

VACUUM
QUICK-RELEASE
VACUUM FITTINGS

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CHAIN CLAMPS

These are chains for quick connection of two tubes by means of tapered flanges. The tubes are centered by means of the inserted seals and a tight vacuum is ensured.

Due to the sturdy design, high compression strengths can be achieved and various types of metal seals used. A decisive aspect in many applications, tightening can be done evenly, with just one or two screws. Tightness is guaranteed once a certain tightening torque has been reached. When opening the chains, just one screw needs to be loosened to remove the chain - swift work ensured.

Since suitable materials are used, such connections are usually not any larger - and above all, they are lighter - than fixed flange couplings. There are various standard designs. The entire system is designed for a wide range of diameters and forces so that corresponding combination of standardized parts can cater to many special demands regarding to sealing force, excess pressure and materials.

The main advantages of this system

- High tightening forces
- Even distribution of force
- Simple and swift assembly and removal
- Assembly possible even in places that is difficult to access
- Great flexibility of design
- Versatile use of various seals

Range of applications

These chains are the preferred choice for:

- Vacuum technology and applications demanding the highest sealing tightness (metal seals)
- Locations subject to radiation (nuclear industry, accelerators, etc.) where radiation-proof seals and quick assembly are essential
- Connections that have to withstand high temperatures or baking (UHV connections, furnaces, etc.)
- Chemical industry (corrosion resistant design), petrochemical industry
- Cryogenics
- Generally for connections with medium to large diameters
- Customized designs for critical applications (restricted space, pressure, etc.)
- Securing of units or assemblies with or without sealing but respective center rings (securing of filters, valves, etc.)

The application range is virtually limitless. The maximum diameter depends on requirements and is between 500 and 700 mm.

There are various materials for various purposes, such as antimagnetic systems made from Aluminum and Stainless Steel.

MATERIALS	RANGE OF APPLICATIONS
Plastic high-temperature	-20... +100°C, (150°C short time), antimagnetic, only for elastomer seals, electric insulation, suitable for cleanrooms, for glass and metal flanges
Plastic ultra high-temperature	-20... +200°C, (220°C short time), only for elastomer seals, electric insulation, antimagnetic, suitable for cleanrooms, for glass and metal flanges
Aluminum BX Type* with knob (1 catch)	-271... +150°C, suitable for cleanrooms, antimagnetic, only for elastomer seals
Stainless Steel (1 catch)	-271... +350°C, cryogenics, antimagnetic, radiation resistant, only elastomer seals
Stainless Steel (2 screws)	-271... +350°C, cryogenics, antimagnetic, radiation resistant, metal and elastomer seals
Plastic standard	-20... +60°C, (80°C short time), antimagnetic, only for elastomer seals, electric insulation, suitable for cleanrooms, for glass and metal flanges
Cast Aluminum	-20... +100°C, antimagnetic, only for elastomer seals, suitable for cleanrooms
Forged Aluminum	-271... +150°C, cryogenics, antimagnetic, for metal and elastomer seals, radiation resistant
Nickel plated Steel	-271... +350°C, cryogenics, pressure, radiation resistant, for metal and elastomer seals
Stainless Steel (CeFiX)	-271... +350°C, cryogenics, pressure, antimagnetic, radiation resistant, for elastomer and metal seals

*BX Type (4 contact per link) patented.

SEALS

Neyco provides several types of seals, as following:

- Seals with center rings on the inside or outside made from various elastomer materials
- Seals with center rings on the inside or outside as Aluminum edge seals with various cross-sections
- Moulded seals in various shapes and sizes, Aluminum
- CeFiX seals for UHV applications in Aluminum, Copper or Nickel
- CeFiX seals in various shapes and sizes, Aluminum

MATERIALS	RANGE OF APPLICATIONS
Teflon/Viton	Suitable for cleanrooms, electric insulation, leak rate: $<1.10^{-9}$ mbar.l.s ⁻¹ , antimagnetic, -20... +200°C
Teflon/FEP	Suitable for cleanrooms, electrical insulation, leak rate: $<1.10^{-6}$ mbar.l.s ⁻¹ , antimagnetic, chem./corrosion, -50... +200°C
Aluminum/Viton	Suitable for cleanrooms, pressure, antimagnetic, leak rate: $<1.10^{-9}$ mbar.l.s ⁻¹ , -20... +200°C
Stainless Steel/Viton	Pressure, suitable for cleanrooms, leak rate: $<1.10^{-9}$ mbar.l.s ⁻¹ , antimagnetic, -20... +200°C
Stainless Steel/Kalrez	Excellent chem. /corrosion, suitable for cleanrooms, antimagnetic, leak rate: $<1.10^{-9}$ mbar.l.s ⁻¹ , -10... +315°C
Aluminum	Antimagnetic, radiation resistant, cryogenics, temperature range: -271... +150°C leak rate: $<1.10^{-11}$ mbar.l.s ⁻¹
OFS* Copper / OFS* Copper Silver plated	Radiation resistant, antimagnetic, pressure, temperature range: -271... +350°C, cryogenics, leak rate: $<1.10^{-11}$ mbar.l.s ⁻¹
Nickel	Antimagnetic, radiation resistant, cryogenics, temperature range: -271... +150°C leak rate: $<1.10^{-11}$ mbar.l.s ⁻¹

*OFS: Oxygen-free, silver-alloyed copper for higher thermal stability.

FLANGES

Flanges can be used with chain clamps and elastomer seals or with metal seals for UHV applications.

Neyco provides several systems: KF, ISO-Tapered™, CeFiX

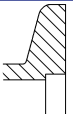


- Temperature: -271°C to +300°C (304), -271°C to +350°C (316L)
- Leak rate: $<1.10^{-9}$ mbar.l.s⁻¹
- Antimagnetic, cryogenics

KF / ISO-Tapered™ Systems (metal)

- Materials: Stainless Steel 304 / Stainless Steel 316L

Advantages

- Space-saving, quick connections
- Exceedingly high vacuum tightness
- Temperature- and radiation-resistant designs
- Antimagnetic designs
- Even distribution of force
- Rotary connection

DRAWING	FLANGE TYPE	FLANGE MATERIAL	SEALS	SEALING SURFACE	CLAMPING MEANS
	KF DN 10 to 63	Aluminum Stainless Steel Glass	Elastomer Aluminum (Copper)	Unprotected	Chain clamps (1 screw)
	ISO-Tapered DN 80 to 250	Aluminum Stainless Steel Glass	Elastomer Aluminum	Unprotected	Chain clamps (1 or 2 screws)
	EVAC-CeFiX DN 80 to 250	Aluminum Stainless Steel	Elastomer Aluminum Copper Nickel	Protected No cutting edge	Chain clamps

CeFiX systems

The most striking feature of the CeFiX flange compared to the CF flange is the lack of a cutting edge. The edge is easily damaged and requires high sealing forces and has therefore been omitted with the CeFiX system.

The seals are designed in such a way that they seal on the 20 degree taper of the flange, thereby reducing the necessary sealing force by up to 50 %. Since the dimensions of the

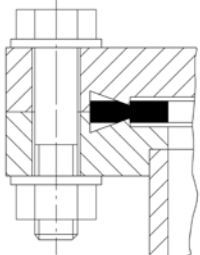
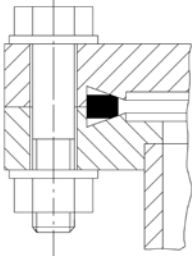
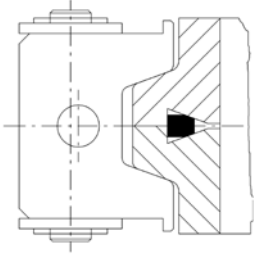
sealing groove of both systems are absolutely identical, the CeFiX seal can also be used for standard CF flanges. So the seal can also be used for flanges with slightly damaged flange edges.

Thanks to the reduced sealing force, Nickel alloys can also be used, but just for CeFiX flanges, since standard CF flanges could be damaged.

Comparison of sealing force (N/mm sealing length)

	CeFiX	STANDARD
Aluminum	70	100
Copper	220	410
Nickel	400	680

- Materials: Stainless Steel 316L
- Temperature: -271°C to +350°C
- Leak rate: <math> < 1.10^{-11} \text{ mbar.l.s}^{-1} </math>
- Antimagnetic, cryogenics, suitable for UHV, excess pressure, resistant to chemicals

STANDARD CF CONNECTION	CeFiX SEAL WITH CF FLANGES	CeFiX SEAL CHAIN CLAMP WITH SPECIFIC FLANGES
Sealing force 100%	Sealing force 50%	Sealing force 50%
		

BELLOWS AND HOSES

Advantages

- Highly flexible, without annealing
- Highest bending and torsion strength
- Can be used for ultra-high vacuum to slight pressure
- Bakeable, suitable for cryogenics
- Radiation resistant, antimagnetic
- Perfect to clean (ultrasound)
- Optimum corrosion resistance
- Minimum outgassing

Behaviour under pressure

Metal bellows and tubes are used for vacuum, excess pressure and on both sides.

If subjected to excess pressure, the bellows and tubes tend to elongate or - in the case of tightly clamped flanges - to buckle.


Applications

- Compensation of axial, lateral or angular set-offs
- Prevention of vibration transfer
- Substitute for elastomer compensators
- Compensate thermal expansion

Metal bellows and hoses

- Materials: Stainless Steel 304 (flanges), Stainless Steel 316Ti (bellows), Stainless Steel 316L (hoses)
- Temperature: -200°C to +350°C
- Leak rate: $<1.10^{-9}$ mbar.l.s⁻¹
- Antimagnetic, cryogenics, radiation resistant, suitable for clean rooms, usable with metal or elastomer seals

Teflon bellows

 See Section H - Glass & Quartz Components in this catalogue.

All given dimensions are nominal in mm.



Chain clamps



Metal bellows

CeFiX Chain Clamps, DN 16-63, UHV

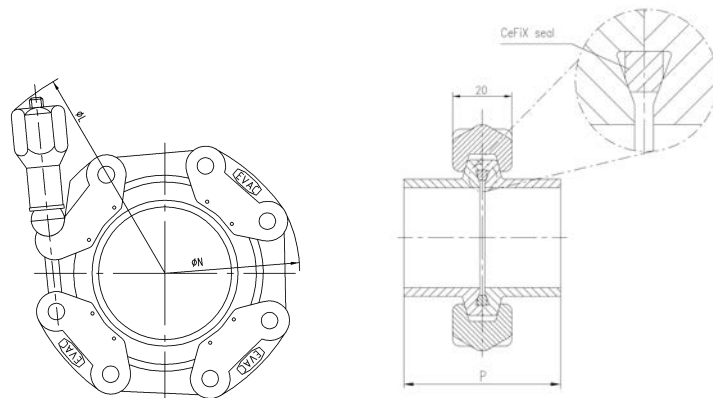


APPLICATIONS

- Food and beverage applications (Stainless Steel)
- Cryogenics applications (all versions)
- Heated use (up to 350°C with Nickel and Steel)
- Oven applications (seals: Al: -271°C to 150°C, Cu: -271°C to 350°C, Ni: -271°C to 450°C)
- Radiation tolerant
- Especially for UHV applications
- Vacuum up to 10^{-11} mbar
- Pressure up to 300 bar (Steel with CeFiX metal seals)
- For antimagnetic requirements (Stainless Steel only)

DN	L	N	P	TORQUE (Nm)			No. OF LINKS
				ALU.	COPPER	NICKEL	
16	110	60	44	2.0	3.5	6.0	3
25	125	70	44	2.5	5.0	8.0	4
40	140	85	54	3.0	6.0	10.0	5
50	152	105	60	4.5	8.5	-	5
63	162	112	60	6.0	10.0	-	6*

*2 catches

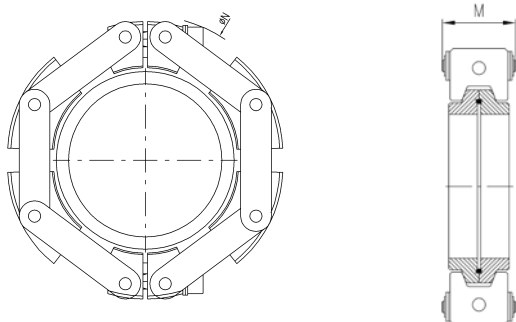


DN 63 chain clamps
(2 catches)

DN 16-50 chain clamps
(1 catch)

	TYPE	STAINLESS STEEL	NICKEL PLATED STEEL
	DN	P/N	
	16	30.016005.151.416	30.016006.151.616
	25	30.025005.151.425	30.025006.151.625
	40	30.040005.151.441	30.040006.151.641
	50	30.050005.151.450	30.050006.151.650
	63	30.063005.151.463	30.063006.151.663
Range of Application	Vacuum	Rough- / High- / UHV	Rough- / High- / UHV
	Temperature range	-271... 350°C	-271... 450°C
	Cryogenics	Yes	Yes
	Leak rate (mbar.l.s ⁻¹)	<1.10 ⁻¹¹	<1.10 ⁻¹¹
	Pressure	Yes	Yes
	Antimagnetic	Yes	Yes
	Radiation resistant	Yes	Yes
	Chemistry / Corrosion	Yes	Yes
	Cleanroom suitable	Depends	Depends
Electrical isolation	-	-	

CeFiX Chain Clamps, DN 80-250, UHV



DN	N	M	TORQUE (Nm)			No. OF LINKS
			ALU.	COPPER	NICKEL	
80	155	45	9	18	30	5
100	192	50	18	36	60	6
160	256	64	27	54	90	6
200	310	68	36	72	120	10
250	360	68	36	84	140	10

APPLICATIONS

- Extreme performance application (nuclear, space, hydraulics...)
- Ultra wide temperature range (-270°C to +450°C, Ni seal)
- Cryogenics applications (all metal seals)
- Oven applications (seals: Cu +350°C, Ni +450°C, Al +150°C)
- Use for UHV and overpressure (up to 100 bar with Ni seal)
- Custom versions up to 300 bar
- CeFiX seals reusable up to 10 times

	TYPE	STAINLESS STEEL
	DN	P/N
	80	30.080005.522.308
	100	30.100005.522.310
	160	30.160005.522.316
	200	30.200005.522.320
	250	30.250005.522.325
Range of application	Vacuum	Rough- /High- /UHV
	Temperature range	-271... 150°C
	Cryogenics	Yes
	Leak rate (mbar.l.s ⁻¹)	<1.10 ⁻¹¹
	Pressure	Yes
	Antimagnetic	Yes
	Radiation resistant	Yes
	Chemistry / Corrosion	Yes
	Cleanroom suitable	Limited
Electrical isolation	-	

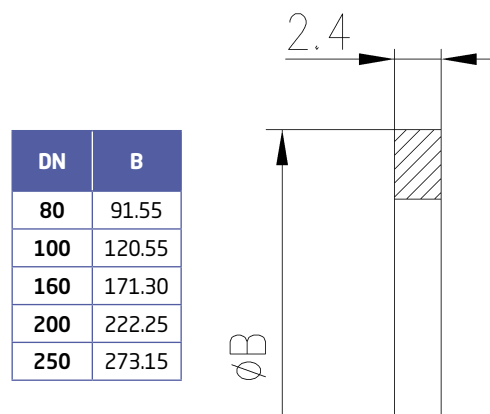
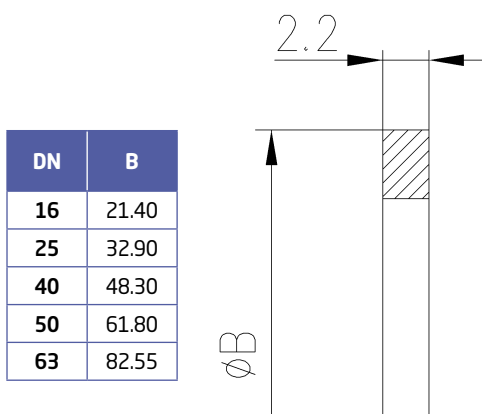
CeFiX Seals, DN 16-63, DN 80-250, UHV



APPLICATIONS

- Seals reusable up to 10 times
- Use for cryogenics applications down to -271°C
- Use for high temperature applications
- Radiation tolerant
- Use for overpressure applications

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TYPE	ALUMINUM	OFS COPPER	OFS COPPER SILVER-PLATED	NICKEL
DN	P/N			
16	34.016001.663.101	34.016070.663.401	34.016073.663.901	34.016068.663.601
25	34.025001.663.102	34.025070.663.402	34.025073.663.902	34.025068.663.602
40	34.040001.663.104	34.040070.663.404	34.040073.663.904	34.040068.663.604
50	34.050001.663.105	34.050070.663.405	34.050073.663.905	-
63	34.063001.663.106	34.063070.663.406	34.063073.663.906	-

TYPE	ALUMINUM	OFS COPPER	OFS COPPER SILVER-PLATED	NICKEL
DN	P/N			
80	34.080001.563.108	34.080070.563.408	34.080073.563.908	34.080068.563.608
100	34.100001.563.108	34.100070.563.410	34.100073.563.910	34.100068.563.610
160	34.160001.563.116	34.160070.563.416	34.160073.563.916	34.160068.563.616
200	34.200001.563.120	34.200070.563.420	34.200073.563.920	34.200068.563.620
250	34.250001.563.125	34.250070.563.425	34.250073.563.925	34.250068.563.625
Vacuum	Rough- /High- /UHV	Rough- /High- /UHV	Rough- /High- /UHV	Rough- /High- /UHV
Temperature range	-271... 150°C	-271... 350°C	-271... 350°C	-271... 450°C
Cryogenics	Yes	Yes	Yes	Yes
Leak rate (mbar.l.s ⁻¹)	<1.10 ⁻¹¹	<1.10 ⁻¹¹	<1.10 ⁻¹¹	<1.10 ⁻¹¹
Pressure	Yes	Yes	Yes	Yes
Antimagnetic	Yes	Yes	Yes	Yes
Radiation resistant	Yes	Yes	Yes	Yes
Chemistry / Corrosion	Yes	Yes	Yes	Yes
Cleanroom suitable	Limited	Limited	Limited	Limited
Electrical isolation	-	-	-	-

Other material combinations are available on request.



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