

Flange Fittings



- Fast availability from responsive local supply centers
- Edwards worldwide support
- International ISO, Pneurop and British Standards
- Complete range for all common sizes in aluminium and stainless steel
- Stainless fittings made in 316L for highest corrosion resistance
- Precision material control ensures low outgassing and dependable vacuum performance

When you buy flange fittings from Edwards, you can expect the service that only a leading international supplier can offer you. Whether you are an OEM (needing scheduled deliveries of component kits for series production) or a unique system builder, you can rely on your local supplier to meet all your requirements.

90+ Years of Vacuum Experience

From our experience in vacuum technology we enjoy solving your vacuum problems. You can rely on our library of vacuum applications and let us advise you on the most cost effective solutions. Our trained engineers will resolve any problem you have in choosing the right product for your application or troubleshooting a product that's not doing what you expected.

Partnership with Edwards

Edwards offers complete vacuum solutions. With our wide range of pumping technologies and sophisticated distribution networks we can offer flexible supply partnerships to match your competitive needs and offer the best value for your budget.

The Edwards Advantage

One Source Shopping

- Simplifies administration and purchasing costs
- Creates more purchasing power
- Ensures total quality performance

Kitting

- All components supplied for system build in one kit
- Simplifies ordering
- Ensures no missing parts in production
- Easier administration
- Reduces inventory levels, stock costs and warehousing space
- Easier control of usage

Consignment Stocks

- Only pay for when used
- Stocks on your premises
- No delivery problems
- Stocks regularly replenished when used

Total Quality

- Accredited ISO9001 supplier
- Customer contracts performance measures

Vacuum Fittings in General

Edwards vacuum fittings are designed to be leak-tight in vacuum applications. However, they are not intended to provide full structural support. When designing vacuum systems, it is essential that consideration be given to the static and dynamic loads imposed on each connection. If necessary, additional mechanical support should be provided.

Regular inspection including leak-checking and, where appropriate, periodic replacement of components should be considered.

These accessories are primarily designed for vacuum applications however some will withstand a small over-pressure, which is indicated in the tables below where appropriate. For the purpose of the European Union's Pressure Equipment Directive (97/23/EC), these items are considered to be piping for Group 2 gases (i.e. gas mixtures which are not explosive, flammable, toxic or oxidising) and are manufactured according to sound engineering practice as defined within the Directive.

NW and ISO Flange Fittings

Choose the optimum material to match your application and budget. Aluminium is ideal for achieving dependable cost-effective performance down to 10^{-7} mbar. Edwards also offers 316L/DIN 1.4404 stainless steel fittings for rugged corrosion resistance in semiconductor processing and excellent repeatability in high vacuum applications. In addition, careful quality control of elastomer specifications ensures critical sealing materials deliver the low outgassing performance your vacuum system performance depends on. Edwards attention to detail on all specifications delivers fit-and-forget dependability for your vacuum equipment.

UHV ConFlat® Flange Fittings

Sealing Principle A copper seal is squeezed axially and radially between two CF flanges, where knife-edges force the copper to cold flow. This flow is severely limited by the vertical flange wall which generates high pressures and fills surface imperfections to give a leak tight joint. At high bakeout temperatures, the flange geometry maintains high internal pressures despite softening of the gasket. A radial groove extends right up to the sealing ring and provides for leak testing of the vacuum connection.

Materials Our range of CF flanges is manufactured from AISI 304 stainless steel, which offers optimum performance at an affordable cost. Stainless steel 304 is used for the majority of UHV applications where a bakeout temperature of up to 450 °C is needed. AISI 316LN stainless steel is recommended for special applications where a harder material, higher bakeout temperature and much lower magnetic permeability are needed: these fittings are available on special order terms.

Dimensions Edwards CF flanges are manufactured to international standards and are compatible with all leading manufacturers. Metric flanges common in Europe and Asia use metric tapped holes and bored holes in flanges suitable for metric tubing. Flanges specified in inches, more commonly used in the USA, use UNF tapped flange threads and bored holes compatible with inch sized tube. Edwards offers both options.

CF Flange Names There are many descriptions used to describe the same flange sizes. Use the table below to cross-reference between common names.

CF Flange Name Equivalents					Flange OD	
					mm	inch
DN16CF	NW16	CF34	NW16CF	1½ inch	34.00	1.33
DN25CF			NW25CF	2½ inch	53.60	2.11
DN40CF	NW35	CF70	NW35CF	2¾ inch	70.00	2.73
DN50CF			NW50CF	3¾ inch	85.70	3.37
DN63CF	NW63	CF114	NW63CF	4½ inch	114.00	4.47
DN80CF			NW75CF	4¾ inch	117.35	4.62
DN100CF	NW100	CF150	NW100CF	6 inch	152.00	5.97
DN125CF			NW130CF	6¾ inch	171.45	6.75
DN160CF	NW150	CF200	NW150CF	8 inch	202.00	7.97
DN200CF	NW200	CF250	NW200CF	10 inch	253.00	9.97
DN250CF	NW250	CF300	NW250CF	12 inch	306.00	13.25

NW Polymer Clamping Rings



In addition to the traditional aluminium hinged clamp, Edwards also offers a range of coupling clamps manufactured from high technology polymer, offering important advantages for the vacuum system builder.

Compared to aluminium, the high flexural modulus and better strength-to-weight ratio has enabled Edwards to design and manufacture clamps which are lighter and more compact than existing aluminium products. The CX4 crystalline aryl polymer clamps can be used at temperatures up to 100 °C and are unaffected by most common solvents.

These clamps are competitively priced and the high quality finish will enhance the appearance of any vacuum system. The range is available in swing and quick release hinged versions covering the following flange sizes: NW10/16, 20/25, 25/32, 32/40 and 50. With Edwards Co-Seals, swing clamps are suitable for use in the pressure range 10⁻⁷ mbar to 10 bar. Electrical continuity across the clamps is achieved by built-in earth strips.

Co-Seal

The introduction of our Co-Seal represented a major advance in the method of sealing NW and ISO flange connections. Discerning users appreciate the benefits of a seal design which eliminates crevices and trapped volumes. Our NW Co-Seals with polymer carriers offer a more economical seal with even wider appeal.

A Co-Seal has a split outer ring, or carrier, which retains a moulded elastomer sealing ring. When fitted, the inner face of the Co-Seal is directly exposed to the vacuum system, eliminating any crevices or trapped volumes which can generate gas bursts and inhibit pump-down. Unlike the regular centring-ring and O-ring, the NW Co-Seal is fully restrained externally and is therefore suitable from 10⁻⁷ mbar to 10 bar. Available with either nitrile or fluoroelastomer seals.

For ISO bolted flanges, cut-outs around the external circumference of the Co-Seal are positioned so that the securing bolts centralise the Co-Seal precisely. For ISO collar flanges, claw clamps also centralise the seal and are themselves spaced around the flange by the cut-outs in the Co-Seal.

Centring Rings in High Technology Polymer

We complement our aluminium centring-rings with a range manufactured from a high-tech polymer. These centring-rings have a unique slotted design which prevents gas bursts. The CX2 polymer can be used at temperatures up to 100 °C and is unaffected by most common solvents. The material has an outgassing rate of 6.6 × 10⁻⁸ mbar l s⁻¹cm⁻² which makes it suitable for use in most vacuum systems, whilst giving additional benefits in terms of lower weight and cost.

Technical Data

Physical Data

Operating pressure range (absolute)	
C clamp and centring-ring	10 ⁻⁷ mbar – 1 bar / 14.5 psi
Stainless steel clamping ring and Co-Seal	10 ⁻⁷ mbar – 10 bar / 145 psi
Stainless steel clamp and metal seal	10 ⁻⁸ mbar – 3 bar / 44 psi
Stainless steel clamp and Co-Seal (all sizes)	10 ⁻⁷ mbar – 10 bar / 145 psi
Polymer and aluminium clamps and Co-Seal	
NW10 to NW25	10 ⁻⁷ mbar – 10 bar / 145 psi
NW40 to NW50	10 ⁻⁷ mbar – 10 bar / 145 psi
NW trapped O-ring	10 ⁻⁷ mbar – 10 bar / 145 psi
O-ring and centring-ring (vacuum use only)	10 ⁻⁷ mbar – 1 bar / 14.5 psi
Bellows	10 ⁻⁷ mbar – 1 bar / 14.5 psi
Flexible pipelines*	10 ⁻⁷ mbar – 1.5 bar / 21 psi
Braided flexible pipelines*	10 ⁻⁷ mbar – 10 bar / 145 psi

* Depends on size

Operating Temperature

The maximum temperature for continuous operation with fluoroelastomer is 150 °C. It may be intermittently baked to 200 °C.

Polymer Co-Seal	-10 to 80 °C
Aluminium Co-Seal and nitrile seal	-10 to 100 °C
Aluminium Co-Seal and fluoroelastomer seal	-10 to 200 °C
Polymer centring-ring and nitrile O-ring	-10 to 100 °C
Polymer centring-ring and fluoroelastomer seal	-10 to 125 °C
Nitrile O-ring	-10 to 100 °C
Fluoroelastomer O-ring	-10 to 200 °C
Polymer clamp	
Constant vacuum use	-10 to 100 °C
Intermittent vacuum use	-10 to 125 °C
Stainless steel clamping ring	-10 to 125 °C
Aluminium clamping ring	-10 to 200 °C
Stainless steel clamp	-10 to 200 °C

Standards compliance

NW and ISO fittings	Pneurop 6606 (1981), ISO1609 (1986) DIN28403, DIN28404
CF fittings	ISO3669
Stainless steel equivalents	

AISI Number	German Steel Number	DIN Standard
304	1.4301	X5 CrNi 18 10
303	1.4305	X10 CrNi 5 18 9
304L	1.4306	X2 CrNi 19 10
301	1.4310	X12 CrNi 17 7
316	1.4401	X5 CrNiMo 18 10
316L	1.4404	X2 CrNiMo 17 13 2
316Ti	1.4571	X6 CrNiMoTi 17 12 2
321	1.4541	X10 CrNiTi 18 9

Chemical Resistance

This information is provided as a general guide only. Further guidance should be sought with respect to specific chemicals and their applications

Material	Generally Resistant To	Generally Attacked By
Nitrile		
Butadiene Acrylonitrile copolymer	Many hydrocarbons fats, oils greases, hydraulic fluids	Ozone, ketones, esters, aldehydes, chlorinated and nitro hydrocarbons
Neoprene		
Chloroprene polymer	Moderate chemicals and acids, ozone, oily fats, greases, many oils and solvents	Strong oxidizing acids and esters, ketones, chlori-nated aromatic and nitro hydrocarbons
Fluoroelastomer		
Fluorocarbon polymer	All aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable fats	Ketones, low molecular weight esters and nitro containing compounds
Aluminium		
	Organic acids, fatty acids, freons, nitric acid	Strong acids, alkalis chlorinated solvents, mercury
Stainless steel		
	Organic acids, alkalis, nitric acid. Sulphuric acid (10%)	Oxidizing chlorines, some organic acids, hydrochloric acid, hydrofluoric acid
Polymer		
Liquid crystal polymer	Organic acids, glycols, chlorinated solvents, ketones, mineral and oxidising acids, caustic solutions freons	Sodium hydroxide, sulphuric acid (70%)