

Ultra-High Vacuum Flange/Fitting [UFC Series/IFS·IFE·IFT·IFX·IFB Series]

Ultra-high vacuum reducing flanges are used to connect UFC flanges with different port diameters.

UFC flanges are manufactured under ISO3669-1986 and are able to be baked for UHV use.

Bolt sets, copper gaskets and various fittings are available from ULVAC.

UFC series is compatible with ICF flange.



Features

- ▶ **Long Life Design**
The knife edge is designed to withstand repeated use for extended life.
- ▶ **Suitable to Ultra-high Vacuum**
For UHV use, metallic seals are used. Flange material is austenitic stainless steel for minimal out gassing and high temperature use.
- [Ultra-High Vacuum Flange]
- ▶ **Choice of Materials and Expert Welding Techniques Provide for Minimal Deflection**
- ▶ **Rotatable and Non-rotatable**
Rotatable and non-rotatable flanges are available. For non-rotatable flanges through holes or tap holes are available.
- [Ultra-High Vacuum Reducing Flange]
- ▶ **Compact Connections are Possible since Any Connection Pipes are Needed**
- [Ultra-High Vacuum Fitting]
- ▶ **Abundant Lineup**
30 fitting types are available.

[Gaskets]

- ▶ **The Gaskets are Suitable for Ultra-high Vacuum**
UFC-G series copper gaskets for UFC flanges are made from oxygen-free copper (OFHC) and are clean for minimizing out gassing.

Applications

- ▶ Used for various types of ultra high vacuum equipment
- ▶ Used for various types of analytical equipment
- ▶ Used for applications where leak tight fittings are needed
- ▶ Used where high temperature baking is required

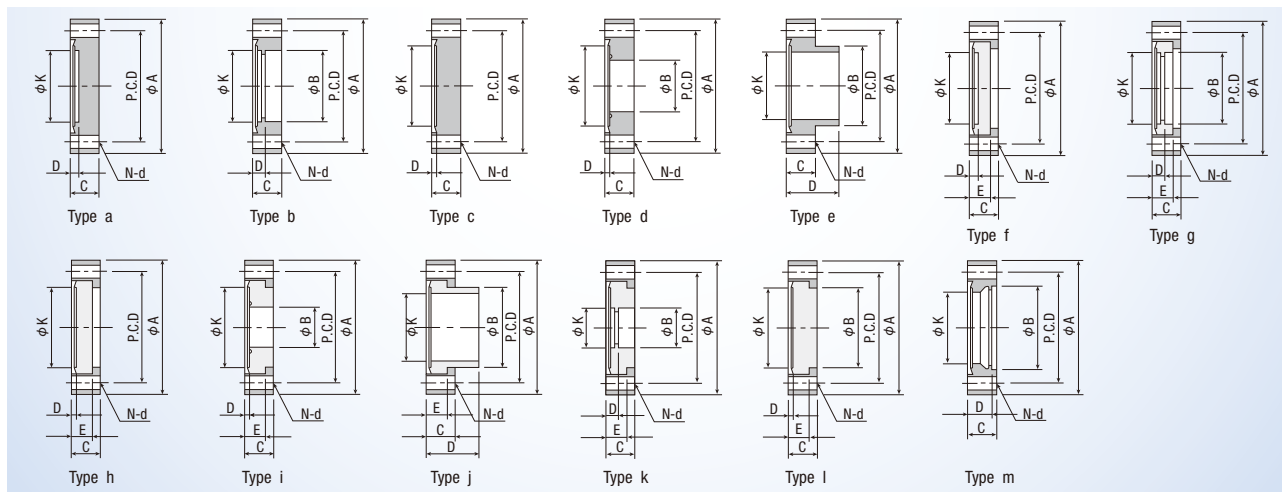
Common specifications

Applicable pressure range	Atmospheric pressure to UHV
Leak tolerance	$1.0 \times 10^{-10} \text{Pa} \cdot \text{m}^3/\text{sec}$, $1.33 \times 10^{-11} \text{Torr} \cdot \text{L}/\text{sec}$, $1.0 \times 10^{-11} \text{mbar} \cdot \text{L}/\text{sec}$
Applicable temperature range	-196 to 450°C (-321 to 842°F)
Typical bake out temperature	$\leq 300^\circ\text{C}$ ($\leq 572^\circ\text{F}$)
Material	Austenitic stainless steel

Ultra-High Vacuum Flange/Fitting [UFC Series/IFS·IFE·IFT·IFX·IFB Series]

► Ultra-High Vacuum Flange UFC Series

External dimension diagram



Dimension table

Unit: mm

► Dimension table for Non rotatable UFC flanges

Model	Dimensions	Flange dimension						Type	Connecting pipe		Bolt		Gasket model (External diameter × Internal diameter × Thickness)
		A	B	PCD	C	D	K		External diameter	Internal diameter	Diameter × Length	N	
UFC034-000FH	FT	33.8	—	27.0	7.2	1.2	18.3	c	—	—	M4 × 20 (16)	6	UFC034G (21.3 × 16.3 × 2)
UFC034-006FHS	FTS		6.4			1.2	18.3	d	6.35	4.35			
UFC034-010FH	FT		10.2			4.6	10.2	b	10.0	8.0			
UFC034-010FHS	FTS		10.2			1.2	18.3	d	10.0	8.0			
UFC034-018FH	FT		18.0			11.2	15.0	e	18.0	16.0			
UFC054-000FH	FT	54.0	—	43.0	10.0	3.5	26.5	a	—	—	M5 × 30 (20)	6	UFC054G (34.8 × 26.0 × 2)
UFC054-022FH	FT		22.2			5.0	22.2	b	21.7	18.7			
UFC054-025FH	FT		25.7			5.0	25.7	b	25.4	22.4			
UFC070-000FH	FT	69.3	—	58.7	12.7	3.8	34.8	a	—	—	M6 × 35 (25)	6	UFC070G (48.1 × 36.9 × 2)
UFC070-025FH	FT		25.7			5.3	25.7	b	25.4	22.4			
UFC070-032FH	FT		31.9			5.3	31.9	b	31.8	28.8			
UFC070-040FH	FT		38.3			5.3	38.3	b	38.1	35.1			
UFC070-042FH	FT		42.9			10.7	39.0	m	42.7	39.4			UFC070GS (48.1 × 40.0 × 2)
UFC114-000FH	FT	113.5	—	92.2	17.5	5.0	63.8	a	—	—	M8 × 45 (35)	8	UFC114G (82.4 × 63.7 × 2)
UFC114-065FH	FT		63.8			7.0	—	b	63.5	59.5			
UFC152-000FH	FT	151.6	—	130.3	19.8	4.8	102.0	a	—	—	M8 × 50 (40)	16	UFC152G (120.5 × 101.8 × 2)
UFC152-100FH	FT		102.0			7.1	—	b	101.6	97.6			
UFC203-000FH	FT	202.4	—	181.1	22.4	9.7	152.9	a	—	—	M8 × 55 (45)	20	UFC203G (171.2 × 152.6 × 2)
UFC203-150FH	FT		152.9			12.7	—	b	152.4	146.4			
UFC253-000FH	FT	253.2	—	231.9	24.6	9.7	203.7	a	—	—	M8 × 60 (50)	24	UFC253G (222.1 × 203.4 × 2)
UFC253-200FH	FT		203.8			12.7	—	b	203.2	197.2			
UFC306-000FH	FT	306.0	—	284.0	27.0	10.0	256.0	a	—	—	M8 × 65 (55)	32	UFC306G (273.0 × 258.0 × 2)
UFC306-250FH	FT		256.0			13.0	—	b	254.0	248.0			

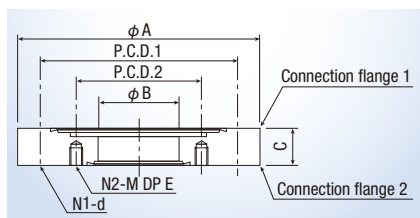
*FH and FHS models have through-bolt holes and FT and FTS models have tapped holes.

*Flange dimension and bolt dimension values are for the FH and FHS models. Values in () are for FT and FTS models.

► Dimension table for rotatable UFC flanges

Model	Dimensions	Flange dimension						Type	Connecting pipe		Bolt		Gasket model (External diameter × Internal diameter × Thickness)
		A	B	PCD	C	D	E		External diameter	Internal diameter	Diameter × Length	N	
UFC034-000RH	—	33.8	—	27.0	7.2	1.2	18.3	i	—	—	M4 × 20	6	UFC034G (21.3 × 16.3 × 2)
UFC034-006RHS	—		6.4			1.2	18.3	i	6.35	4.35			
UFC034-010RH	—		10.2			4.6	10.2	k	10.0	8.0			
UFC034-010RHS	—		10.2			1.2	18.3	i	10.0	8.0			
UFC034-018RH	—		18.0			11.2	15.0	j	18.0	16.0			
UFC054-000RH	—	54.0	—	43.0	10.0	1.2	29.6	h	—	—	M5 × 30	6	UFC054G (34.8 × 26.0 × 2)
UFC054-022RH	—		22.2			5.0	6.6	g	21.7	18.7			
UFC054-025RH	—		25.7			5.0	25.7	g	25.4	22.4			
UFC070-000RH	—	69.3	—	58.7	12.7	2.0	41.3	h	—	—	M6 × 35	6	UFC070G (48.1 × 36.9 × 2)
UFC070-025RH	—		25.7			5.3	7.6	g	25.4	22.4			
UFC070-032RH	—		31.9			5.3	31.9	g	31.8	28.8			
UFC070-040RH	—		38.3			5.3	38.3	g	38.1	35.1			
UFC114-000RH	—	113.5	—	92.2	19.1	5.0	12.7	f	—	—	M8 × 50	8	UFC114G (82.4 × 63.7 × 2)
UFC114-065RH	—		63.8			7.0	63.8	g	63.5	59.5			
UFC152-000RH	—	151.6	—	130.3	21.3	4.8	14.3	f	—	—	M8 × 55	16	UFC152G (120.5 × 101.8 × 2)
UFC152-100RH	—		102.0			7.1	—	g	101.6	97.6			
UFC203-000RH	—	202.4	—	181.1	23.9	9.7	15.9	f	—	—	M8 × 60	20	UFC203G (171.2 × 152.6 × 2)
UFC203-150RH	—		152.9			12.7	152.9	g	152.4	146.4			
UFC253-000RH	—	253.2	—	231.9	24.6	9.7	17.2	f	—	—	M8 × 60	24	UFC253G (222.1 × 203.4 × 2)
UFC253-200RH	—		203.8			12.7	203.7	g	203.2	197.2			
UFC306-000RH	—	306.0	—	284.0	27.0	10.0	18.0	f	—	—	M8 × 65	32	UFC306G (273.0 × 258.0 × 2)
UFC306-250RH	—		256.0			13.0	256.0	g	254.0	248.0			

External dimension diagram

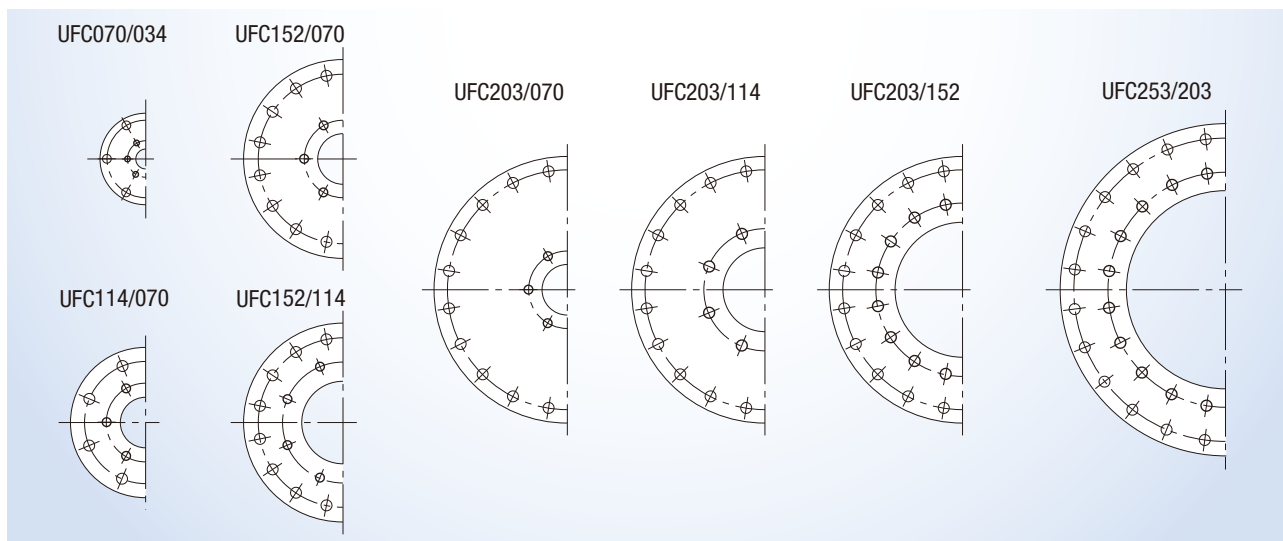


Dimension table

Unit: mm

Model	Connection flange 1	Connection flange 2	A	B	C	P.C.D.1	N1	d	P.C.D.2	N2	M	E
UFC070/034	UFC070	UFC034	69.3	15.0	12.7	58.7	6	6.8	27.0	6	M4	5.0
UFC114/070	UFC114	UFC070	113.5	38.0	17.5	92.2	8	8.5	58.7	6	M6	8.0
UFC152/070	UFC152	UFC070	151.6	38.0	19.8	130.3	16	8.5	58.7	6	M6	8.0
UFC152/114	UFC152	UFC114	151.6	64.0	19.8	130.3	16	8.5	92.2	8	M8	8.0
UFC203/070	UFC203	UFC070	202.4	38.0	22.4	181.1	20	8.5	58.7	6	M6	8.0
UFC203/114	UFC203	UFC114	202.4	64.0	22.4	181.1	20	8.5	92.2	8	M8	8.0
UFC203/152	UFC203	UFC152	202.4	102.0	22.4	181.1	20	8.5	130.3	16	M8	8.0
UFC253/203	UFC253	UFC203	253.2	153.0	24.6	231.9	24	8.5	181.1	20	M8	8.0

Bolt hole positioning



Copper gaskets for fastening UFC flanges

- ▶ UFC-G series copper gaskets for UFC flanges are made from oxygen-free copper (OFHC).
- ▶ The gaskets are clean with little out gassing and are suitable for ultra-high vacuum.
- ▶ Since copper gaskets are oxidized if left in air for a long period of time, each UFC-G series gasket is individually vacuum packed to eliminate oxidation.

Model	Flange type	Quantities	External diameter × Internal diameter × Thickness (mm)
UFC034G	UFC034	5 Set	21.3 × 16.3 × 2
UFC054G	UFC054	5 Set	34.8 × 26.0 × 2
UFC070G	UFC070	5 Set	48.1 × 36.9 × 2
UFC070GS	UFC070-042	5 Set	48.1 × 40.0 × 2
UFC114G	UFC114	5 Set	82.4 × 63.7 × 2
UFC152G	UFC152	5 Set	120.5 × 101.8 × 2
UFC203G	UFC203	5 Set	171.3 × 152.6 × 2
UFC253G	UFC253	5 Set	222.1 × 203.4 × 2
UFC306G	UFC306	5 Set	273.0 × 258.0 × 2

Bolt Sets for Fastening UFC Flanges

- ▶ Use of stainless steel bolts is recommended for fastening UFC flanges.
- ▶ Stainless steel bolts, nuts, and washers for each flange type are available from ULVAC.

*Since bolt sets have been cleaned, be sure to spread heat resistant lubricant when fastening bolts. These parts may fuse after bakeout

[For UFC-FH]

1set includes 1bolt, 1nut and 1washer

Model	Flange type	Bolt sizes	Quantities
UFC034B	UFC034	M4 × 20L	6 set
UFC054B	UFC054	M5 × 30L	6 set
UFC070B	UFC070	M6 × 35L	6 set
UFC114B	UFC114	M8 × 45L	8 set
UFC152B	UFC152	M8 × 50L	16 set
UFC203B	UFC203	M8 × 55L	20 set
UFC253B	UFC253	M8 × 60L	24 set
UFC306B	UFC306	M8 × 65L	32 set

[For UFC-FT]

1set includes 1bolt, 1nut and 1washer

Model	Flange type	Bolt sizes	Quantities
UFC034BT	UFC034	M4 × 16L	6 set
UFC054BT	UFC054	M5 × 20L	6 set
UFC070BT	UFC070	M6 × 25L	6 set
UFC114BT	UFC114	M8 × 35L	8 set
UFC152BT	UFC152	M8 × 40L	16 set
UFC203BT	UFC203	M8 × 45L	20 set
UFC253BT	UFC253	M8 × 50L	24 set
UFC306BT	UFC306	M8 × 55L	32 set

Torque Ranges for UFC Flange Fastening

- ▶ Use of a torque wrench is recommended when fastening bolts. The preset type torque wrench is also recommended. The bolt sizes and fastening torques for various flanges are shown in the table at right

Flange type	Bolt sizes	Fastening torque
UFC034	M4	3 to 4 N·m
UFC054	M5	6 to 8 N·m
UFC070	M6	10 to 12 N·m
UFC114-306	M8	13 to 20 N·m

Ultra-High Vacuum Flange/Fitting [UFC Series/IFS·IFE·IFT·IFX·IFB·Series]

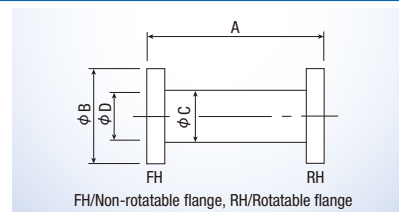
Ultra-High Vacuum Fitting IFS·IFE·IFT·IFX·IFB Series

Nipple Type Piping (IFS series)

Unit: mm

Model	A	ϕB	ϕC	ϕD	Connection flange	Weight (kg)
IFS034-018	76.0	33.8	18.0	15.0	UFC034	0.11
IFS070-040	128.0	69.3	38.1	35.1	UFC070	0.7
IFS114-065	172.0	113.5	63.5	59.5	UFC114	2.5
IFS152-100	216.0	151.6	101.6	97.6	UFC152	4.0
IFS203-150 *1	276.0	202.4	152.4	146.4	UFC203	8.0
IFS253-200 *1	320.0	253.2	203.2	197.2	UFC253	12.0

*1 A custom-made model

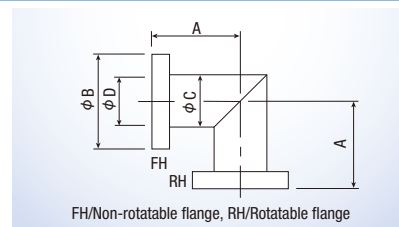


Elbow Type Piping (IFE series)

Unit: mm

Model	A	ϕB	ϕC	ϕD	Connection flange	Weight (kg)
IFE034-018	38.0	33.8	18.0	15.0	UFC034	0.1
IFE070-040	64.0	69.3	38.1	34.0	UFC070	0.7
IFE114-065	86.0	113.5	63.5	59.5	UFC114	2.5
IFE152-100	108.0	151.6	101.6	97.6	UFC152	4.0
IFE203-150 *1	138.0	202.4	152.4	146.4	UFC203	8.0
IFE253-200 *1	160.0	253.2	203.2	197.2	UFC253	12.0

*1 A custom-made model

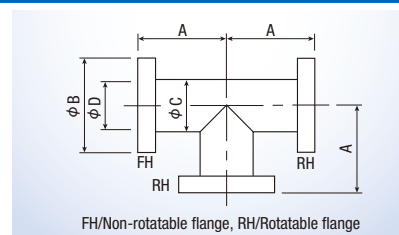


Tee-Type Piping (IFT series)

Unit: mm

Model	A	ϕB	ϕC	ϕD	Connection flange	Weight (kg)
IFT034-018	38.0	33.8	18.0	14.0	UFC034	0.2
IFT070-040	64.0	69.3	38.1	33.0	UFC070	1.0
IFT114-065	86.0	113.5	63.5	54.0	UFC114	4.0
IFT152-100	108.0	151.6	101.6	97.6	UFC152	6.0
IFT203-150 *1	138.0	202.4	152.4	146.4	UFC203	12.0
IFT253-200 *1	160.0	253.2	203.2	197.2	UFC253	18.0

*1 A custom-made model

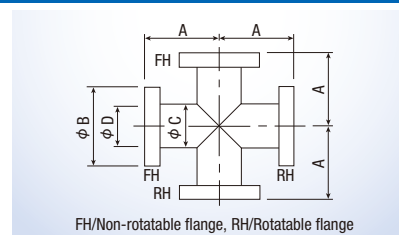


4-Way Cross Piping (IFX series)

Unit: mm

Model	A	ϕB	ϕC	ϕD	Connection flange	Weight (kg)
IFX034-018	38.0	33.8	18.0	17.0	UFC034	0.2
IFX070-040	64.0	69.3	38.1	34.0	UFC070	1.3
IFX114-065	86.0	113.5	63.5	54.0	UFC114	5.0
IFX152-100	108.0	151.6	101.6	97.6	UFC152	8.0
IFX203-150 *1	138.0	202.4	152.4	146.4	UFC203	13.0
IFX253-200 *1	160.0	253.2	203.2	197.2	UFC253	20.0

*1 A custom-made model

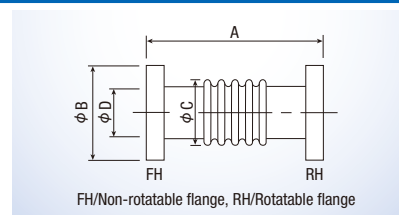


Bellows Type Piping (IFB series)

Unit: mm

Model	A	ϕB	ϕC	ϕD	Expansion/contraction	Connection flange	Weight (kg)	Bellows type piping
IFB034-018	76.0	33.8	18.0	8.0	+5, -10	UFC034	0.13	Welded
IFB070-040	80.6	69.3	42.0	30.0	+4, -7	UFC070	0.6	Molded
IFB114-065 *1	111.0	113.5	63.5	50.0	+8, -13	UFC114	2.2	Molded
IFB152-100 *1	216.0	151.6	109.0	90.0	+10, -16	UFC152	4.0	Molded
IFB203-150 *1	276.0	202.4	153.0	134.0	+10, -13	UFC203	8.0	Molded
IFB253-200 *1	320.0	253.2	213.0	180.0	+12, -19	UFC253	12.0	Molded

*1 A custom-made model



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