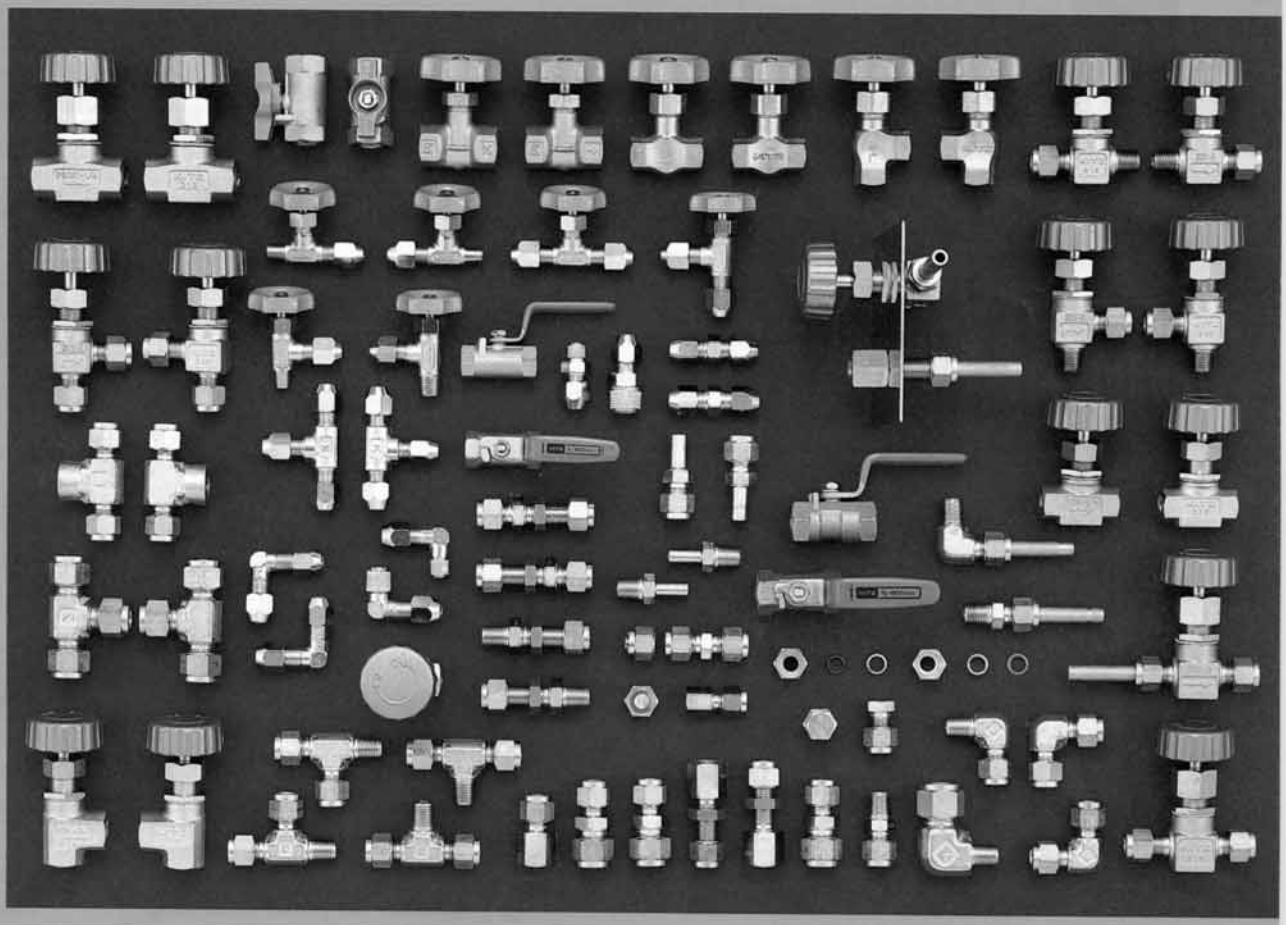
No. B017E

KITZ®

Miniature Valves and "COUPLE LOK" Tube Fittings



KITZ Corporation offers compact, high performance miniature valves and "COUPLELOK" tube fittings to help facilitate piping systems of machineries, test and inspection apparatus, water handling, and heating, ventilation or air conditioning facilities for a broad range of industries, which includes food processing, pharmaceutical, hydrocarbon processing, chemical, and biochemical industries.

KITZ CORPORATION

Service Applications

- Stainless steel miniature valves for heavy-duty instrumentation for handling high pressure, high temperature and/or corrosive fluid.
- Brass miniature valves for general purpose instrumentation service.

Design Features

- Stabilized flow characteristics.
- Wide service pressure range from 10K to 260K.
- Superior sealing performance.
- Direct panel mounting by means of the panel tap provided on the bottom and U-bolts (Stainless steel UN3 & UN26 Series).
- Human engineered low torque operating handle.

Maximum Working Pressure–Temperature Range

UN3 Series for water, oil, gas & chemicals
27 kgf/cm² for 150°C and lower
30 kgf/cm² for 100°C and lower
35 kgf/cm² for 38°C down to −20°C

UN26 Series for water, oil, gas & chemicals
202 kgf/cm² for 150°C and lower
222 kgf/cm² for 100°C and lower
260 kgf/cm² for 38°C down to −20°C

N1A for water, oil & gas
14 kgf/cm² for 80°C and lower

N2 Series for water, oil & gas
25 kgf/cm² for 80°C and lower

UTKM stainless steel ball valves
42 kgf/cm² for water, oil & gas at an ambient temperature
10.5 kgf/cm² for saturated steam

T brass ball valves
28 kgf/cm² for water, oil & gas at an ambient temperature
7 kgf/cm² for 150°C or lower water, oil & gas

TK & TKT brass ball valves
42 kgf/cm² for water, oil & gas at an ambient temperature
10 kgf/cm² for saturated steam

Contact KITZ Corporation for technical advice in case of requirements of higher or lower temperature service than specified here.

Material Configuration

Shell Material	Stainless Steel		Brass	
Description \ Valve Fig.	UN3 Series	UN26 Series	N1 Series	N2 Series
Body	SUS316	SUS316	C3771BE	C3771BE
Stem	SUS316 Hard-faced	SUS316 Hard-faced	K-Metal	SUS304*2
Gland	SUS316	SUS316	—	—
Gland packing	PTFE	PTFE*1	—	—
Panel gasket	Asbestos	Asbestos	—	—
Set screw	SUS304	SUS304	—	—
Front ferrule	SUS316	SUS316	—	—
Back ferrule	SUS316	SUS316	—	—
Handle	ZDC	ZDC	ZDC	ZDC
O ring	—	—	NBR	NBR
Gasket	—	—	—	NYLON

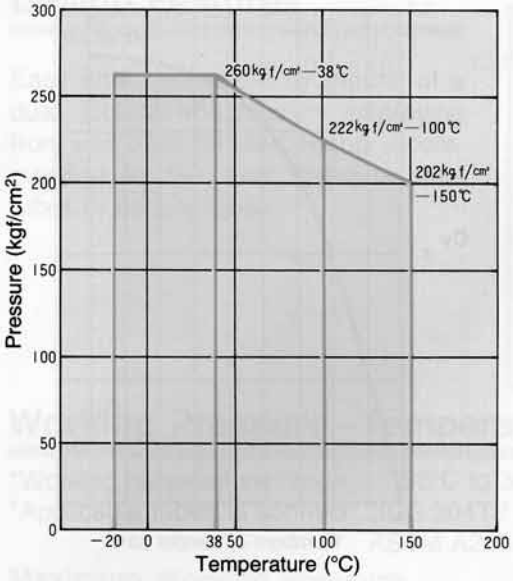
Shell Material	Stainless Steel	Brass
Description \ Valve Fig.	UTKM	T/TK/TKT
Body	SCS14	C3771BE
Stem	SUS316	K-Metal
Ball seat	G/F+PTFE	G/F+PTFE
Handle	SUS430	SUS430*3

*1 = PTFE+PFA for UN26-AP
*2 = K-Metal for N2-A & N2-B
*3 = ZDC for TKT

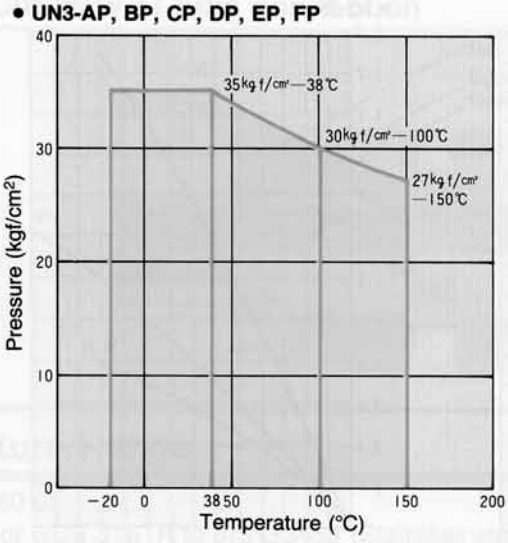
Pressure–Temperature Rating/Flow Characteristics

■ Pressure-Temperature Rating

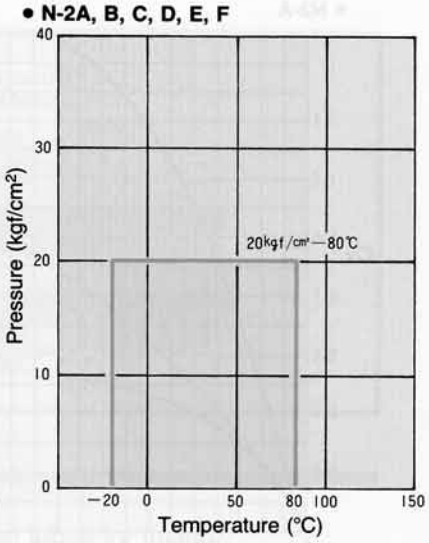
• **UN26-AP/UN26-CP**



• **UN3-AP, BP, CP, DP, EP, FP**

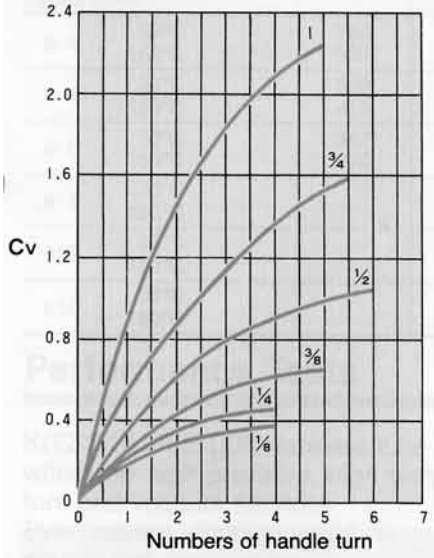


• **N-2A, B, C, D, E, F**

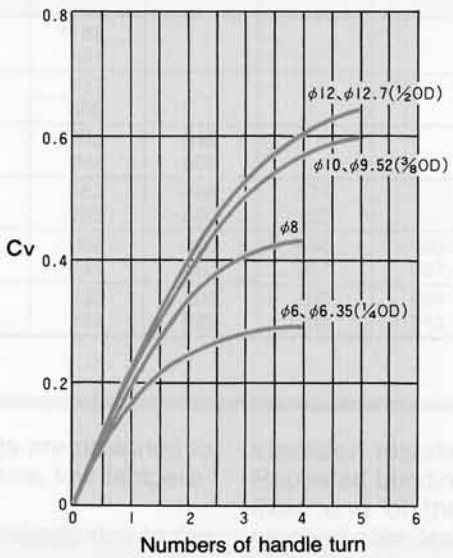


■ Flow Characteristics

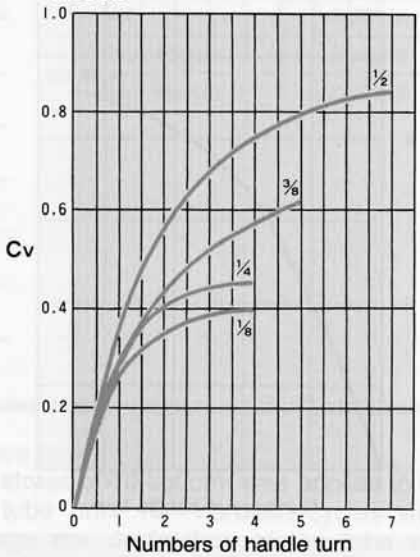
• **UN26-AP, SP**



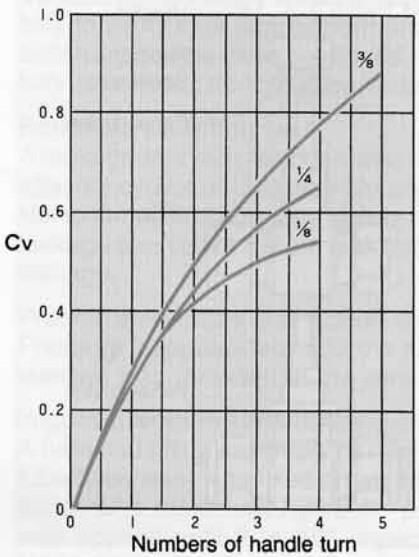
• **UN26-CP**



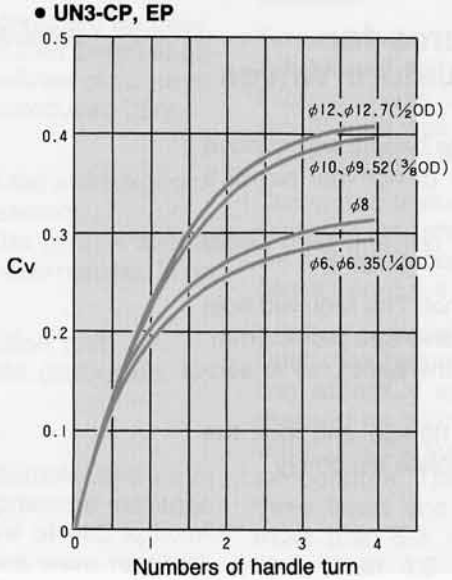
• **UN3-AP**



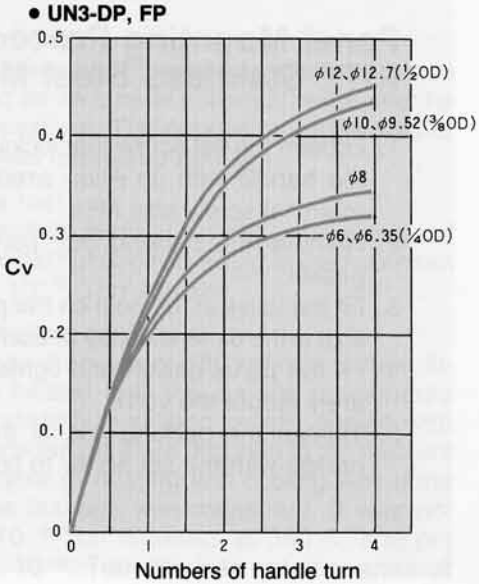
• **UN3-BP**



• **UN3-CP, EP**

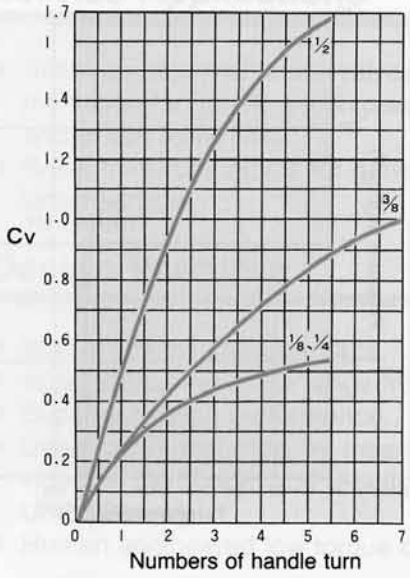


• **UN3-DP, FP**

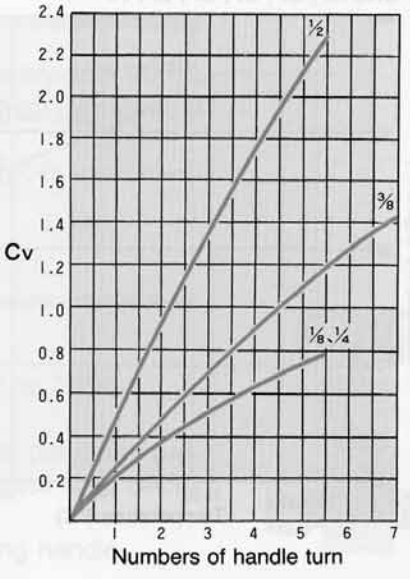


■ Flow Characteristics

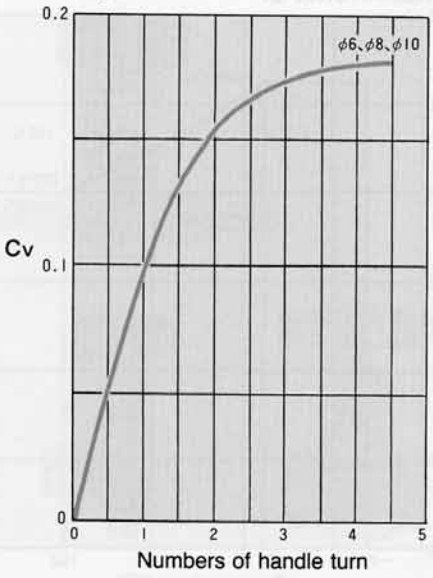
• N2-A



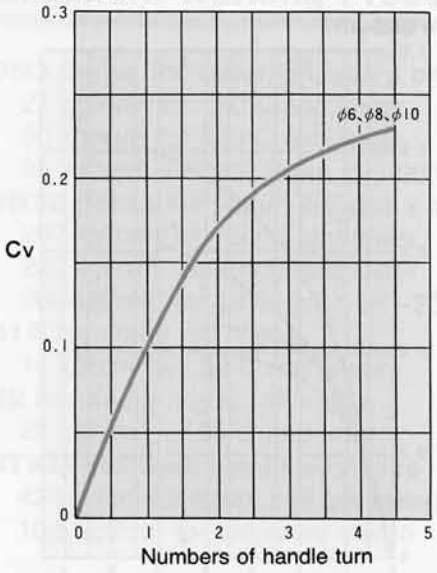
• N2-B



• N2-C, E

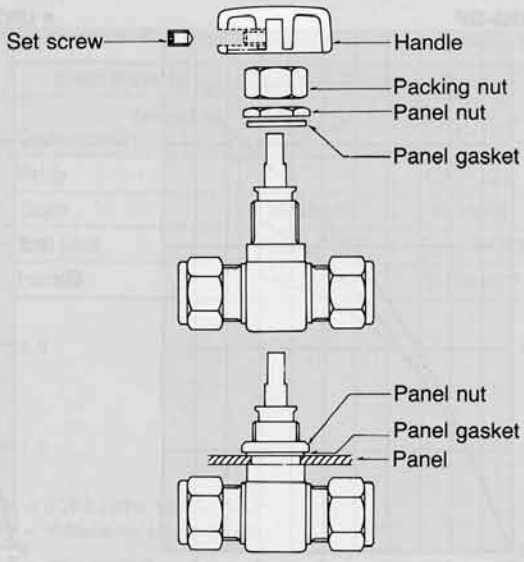


• N2-D, F



Panel Mounting Procedures for KITZ Stainless Steel Miniature Valves

1. Loosen the set screw that locks the handle and remove the handle with an Allen wrench of nominal size 2.5 (nominal screw size M5).
2. Remove the packing nut, panel nut and then panel gasket.
3. Fit the valve in the hole on the panel. The required hole size is the dimension D3 of each valve size plus 0.5mm.
4. Fit the panel gasket and tighten the panel nut to securely mount the valve.
5. Tighten the packing nut, fit the handle and lock the handle with the set screw to complete assembly.

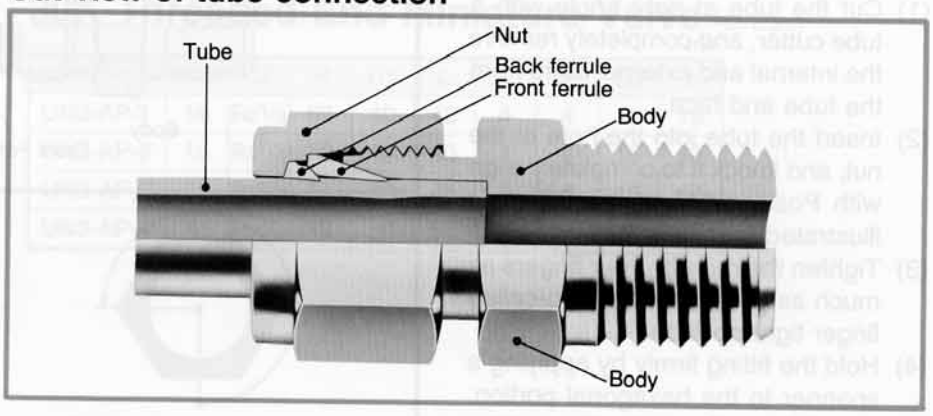


KITZ COUPLE LOK Tube Fittings

Design Features

Easy tube connection by means of a dual locking mechanism employing front and back ferrules. Highly recommended for thin wall stainless steel tubes or copper tubes.

Cut view of tube connection



Working Pressure–Temperature Range

*Working temperature range: −196°C to 360°C
*Applicable tubes to connect: SUS 304TP or SUS 316TP to JIS G3459 (Stainless steel tubes for tubing).
ASTM A269 TP304 or TP316

Maximum Working Pressure

kgf/cm²

Tube diam. \ Tube thickness (mm)		0.72	0.89	1.00	1.24	1.50	1.65
ø 3	38°C	760	1015	1188			
	150°C	591	789	924			
ø 4	38°C	539	707	817			
	150°C	419	550	636			
ø 6	38°C	347	440	503	648		
	150°C	270	343	392	505		
ø 8	38°C		319	363	463	577	
	150°C		249	283	360	450	
ø10	38°C		251	284	360	446	498
	150°C		195	221	280	347	387
ø12	38°C		206	233	295	363	404
	150°C		160	182	229	283	315

Materials

Body	SUS316
Nut	SUS316
Front Ferrule	SUS316
Back Ferrule	SUS316

Performance Tests

KITZ COUPLE LOK flareless tube fittings are designed to withstand high pressure, high temperature, low temperature and vacuum services.
Even severe vibration could cause no leakage due to the double lock mechanism.
Various performance tests have been conducted successfully to verify their high performance and their broad application range has been confirmed. The outlines of successfully conducted performance tests are introduced here.

Repeated coupling test

A leakage test with Nitrogen was conducted at 210kgf/cm² after 12 cycles of disassembly and reassembly.
No external leakage was detected at the joint. A similar leakage test with a helium leak detector also resulted in no leakage.

Pressure resistance & actual destruction test

Pressure was boosted until the tube was destructed. No leakage was detected at the joint.

Impact pressure resistance test

A tube and fitting assembly (6 mm joint diameter and 1 mm tube thickness) was fixed on an impact pressure resitance tester and maximum hydraulic pressure of 480 kgf/cm² was applied until 2×10^5 impact cycles were reached. No leakage was detected from the joint.

Vibration resistance test

Repeated bending stress of 10 kgf/cm² was applied to the fixed end of the tube until 10^7 vibration cycles were reached. No leakage nor destruction of the tube was detected.

Tension Test

A tube and fitting assembly (6 mm diameter and 1 mm thickness) was fixed on an amsler universal tester and the tensile load was measured. The maximum tensile load of the test specimen was measured 890 kgf.

Cryogenic leakage test

Down to the temperature level of −190°C, the pointer of the leakage indicator did not begin to swing at the maximum sensitivity of 6.4×10^{-10} Torr liter/sec.

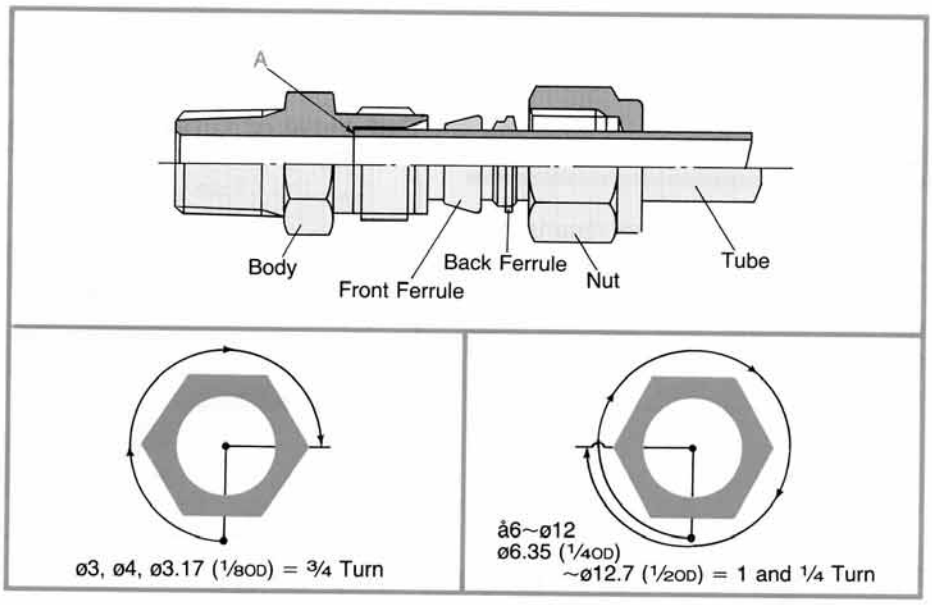
Heating & rapid cooling cycle test

Under the helium gas pressure of 180 kgf/cm², a tube fitting assembly was heated until the surface temperature reached to 360°C steadily and then rapidly cooled with water until the surface temperature dropped to the ambient temperature. The cycle of heating and cooling was done three times and the leakage was measured. It was not more than 6.3×10^{-8} Torr liter/sec. at 360°C, and not more than 4.9×10^{-8} Torr liter/sec. at the ambient temperature.

Tube Connection

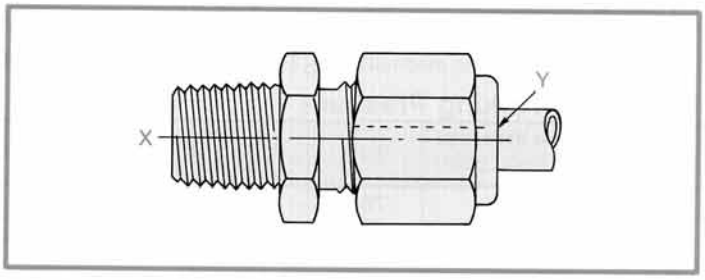
1. Assembly

(1) Cut the tube at right angle with a tube cutter, and completely remove the internal and external burrs from the tube end face.
(2) Insert the tube into the hole of the nut, and knock it to completely align with Position "A" of the fitting as illustrated here.
(3) Tighten the nut with your fingers as much as possible, to the so-called finger tight position.
(4) Hold the fitting firmly by applying a spanner to the hexagonal portion, and tighten the nut with another spanner.



2. Disassemby & reassembly

(1) Before disassembly of the fitting from the tube, be sure to apply an identification mark (Line X as illustrated here) on the nut and the fitting body.
(2) On reassembly, tighten the nut slightly farther than the original position (Line Y as illustrated here).
(3) The function of the fitting shall never be affected if the nut is tightened correctly as explained above.



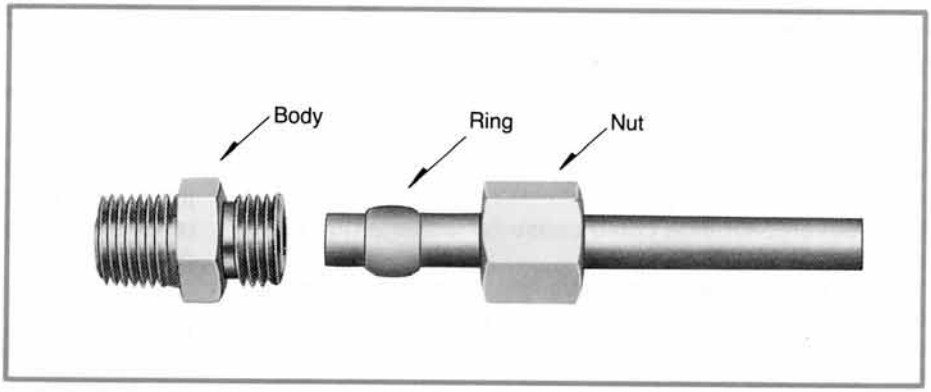
KITZ Forged Brass Ring Joint Fittings

Design Features

Easy tube connection by means of nut tightening after tube insertion. Recommended for instantaneous copper tube connection.

Design Specifications

- Working temperature range: −20°C to 150°C
- Working pressure: C1020, C1100, C1201 and C1220 to JIS H3300 (Copper and copper alloy seamless tubes).



Tube Connection

kgf/cm²

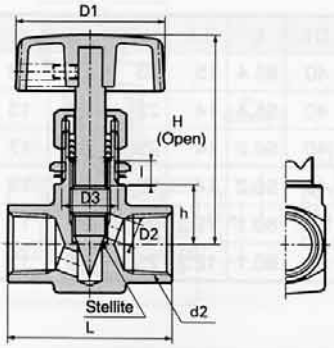
Tube thickness / Tube diam.	0.7 (mm)	0.8	1.0	1.2	1.5
6ø (mm)	123	143	184	—	—
8ø	90	104	133	163	211
10ø	71	82	104	127	163
12ø	58	67	85	104	133

Materials

Body	C3771BE*3
Nut	C3604BD
Ring	C3604BD

*3 NH and HF are made of C3604BD

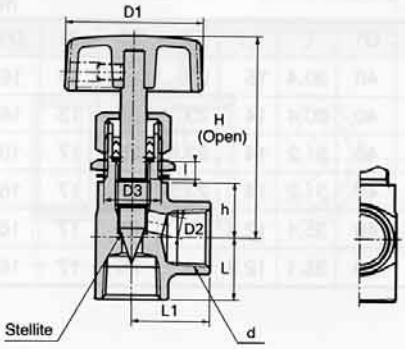
Fig. UN3-AP 30K Threaded End Miniature Valve (Straight)



mm

Fig. No.	Size	d2	H	D1	L	l	D2	D3	h
UN3-AP-1	1/8	Rc1/8	59	40	40	4	4	16	13
UN3-AP-2	1/4	Rc1/4	59	40	40	4	4	16	13
UN3-AP-3	3/8	Rc3/8	64	40	45	5	6	16	17
UN3-AP-4	1/2	Rc1/2	79	50	55	7	7	18	20

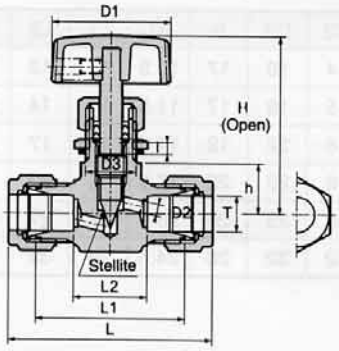
Fig. UN3-BP 30K Threaded End Miniature Valve (Angle)



mm

Fig. No.	Size	d	H	D1	L	L1	l	D2	D3	h
UN3-BP-1	1/8	Rc1/8	59	40	15	20	4	4	16	13
UN3-BP-2	1/4	Rc1/4	59	40	15	20	4	4	16	13
UN3-BP-3	3/8	Rc3/8	64	40	18	22.5	5	6	16	17

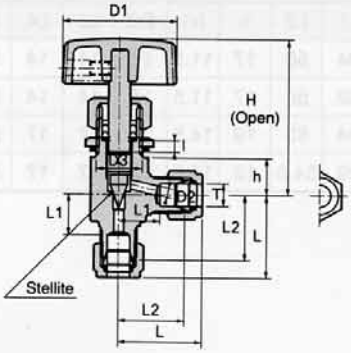
Fig. UN3-CP 30K COUPLE LOK Miniature Valve (Straight)



mm

Fig. No.	Size	T	D2	H	l	D1	L	L1	L2	h	D3
UN3-CP-6	6	6	3.5	59	4	40	60.8	46	30	13	16
UN3-CP-8	8	8	3.5	59	4	40	60.8	46	28	13	16
UN3-CP-10	10	10	4	64	4	40	62.4	47	28	17	16
UN3-CP-12	12	12	4	64	4	40	70.2	50	24.6	17	16

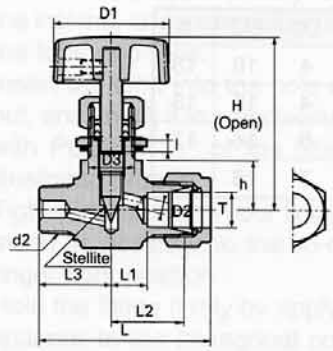
Fig. UN3-DP 30K COUPLE LOK Miniature Valve (Angle)



mm

Fig. No.	Size	T	D2	H	l	D1	L	L1	L2	h	D3
UN3-DP-6	6	6	3.5	59	4	40	30.4	15	23	13	16
UN3-DP-8	8	8	3.5	59	4	40	30.4	14	23	13	16

Fig. **UN3-EP**

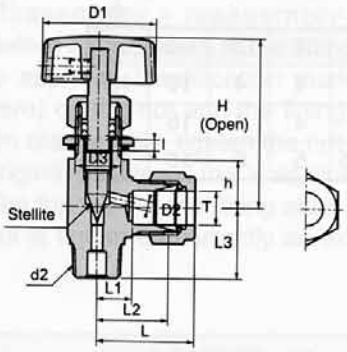


30K Threaded End/COUPLE LOK Miniature Valve (Straight)

mm

Fig. No.	Size	T	d2	D2	H	I	D1	L	L1	L2	L3	h	D3
UN3-EP-6-2	6	6	R1/4	3.5	59	4	40	55.4	15	23	25	13	16
UN3-EP-8-2	8	8	R1/4	3.5	59	4	40	55.4	14	23	25	13	16
UN3-EP-10-2	10	10	R1/4	4	64	4	40	56.2	14	23.5	25	17	16
UN3-EP-10-3	10	10	R3/8	4	64	4	40	56.2	14	23.5	25	17	16
UN3-EP-12-2	12	12	R1/4	4	64	4	40	60.1	12.3	25	25	17	16
UN3-EP-12-3	12	12	R3/8	4	64	4	40	60.1	12.3	25	25	17	16

Fig. **UN3-FP**

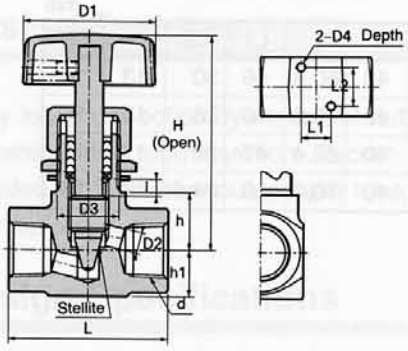


30K Threaded End/COUPLE LOK Miniature Valve (Angle)

mm

Fig. No.	Size	T	d2	D2	H	I	D1	L	L1	L2	L3	h	D3
UN3-FP-6-2	6	6	R1/4	3.5	59	4	40	30.4	15	23	25	13	16
UN3-FP-8-2	8	8	R1/4	3.5	59	4	40	30.4	14	23	25	13	16
UN3-FP-10-2	10	10	R1/4	4	64	4	40	31.2	14	23.5	25	17	16
UN3-FP-10-3	10	10	R3/8	4	64	4	40	31.2	14	23.5	25	17	16
UN3-FP-12-2	12	12	R1/4	4	64	4	40	35.1	12.3	25	25	17	16
UN3-FP-12-3	12	12	R3/8	4	64	4	40	35.1	12.3	25	25	17	16

Fig. **UN26-AP**

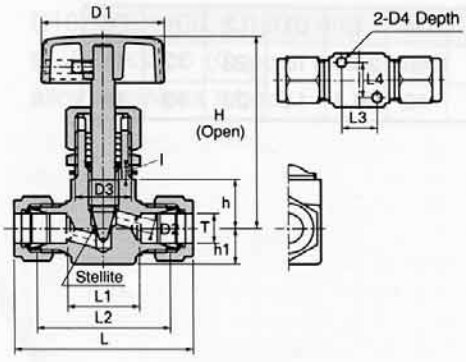


260K Threaded End Miniature Valve (Straight)

mm

Fig. No.	Size	d	H	D1	L	I	D2	D3	h	h1	L1	L2	D4
UN26-AP-1	1/8	Rc1/8	69	40	48	4	4	18	17	10.5	14	12	M4
UN26-AP-2	1/4	Rc1/4	69	40	48	4	5	18	17	11.5	14	14	M5
UN26-AP-3	3/8	Rc3/8	82	70	55	5	6	22	19	14	16	17	M5
UN26-AP-4	1/2	Rc1/2	87	70	60	6	8	22	22	17.5	15	22	M5
UN26-AP-6	3/4	Rc3/4	104	85	70	8	10	25	26	20.5	19	27	M5
UN26-AP-8	1	Rc1	122	85	80	10	12	32	28	24.5	24	32	M5

Fig. **UN26-CP**

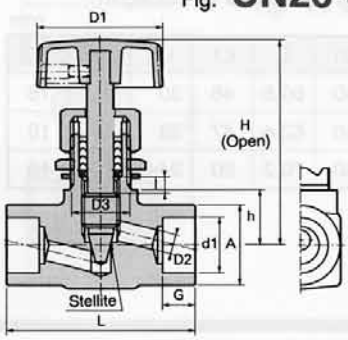


260K COUPLE LOK Miniature Valve (Straight)

mm

Fig. No.	Size	T	D2	H	I	D1	L	L1	L2	h	h1	D3	L3	L4	D4
UN26-CP-6	6	6	4	69	4	40	64.8	34	50	17	11.5	18	14	14	M5
UN26-CP-8	8	8	5	69	4	40	64.8	32	50	17	11.5	18	14	14	M5
UN26-CP-10	10	10	5.5	83	5	50	68.4	34	53	19	14.5	22	17	17	M5
UN26-CP-12	12	12	5.5	83	5	50	74.7	29	54.5	19	14.5	22	17	17	M5

Fig. **UN26-SP**

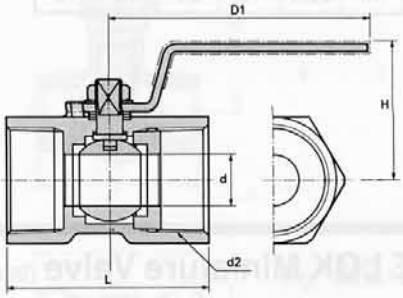


260K Socket Weld End Miniature Valve (Straight)

mm

Fig. No.	Size	d1	G	H	D1	L	l	D2	D3	h	A
UN26-SP-1	1/8	11.0	10	69	40	60	4	4	18	17	22
UN26-SP-2	1/4	14.3	10	69	40	60	4	5	18	17	22
UN26-SP-3	3/8	17.8	13	82	70	65	5	6	22	19	26
UN26-SP-4	1/2	22.2	13	87	70	75	6	8	22	22	32
UN26-SP-6	3/4	27.7	16	104	85	85	8	10	25	26	38
UN26-SP-8	1	34.5	16	122	85	100	10	12	32	28	46

Fig. **UTKM**

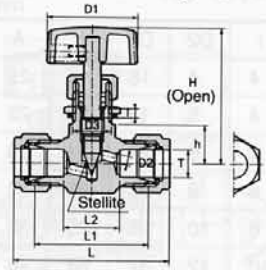


Type 600 Threaded End Ball Valve Reduced bore

mm

Size	d	H	D1	L	d2
1/4	5	31	60	39	Rc1/4
3/8	7	36	70	44	Rc3/8
1/2	9.2	41	85	56.5	Rc1/2
3/4	12.5	44	85	59	Rc3/4
1	16	48	100	71	Rc1

Fig. **UN3-CP**

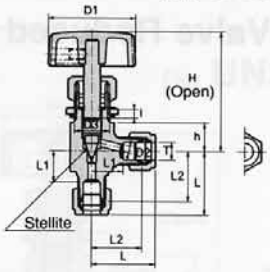


30K COUPLE LOK Miniature Valve (Straight)

mm

Fig. No.	Size	T	D2	H	I	D1	L	L1	L2	h	D3
UN3-CP-02	1/4	6.35	3.5	59	4	40	60.8	46	30	13	16
UN3-CP-03	3/8	9.52	4	64	4	40	62.4	47	28	17	16
UN3-CP-04	1/2	12.70	4	64	4	40	70.2	50	24.6	17	16

Fig. **UN3-DP**

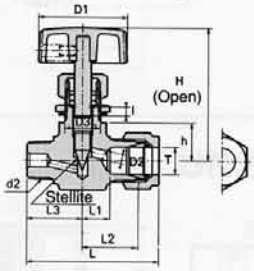


30K COUPLE LOK Miniature Valve (Angle)

mm

Fig. No.	Size	T	D2	H	I	D1	L	L1	L2	h	D3
UN3-DP-02	1/4	6.35	3.5	59	4	40	30.4	15	23	13	16

Fig. **UN3-EP**

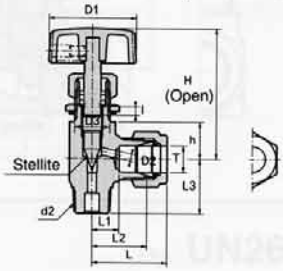


30K Threaded End/COUPLE LOK Miniature Valve (Straight)

mm

Fig. No.	Size	T	d2	D2	H	I	D1	L	L1	L2	L3	h	D3
UN3-EP-02-1	1/4	6.35	R1/4	3.5	59	4	40	55.4	15	23	25	13	16
UN3-EP-02-2	1/4	6.35	R1/4	3.5	59	4	40	55.4	15	23	25	13	16
UN3-EP-03-1	3/8	9.52	R1/4	4	64	4	40	56.2	14	23.5	25	17	16
UN3-EP-03-2	3/8	9.52	R3/8	4	64	4	40	56.2	14	23.5	25	17	16

Fig. **UN3-FP**

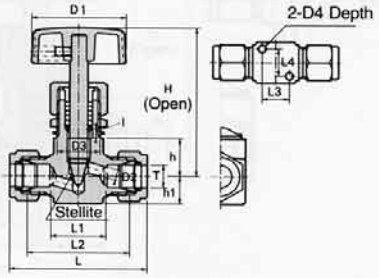


30K Threaded End/COUPLE LOK Miniature Valve (Angle)

mm

Fig. No.	Size	T	d2	D2	H	I	D1	L	L1	L2	L3	h	D3
UN3-FP-02-1	1/4	6.35	R1/8	3.5	59	4	40	30.4	15	23	25	13	16
UN3-FP-02-2	1/4	6.35	R1/4	3.5	59	4	40	30.4	15	23	25	13	16
UN3-FP-03-2	3/8	9.52	R1/4	4	64	4	40	31.2	14	23.5	25	17	16
UN3-FP-03-3	3/8	9.52	R3/8	4	64	4	40	31.2	14	23.5	25	17	16

Fig. **UN26-CP**



260K COUPLE LOK Miniature Valve (Straight)

mm

Fig. No.	Size	T	D2	H	I	D1	L	L1	L2	h	h1	D3	L3	L4	D4
UN26-CP-02	1/4	6.35	4	69	4	40	64.8	34	50	17	11.5	18	14	14	M5
UN26-CP-03	3/8	9.52	5.5	83	5	50	68.4	34	53	19	14.5	22	17	17	M5
UN26-CP-04	1/2	12.70	5.5	83	5	50	74.7	29	54.5	19	14.5	22	17	17	M5

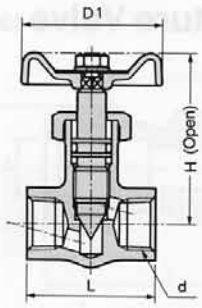


Fig. **N1-A**

10K Threaded End Miniature Valve (Straight)

mm

Fig. No.	Size	d	H	D1	L
N1-A-1	1/8	Rc1/8	52	43	32
N1-A-2	1/4	Rc1/4	52	43	32
N1-A-3	3/8	Rc3/8	52	43	40

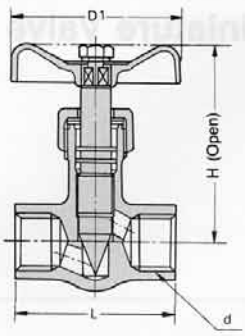


Fig. **N2-A**

20K Threaded End Miniature Valve (Straight)

mm

Fig. No.	Size	d	H	D1	L
N2-A-1	1/8	Rc1/8	55.5	43	38
N2-A-2	1/4	Rc1/4	55.5	43	38
N2-A-3	3/8	Rc3/8	66	50	47
N2-A-4	1/2	Rc1/2	81	70	57

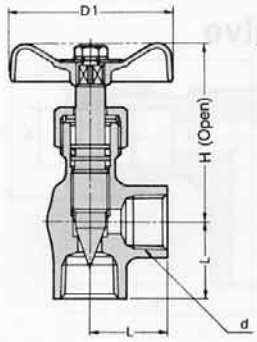


Fig. **N2-B**

20K Threaded End Miniature Valve (Angle)

mm

Fig. No.	Size	d	H	D1	L
N2-B-1	1/8	Rc1/8	52	43	19
N2-B-2	1/4	Rc1/4	52	43	19
N2-B-3	3/8	Rc3/8	61.5	50	23.5
N2-B-4	1/2	Rc1/2	74	70	28.5

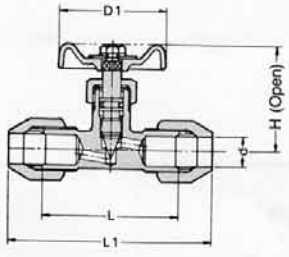


Fig. **N2-C**

20K Ring Joint Type Miniature Valve (Straight)

mm

Fig. No.	Size	d	H	D1	L	L1
N2-C-6	6	6	38	35	40	60
N2-C-8	8	8	38	35	40	60
N2-C-10	10	10	38	35	44	66

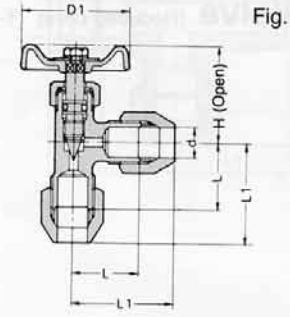


Fig.

20K Ring Joint Type Miniature Valve (Angle)

mm

Fig. No.	Size	d	H	D1	L	L1
N2-D-6	6	6	34.5	35	20	30
N2-D-8	8	8	34.5	35	20	30
N2-D-10	10	10	34.5	35	22	33

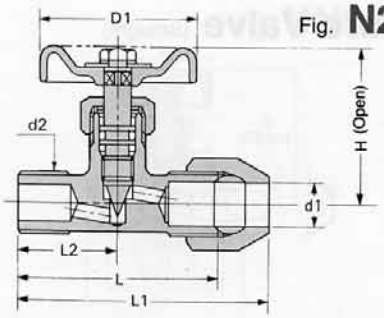


Fig. **N2-E**

20K Threaded End/Ring Joint Miniature Valve (Straight)

mm

Fig. No.	Size	d2	H	D1	L	L1	L2
N2-E-6-1	6	R1/8	38	35	39	49	19
N2-E-6-2	6	R1/4	38	35	42	52	22
N2-E-8-1	8	R1/8	38	35	39	49	19
N2-E-8-2	8	R1/4	38	35	42	52	22

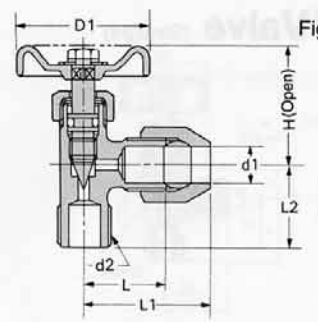


Fig. **N2-F**

20K Threaded End/Ring Joint Miniature Valve (Angle)

mm

Fig. No.	Size	d2	H	D1	L	L1	L2
N2-F-6-1	6	R1/8	34.5	35	20	30	19
N2-F-6-2	6	R1/4	34.5	35	20	30	22
N2-F-8-1	8	R1/8	34.5	35	20	30	19
N2-F-8-2	8	R1/4	34.5	35	20	30	22

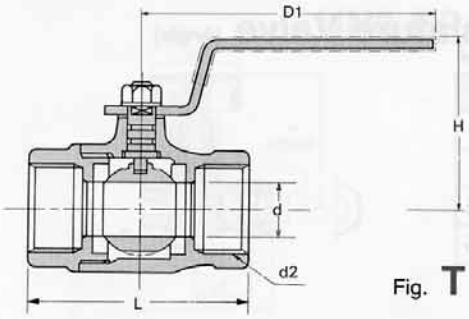


Fig. **T**

Type 400 Threaded End Ball Valve

mm

Size	d	L	H	D1	d2
1/4	10	50	45	80	Rc1/4
3/8	10	50	45	80	Rc3/8
1/2	10	65	45	100	Rc1/2
3/4	15	68	50	100	Rc3/4
1	20	79	55	130	Rc1

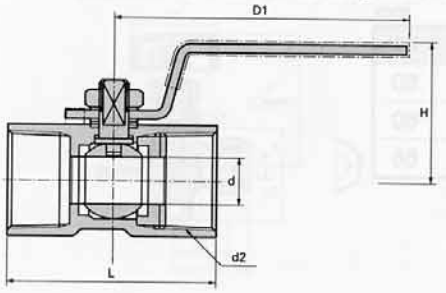


Fig. **TK**

Type 600 Threaded End Ball Valve (Reduced bore)

mm

Size	d	H	D1	L	d2
1/4	5	31	60	39	Rc1/4
3/8	7	36	70	44	Rc3/8
1/2	9.2	41	85	56.5	Rc1/2
3/4	12.5	44	85	59	Rc3/4
1	16	48	100	71	Rc1

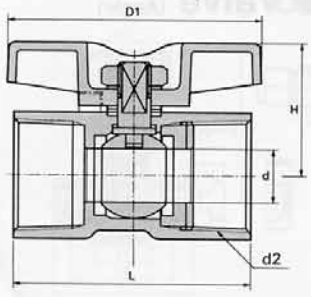


Fig. **TKT**

Type 600 Threaded End Ball Valve (Reduced bore) (T-Handle)

mm

Size	d	H	D1	L	d2
1/4	5	23	35	39	Rc1/4
3/8	7	27	40	44	Rc3/8
1/2	9.2	31	60	56.5	Rc1/2
3/4	12.5	34	60	59	Rc3/4
1	16	42	76	71	Rc1

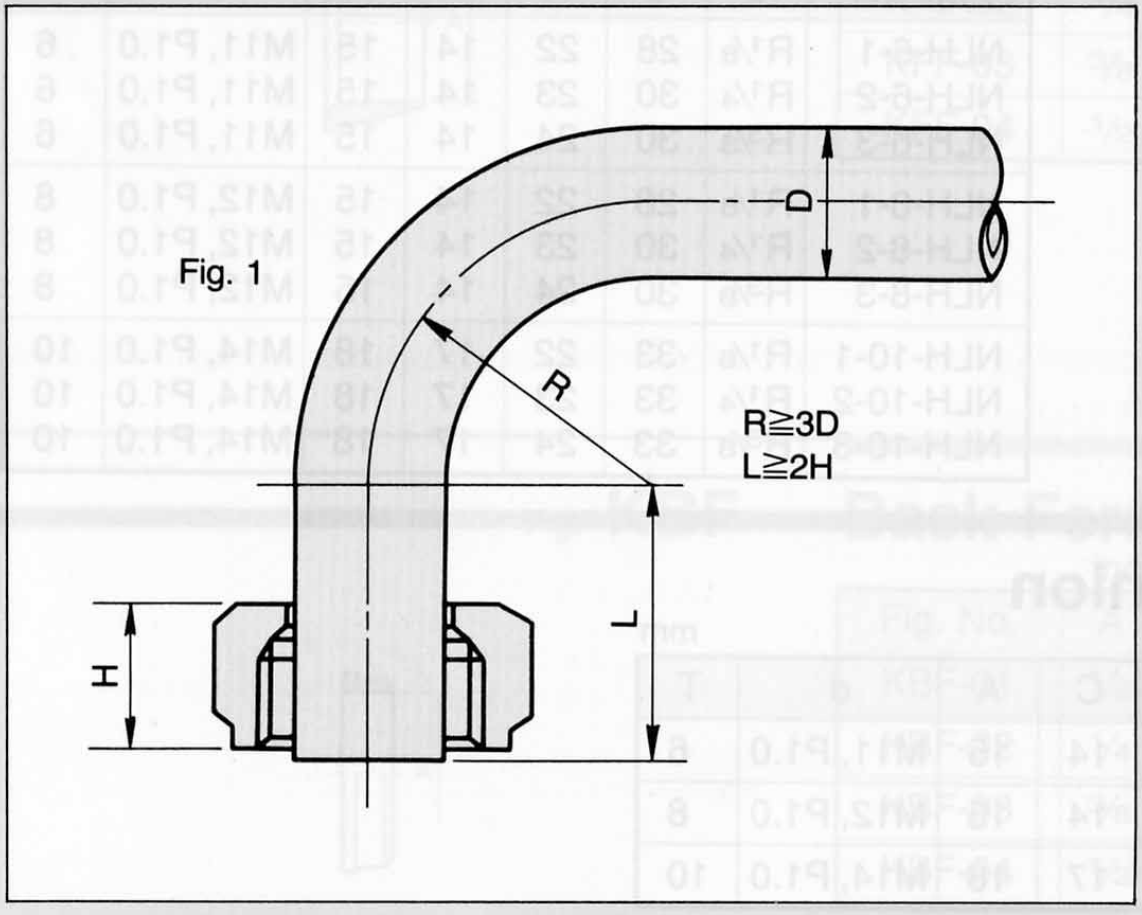
Bending the Tube

For bending the tube, use a tube bender matched with the tube diameter so that the bent portion will not be dented. Length (L) of the straight portion should be two times or more the nut height from the tube end. Further, it is recommended that the bedning radius (R) be threee or more times the outside diameter (D). (Fig. 2)

Tube diameter: øD	Nut height: H
ø3	11.9
ø4	11.9
ø6	12.7
ø8	13.5
ø10	15.1
ø12	17.5

Tube diameter: øD	Nut height: H
ø3.17 (⅛OD)	11.9
ø6.35 (¼OD)	12.7
ø9.52 (⅜OD)	14.2
ø12.70 (½OD)	17.5

Fig. 1



Pressure Conversion

$1 lb/in^2 \rightarrow kgf/cm^2$
$1 lb/in^2 = 0.703070 kgf/cm^2$

1 ~ 50		51 ~ 100		105 ~ 400		410 ~ 900		910 ~ 1700	
lb/in^2	Kgf/cm^2	lb/in^2	Kgf/cm^2	lb/in^2	Kgf/cm^2	lb/in^2	Kgf/cm^2	lb/in^2	Kgf/cm^2
1	.07	51	3.59	105	7.38	410	28.83	910	63.98
2	.14	52	3.66	110	7.73	420	29.53	920	64.68
3	.21	53	3.73	115	8.09	430	30.23	930	65.39
4	.28	54	3.80	120	8.44	440	30.93	940	66.09
5	.35	55	3.87	125	8.79	450	31.64	950	66.79
6	.42	56	3.94	130	9.14	460	32.34	960	67.49
7	.49	57	4.01	135	9.49	470	33.04	970	68.20
8	.56	58	4.08	140	9.84	480	33.75	980	68.90
9	.63	59	4.15	145	10.19	490	34.45	990	69.60
10	.70	60	4.22	150	10.55	500	35.15	1000	70.31
11	.77	61	4.29	155	10.90	510	35.86	1010	71.01
12	.84	62	4.36	160	11.25	520	36.56	1020	71.71
13	.91	63	4.43	165	11.60	530	37.26	1030	72.42
14	.98	64	4.50	170	11.95	540	37.97	1040	73.12
15	1.05	65	4.57	175	12.30	550	38.67	1050	73.82
16	1.12	66	4.64	180	12.66	560	39.37	1060	74.52
17	1.20	67	4.71	185	13.01	570	40.07	1070	75.23
18	1.27	68	4.78	190	13.36	580	40.78	1080	75.93
19	1.34	69	4.85	195	13.71	590	41.48	1090	76.63
20	1.41	70	4.92	200	14.06	600	42.18	1100	77.34
21	1.48	71	4.99	205	14.41	610	42.89	1120	78.74
22	1.55	72	5.06	210	14.76	620	43.59	1140	80.15
23	1.62	73	5.13	215	15.12	630	44.29	1160	81.56
24	1.69	74	5.20	220	15.47	640	45.00	1180	82.96
25	1.76	75	5.27	225	15.82	650	45.70	1200	84.37
26	1.83	76	5.34	230	16.17	660	46.40	1220	85.77
27	1.90	77	5.41	235	16.52	670	47.11	1240	87.18
28	1.97	78	5.48	240	16.87	680	47.81	1260	88.59
29	2.04	79	5.55	245	17.23	690	48.51	1280	89.99
30	2.11	80	5.62	250	17.58	700	49.21	1300	91.40
31	2.18	81	5.69	255	17.93	710	49.92	1320	92.80
32	2.25	82	5.77	260	18.28	720	50.62	1340	94.21
33	2.32	83	5.84	265	18.63	730	51.32	1360	95.62
34	2.39	84	5.91	270	18.98	740	52.03	1380	97.02
35	2.46	85	5.98	275	19.33	750	52.73	1400	98.43
36	2.53	86	6.05	280	19.69	760	53.43	1420	99.84
37	2.60	87	6.12	285	20.04	770	54.14	1440	101.24
38	2.67	88	6.19	290	20.39	780	54.84	1460	102.65
39	2.74	89	6.26	295	20.74	790	55.54	1480	104.05
40	2.81	90	6.33	300	21.09	800	56.25	1500	105.46
41	2.88	91	6.40	310	21.80	810	56.95	1520	106.87
42	2.95	92	6.47	320	22.50	820	57.65	1540	108.27
43	3.02	93	6.54	330	23.20	830	58.35	1560	109.68
44	3.09	94	6.61	340	23.90	840	59.06	1580	111.09
45	3.16	95	6.68	350	24.61	850	59.76	1600	112.49
46	3.23	96	6.75	360	25.31	860	60.46	1620	113.90
47	3.30	97	6.82	370	26.01	870	61.17	1640	115.30
48	3.37	98	6.89	380	26.72	880	61.87	1660	116.71
49	3.45	99	6.96	390	27.42	890	62.57	1680	118.12
50	3.52	100	7.03	400	28.12	900	63.28	1700	119.52