500	800	Ni 기함금으로 내열, 내식성에 우수하고 특히 염산에 대한 내식성이 우수하다. Nickel based alloy, having good resistance against heat and corrosion and, especially, against corrosion by hydrochloric acid.
C276 (HASTELLOY C276)		○	900	1090	유황산 화합물이나 염화물에 대하여 우수한 내식성이 있고 화학공업 프로세스에 사용된다. 용접후의 내식성에 우수. Having good corrosion resistance against sulfuric compound and chloride and being used for various processes in chemical industries. Also having good corrosion resistance after welding.
SANDVIK P4(4C54)	○		1050	1100	27Cr 강으로 내열, 환원염 및 유황가스에 강하다. 27Cr steel. Endurable against reducing flame and sulfuric gas.
SUH446 (AISI446)	○	○	1050	1100	
(TITANIUM)	○	○	250	500	저온에 있어 내식성은 극도로 우수 하지만 고온에서는 산화되어 부서지기 쉽다. Corrosion resistance at low temperature is fairly good, but oxidized and fragile at high temperature.
(MONEL400)		○	500	1000	NiCu 합금으로 특히 내해수성이 우수 각종산, 알칼리용액에 견딘다. Ni -Cu alloy, having good resistance especially against sea water and also various types of acid or alkaline solution.
(KANTHAL AF)	○		1100	1300	고온에서의 기계적 강도가 크고 취부 금속 용접이 안됨. Having mechanical strength at high temperature. Not suitable for welding of metallic fittings.

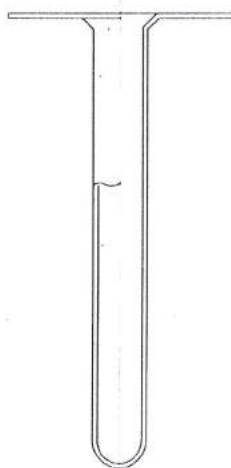
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Types and Characteristics of Surface Treatments and for Metallic Protection Tubes and Thermowells including Covers

Type	Max. Temp. Limit (°C)		Features
	Nor.	Max.	
PFA Coating	200	250	내약품성이 좋고, 온도가 변해도 내식성이 변하지 않는다. 타 수지 코팅에 비해 기계적 강도가 크다. Having good corrosion resistance against chemicals. Corrosion resistance not changed even if temperature changes. Mechanical strength greater compared to other resin coating.
Glass Lining	250	350	소재는 STPG370을 사용 내산성이 우수 하지만 알칼리성에 열등하다. STPG370 used as the base material. Acid resistance is good but alkali resistance inferior.
Ceramic Coating	1200	1300	내식성, 내마모성에 우수, 내산 알칼리성에 우수. Having good acid resistance. The coating material, if oxidized chrome contained, has good alkali resistance. Abrasion resistance is also good.
Hard Facing			모트산에 강하다. 내산성에는 우수 하지만 공기 중에 서는 고온에서 부서지기 쉽다. 내알칼리성에 열등. Having good resistance against corrosion and abrasion, and also against acid and alkali.
Tantalum Cover	350	500	4-6 불화 수지제로 내약품성에는 대부분의 저항을 나타낸다. 보다 고온용의 PFA 수지제도 있다. Having resistance against all acids. But getting fragile in air at high temperature.
FEP Cover	150	200	4-6 fluorocarbon resin product, having resistance against most of chemicals. Other PFA resin product for higher temperature also available.



Tantalum



FEP COVER

Chemical Resistance of Protection Tube Material

Corrosives	Concentration	Temp. (°C)	Material																															
			304SS	321SS	316SS	316LSS	316JLSS	310S SS	347SS	Carpenter 20	Inconel 600	Nimonic	Hastelloy B	Hastelloy C-276	Hastelloy X	Titanium	Monel	Tantalum	Teflon	Copper	Zirconium	Nickel	PVC	Cupro-nickel	Aluminium	Brass	Lead	Common steel	50Co-30Cr	Haynes alloy 25				
H ₂ SO ₄	5%	30	B	B	B	B	B	B	B	A	B	B	A	A	B	B	B	A	A	B	A	B	A	B	C	C	A	A	B	A	B	A	B	
	10%	30	B	B	B	B	B	B	B	A	B	B	A	A	B	B	B	A	A	B	A	B	A	B	C	C	A	A	B	A	B	A	B	
	50%	30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
	90%	30	B	B	B	B	B	B	B	A	B	B	A	A	B	B	B	A	A	B	A	B	A	B	C	C	A	A	B	A	B	A	B	
		B.P	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2HCl	5%	30	C	C	C	C	C	C	C	C	C	B	B	B	A	A	A	A	B	B		A	C	C	C	C	C	C	C	C	C	C	C	
	10%	30	C	C	C	C	C	C	C	C	C	B	B	B	A	A	A	A	B	B		A	C	C	C	C	C	C	C	C	C	C	C	
	20%	30	C	C	C	C	C	C	C	C	C	B	B	B	A	A	A	A	B	B		A	C	C	C	C	C	C	C	C	C	C	C	
		B.P	C	C	C	C	C	C	C	C	C	B	B	B	A	A	A	A	B	B		A	C	C	C	C	C	C	C	C	C	C	C	
HNO ₃	20%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C		C	B	C	C	B	C	C	C	C	C	C	C	
	40%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C		C	B	C	C	B	C	C	C	C	C	C	C	
	75%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C		C	B	C	C	B	C	C	C	C	C	C	C	
		B.P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C		C	B	C	C	B	C	C	C	C	C	C	C
CH ₃ CO ₂ H	10%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	
	50%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	
	80%	30	B	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	
		B.P	B	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	
H ₃ PO ₄	5%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	50%	30	B	B	B	B	B	B	B	B	A	B	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	85%	30	B	B	B	B	B	B	B	B	A	B	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
		B.P	B	B	B	B	B	B	B	B	A	B	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
H ₂ F ₂	30%	30	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	70%	B.P	C	C	C	C	C	C	C	C	C	C	B		C	C	C	C	C		A	B	A	B	A	B	B	C	C	C	C	C	C	
HCl	30	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	200	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	400	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
NaOH	10%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	50%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	70%	30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
		B.P	B	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
KOH	25%	B.P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
	50%	B.P	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A		A	B	A	B	A	B	B	C	C	C	C	C	C	
HCl (dry)		30	C	C	C	C	C	C	C	C	C	C			A	A	A	A																
HCl (wet)		30	C	C	C	C	C	C	C	C	C	C			A	A	A	A																
HCl vapor			C	C	C	C	C	C	C	C	C	B			C	C	C	C																
HF			C	C	C	C	C	C	C	C	A	C																						
H ₂ (SiF ₆)	5%	20	C	C	C	C	C	C	C	C	A	A			A	A						B	A	C	C	C	C	B	C					
F	10%	30	C	C	C	C	C	C	C	C	A	A			A	A																		
NaOH	10%	B.P	B	A	A	A	A	A	A	A	A	A			A	A																		
CO ₂	75%	100	B	A	A	A	A	A	A	A	A	A			A	A																		
SO ₂	10%	200	A	A	A	A	A	A	A	A	A	A			A	A																		
Na ₅ P ₃ O ₁₀	10%	30	B	B	B	B	B	B	B	B	B	B	C	C	C	A																		
CHCl	30	C	C	C	C	C	C	C	C	C																								
AlF ₃	50%	30	B		B																													
Fatty Acids	100		A	A	A	A	A	A	A	A	A	A			A	A																		
NH ₃			A	A	A	A	A	A	A	A	A	A			A	A																		
NaCl			A	A	A	A	A	A	A	A	A	A			A	A																		
CrO ₄																																		
H ₂ O ₄			A	A	A	A	A	A	A	A	A	A			A	A																		
S (liquid)			A	A	A	A	A	A	A	A	A	A			A	A																		
CaCl ₂			A	A	A	A	A	A	A	A	A	A			A	A																		

Note: A = Almost no corrosion in critical conditions. B = Small corrosion but permissible in general use other than specific parts. C = Heavy corrosion and unsuitable.

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JIS 규격 FLANGE

JIS 규격 FLANGE
(JIS B 2210-1984)



5 Kgf/cm²

10 Kgf/cm²

호칭	적용배관경	O	C	g	T	f	n-h	호칭	적용배관경	O	C	g	T	f	n-h
10	17.3	75	55	39	9	1	4-12	10	17.3	90	65	46	12	1	4-15
15	21.7	80	60	44	9	1	4-12	15	21.7	95	70	51	12	1	4-15
20	27.2	85	65	49	10	1	4-12	20	27.2	100	75	56	14	1	4-15
25	34.0	95	75	59	10	1	4-12	25	34.0	125	90	67	14	1	4-19
32	42.7	115	90	70	12	2	4-15	32	42.7	135	100	76	16	2	4-19
40	48.6	120	95	75	12	2	4-15	40	48.6	140	105	81	16	2	4-19
50	60.5	130	105	85	14	2	4-15	50	60.5	155	120	96	16	2	4-19
65	76.3	155	130	110	14	2	4-15	65	76.3	175	140	116	18	2	4-19
80	89.1	180	145	121	14	2	4-19	80	89.1	185	150	126	18	2	8-19
(90)	101.6	190	155	131	14	2	4-19	(90)	101.6	195	160	136	18	2	8-19
100	114.3	200	165	141	16	2	8-19	100	114.3	210	175	151	18	2	8-19
125	139.8	235	200	176	16	2	8-19	125	139.8	250	210	182	20	2	8-23
150	165.2	265	230	206	18	2	8-19	150	165.2	280	240	212	22	2	8-23
(175)	190.7	300	260	232	18	2	8-23	(175)	190.7	305	265	237	22	2	12-23
200	216.3	320	280	252	20	2	8-23	200	216.3	330	290	262	22	2	12-23
(225)	241.8	345	305	277	20	2	12-23	(225)	241.8	350	310	282	22	2	12-23
250	267.4	385	345	317	22	2	12-23	250	267.4	400	355	324	24	2	12-25
300	318.5	430	390	360	22	3	12-23	300	318.5	445	400	368	24	3	16-25
350	355.6	480	435	403	24	3	12-25	350	355.6	490	445	413	26	3	16-25
400	406.4	540	495	463	24	3	16-25	400	406.4	560	510	475	28	3	16-27

16 Kgf/cm²

20 Kgf/cm²

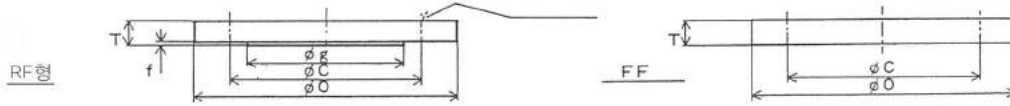
10	17.3	90	65	46	12	1	4-15	10	17.3	90	65	46	14	1	4-15
15	21.7	95	70	51	12	1	4-15	15	21.7	95	70	51	14	1	4-15
20	27.2	100	75	56	14	1	4-15	20	27.2	100	75	56	16	1	4-15
25	34.0	125	90	67	14	1	4-19	25	34.0	125	90	67	16	1	4-19
32	42.7	135	100	76	16	2	4-19	32	42.7	135	100	76	18	2	4-19
40	48.6	140	105	81	16	2	4-19	40	48.6	140	105	81	18	2	4-19
50	60.5	155	120	96	16	2	8-19	50	60.5	155	120	96	18	2	8-19
65	76.3	175	140	116	18	2	8-19	65	76.3	175	140	116	20	2	8-19
80	89.1	200	160	132	20	2	8-23	80	89.1	200	160	132	22	2	8-23
(90)	101.6	210	170	145	20	2	8-23	(90)	101.6	210	170	145	24	2	8-23
100	114.3	225	185	160	22	2	8-23	100	114.3	225	185	160	24	2	8-23
125	139.8	270	225	195	22	2	8-25	125	139.8	270	225	195	26	2	8-25
150	165.2	305	260	230	24	2	12-25	150	165.2	305	260	230	28	2	12-25
200	216.3	350	305	275	26	2	12-25	200	216.3	350	305	275	30	2	12-25
250	267.4	430	380	345	28	2	12-27	250	267.4	430	380	345	34	2	12-27
300	318.5	480	430	395	30	3	16-27	300	318.5	480	430	395	36	3	16-27
350	355.6	540	480	440	34	3	16-33	350	355.6	540	480	440	40	3	16-33
400	406.4	605	540	495	38	3	16-33	400	406.4	605	540	495	46	3	16-33

주) () 호칭은 일반적으로 사용하지 않음.

보호관

PROTECTION TUBE & WELL

JIS규격FLANGE
(JIS B 2210 - 1984)



30 Kgf/cm²

40 Kgf/cm²

호 칭	적용배관경	O	C	g	T	f	n-h	호 칭	적용배관경	O	C	g	T	f	n-h
10	17.3	110	75	52	16	1	4-19	10	17.3	110	75	52	18	1	4-19
15	21.7	115	80	55	18	1	4-19	15	21.7	115	80	55	20	1	4-19
20	27.2	120	85	60	18	1	4-19	20	27.2	120	85	60	20	1	4-19
25	34.0	130	95	70	20	1	4-19	25	34.0	130	95	70	22	1	4-19
32	42.7	140	105	80	22	2	4-19	32	42.7	140	105	80	24	2	4-19
40	48.6	160	120	90	22	2	4-23	40	48.6	160	120	90	24	2	4-23
50	60.5	165	130	105	22	2	8-19	50	60.5	165	130	105	26	2	8-19
65	76.3	200	160	130	26	2	8-23	65	76.3	200	160	130	30	2	8-23
80	89.1	210	170	140	28	2	8-23	80	89.1	210	170	140	32	2	8-23
(90)	101.6	230	185	150	30	2	8-25	(90)	101.6	230	185	150	34	2	8-25
100	114.3	240	195	160	32	2	8-25	100	114.3	250	205	165	36	2	8-25
125	139.8	275	230	195	36	2	8-25	125	139.8	300	250	200	40	2	8-27
150	165.2	325	275	235	38	2	12-27	150	165.2	355	295	240	44	2	12-33
200	216.3	370	320	280	42	2	12-27	200	216.3	405	345	290	50	2	12-33
250	267.4	450	390	345	48	2	12-33	250	267.4	475	410	355	56	2	12-33
300	318.5	515	450	405	52	3	16-33	300	318.5	540	470	410	60	3	16-39
350	355.6	560	495	450	54	3	16-33	350	355.6	585	515	455	64	3	16-39
400	406.4	630	560	510	60	3	16-39	400	406.4	645	570	515	70	3	16-39

63 Kgf/cm²

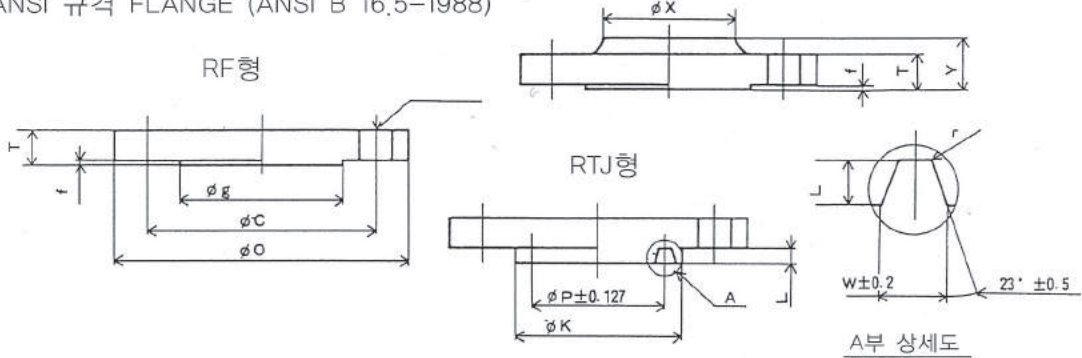
10	17.3	115	80	52	23	1	4-19
15	21.7	120	85	55	23	1	4-19
20	27.2	135	95	60	25	1	4-23
25	34.0	140	100	70	27	1	4-23
32	42.7	150	110	80	30	2	4-23
40	48.6	175	130	90	32	2	4-25
50	60.5	185	145	105	34	2	8-23
65	76.3	220	175	130	38	2	8-25
80	89.1	230	185	140	40	2	8-25
(90)	101.6	255	205	150	42	2	8-27
100	114.3	270	220	165	44	2	8-27
125	139.8	325	265	200	50	2	8-33
150	165.2	365	305	240	54	2	12-33
200	216.3	425	360	290	60	2	12-33
250	267.4	500	430	355	68	2	12-39
300	318.5	560	485	410	77	3	16-39
350	355.6	615	530	455	81	3	16-46
400	406.4	680	590	515	89	3	16-46

주) ()호칭은 일반적으로 사용하지않음.

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ANSI 규격 FLANGE

ANSI 규격 FLANGE (ANSI B 16.5-1988)

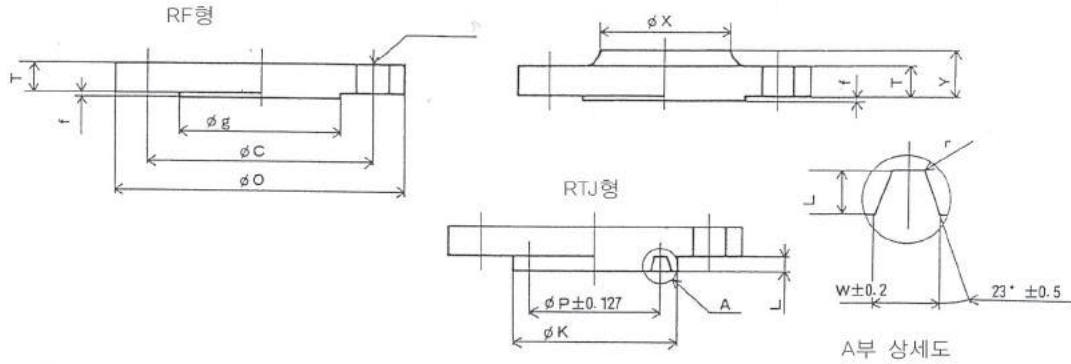


호 칭	적용배관경	O	C	g	X	Y	T	f	n-h	R T J 형의경우				
										K	P	W	L	r
1/2B	21.7	88.9	60.5	35.1	30.2	15.7	11.2	1.6	4-15.7	—	—	—	—	—
3/4B	27.2	98.6	69.9	42.9	38.1	15.7	12.7	1.6	4-15.7	—	—	—	—	—
1B	34.0	108.0	79.2	50.8	49.3	17.5	14.2	1.6	4-15.7	63.5	47.63	8.74	6.35	0.76
1 1/4B	42.7	117.3	88.9	63.5	58.7	20.6	15.7	1.6	4-15.7	73.2	57.15	8.74	6.35	0.76
1 1/2B	48.6	127.0	98.6	73.2	65.0	22.4	17.5	1.6	4-15.7	82.6	65.07	8.74	6.35	0.76
2B	60.5	152.4	120.7	91.9	77.7	25.4	19.1	1.6	4-19.1	101.6	82.55	8.74	6.35	0.76
2 1/2B	76.3	177.8	139.7	104.6	90.4	28.4	22.4	1.6	4-19.1	120.7	101.60	8.74	6.35	0.76
3B	89.1	190.5	152.4	127.0	108.0	30.2	23.9	1.6	4-19.1	133.4	114.30	8.74	6.35	0.76
3 1/2B	101.6	215.9	177.8	139.7	122.2	31.8	23.9	1.6	8-19.1	153.9	131.78	8.74	6.35	0.76
4B	114.3	228.6	190.5	157.2	134.9	33.3	23.9	1.6	8-19.1	171.5	149.23	8.74	6.35	0.76
5B	139.8	254.0	215.9	185.7	163.6	36.6	23.9	1.6	8-22.4	193.5	171.45	8.74	6.35	0.76
6B	165.2	279.4	241.3	215.9	192.0	39.6	25.4	1.6	8-22.4	218.9	193.68	8.74	6.35	0.76
8B	216.3	342.9	298.5	269.7	246.1	44.5	28.4	1.6	8-22.4	273.1	247.65	8.74	6.35	0.76
10B	267.4	406.4	362.0	323.9	304.8	49.3	30.2	1.6	12-25.4	330.2	304.80	8.74	6.35	0.76

300Lb

호 칭	적용배관경	O	C	g	X	Y	T	f	n-h	R T J 형의경우				
										K	P	W	L	r
1/2B	21.7	95.3	66.5	35.1	38.1	22.4	14.2	1.6	4-15.7	50.8	34.14	7.14	5.56	0.76
3/4B	27.2	117.3	82.6	42.9	47.8	25.4	15.7	1.6	4-19.1	63.5	42.88	8.74	6.35	0.76
1B	34.0	124.0	88.9	50.8	53.8	26.9	17.5	1.6	4-19.1	69.9	50.80	8.74	6.35	0.76
1 1/4B	42.7	133.4	98.6	63.5	63.5	26.9	19.1	1.6	4-19.1	79.2	60.33	8.74	6.35	0.76
1 1/2B	48.6	155.4	114.3	73.2	69.9	30.2	20.6	1.6	4-22.4	90.4	68.28	8.74	6.35	0.76
2B	60.5	165.1	127.0	91.9	84.1	33.3	22.4	1.6	8-19.1	108.0	82.55	11.91	7.92	0.76
2 1/2B	76.3	190.5	149.4	104.6	100.1	38.1	25.4	1.6	8-22.4	127.0	101.60	11.91	7.92	0.76
3B	89.1	209.6	168.1	127.0	117.3	42.9	28.4	1.6	8-22.4	146.1	123.83	11.91	7.92	0.76
3 1/2B	101.6	228.6	184.2	139.7	133.4	44.5	30.2	1.6	8-22.4	158.8	131.78	11.91	7.92	0.76
4B	114.3	254.0	200.2	157.2	146.1	47.8	31.8	1.6	8-22.4	174.8	149.23	11.91	7.92	0.76
5B	139.8	279.4	235.0	185.7	177.8	50.8	35.1	1.6	8-22.4	209.6	180.98	11.91	7.92	0.76
6B	165.2	317.5	269.7	215.9	206.2	52.3	36.6	1.6	12-22.4	241.3	211.12	11.91	7.92	0.76
8B	216.3	381.0	330.2	269.7	260.4	62.0	41.1	1.6	12-25.4	301.8	269.88	11.91	7.92	0.76
10B	267.4	444.5	387.4	323.9	320.5	66.5	47.8	1.6	16-28.4	355.6	323.85	11.91	7.92	0.76

ANSI 규격 FLANGE (ANSI B 16.5-1988)



400Lb

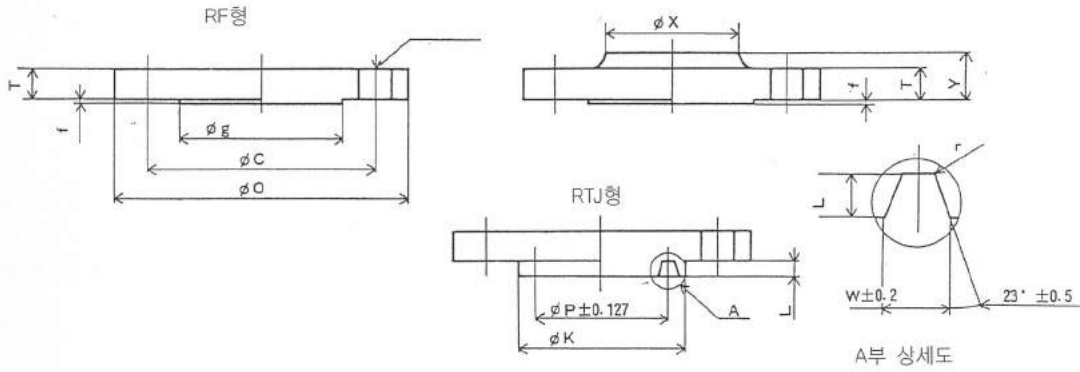
호 칭	적용배관경	O	C	g	X	Y	T	f	n-h	R T J 형의 경우				
										K	P	W	L	r
1/2B	21.7	95.3	66.5	35.1	38.1	22.4	14.2	6.35	4-15.7	50.8	34.14	7.14	5.56	0.76
3/4B	27.2	117.3	82.6	42.9	47.8	25.4	15.7	6.35	4-19.1	63.5	42.88	8.74	6.35	0.76
1B	34.0	124.0	88.9	50.8	53.8	26.9	17.5	6.35	4-19.1	69.9	50.80	8.74	6.35	0.76
1 1/4B	42.7	133.4	98.6	63.5	63.5	28.4	20.6	6.35	4-19.1	79.2	60.33	8.74	6.35	0.76
1 1/2B	48.6	155.4	114.3	73.2	69.9	31.8	22.4	6.35	4-22.4	90.4	68.28	8.74	6.35	0.76
2B	60.5	165.1	127.0	91.9	84.1	36.6	25.4	6.35	8-19.1	108.0	82.55	11.91	7.92	0.76
2 1/2B	76.3	190.5	149.4	104.6	100.1	41.1	28.4	6.35	8-22.4	127.0	101.60	11.91	7.92	0.76
3B	89.1	209.6	168.1	127.0	117.3	46.0	31.8	6.35	8-22.4	146.1	123.83	11.91	7.92	0.76
3 1/2B	101.6	228.6	184.2	139.7	133.1	49.3	35.1	6.35	8-25.4	158.8	131.78	11.91	7.92	0.76
4B	114.3	254.0	200.2	157.2	141.5	50.8	35.1	6.35	8-25.4	174.8	149.23	11.91	7.92	0.76
5B	139.8	279.4	235.0	185.7	177.8	53.8	38.1	6.35	8-25.4	209.6	180.98	11.91	7.92	0.76
6B	165.2	317.5	269.7	215.9	206.2	57.2	41.1	6.35	12-25.4	241.3	211.12	11.91	7.92	0.76
8B	216.3	381.0	330.2	269.7	260.4	68.3	47.8	6.35	12-28.4	301.8	269.88	11.91	7.92	0.76
10B	267.4	444.5	387.4	323.9	320.5	73.2	53.8	6.35	16-31.8	355.6	323.85	11.91	7.92	0.76

600Lb

호 칭	적용배관경	O	C	g	X	Y	T	f	n-h	R T J 형의 경우				
										K	P	W	L	r
1/2B	21.7	95.3	66.5	35.1	38.1	22.4	14.2	6.35	4-15.7	50.8	34.14	7.14	5.56	0.76
3/4B	27.2	117.3	82.6	42.9	47.8	25.4	15.7	6.35	4-19.1	63.5	42.88	8.74	6.35	0.76
1B	34.0	124.0	88.9	50.8	53.8	26.9	17.5	6.35	4-19.1	69.9	50.80	8.74	6.35	0.76
1 1/4B	42.7	133.4	98.6	63.5	63.5	28.4	20.6	6.35	4-19.1	79.2	60.33	8.74	6.35	0.76
1 1/2B	48.6	155.4	114.3	73.2	69.9	31.8	22.4	6.35	4-22.4	90.4	68.28	8.74	6.35	0.76
2B	60.5	165.1	127.0	91.9	84.1	36.6	25.4	6.35	8-19.1	108.0	82.55	11.91	7.92	0.76
2 1/2B	76.3	190.5	149.4	104.6	100.1	41.1	28.4	6.35	8-22.4	127.0	101.60	11.91	7.92	0.76
3B	89.1	209.6	168.1	127.0	117.3	46.0	31.8	6.35	8-22.4	146.1	123.83	11.91	7.92	0.76
3 1/2B	101.6	228.6	184.2	139.7	133.1	49.3	35.1	6.35	8-25.4	158.8	131.78	11.91	7.92	0.76
4B	114.3	273.1	215.9	157.2	152.4	53.8	38.1	6.35	8-25.4	174.8	149.23	11.91	7.92	0.76
5B	139.8	330.2	266.7	185.7	189.0	60.5	44.5	6.35	8-28.4	209.6	180.98	11.91	7.92	0.76
6B	165.2	355.6	292.1	215.9	222.3	66.5	47.8	6.35	12-28.4	241.3	211.12	11.91	7.92	0.76
8B	216.3	419.1	349.3	269.7	273.1	76.2	55.6	6.35	12-31.8	301.8	269.88	11.91	7.92	0.76
10B	267.4	508.0	431.8	323.9	342.9	85.9	63.5	6.35	16-35.1	355.6	323.85	11.91	7.92	0.76

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ANSI 규격 FLANGE (ANSI B 16.5-1988)

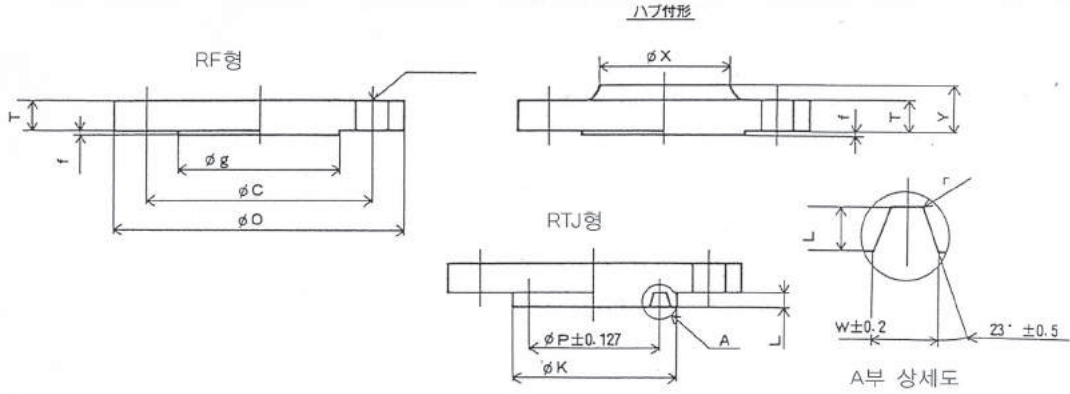


900Lb

호 칭	적용배관경	O	C	g	X	Y	T	f	n-h	R T J형의 경우				
										K	P	W	L	r
1/2B	21.7	120.7	82.6	35.1	38.1	31.8	22.4	6.35	4-22.4	60.5	39.67	8.74	6.35	0.76
3/4B	27.2	130.0	88.9	42.9	44.5	35.1	25.4	6.35	4-22.4	66.5	44.45	8.74	6.35	0.76
1B	34.0	149.4	101.6	50.8	52.3	41.1	28.4	6.35	4-25.4	71.4	50.80	8.74	6.35	0.76
1 1/4B	42.7	158.8	111.3	63.5	63.5	41.1	28.4	6.35	4-25.4	81.0	60.33	8.74	6.35	0.76
1 1/2B	48.6	177.8	124.0	73.2	69.9	44.5	31.8	6.35	4-28.4	91.9	68.28	8.74	6.35	0.76
2B	60.5	215.9	165.1	91.9	104.6	57.2	38.1	6.35	8-25.4	124.0	95.25	11.91	7.92	0.76
2 1/2B	76.3	244.3	190.5	104.6	124.0	63.5	41.1	6.35	8-28.4	136.7	107.95	11.91	7.92	0.76
3B	89.1	241.3	190.5	127.0	127.0	53.8	38.1	6.35	8-25.4	155.4	123.83	11.91	7.92	0.76
4B	114.3	292.1	235.0	157.2	158.8	69.9	44.5	6.35	8-31.8	180.8	149.23	11.91	7.92	0.76
5B	139.8	349.3	279.4	185.7	190.5	79.2	50.8	6.35	8-35.1	215.9	180.98	11.91	7.92	0.76
6B	165.2	381.0	317.5	215.9	235.0	85.9	55.6	6.35	12-31.8	241.3	211.12	11.91	7.92	0.76
8B	216.3	469.9	393.7	269.7	298.5	101.6	63.5	6.35	12-38.1	307.8	269.88	11.91	7.92	0.76
10B	267.4	546.1	469.9	323.9	368.3	108.0	69.9	6.35	16-38.1	362.0	323.85	11.91	7.92	0.76

호 칭	적용배관경	O	C	g	X	Y	T	f	n-h	R T J형의 경우				
										K	P	W	L	r
1/2B	21.7	120.7	82.6	35.1	38.1	31.8	22.4	6.35	4-22.4	60.5	39.67	8.74	6.35	0.76
3/4B	27.2	130.0	88.9	42.9	44.5	35.1	25.4	6.35	4-22.4	66.5	44.45	8.74	6.35	0.76
1B	34.0	149.4	101.6	50.8	52.3	41.1	28.4	6.35	4-25.4	71.4	50.80	8.74	6.35	0.76
1 1/4B	42.7	158.8	111.3	63.5	63.5	41.1	28.4	6.35	4-25.4	81.0	60.33	8.74	6.35	0.76
1 1/2B	48.6	177.8	124.0	73.2	69.9	44.5	31.8	6.35	4-28.4	91.9	68.28	8.74	6.35	0.76
2B	60.5	215.9	165.1	91.9	104.6	57.2	38.1	6.35	8-25.4	124.0	95.25	11.91	7.92	0.76
2 1/2B	76.3	244.3	190.5	104.6	124.0	63.5	41.1	6.35	8-28.4	136.7	107.95	11.91	7.92	0.76
3B	89.1	266.7	203.2	127.0	133.4	73.2	47.8	6.35	8-31.8	168.1	136.53	11.91	7.92	0.76
4B	114.3	311.2	241.3	157.2	162.1	90.4	53.8	6.35	8-35.1	193.5	161.93	11.91	7.92	0.76
5B	139.8	374.7	292.1	185.7	196.9	104.6	73.2	6.35	8-41.1	228.6	193.68	11.91	7.92	0.76
6B	165.2	393.7	317.5	215.9	228.6	119.1	82.6	6.35	12-38.1	247.7	211.12	13.49	9.53	1.52
8B	216.3	482.6	393.7	269.7	292.1	142.7	91.9	6.35	12-44.5	317.5	269.88	16.66	11.13	1.52
10B	267.4	584.2	482.6	323.9	368.3	158.8	108.0	6.35	12-50.8	371.3	323.85	16.66	11.13	1.52

ANSI 규격 FLANGE (ANSI B 16.5-1988)



2500Lb

호 칭	적용배관경	O	C	g	X	Y	T	f	n-h	R T J 형의 경우				
										K	P	W	L	r
1/2B	21.7	133.4	88.9	35.1	42.9	39.6	30.2	6.35	4-22.4	65.0	42.88	8.74	6.35	0.76
3/4B	27.2	139.7	95.3	42.9	50.8	42.9	31.8	6.35	4-22.4	73.2	50.80	8.74	6.35	0.76
1B	34.0	158.8	108.0	50.8	57.2	47.8	35.1	6.35	4-25.4	82.6	60.33	8.74	6.35	0.76
1 1/4B	42.7	184.2	130.0	63.5	73.2	52.3	38.1	6.35	4-28.4	101.6	72.24	11.91	7.92	0.76
1 1/2B	48.6	203.2	146.1	73.2	79.2	60.5	44.5	6.35	4-31.8	114.3	82.55	11.91	7.92	0.76
2B	60.5	235.0	171.5	91.9	95.3	69.9	50.8	6.35	8-28.4	133.4	101.60	11.91	7.92	0.76
2 1/2B	76.3	266.7	196.9	104.6	114.3	79.2	57.2	6.35	8-31.8	149.4	111.13	13.49	9.53	1.52
3B	89.1	304.8	228.6	127.0	133.4	91.9	66.5	6.35	8-35.1	168.1	127.00	13.49	9.53	1.52
4B	114.3	335.6	273.1	157.2	165.1	108.0	76.2	6.35	8-41.1	203.2	157.18	16.66	11.13	1.52
5B	139.8	419.1	323.9	185.7	203.2	130.0	91.9	6.35	8-47.8	241.3	190.50	19.84	12.70	1.52
6B	165.2	482.6	368.3	215.9	235.0	152.4	108.0	6.35	8-53.8	279.4	228.60	19.84	12.70	1.52
8B	216.3	552.5	438.2	269.7	304.8	177.8	127.0	6.35	12-53.8	339.9	279.40	23.01	14.27	1.52
10B	267.4	673.1	539.8	323.9	374.7	228.6	165.1	6.35	12-66.5	425.5	342.90	30.18	17.48	2.29

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ORDERING INFORMATION

W-551C

NPT1/2(M)

PT1/2

300L

∅16

316SS

MATERIAL :

- 304SS : STS304
- 316SS : STS316
- 316SS : STS316
- 310SS : STS310
- 321SS : STS321
- 446SS : STS446
- INCONEL600
- HASTELLOY X
- OTHER

BAR & TUBE OUT DIA

- ∅14 - ∅16 - ∅17 - ∅19
- PIPE SIZE

INSERT LENGTH :

- 50 ~ 1200mm
- 50 ~ 6000mm

PROCESS CONNECTION TYPE :

- PT1/2 - PT3/4 - PT1
- FLANGE SIZE

INSERT CONNECTION TYPE :

- PT1/2(F) : PT1/2(Female) - NPT1/2(F) : NPT1/2(Female)
- PT1/2(M) : PT1/2(Male) - NPT1/2(M) : NPT1/2(Male)

MODEL & MOUNTING TYPE :

W-551A : Drilled Bar Type & Welding Type

W-551C : Drilled Bar Type & Screw Type

W-552 A·B·C·D : Drilled Bar Type & Flange Type

W-553 : Ended Close Type & Screw Type

W-554 A·D·F·T : Ended Close Type & Flange Type

※Model No. : Table 참조

보호관

PROTECTION TUBE & WELL

Basic Model 기본형식	page	Appearance Shape 외관형태	Basic Model 기본형식	page	Appearance Shape 외관형태
W551A			W-552A-1		
W-551A-2			W-551A-3		
W-551A-4			W-551A-5		
W-551A-6			W-551C		
W-551C-1			W-551C-2		

A
B
C
D
E
F
G
H
I
J

보호관

PROTECTION TUBE & WELL

Basic Model 기본형식	page	Appearance Shape 외관형태	Basic Model 기본형식	page	Appearance Shape 외관형태
W-552D-3			W-552D-3		
W-551D			W-551D-1		
W-551D-2			W-551D-3		
W-552A			W-552A-1		
W-552A-2			W-552B		

보호관

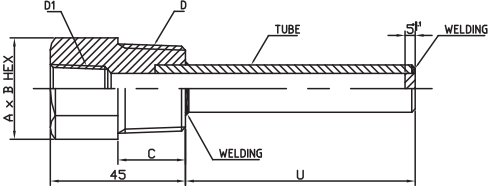
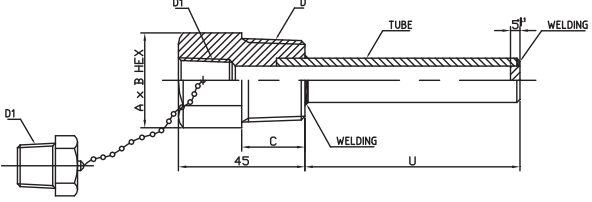
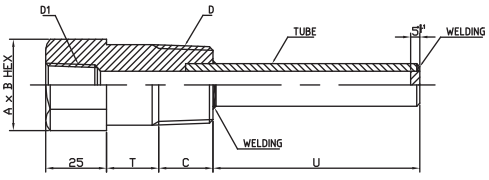
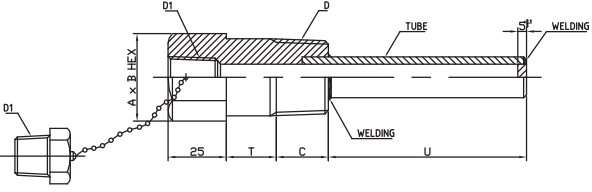
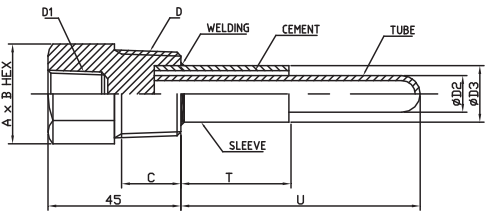
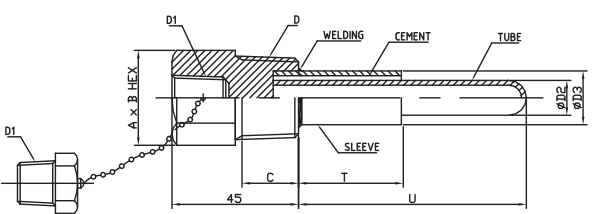
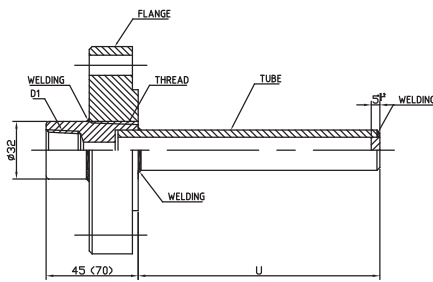
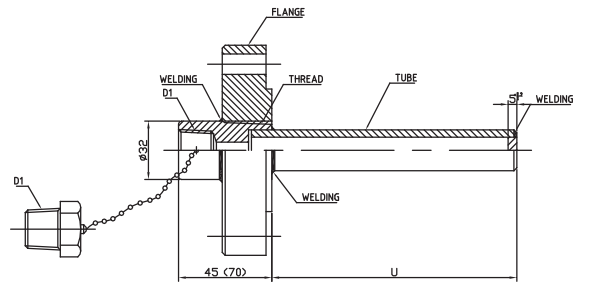
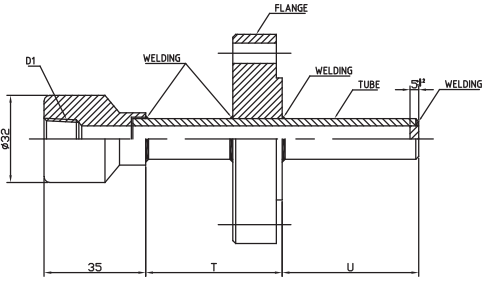
PROTECTION TUBE & WELL

Basic Model 기본형식	page	Appearance Shape 외관형태	Basic Model 기본형식	page	Appearance Shape 외관형태
W-552B-1			W-552B-2		
W-552C			W-552C-1		
W-552C-2			W-552D		
W-552D-1			W-552D-2		
W-552D-3			W-552E		

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G
H
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보호관

PROTECTION TUBE & WELL

Basic Model 기본형식		Appearance Shape 외관형태	Basic Model 기본형식		Appearance Shape 외관형태
page			page		
W-553A			W-553A-1		
W-553B			W-553B-1		
W-553C			W-553C-1		
W-554A			W-554A-1		
W-554D			W-554F		