

## 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, VACOM offers vacuum components of all important standards. Our product range covers a vast selection of standard vacuum components.

VACOM also specialises in the manufacture of vacuum components to your precise requirements. Please find more detailed information in Chapter 2, Vacuum Custom Components and Vacuum Chambers.

### 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. VACOM's 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

VACOM 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.

VACOM manufactures 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 VACOM originates from material especially produced for VACOM. The specifications respective composition and purity are clearly closer defined by VACOM 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	-

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### 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 VACOM 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.