

# SAES RIAL VACUUM

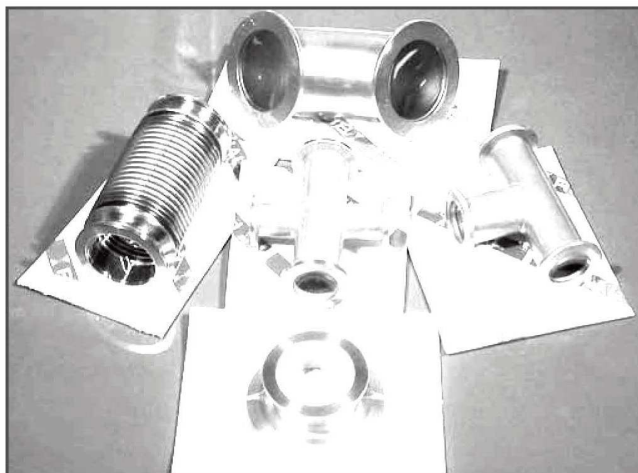
CATALOGO RACCORDERIA 2017



## H.V. AND U.H.V. COMPONENTS

**SAES RIAL Vacuum** could supply standard and special vacuum components. For the standard versions are available a stock of ISO-K, ISO-KF and CF flanges and fittings. Other standard versions (i.e. ANSI) and special dimensions are available on request. The material used for the components are: 304 L (components on stock), 304 LN ESR, 316 L, 316 LN, 316 LN ESR as ASTM E 45/76 - Method D.

*The packaging of the vacuum components is made to warranty the cleanliness and to protect the materials from damage during the transport. Special packagings are available on request.*



*A stock of standard components is available in **SAES RIAL Vacuum** in order to warranty a really short delivery time. Customized stock of standard or special components is also available on request.*



*Stock of special vacuum flanges for C.E.R.N. - L.H.C. project*



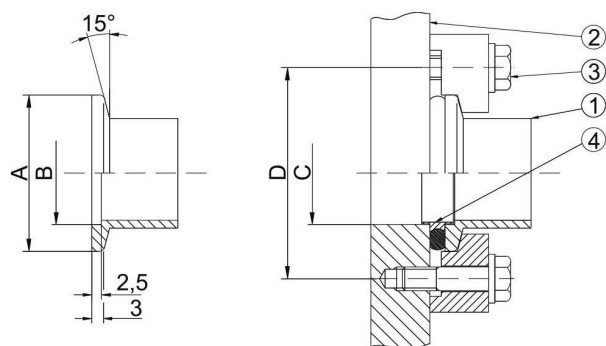
Our products include all recommended diameters according to PNEUROP and ISO standards. For our quality vacuum components we utilize 304 L stainless steel with low carbon and high weldability. The weldings are made by TIG techniques in argon atmosphere. The surface are polished or microsanded for improving the vacuum tightness and joint life and lowering the wall outgassing. All welded components are tested with an helium leak detector to a leak level of  $10^{-9}$  mbar l/s. Furthermore, on request we can realise with the same technology any combination of non standard fittings. In our company it is available a stock of all standard flanges and fittings to warranty a really short delivery time.

## ISO-KF FLANGES AND FITTINGS

Conform to PNEUROP 6606/1981 and DIN 28403.



The **SAES RIAL Vacuum** range of small flanges, fittings and components includes all sizes with nominal diameters: DN 10, DN 16, DN 25, DN 40, DN 50 KF. Sealing Materials: Buna, Viton, Aluminium. Flanges and fittings are made of stainless steel AISI 304 L. High vacuum sealed KF connections can be realized without tools simply by tightening the wing nut on the clamping ring.



### TECHNICAL DATA

Pressure range for application of stainless steel fittings:  
from 2 bar to  $10^{-8}$  mbar

Maximum bakeout temperature for the seals:  
Buna  $90^{\circ}\text{C}$  - Viton  $145^{\circ}\text{C}$  - Aluminium  $200^{\circ}\text{C}$

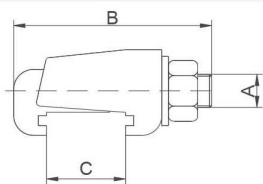
### DIMENSIONS

1. Small flange
2. Housing wall with threaded tap
3. Claw grip
4. Seal

Nominal diameter	A	B	C	D	E	Number of claw grip
DN10	30	12,2	12,2	44		4
DN16	30	17,2	17,2	44		4
DN25	40	26,2	26,2	54		4
DN40	55	41,2	41,2	69		4
DN50	75	52,4	52,4	91		4

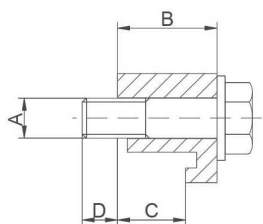
## CONNECTION ELEMENTS

### Clamps



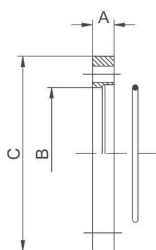
Materials	Nominal diameter	A	B	C	D	E	Code
AISI 304	DN63	M10	60	23,6			010100144
	DN100	M10	60	23,6			010100144
	DN160	M10	60	23,6			010100144
	DN200	M10	60	23,6			010100144
	DN250	M10	60	23,6			010100144
	DN320	M10	70	35,6			010100150
	DN400	M10	70	35,6			010100150
	DN500	M10	70	35,6			010100150
	DN630	M12	95	39,5			010100153

### Wall clamps



AISI 304	DN63	M8	23,2	14	6,8		010100154
	DN100	M8	23,2	14	6,8		010100154
	DN160	M10	24,8	15,6	10,2		010100157
	DN200	M10	24,8	15,6	10,2		010100157
	DN250	M10	24,8	15,6	10,2		010100157
	DN320	M12	29,8	20,6	10,2		010100161
	DN400	M12	29,8	20,6	10,2		010100162
	DN500	M12	29,8	20,6	10,2		010100162
	DN630	M12	34,8	25,6	15,2		010100164

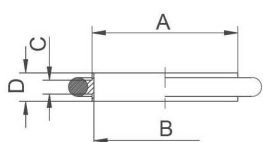
### Collar ring flanges



AISI 304 L	DN63	12	95,5	130			010100187
	DN100	12	130,5	165			010100189
	DN160	16	180,7	225			010100191
	DN200	16	240,7	285			010100192
	DN250	16	290,7	335			010100193
	DN320	20	370,8	425			010100194
	DN400	20	450,8	510			010100195
	DN500	20	550,8	610			010100196

## SEALS

### Centering rings



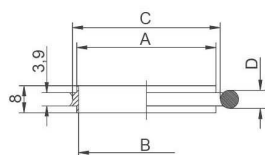
AISI 304 L Viton	DN63	70	68	3,9	8		010101061
	DN100	102	100	3,9	8		010101063
	DN160	153	148	5,6	14		010101065
	DN200	213	208	5,6	14		010101066
	DN250	261	256	5,6	14		010101067
	DN320	318	313	5,6	14		010101068
	DN400	400	395	5,6	14		010101069
	DN500	501	495	5,6	14		010101070
	DN630	651	645	5,6	14		010101071

### Centering rings with outer ring

AISI 304 L Viton	DN63						010101700
	DN100						010101701
	DN160						010101702
	DN200						010101703
	DN250						010101704
	DN320						010101705
	DN400						010101706
Al Viton	DN63						010101710
	DN100						010101711
	DN160						010101712
	DN200						010101713
	DN250						010101714
	DN320						010101715
	DN400						010101716

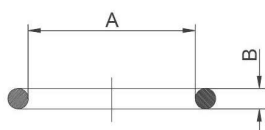


## Centering ring



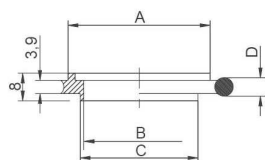
Materials	Nominal diameter	A	B	C	D	E	Code
AISI 304 L	DN10	12	10	15,3	5,33		010100019
O-ring Viton	DN16	17	16	18,5	5,33		010100020
	DN25	26	25	28,5	5,33		010100022
	DN40	41	40	43	5,33		010100024
	DN50	52	50	55,5	5,33		010100025
AISI 304 L	DN10	12	10	15,3	5,33		010100026
O-ring Buna	DN16	17	16	18,5	5,33		010100027
	DN25	26	25	28,5	5,33		010100029
	DN40	41	40	43	5,33		010100031
	DN50	52	50	55,5	5,33		010100032

## O-Ring



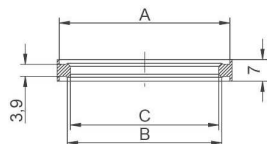
Viton	DN10	15	5,33		set of 10		010100297
	DN16	18	5,33		set of 10		010100298
	DN25	28	5,33		set of 10		010100300
	DN40	40,64	5,33		set of 10		010100302
	DN50	53,34	5,33		set of 10		010100303

## Adapting centering ring



AISI 304 L	DN10/16	17	10	12	5,33		010100033
O-ring Viton	DN20/25	26	21	22	5,33		010100034
	DN32/40	41	32	34	5,33		010100035
AISI 304 L	DN10/16	17	10	12	5,33		010100036
O-ring Buna	DN20/25	26	21	22	5,33		010100037
	DN32/40	41	32	34	5,33		010100038

## Metallic Seal



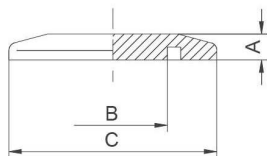
Al	DN10/16	30,1	25	23			010100279
	DN20/25	40,2	35	33			010100280
	DN32/40	55,2	50	48			010100281
	DN50	75,2	70	68			010100282

## Centering Ring with Screen (72 mesh)

AISI 304L	DN16						010101620
Viton	DN25						010101621
	DN40						010101622
	DN50						010101623

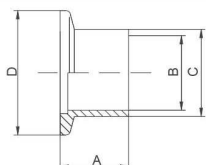
## FLANGES AND FITTINGS

## Blank flanges



AISI 304 L	DN10	5	7,2	30			010100039
	DN16	5	12,2	30			010100040
	DN25	5	21,2	40			010100042
	DN40	5	36,2	55			010100044
	DN50	5	47,2	75			010100045

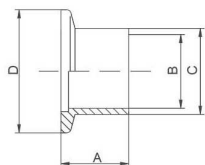
## Short welding flanges



AISI 304 L	DN10	22	10	14	30		010100005
	DN16	22	16	20	30		010100006
	DN25	22	24	28	40		010100008
	DN40	22	41	45	55		010100010
	DN50	22	50	57	75		010100011

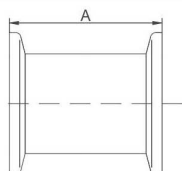
Materials	Nominal diameter	A	B	C	D	E	Code
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## Long welding flanges



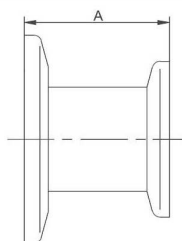
AISI 304 L	DN10	52	10	14	30		010100012
	DN16	52	16	20	30		010100013
	DN25	55	24	28	40		010100015
	DN40	58	41	45	55		010100017
	DN50	58	50	57	75		010100018

## Nipples



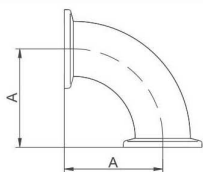
AISI 304 L	DN10	80					010100047
	DN16	80					010100048
	DN25	100					010100050
	DN40	130					010100052
	DN50	140					010100053

## Reducing nipples



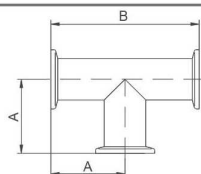
AISI 304 L	DN16/10	28					010100054
	DN25/16	28					010100056
	DN40/16	28					010100058
	DN40/25	28					010100060
	DN50/10	28					010100061
	DN50/16	28					010100062
	DN50/25	28					010100064
	DN50/40	28					010100066

## 90° Elbows



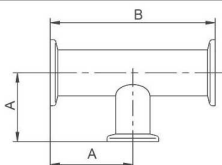
AISI 304 L	DN10	30					010100067
	DN16	40					010100068
	DN25	50					010100070
	DN40	65					010100072
	DN50	70					010100073

## 90° Tees



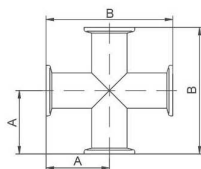
AISI 304 L	DN10	30	60				010100074
	DN16	40	80				010100075
	DN25	50	100				010100077
	DN40	65	130				010100079
	DN50	70	140				010100080

## Adapting 90° Tees



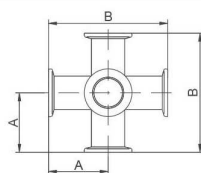
AISI 304 L	DN25/25/16	50	100				010100081
	DN40/40/25	65	130				010100082
	DN50/50/25	70	140				010100083
	DN50/50/40	70	140				010100084

## 90° Crosses



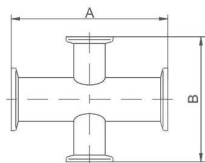
AISI 304 L	DN10	30	60				010100085
	DN16	40	80				010100086
	DN25	50	100				010100088
	DN40	65	130				010100090
	DN50	70	140				010100091

## 6 Ways Crosses



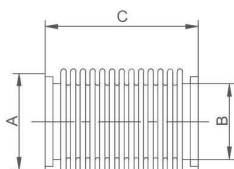
AISI 304 L	DN10	30	60				010101031
	DN16	40	80				010101032
	DN25	50	100				010101033
	DN40	65	130				010101034
	DN50	70	140				010101035

## Reducing Crosses



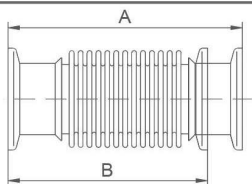
Materials	Nominal diameter	A	B	C	D	E	Code
AISI 304 L	DN25/25/16/16	100	80				010100094
	DN40/40/16/16	130	90				010100097
	DN40/40/25/25	130	100				010100098
	DN40/40/25/16	65	130				010100099
	DN50/50/25/25	70	140				010100100

## Bellows



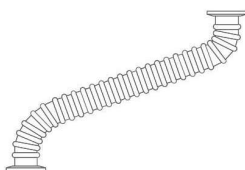
AISI 316 T	S 14	14	9,1	48			010100316
AISI 316 L	S 17	17	11,7	60			010100317
	S 25	25,6	17	60			010100318
	S 28	28,6	19	78			010100319
	S 38	38	25	78			010100320
	S 46	46	31,5	88			010100321
	S 56	56	41	88			010100322
	S 66	66	49	88			010100323
	S 90	89	67,5	70			010100324
	S 100	100	79	87			010100325
	S 120	120	98	78			010100326
	S 146	146	125	107			010100327
	S 175	175	154	85			010100328
	S 232	232	206	130			010100329
	S 285	285	260	207			010100330
	S 345	345	320	207			010100331
	S 430	430	402	207			010100332
	S 510	512	480	227			010100333

## Flanged bellows



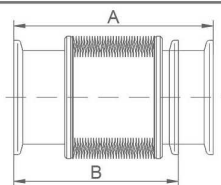
AISI 304 L	DN10	90	80				010100115
	DN16	120	110				010100116
AISI 316 L	DN25	120	105				010100118
	DN40	120	100				010100120
	DN50	120	100				010100121

## Flexible pipes



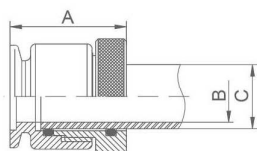
AISI 304 L	DN10	250					010100122
	DN16	250					010100123
	DN25	250					010100125
	DN40	250					010100127
	DN50	250					010100128
	DN10	500					010100129
	DN16	500					010100130
	DN25	500					010100132
	DN40	500					010100134
	DN50	500					010100135
	DN10	750					010101041
	DN16	750					010101042
	DN25	750					010101044
	DN40	750					010101046
	DN50	750					010101047
	DN10	1000					010100136
	DN16	1000					010100137
	DN25	1000					010100139
	DN40	1000					010100141
	DN50	1000					010100142

## Diaphragm bellows



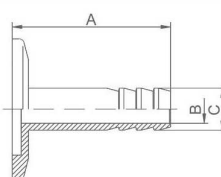
Materials	Nominal diameter	A	B	C	D	E	Code
AISI 316 L AM 350	DN10	77	68				010101051
	DN16	77	68				010101052
	DN25	87	69				010101054
	DN40	96	68				010101056
	DN50	126	78				010101057

## Metal glass connections



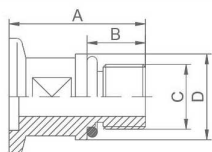
AISI 304 L	DN10	40	8	10			010100304
	DN16	40	14	16			010100305
	DN25	45	20	25			010100306
	DN40	45	16	20			010100307
	DN50	45	22	25,4			010100308

## Hose nipple



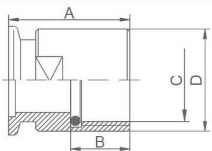
AISI 304 L	DN10	45	8	12			010100101
	DN16	45	8	12			010100102
	DN25	45	8	12			010100104
	DN40	45	8	12			010100106
	DN50	45	8	12			010100107

## Screw-in flange



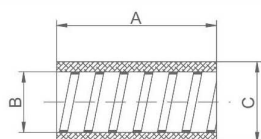
AISI 304 L Viton	DN10	35	15	G 3/8"	22		010101321
	DN16	35	16	G 1/2"	26		010101322
	DN25	45	24	G 1"	39		010101323
	DN40	56	24	G 1 1/2"	50		010101324

## Screw-on flange



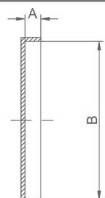
AISI 304 L Viton	DN10	35	15,5	G 3/8"	20		010101326
	DN16	35	16	G 1/2"	24		010101327
	DN25	45	22	G 1"	38		010101328
	DN40	45	22	G 1 1/2"	52		010101329

## Plastique tubes



AISI 304 L Viton	DN16	1 m.	18	24			010100108
	DN25	1 m.	25	35			010100110
	DN40	1 m.	40	50			010100112
	DN50	1 m.	50	60			010100113

## Protective cover



Poliethylene	DN16	3	30				010101161
	DN25	3	40				010101162
	DN40	3	55				010101163
	DN50	3	75				010101164

## Vacuum grease

Silicone tube gr.100	These lubricants is used in assemblies with sliding elastomer seals to eliminate very small leaks. They have low vapour pressure (<10 <sup>-8</sup> mbar)						010101501
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## ISO-K FLANGES AND FITTINGS

Clamping flanges and fittings conform to PNEUROP 6606/1981 and DIN 28404 standards.

Dimensions: DN 63 - 100 - 160 - 200 - 250 - 320 - 400 - 500 - 630 - 800 - 1000 ISO.

Flanges and fittings are made of stainless steel AISI 304 L. Elastomer or metal seals.



1. Clamping flange

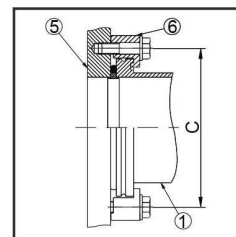
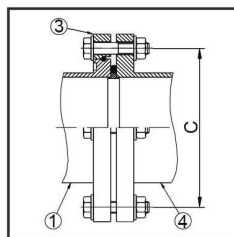
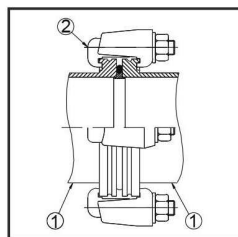
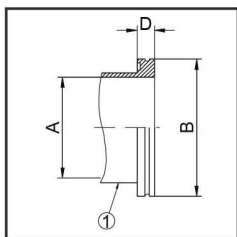
2. Clamping screw

3. Collar flange

4. Bolted flange

5. Base plate

6. Wall clamps



### TECHNICAL DATA

Tightness better than  $1 \times 10^{-9}$  mbar l/s;

Maximum bakeout temperature for the seals:

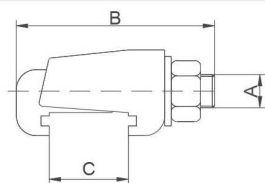
Buna 90°C - Viton 145°C - Aluminium 200°C

Nominal diameter	A	B	D	Clamping screw	Number of clamping screw	C pitch circle diam.	Screw for collar ring flange	Number of holes in collar ring flange	Screw for claw grip	Number of claw grip
DN63	70	95	12	M 10X21	4	110	M 8X40	4	M 8X30	4
DN100	102	130	12	M 10X21	4	145	M 8X40	8	M 8X30	8
DN160	153	180	12	M 10X21	4	200	M 10X50	8	M 10X35	8
DN200	213	240	12	M 10X21	6	260	M 10X50	12	M 10X35	12
DN250	261	290	12	M 10X21	6	310	M 10X50	12	M 10X35	12
DN320	318	370	17	M 10X31	8	395	M 12X60	12	M 12X40	12
DN400	400	450	17	M 10X31	8	480	M 12X60	16	M 12X40	16
DN500	501	550	17	M 10X31	12	580	M 12X60	16	M 12X40	16
DN630	651	690	22	M 12X80	12	720	M 12X70	20	M 12X50	20

Diam. 800 and 1000 available on request. Not-standard dimensions available on request.

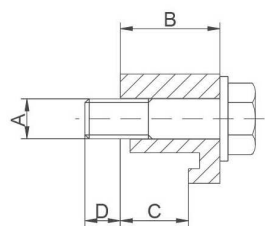
## CONNECTION ELEMENTS

### Clamps



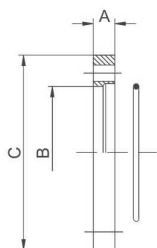
Materials	Nominal diameter	A	B	C	D	E	Code
AISI 304	DN63	M10	60	23,6			010100144
	DN100	M10	60	23,6			010100144
	DN160	M10	60	23,6			010100144
	DN200	M10	60	23,6			010100144
	DN250	M10	60	23,6			010100144
	DN320	M10	70	35,6			010100150
	DN400	M10	70	35,6			010100150
	DN500	M10	70	35,6			010100150
	DN630	M12	95	39,5			010100153

### Wall clamps



AISI 304	DN63	M8	23,2	14	6,8		010100154
	DN100	M8	23,2	14	6,8		010100154
	DN160	M10	24,8	15,6	10,2		010100157
	DN200	M10	24,8	15,6	10,2		010100157
	DN250	M10	24,8	15,6	10,2		010100157
	DN320	M12	29,8	20,6	10,2		010100161
	DN400	M12	29,8	20,6	10,2		010100162
	DN500	M12	29,8	20,6	10,2		010100162
	DN630	M12	34,8	25,6	15,2		010100164

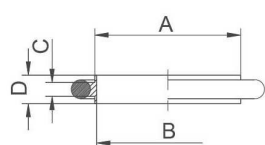
### Collar ring flanges



AISI 304 L	DN63	12	95,5	130			010100187
	DN100	12	130,5	165			010100189
	DN160	16	180,7	225			010100191
	DN200	16	240,7	285			010100192
	DN250	16	290,7	335			010100193
	DN320	20	370,8	425			010100194
	DN400	20	450,8	510			010100195
	DN500	20	550,8	610			010100196

## SEALS

### Centering rings

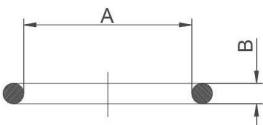


AISI 304 L Viton	DN63	70	68	3,9	8		010101061
	DN100	102	100	3,9	8		010101063
	DN160	153	148	5,6	14		010101065
	DN200	213	208	5,6	14		010101066
	DN250	261	256	5,6	14		010101067
	DN320	318	313	5,6	14		010101068
	DN400	400	395	5,6	14		010101069
	DN500	501	495	5,6	14		010101070
	DN630	651	645	5,6	14		010101071

### Centering rings with outer ring

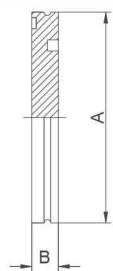
AISI 304 L Viton	DN63						010101700
	DN100						010101701
	DN160						010101702
	DN200						010101703
	DN250						010101704
	DN320						010101705
	DN400						010101706
Al Viton	DN63						010101710
	DN100						010101711
	DN160						010101712
	DN200						010101713
	DN250						010101714
	DN320						010101715
	DN400						010101716

## O-Rings

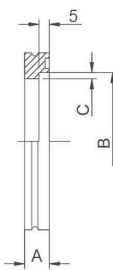
	Materials	Nominal diameter	A	B	C	D	E	Code
	Viton	DN63	75,6	5,33		set 10 pcs		010100334
		DN100	107,3	5,33		set 5 pcs		010100336
		DN160	164,5	6,99		set 5 pcs		010100338
		DN200	215,3	6,99		set 5 pcs		010100339
		DN250	266,1	6,99		set 5 pcs		010100340
		DN320	329,6	6,99		set 3 pcs		010100341
		DN400	405,3	6,99		set 3 pcs		010100342
		DN500	506,9	6,99		set 3 pcs		010100343
		DN630	658,9	6,99		set 3 pcs		010100344
	Buna	DN63	75,6	5,33		set 10 pcs		010100345
		DN100	107,3	5,33		set 10 pcs		010100347
		DN160	164,5	6,99		set 10 pcs		010100349
		DN200	215,3	6,99		set 10 pcs		010100350
		DN250	266,1	6,99		set 10 pcs		010100351
		DN320	329,6	6,99		set 5 pcs		010100352
		DN400	405,3	6,99		set 5 pcs		010100353
		DN500	506,9	6,99		set 5 pcs		010100354
		DN630	658,9	6,99		set 5 pcs		010100355

## FLANGES

## Blank flanges

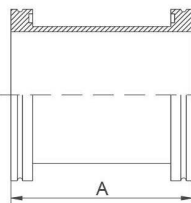
	AISI 304 L	DN63	95	12				010100197
		DN100	130	12				010100199
		DN160	180	12				010100201
		DN200	240	12				010100202
		DN250	290	12				010100203
		DN320	370	17				010100204
		DN400	450	17				010100205
		DN500	550	17				010100206
		DN630	690	22				010100207

## Welding flanges

	AISI 304 L	DN63	12	76	3			010100165
		DN100	12	108	3			010100167
		DN160	12	159	3			010100169
		DN200	12	219	3			010100170
		DN250	12	267	3			010100171
		DN320	17	324	3			010100172
		DN400	17	406	3			010100173
		DN500	17	508	4			010100174
		DN630	22	660	5			010100175

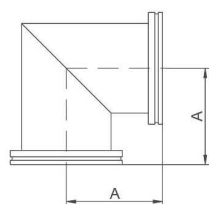
## PIPE FITTINGS

## Nipples

	AISI 304 L	DN63	88					010100588
		DN100	108					010100590
		DN160	138					010100592
		DN200	200					010100593
		DN250	208					010100594
		DN320	300					010100595
		DN400	350					010100596
		DN500	400					010100597

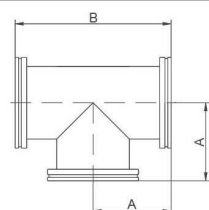
Materials	Nominal diameter	A	B	C	D	E	Code
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## 90° Elbows



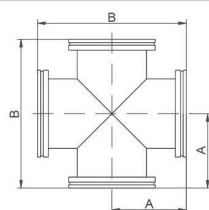
AISI 304 L	DN63	88					010100218
	DN100	108					010100220
	DN160	138					010100222
	DN200	200					010100223
	DN250	208					010100224
	DN320	300					010100225

## 90° Tees



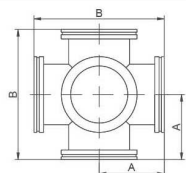
AISI 304 L	DN63	88	176				010100226
	DN100	108	216				010100228
	DN160	138	276				010100230
	DN200	200	400				010100231
	DN250	208	416				010100232
	DN320	300	600				010100233

## 90° Crosses



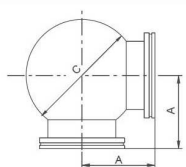
AISI 304 L	DN63	88	176				010100234
	DN100	108	216				010100236
	DN160	138	276				010100238
	DN200	200	400				010100239
	DN250	208	416				010100240
	DN320	300	600				010100241

## 90° Crosses 6 portes



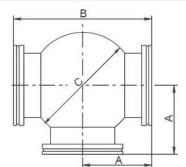
AISI 304 L	DN63	88	176				010101073
	DN100	108	216				010101075
	DN160	138	276				010101077
	DN200	200	400				010101078
	DN250	208	416				010101079

## Elbows with spherical body



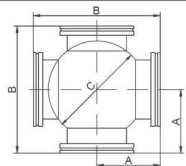
AISI 304 L	DN63	88	176	120			010100367
	DN100	108	216	175			010100369
	DN160	138	276	250			010100371
	DN200	200	400	350			010100372

## Tees with spherical body



AISI 304 L	DN63	88	176	120			010100494
	DN100	108	216	175			010100496
	DN160	138	276	250			010100498
	DN200	200	400	350			010100499

## Crosses with spherical body



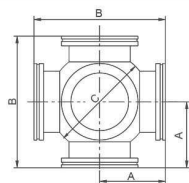
AISI 304 L	DN63	88	176	120			010100500
	DN100	108	216	175			010100502
	DN160	138	276	250			010100504
	DN200	200	400	350			010100505



## PIPE FITTINGS

Materials	Nominal diameter	A	B	C	D	E	Code
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Crosses 6 portes with spherical body

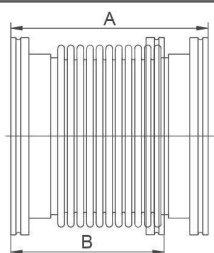


AISI 304 L	DN63	88	176	120			010101081
	DN100	108	216	175			010101083
	DN160	138	276	250			010101085
	DN200	200	400	350			010101086

On request Rial can produce special fittings as per customer's requirements

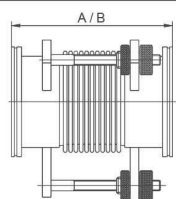
## FLEXIBLE PIPINGS

Bellows



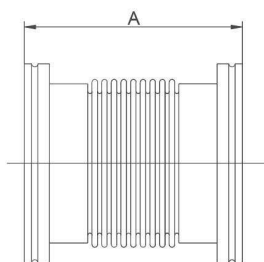
AISI 304 L AISI 316	DN63	130	117				010100260
	DN100	130	117				010100262
	DN160	150	135				010100264
	DN200	230	210				010100265
	DN250	250	230				010100266
	DN320	260	235				010100267
	DN400	260	235				010100268
	DN500	260	255				010100269

Adjusting piece with bellows



AISI 304 L	DN63	130	117				010101141
	DN100	130	117				010101143
	DN160	150	135				010101144
	DN200	230	210				010101145
	DN250	250	230				010101146

Flexible pipes

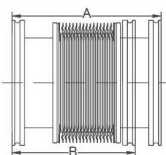


AISI 304 L	DN63	250					010101101
		500					010101102
		750					010101103
		1000					010101104
	DN100	250					010101109
		500					010101110
		750					010101111
		1000					010101112
	DN160	250					010101113
		500					010101114
		750					010101115
		1000					010101116
	DN200	250					010101117
		500					010101118
		750					010101119
		1000					010101120
	DN250	250					010101121
		500					010101122
		750					010101123
		1000					010101124
	DN320	250					010101125
		500					010101126
		750					010101127
		1000					010101128

## FLEXIBLE PIPINGS

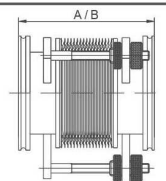
Materials	Nominal diameter	A	B	C	D	E	Code
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### Diaphragm Bellows



AISI 304 L	DN63	144	119				010101131
	DN100	161	119				010101133
	DN160	144	117				010101134
	DN200	138	116				010101135

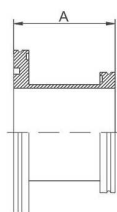
### Adjusting piece with diaphragm bellows



	DN63	144	19				010101151
	DN100	161	119				010101153
	DN160	144	117				010101154
	DN200	138	116				010101155

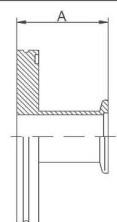
## TRANSITION PIECES

### Reducing nipples



AISI 304 L	DN100/DN63						010101401
	DN160/DN100						010101403
	DN160/DN63						010101402
	DN200/DN160	90					010100212
	DN250/DN200	90					010100213
	DN320/DN250	100					010100214
	DN400/DN320	100					010100215
	DN500/DN400	100					010100216
	DN630/DN500	120					010100217

### Reducing nipples for small flanges

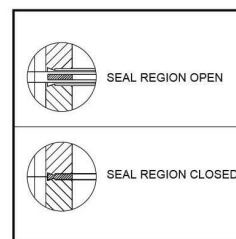


AISI 304 L	DN63/DN25	50					010100254
	DN63/DN40	50					010100255
	DN63/DN50	50					010100256

Ultra high vacuum is defined as the pressure range below to  $10^{-8}$  mbar. UHV has become an indispensable tool for accelerators, surface analysis, molecular beam epitaxie, electronic microscopy and many other applications, when it is very important to have a low gas density together with more visible gas spectrum. As to the UHV requirements, both all the materials and the techniques have been strictly observed in order to achieve the utmost clean vacuum, along with a leakless and lowest outgassing.

## CF Series Flanges and Components

Compatible with the Conflat range or similar  
Simple to use in any orientation  
Repeated sealing requires no special techniques  
All sizes are available either rotatable or non rotatable  
Flanges seal with a copper gaskets  
Viton gasket optional  
Available with tapped bolt holes in all sizes  
Complete range of double sides flanges  
Special flanges on request

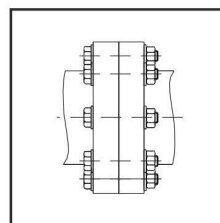


## Sealing Principle of CF Series Flanges

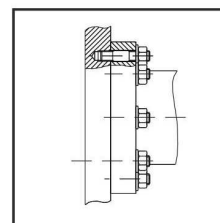
The flat copper gasket is fitted between the cutting edges of a pair of CF flanges. The cutting edges pressed into flat copper gasket create a flow in a radial direction stopped by the vertical flange. Thus, the gasket is locked and ensure high reliability of seal, even at high temperatures. Sometimes, such flanges stick firmly together, for the above mentioned deformation; they can be easily separated with a special tool or screwdriver. This sealing principle is applied for connections up to 250 mm I.D. The materials used in flange manufacture are chosen to ensure the best reliability and freedom from leaks also at bake out temperature of  $450^{\circ}\text{C}$ . Materials available for flanges and fittings: 304 L, 304 LN ESR, 316 L, 316 LN, 316 LN ESR as ASTM E 45/76 - Method D.

### TECHNICAL DATA

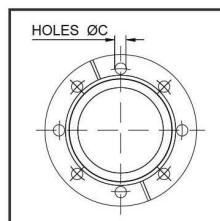
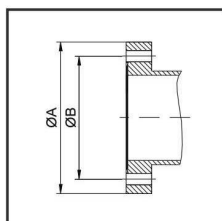
Application range to:  $10^{-12}$  mbar;  
Max. bakeout temperature: Viton seal  $145^{\circ}\text{C}$   
Copper gasket  $450^{\circ}\text{C}$   
Internal diameters: 16 - 40 - 63 - 100 - 150 - 200 - 250 CF  
CF components materials: Stainless steel  
Seal materials: OFHC copper, OFHC silver plated copper, Viton



Connection with screws



Connection with stud screws

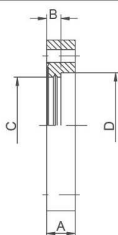


Nominal diameter	OD.	A	B	C	Number of holes	Number of screws	Number of stud screws	Number of triple nuts
CF 16	1 1/3"	33	27	4,3	6	6	6	2
CF 40	2 3/4"	69,8	58,7	6,6	6	6	6	2
CF 63	4 1/2"	113,5	92,2	8,5	8	8	8	2
CF 100	6"	152	130,3	8,5	16	16	16	-
CF 150	8"	202,5	181	8,5	20	20	20	-
CF 200	10"	253	231,8	8,5	24	24	-	-
CF 250	12"	306	284	8,5	32	32	-	-

"CONFLAT" registered trade mark of VARIAN - USA

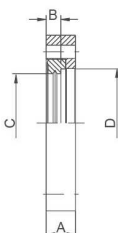
## FLANGES

### Welding flanges



Materials	Nominal diameter	A	B	C	D	E	Code
AISI 304 L	CF16	7,2	4,3	16	18,6		010201001
	CF40	13	5,5	39	42,2		010201002
	CF63	19	9,5	64	70		010201003
	CF100	21	11	102	108		010201004
	CF150	24	12	153	159		010201005
	CF200	24,6	12,5	200	206		010201006
	CF250	26	13	250	256		010201291

### Rotatable Welding flanges



AISI 304 L	CF16	7,2	4,3	16	18,6		010201019
	CF40	13	5,5	39	42,2		010201020
	CF63	19	9,5	64	70		010201021
	CF100	21	11	102	108		010201022
	CF150	24	12	153	159		010201023
	CF200	24,6	12,5	200	206		010201024
	CF250	26	13	250	256		010201294

### Blank flanges



AISI 304 L	CF16	7,2					010201025
	CF40	13					010201026
	CF63	19					010201027
	CF100	21					010201028
	CF150	24					010201029
	CF200	24,6					010201030
	CF250	26					010201295

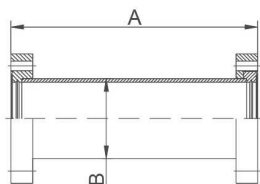
### Rotatable blank flanges



AISI 304 L	CF16	7,2	5,2				010201031
	CF40	13	7,6				010201032
	CF63	19	12,7				010201033
	CF100	21	14,3				010201034
	CF150	24	15,8				010201035
	CF200	24,6	17,1				010201036
	CF250	26	18,1				010201296

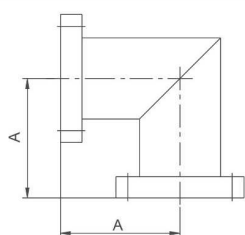
## PIPE FITTINGS

### Nipples (1 rotatable flange)



AISI 304 L	CF16	80	18,6				010201067
	CF40	130	42,2				010201068
	CF63	210	70				010201069
	CF100	280	108				010201070
	CF150	340	159				010201071
	CF200	400	206				010201072
	CF250	450	256				010201297

### Elbows 90° (1 rotatable flange)

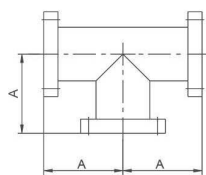


AISI 304 L	CF16	38					010201073
	CF40	63					010201074
	CF63	105					010201075
	CF100	135					010201076
	CF150	167					010201077
	CF200	240					010201078
	CF250	250					010201298



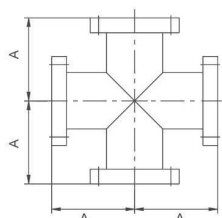
## PIPE FITTINGS

### Tees 90° (2 rotatable flanges)



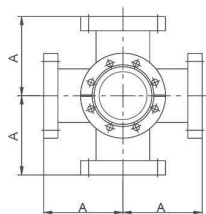
Materials	Nominal diameter	A	B	C	D	E	Code
AISI 304 L	CF16	38	76				010201079
	CF40	63	126				010201080
	CF63	105	210				010201081
	CF100	135	270				010201082
	CF150	167	334				010201083
	CF200	240	480				010201084
	CF250	250	500				010201099

### Crosses 90° (2 rotatable flanges)



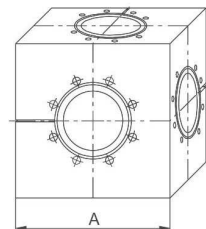
AISI 304 L	CF16	38	76				010201085
	CF40	63	126				010201086
	CF63	105	210				010201087
	CF100	135	270				010201088
	CF150	167	334				010201089
	CF200	240	480				010201090
	CF250	250	500				010201300

### 6 ways Crosses 90° (3 rotatable flanges)



AISI 304 L	CF16	38					010201091
	CF40	63					010201092
	CF63	105					010201093
	CF100	135					010201094
	CF150	167					010201095
	CF200	240					010201096
	CF250	250					010201301

### Cubic Crosses 6 ways

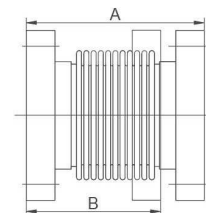


AISI 304 L	CF16	40					010201144
	CF40	75					010201145
	CF63	116					010201146
	CF100	154					010201147
	CF150	206					010201148
	CF200	255					010201149
	CF250	310					010201150

Reduction crosses can be realized on request

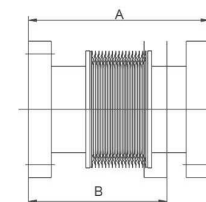
## FLEXIBLE FITTINGS

### Bellows (1 rotatable flange)



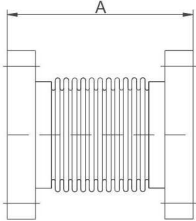
AISI 304 L	CF16	130	118				010201115
	CF40	194	176				010201116
	CF63	200	180				010201117
	CF100	220	200				010201118
	CF150	250	228				010201119
	CF200	300	270				010201120
	CF250	320	290				010201302

### Membrane Bellows (1 rotatable flanges)

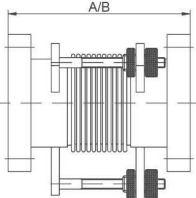


AISI 304 L	CF16	95	77	16	19		010201191
	CF40	145	117	35	39		010201192
	CF63	194	168	63	67		010201193
	CF100	211	168	102	102,4		010201194
	CF150	214	186	153	159		010201195
	CF200	208	186	200	216		010201196

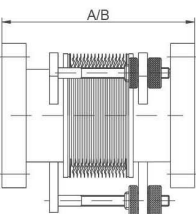
## FLEXIBLE PIPINGS

	Materials	Nominal diameter	A	B	C	D	E	Code
<i>Flexible coupling (1 rotatable flange)</i>								
	AISI 304 L	CF16	250					010201161
			500					010201162
			750					010201163
			1000					010201164
		CF40	250					010201165
			500					010201166
			750					010201167
			1000					010201168
		CF63	250					010201169
			500					010201170
			750					010201171
			1000					010201172
		CF100	250					010201173
			500					010201174
			750					010201175
			1000					010201176
		CF200	250					010201177
			500					010201178
			750					010201179
			1000					010201180
		CF200	250					010201181
			500					010201182
			750					010201183
			1000					010201184
		CF250	250					010201185
			500					010201186
			750					010201187
			1000					010201188

*Adjusting Piece with Bellows (1 rotatable flange)*

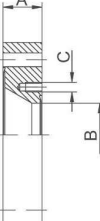
	AISI 304 L	CF16	130	118	31			010201201
		CF40	194	176	42			010201202
		CF63	200	180	67			010201203
		CF100	220	200	88			010201204
		CF150	250	228	113			010201205
		CF200	300	270	139			010201206
		CF250	320	295	164			010201207

*Adjusting Piece with Membrane Bellows (1 rotatable flange)*

	AISI 304 L	CF16	95	77	68			010201211
		CF40	145	117	100			010201212
		CF63	194	168	134			010201213
		CF100	211	168	200			010201214
		CF150	214	186	250			010201215
		CF200	208	186	305			010201216

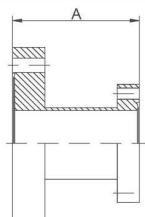
## TRANSATION PIECES

*Reduction Flanges (zero lenght)*

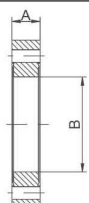
	AISI 304 L	CF40/16ID	15	16	6 x M4			010201060
		CF63/40ID	24	39	6 x M6			010201061
		CF100/40ID	24	39	6 x M6			010201062
		CF100/63ID	24	64	8 x M8			010201063
		CF150/40ID	24	39	6 x M6			010201064
		CF150/63ID	24	64	8 x M8			010201065
		CF150/100ID	24	102	16 x M8			010201066

## TRANSATION PIECES

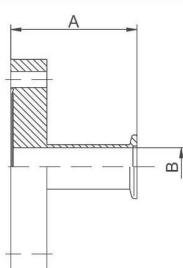
### Reductions (1 rotatable Flanges)

	Materials	Nominal diameter	A	B	C	D	E	Code
	AISI 304 L	CF40/16ID	60					010201097
		CF63/40ID	95					010201098
		CF100/40ID	110					010201099
		CF100/63ID	115					010201100
		CF150/100ID	120					010201101
		CF200/150ID	130					010201102

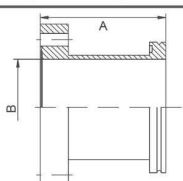
### Double face flanges

	AISI 304 L	CF16	19	16				010201152
		CF40	19	39				010201153
		CF63	19	64				010201154
		CF100	21	102				010201155

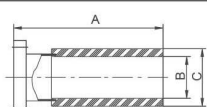
### Adaptors CF/Pneurop Flange

	AISI 304 L	CF16/DN10	40	10				010201103
		CF16/DN16	40	16				010201104
		CF40/DN10	40	10				010201105
		CF40/DN16	40	16				010201106
		CF40/DN25	40	24				010201107
		CF40/DN40	60	39				010201108
		CF63/DN40	60	39				010201109

### Adaptors CF/ISO Clamped Flange

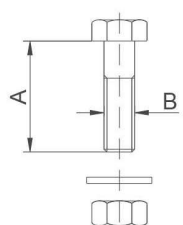
	AISI 304 L	CF63/DN63	100	64				010201110
		CF100/DN100	100	102				010201111
		CF150/DN160	100	153				010201112

### Glass Adaptors

		CF16ID	110	14	16			010201113
		CF40ID	130	36	40			010201114

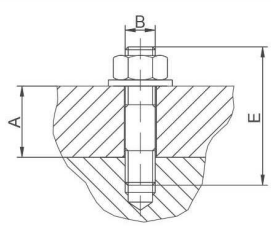
## SCREWS

### Set of Bolt (25 incl.bolts nuts and washers)

					number required	necessary torque		
	Silver plated	CF16	20	M4	6	0,6 Kgm		010201239
		CF40	35	M6	6	1,5Kgm		010201240
		CF63	50	M8	8	2,5 Kgm		010201241
		CF100	55	M8	16	2,5Kgm		010201242
		CF150	60	M8	20	3Kgm		010201243
		CF200	60	M8	24	3Kgm		010201243
		CF250	65	M8	32	3Kgm		010201244

Not silver plated version available on request

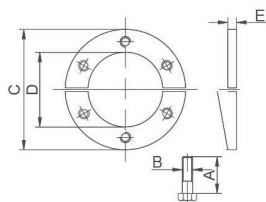
### Studs for tapped Bolt Holes (25 incl.bolts nuts and washers)

	Silver plated	CF16	8	M4	6	0,4 Kgm	22	010201246
		CF40	13	M6	6	1 Kgm	32	010201247
		CF63	19	M8	8	2 Kgm	44	010201248
		CF100	21	M8	16	2 Kgm	50	010201249
		CF150	24	M8	20	3 Kgm	55	010201250
		CF200	24,6	M8	24	3 Kgm	55	010201251
		CF250	25,2	M8	32	3 Kgm	55	010201252

## SCREWS

Materials	Nominal diameter	A	B	C	D	E	Code
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Bolt with triple nuts (set of bolts with 2 triple nuts)



Silver plated	CF16	20	M4	33	20,3		010201254
	CF40	35	M6	68	40,2		010201255
	CF63	50	M8	111	72		010201256

Temperature Resistant to 1000°C Grease 1/2 Kg 010201258

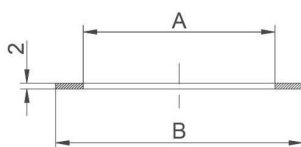
Thread Lubricants to 1000°C Spray 300 ml 010201259

This lubricant ensure that the screws in UHV systems can be easily turned and do not seize.

These thread lubricant tolerate high temperature at atmospheric pressure. It is fully effective for at least 10 bakeout cycles.

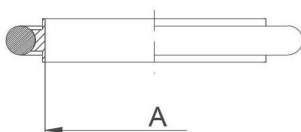
## GASKETS

Copper Gasket



Copper	CF16	21,2	16,2			set 10 pcs	010201037
	CF40	48,1	39			set 10 pcs	010201038
	CF63	82,4	63,6			set 10 pcs	010201039
	CF100	120,4	101,7			set 10 pcs	010201040
	CF150	171,3	152,6			set 10 pcs	010201041
	CF200	222,1	203,3			set 10 pcs	010201042
	CF250	273	254			set 5 pcs	010201043

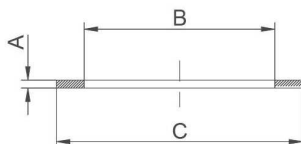
Centerig ring with OR Viton



AISI 304 L Viton	CF16	-					-
	CF40	33					010201044
	CF63	60					010201045
	CF100	98					010201046
	CF150	149					010201047
	CF200	196					010201048
	CF250	246					010201305

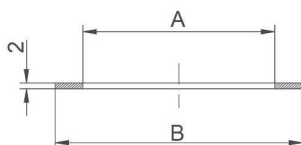
Bakeability to 150°C

Viton Gasket



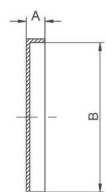
Viton	CF16	2,3	16,5	21,4		set 5 pcs	010201261
	CF40	2,3	36	48,3		set 5 pcs	010201262
	CF63	2,3	69	82,5		set 5 pcs	010201263
	CF100	2,3	106	120,6		set 5 pcs	010201264
	CF150	2,3	155	171,4		set 5 pcs	010201265

Silver Plated Copper Gasket



Silver plated Copper	CF16	2	21,2	16,2		set 10 pcs	010201271
	CF40	2	48,1	39		set 10 pcs	010201272
	CF63	2	82,4	63,6		set 10 pcs	010201273
	CF100	2	120,4	101,7		set 10 pcs	010201274
	CF150	2	171,3	152,6		set 10 pcs	010201275
	CF200	2	222,1	203,3		set 10 pcs	010201276

CF protective cover



Polyethylene	CF16	9,5	33				010201281
	CF40	17,5	69,8				010201282
	CF63	22	113,5				010201283
	CF100	24,5	152				010201284
	CF150	27	202,5				010201285
	CF200	29	253				010201286

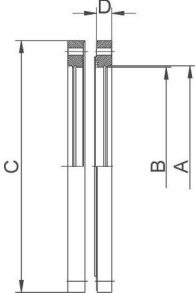


## FRO FLANGES

The FRO flange connection for size larger than NW 250 consist of two non-identical flanges of different mating profiles with O-ring copper gasket forming a compression seal beetwen the mating flange faces. The flange connection is bakeable to 450°C. The O-ring copper gasket can be replaced by a VITON O-ring with bearing ring. The FRO flange is also suitable for mouting a glass bell jar sealed with L-VITON gasket.

	Materials	Nominal diameter	A	B	C	D	E	Code
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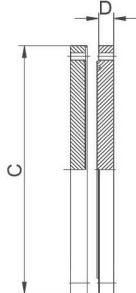
*FRO Welding flanges*



AISI 304 L	DN250F	250	244	314	27,8		010204002
	DN250M	250	244	314	27,8		010204004
	DN300F	300	294	371	27,8		010204006
	DN300M	300	294	371	27,8		010204008
	DN350F	356	350	430	33		010204010
	DN350M	356	350	430	33		010204012
	DN400F	406	400	500	35		010204014
	DN400M	406	400	500	35		010204016
	DN450F	450	444	562	38,1		010204018
	DN450M	450	444	562	38,1		010204020
	DN500F	508	501	610	40		010204022
	DN500M	508	501	610	40		010204024
	DN600F	600	590	689	43		010204026
	DN600M	600	590	689	43		010204028
	DN1000F	1016	1000	1110	50		010204034
	DN1000M	1016	1000	1110	50		010204036

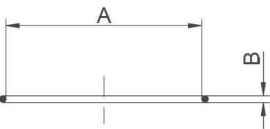
### FRO Blank flages

	AISI 304 L	DN250F			314	27,8		010204038
		DN250M			314	27,8		010204040
		DN300F			371	27,8		010204042
		DN300M			371	27,8		010204044
		DN350F			430	33		010204046
		DN350M			430	33		010204048
		DN400F			500	35		010204050
		DN400M			500	35		010204052
		DN450F			562	38,1		010204054
		DN450M			562	38,1		010204056
		DN500F			610	40		010204058
		DN500M			610	40		010204060
		DN600F			689	43		010204062
		DN600M			689	43		010204064
		DN1000F			1110	50		010204070
		DN1000M			1110	50		010204072



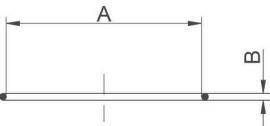
### Silver plated Copper Gasket

	Silver Plated Copper	DN250	272,9	2				010204102
		DN300	329,2	2				010204104
		DN350	382,2	2				010204106
		DN400	440,0	2				010204108
		DN450	490,8	2				010204110
		DN500	546,8	2				010204112
		DN600	636,3	2				010204114
		DN1000	1057,4	2				010204118



### Gold plated Copper Gasket

	Gold Plated Copper	DN250	264,2	1				010204122
		DN300	320,4	1				010204124
		DN350	373,3	1				010204126
		DN400	431,3	1				010204128
		DN450	482,0	1				010204130
		DN500	538,0	1				010204132
		DN600	627,8	1				010204134
		DN1000	1048,8	1				010204136



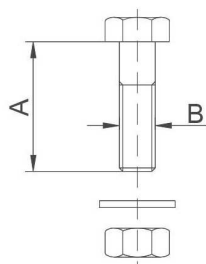
# FRO FLANGES

Center ring OR - Viton

Materials	Nominal diameter	A	B	C	D	E	Code
AISI 304 L	DN250	253,3	5,33				010204142
	DN300	304,1	6,99				010204144
	DN350	354,9	6,99				010204146
	DN400	405,2	6,99				010204148
	DN450	456,0	6,99				010204150
	DN500	506,8	6,99				010204152
	DN600	608,0	6,99				010204154
	DN1000	1023	6,99				010204158

Bolts for FRO flanges

number of Bolts



	DN250	60			24		010204162
	DN300	65			32		010204164
	DN350	80			36		010204166
	DN400	90			36		010204168
	DN450	90			36		010204170
	DN500	100			36		010204172
	DN600	110			40		010204174
	DN1000	120			64		010204178

### Borosilicate glass Viewports

Borosilicate glass S801-51 identified as glass S747-01 of-"optic quality".

This optic glass window is welded on a Kovar screw base. It can be TIG welded on a flange or directly on a vacuum bell. This borosilicate glass viewport can be bakeable up to 400 °C with temperature variation : 20 °C/min in heating 10 °C/min in cooling down to 350 °C, then 20 °C/min down to room temperature.

#### PHYSICAL PROPERTIES

Density (g/cm<sup>3</sup>) 2,28

#### OPTICAL PROPERTIES

Refraction index (nd) 1,487

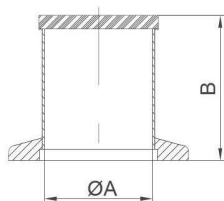
Constraint (v) 65,7

#### GEOMETRIC PROPERTIES

Parallelism (cent.) 3-4

Flatness (fringe) 10-15

### Viewports for ISO-KF Connections



Materials	Nominal diameter	A	B	C	D	E	Code
Pirex Kovar AISI 304 L	DN10	10	13				010100608
	DN16	10	13				010100609
	DN25	23	28,5				010100610
	DN40	38	33,5				010100611
	DN50	46	38,5				010100612

### Windows set for ISO-K flanges

These viewports are designed for an easy and simple assembly and maintenance. For example in any evaporators, the windows are contaminated by different coatings and became less transparent in the time. So it is very difficult to clean and restore a welded viewport. In our model, if necessary, you could substitute only the glass very easily and at very cheap price. And more you can have many different material viewports that you can change as per your requirements.

#### FEATURES

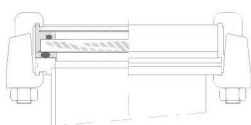
Tempered borosilicate glass

Mounting on ISO-K flanges

Bakeable to 140° C

Vacuum = 10<sup>-9</sup> mbar

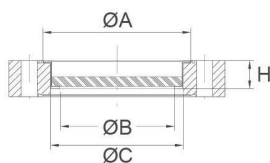
Other window materials on request



	DN63						010100735
	DN100						010100737
	DN160						010100739
	DN200						010100740
	DN250						010100741

### ZERO-LENGTH VIEWPORTS FOR CF CONNECTIONS

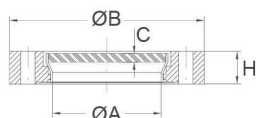
#### Borosilicate glass Viewports



	CF16	17,8	12,5	15,8	5,50		010100638
	CF40	46	32,7	38	10,40		010100640
	CF63	69,8	52,1	60	15,60		010100642
	CF100	114,5	92,2	101,6	18,12		010100643
	CF150	163,8	137,4	149,6	22,50		010100645

#### Quartz viewports

This kind of ultra high vacuum viewports are supplied with high purity silicon dioxide (99,5 % SiO<sub>2</sub>) fused quartz. Fused silica is also available on request. Fused quartz is created by fusing quartz crystals at high temperature. Fused silica is a synthetic material manufactured by flame hydrolysis of silicon tetrachloride. A characteristic of fused quartz is that the impurities cause a blue-violet fluorescence when exposed to ultraviolet radiation at 253,7 nm. This fluorescence is not evident in fused silica. Fused quartz and fused silica viewports are preferred over glass viewports because of their transparency to ultraviolet radiation. Other advantages include an higher abrasion resistance and a low coefficient of thermal expansion, making them very resistant to thermal shock. The viewports are vacuum rated down to 1 x 10<sup>-11</sup> torr. The assemblies are rated for 200 °C maximum bakeout. The window-to-sleeve transitions are made of lead alloy, which melts at 300 °C.

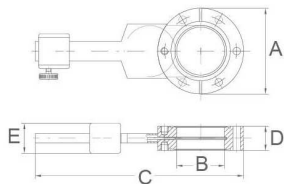


	CF35	35,6	69,8	3,2	13		010100714
	CF63	68,3	113,5	6,4	19		010100716
	CF100	98,5	152	6,4	21		010100718

Other materials on request

## MOVABLE SHIELD WITH MAGNETIC CONTROL - CF FLANGED

This movable shield has been designed in order to protect the viewports during evaporations. It is also possible to add this shield on already functioning systems. These shields consist of 1 mm thickness stainless steel plate easily translated by a SmCo magnet assembly. Materials used are compatible for U.H.V. application and bakeable at 300 °C for outgassing. The assembly is really easy, thanks to a double face CF flange except for some holes on which studs are utilized. For this reason, these shields cannot be mounted on a flange with threaded holes.



Materials	Model	ø A	ø B	C	D	E	Code
	CF16	34	16	95,5	18	24,4	010201741
	CF40	70	39	169,5	20	24,4	010201742
	CF63	113,5	64	266,2	22	24,4	010201743
	CF100	152	102	386,2	22	24,4	010201744

## QUICK ACCESS DOORS

The ultra high vacuum requires a sufficiently long time to be achieved, mainly because the UHV system has to be heated for a few days just in order to degas as much as possible. The need to slip the samples into the UHV vessel, without breaking the high vacuum, requires rapid and particular load lock systems. SAES RIAL Vacuum is able to design and supply as custom load lock chambers and accessories as standard accessories as quick access doors. Our quick access doors have been designed to allow an easy assembly on already existing CF flange of the system, so these are not to be welded. Two versions are available: with pyrex windows and blank. Special versions are available on request.

### MATERIALS

Flanges : AISI 304 L

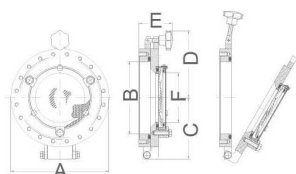
Seals: Viton

Window: Pyrex

Safety net: AISI 304

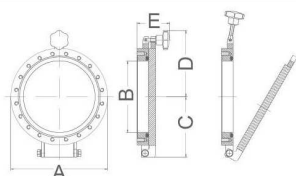
Nominal diameter	A	B	C	D	E	F	Code
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Quick access doors with viewports



CF100	152,1	100	101	113,5	65,4	70	010201861
CF150	202,5	150	126,5	138,7	68,3	102	010201863
CF200	253	200	156,4	164	70,2	153	010201866
CF250	306	250	183	190,5	80,7	210	010201869

Blank quick access doors



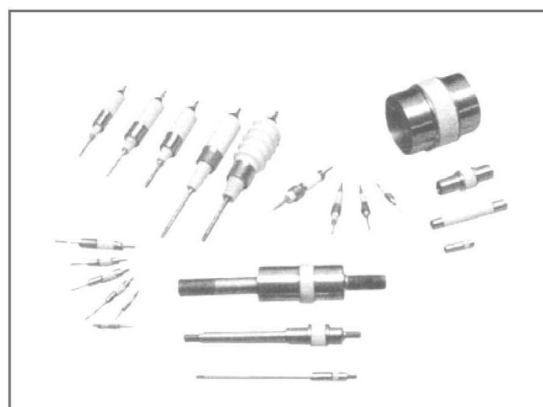
CF100	152,1	100	101	113,5	113,5	64,1	010201851
CF150	202,5	150	126,5	138,7	138,7	67,1	010201853
CF200	253	200	156,4	164	164	67,7	010201856
CF250	306	250	183	190,5	190,5	72,7	010201859

## FEEDTHROUGHS

SAES RIAL Vacuum is able to supply different kind of feedthroughs, designed to be used in most important vacuum applications, like thin film deposition and sputtering systems. A large range of feedthroughs is available:

- Insulated rotary motion feedthroughs (Viton seals or ferromagnetic) ;
- Gas feedthroughs;
- Liquid nitrogen feedthroughs;
- High voltage feedthroughs;
- High current feedthroughs (water cooled available) ;
- 6 PIN voltage feedthroughs;
- 12 PIN voltage feedthroughs;
- UHV electrical amagnetic feedthroughs;
- Thermocouple feedthroughs;

Special flanges with custom feedthroughs are available on request.





*VACUUM CHAMBERS*

*VACUUM SYSTEMS ASSEMBLY*

*SAMPLE MOTION FEEDTHROUGHS AND FURNACES*

*SYNCHROTRON FACILITIES*

*CRYOSTATS AND CRYOGENIC TRANSFER LINES*

*SERVICE AND REPAIR OF VACUUM PUMPS*

*VACUUM PUMPS:*

- *ROUGHING PUMPS, DRY ROUGHING PUMPS, ROOTS*
- *TURBOMOLECULAR*
- *CRYOGENIC PUMPS*

*HELIUM LEAK DETECTORS*

*VACUUM GAUGES*

*VACUUM VALVES*

*ROTARY FEEDTHROUGHS*

*CERAMIC MATERIALS*

*For more information about SAES RIAL Vacuum products, please contact our sales office*