

Vacuum Components

KF Components



ISO Components



CF Components



Micro CF Components



Quick CF Components



Introduction	Page 1-3 to 1-4
KF Components	
KF Introduction	Page 1-5 to 1-6
KF Flanges	Page 1-7 to 1-8
KF Fittings	Page 1-8 to 1-17
KF Flexible hoses	Page 1-18 to 1-19
KF Glass-to-metal connections	Page 1-19
KF Liquid feedthroughs	Page 1-20
KF Seals	Page 1-21 to 1-26
KF Connecting elements	Page 1-27 to 1-30
ISO Components	
ISO Introduction	Page 1-31 to 1-33
ISO Flanges	Page 1-34 to 1-36
ISO Fittings	Page 1-37 to 1-42
ISO Flexible hoses	Page 1-43
ISO Seals	Page 1-44 to 1-48
ISO Connecting elements	Page 1-48 to 1-50
CF Components	
CF Introduction	Page 1-51 to 1-52
CF Flanges	Page 1-53 to 1-56
CF Fittings	Page 1-57 to 1-63
CF Flexible hoses	Page 1-64
CF Glass-to-metal connections and CF quick access doors	Page 1-65 to 1-66
CF Liquid feedthroughs	Page 1-67
CF Seals	Page 1-68 to 1-70
CF Connecting elements	Page 1-70 to 1-72
Micro CF Components	
Micro CF Flanges	Page 1-73
Micro CF Fittings	Page 1-74
Micro CF Edge welded bellows	Page 1-74
Micro CF Gaskets	Page 1-74
Micro CF Connecting elements	Page 1-75
Micro CF Mechanical feedthroughs	Page 1-75 to 1-76
Micro CF Electrical feedthroughs	Page 1-77
Quick CF Components	
Quick CF Flanges	Page 1-79
Quick CF Components	Page 1-80 to 1-82
Quick CF Seals	Page 1-82 to 1-84
Quick CF Connecting elements	Page 1-84

General technical information

Introduction

Vacuum components are important parts of vacuum technology. These are all components of vacuum equipment which are necessary for the assembly of vacuum lines, e. g. flanges, seals and tube components (elbows, tees, crosses etc.). Applications in vacuum technology make high demands on the selection of material as well as the fabrication of these components.

Varied fields of application require different connection standards which are based on different flange systems. Therefore, we offer vacuum components of all important standards. Our product range covers a vast selection of standard vacuum components.

We are also specialised in the manufacture of vacuum components to your precise requirements.

Flange systems (KF, ISO, CF)

Three different flange systems or standards are basically used in vacuum technology. The selection of the most suitable system depends on the respective application. Please find further technical details in the introductions of the subsections. Our flanges comply with the following standards:

Flange system	Small flange	Clamping flange	ConFlat® compatible
Short term	KF (ISO-KF)	ISO (ISO-K, ISO-F)	CF
Nominal diameter	DN10 to DN50	DN63 to DN630	DN10 to DN250
Standard	DIN28403 ISO2861	DIN 28404 ISO1609	ISO3669
Vacuum range	up to HV	up to HV	up to UHV
Standard seal	elastomer O-ring	elastomer O-ring	Cu gasket
Leak rate	< 1.0E-9 mbar l / s	< 1.0E-9 mbar l / s	< 1.0E-11 mbar l / s

Materials

Our vacuum components are made of materials which meet the high demands of vacuum technology. Only stainless steels are processed for flanges and tubes. In addition we offer KF components of aluminium.

We manufacture flanges of forged stainless steel 316LN ESR for demanding applications, especially in ultra high vacuum. This electroslag remelted material is characterised by highest purity and homogeneous structure, high durability and low permeability. The stainless steel 316LN ESR processed by us originates from especially produced material. The specifications respective composition and purity are clearly closer defined by us than determined by the standard.

Applied stainless steels

Material no.	AISI	ESR
1.4301	304	-
1.4305	303	-
1.4307	304L	-
1.4404 / 1.4435	316L	-
1.4429	316LN	yes
1.4541	321	-
1.4571	316Ti	-

General technical information

Sealing materials

Different sealing materials are used in vacuum applications. The selection of the appropriate material depends on the required characteristics, especially with respect to:

- Ultimate pressure
- Temperature
- Chemical resistance
- Radiation resistance

O-rings of NBR or FKM are commonly used for KF and ISO components. Flat seals of copper are standard for CF components. Other materials are also used for special applications.

Elastomer seals

Material	NBR (nitrile butadiene rubber)	FKM (fluor rubber)	PFPM (perfluor rubber)	PTFE (polytetrafluorethylene)
Flange system	KF, ISO	KF, ISO, CF	KF, ISO	KF
Design	O-ring	O-ring or flat seal	O-ring	edge seal
Application	non corrosive	moderate corrosive	highly corrosive	highly corrosive
Comment	standard material for KF and ISO	standard material for KF and ISO	application mainly in semiconductor technology	high pressing forces, clamp chains or special clamps

Metal seals

Material	Aluminium	Copper (OFHC)
Flange system	KF, ISO	CF
Design	edge seal	flat gasket
Application	up to ultimate pressure 1.0E-7 mbar	up to ultimate pressure, radiation resistant
Comment	high pressing forces, for KF with clamp chains or special clamps usable	standard material for CF, for special applications silver coated or annealed

Quality, cleaning and packing

Vacuum components by us are subject to demanding quality requirements. The most important data are listed in the following table:

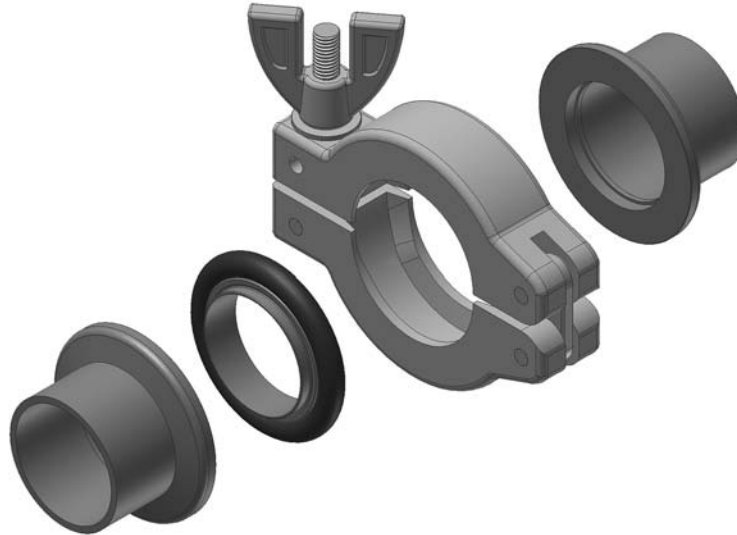
Leak rate	< 1.0 E-9 mbar l / s, - welded part separately tested - inspection certificate on request
Weld seams	inside or from outside through welded
Surface quality	turning workpieces: - blank - roughness: Ra 3.2 (sealing surface: Ra 1.6 or 0.8) welded parts: - KF and ISO: glass bead blasted inside and outside - CF: inside blank, outside polished or glass bead blasted - roughness: Ra 3.2 or better - electropolished on request
Cleaning	- oil- and grease-free - hydrocarbon-free - ultrasonic cleaning with deionized water
Packing	- dust-proof packed in bags or foils - protected against damage - cleanroom packing on request

Dimensions

All dimensions in mm unless specified.

Introduction

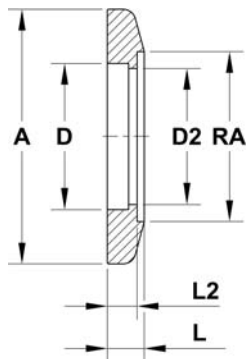
The Small flange or KF standard (DIN 28403, ISO 2961) is the standard connection for vacuum pipes up to the nominal diameter of DN50 used in low, fine and high vacuum. The connection between two flanges is shown in the following figure:



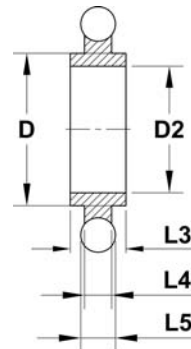
Functional principle

A seal is positioned between the flanges. The seal consists of a centering ring and the O-ring stretched upon. The flanges are held together by a clamp. The clamp has an inclined interior surface adequate to the conical outer surface of the flanges.

Usually centering rings and standard clamps are used with wing nuts. They enable a quick and easy assembly without any tools. Trapped centering rings and special clamps or clamp chains are offered for special applications. Claw clamps or so-called bulkhead clamps are available for wall mounting.



KF flange



KF centering ring

Dimensions of KF flanges / KF centering rings

Dimension	DN10	DN16	DN25	DN40	DN50
A	30.0	30.0	40.0	55.0	75.0
D	12.2	17.2	26.2	41.2	52.2
D2	10.0	16.0	25.0	40.0	50.0
RA	14.0	19.0	28.0	41.0	53.0
L	5.1	4.5	4.6	4.4	5.4
L2	3.5	3.5	3.5	3.5	4.5

Introduction

Materials

Seals	Flanges	Components
NBR (O-ring)	aluminium	aluminium
FKM (O-ring)	stainless steel 1.4301	stainless steel 1.4301
PTFE (edge seal)	stainless steel 1.4305	stainless steel 1.4305
PTFE (centering ring / trapped centering ring)	stainless steel 1.4404	stainless steel 1.4404
aluminium (edge seal)		stainless steel 1.4435
aluminium (centering ring / trapped centering ring)		stainless steel 1.4541
stainless steel 1.4301 (centering ring)		stainless steel 1.4571
stainless steel 1.4404 (centering ring)		

Fields of application

Materials components and seals	Pressure range (mbar - bar)	Leak rate (mbar l / s)	Recommended centering ring	Recommended connecting element
aluminium with elastomer seal	1.0E-7 to 1.5 1.0E-7 to 1.5	1.0E-8	inside outside	standard clamp clamp chain
stainless steel with elastomer seal	1.0E-8 to 1.5 1.0E-8 to 1.5	1.0E-9	inside outside	standard clamp clamp chain
stainless steel with metal seal	1.0E-9 to 1.5	< 1.0E-9	outside	clamp chain or special clamp