DIABON® tubes for heat exchanger

SGL Carbon is a leading producer of graphite shell and tube heat exchanger which are sold under the brand name DIABON. With more than 4000 references and more than 70 years of design and manufacturing expertise DIABON heat exchanger are considered as quality benchmark for corrosive applications. The performance of heat exchanger is strongly determined by the graphite tubes.

↑ DIABON graphite tubes equipped with CARBOGUARD

Tube materials

We offer three different tube types depending on customer requirements and the application.
All tubes are based on an optimized recipe on grain size to achieve a perfect balance between mechanical strength and ductility. Highest efficiency, safety and reliability for our customers' processes are the result.

All tube material grades are suitable up to 200 °C material temperature and available in all standard tube dimensions.

- **DIABON NK1:**
  Phenolic resin impregnated graphite tube. Recommended for standard applications with normal requirements on heat exchanger efficiency and fouling/cleaning cycles.

- **DIABON NS1:**
  Phenolic resin impregnated graphite tube. Recommended for applications with high requirements on heat exchanger efficiency (compact design) and minimized fouling/cleaning cycles.

- **DIABON NS2:**
  Phenolic resin impregnated graphite tube with reduced resin content. Recommended for very high corrosion resistance and applications with demanding requirements on heat exchanger efficiency (compact design) and minimized fouling/cleaning cycles.

Tube enhancement options

- **CARBOGUARD®**
  CARBOGUARD – developed by SGL Carbon – is a carbon fiber reinforcement of graphite and silicon carbide parts. DIABON tubes equipped with CARBOGUARD increase the operational reliability and safety of your application. It extends the range of application under high-stress conditions like temperature/ or pressure shocks.

- **Resin free design**
  DIABON tubes can be manufactured without a resin layer inside the tube. This design is beneficial for very clean requirements or for falling film applications.

By the way: DIABON phenolic resin impregnated graphite is certified by FDA (Food and Drug Administration)

Material data of DIABON® tubes

Typical properties	Units	DIABON
Impregnation media		phenolic resin
Max. service temperature	°C	up to 200
Bulk density	g/cm³	> 1.85
Flexural strength	MPa	> 52
Compressive strength	MPa	> 85
Tensile strength	MPa	> 28
Thermal conductivity (longitudinal/radial)	$Wm^{-1}K^{-1}$	up to 130/70 (certified by TÜV)

Costumer benefits

	DIABON NK1	DIABON NS1	DIABON NS2
HX efficiency	Industry standard	Compactness up to + 40 % more efficient	Compactness up to + 40 % more efficient
Corrosion and temperature resitance	High performance	High performance	Superior performance up to + 30 % better

DIABON tube quality

All our DIABON tubes are produced by SGL Carbon. They have to pass three core quality tests before they leave our workshops. A stringent and consequent quality monitoring is applied acc. ISO 9001:

- Leakage test at > 20 bar air
- Leakage test after any special machining or processing cementing if applicable
- pressure test after equipment assembly, before shipment

Graphite Materials & Systems | SGL CARBON GmbH
Sales Europe/Middle East/Africa | pt-europe@sglcarbon.com
Sales Americas | pt-americas@sglcarbon.com
Sales Asia/Pacific | pt-asia@sglcarbon.com
www.sglcarbon.com

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The data contained herein represent the current state of our product knowledge and are intended to provide general information on our products and their application spectra. In view of the variety and large number of application possibilities, these data should be regarded merely as general information that gives no guarantee of any specific properties and/or suitability of those products for any particular application. Consequently, when ordering a product, please contact us for specific information on the properties required for the application concerned. On request, our technical service will supply a profile of characteristics for your specific application requirements without delay.

Exotic metal axial flow pump

For more than 30 years, SGL Carbon has been developing and manufacturing axial flow pumps able to deliver high flow rates required by chemical industries for fertilizers or chlor-alkali processes.

Based on a close cooperation with the phosphoric acid market players, SGL introduced a complete range of exotic metal pumps with an optimized design offering flexibility and durable performances.

Installed all over the world -typically on evaporation, crystallization or flash cooler lines- these heavy-duty motor-pump groups warrant an extended level of reliability at our valued customer's production plants.

Customer benefits

Extreme corrosion resistance
A wide range of fine metal grades carefully selected according to the process conditions and the considered wetted parts of the pump: the perfect chemical compatibility.

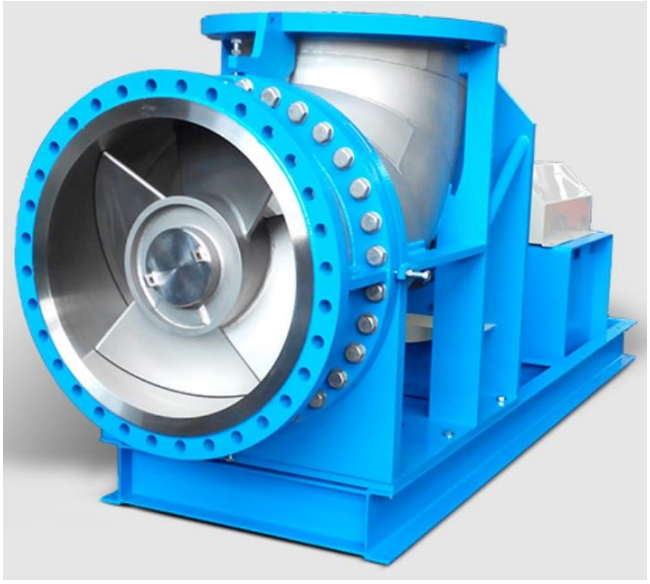
Production costs under control along the lifecycle
Robust construction and first-class raw materials cut the effects of corrosion and erosion ensuring extended operating lifetime and maintenance intervals.

High flexibility
Multiple design options to optimize the performances of both new plants as well as of installations with existing footprint.

Unique durability
Reinforced bearing housings and the reliable design of the elbow steel structure ensure a low sensitivity to the operating parameters, enabling a lasting efficiency.

Application examples

- Circulation of corrosive and/or abrasive fluids at high flow rates in loops of reduced head losses.
- Phosphoric, fluosilicic acid, caustic potash and soda, industrial effluents.



↑ 904L axial-flow pump C900

Product information

- Outstanding shaft rigidity preventing deflection at seal and vibrations: safe and reliable
- Rugged, dismantlable shaft protection sleeve made from a suitable corrosion-resistant exotic metal
- Sealing via gland packing or cartridge mechanical seals
- Operation stability thanks to the steep and continuous decline of performance curves
- Blades set customized to fit customer duty point
- Elbow wear sleeve adjustable and replaceable to permit better performances, easier inspection and maintenance
- Complete range of fabricated metals: nickel alloys, Hastelloy, Uranus, Sanicro, Super Duplex, titanium etc.
- Multiple motor-pump group arrangements: vertical, horizontal, ground-based, spring-mounted, suspended, gear-box, V-belts transmission or universal coupling

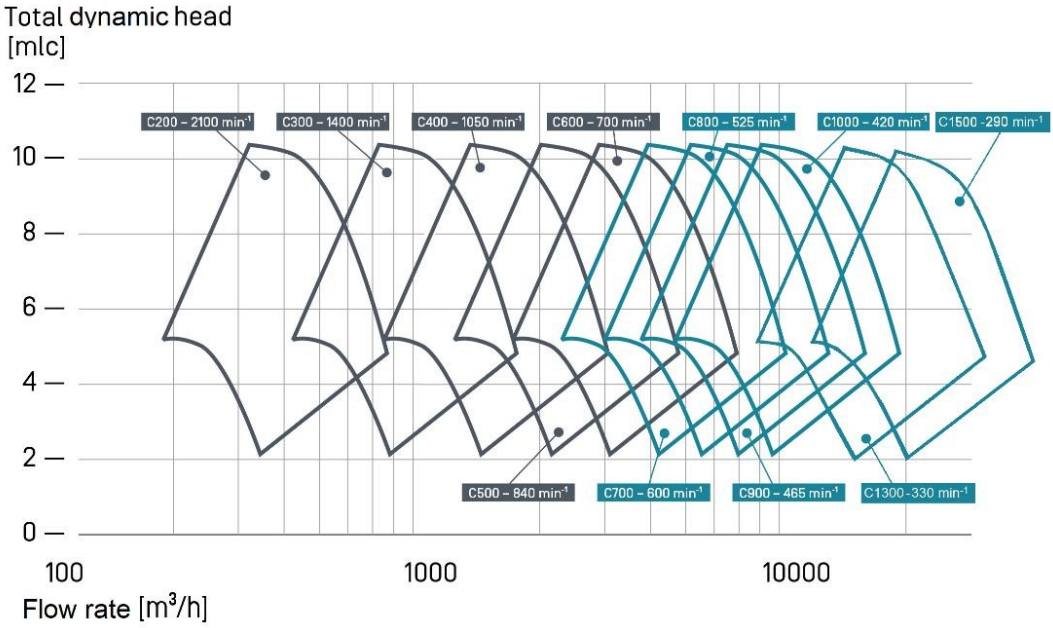
By the way: independently of the pump size, each exotic metal part is fabricated. This avoids chemical and mechanical problems faced by casted materials: impurities, heterogeneous structure, sensitivity to abrasion.

Data of exotic metal axial-flow pump

Technical specification	Units	Type C200 to C1500
Propeller diameters	mm	from 200 to 1500
Flow directions		Top suction -> Down or End suction -> Top
Installation		horizontal as standard, vertical design available
Flow rates	m³/h	from 120 to 30 000
Total Dynamic Heads	mlc	up to 10
Rotation speeds	rpm	from 200 to 2100
Operating temperatures	°C	from -40 to +250
Design pressures	barg	up to 10
Flanges standards		ISO PN metric, ANSI 150 lbs metric, ANSI 150 lbs UNC
Materials		nickel alloys, Super Duplex metals, stainless steels, reactive metals
Sealing technologies		gland packing, cartridge mechanical seals

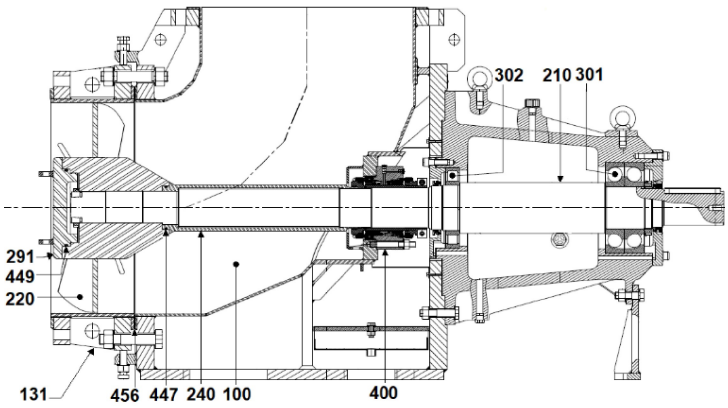
↑ Super Duplex propellers for C1300 V pump

Metallic axial-flow pumps performance chart



Typical exotic metal axial-flow pump bill of material

Item	Description	Material
100	elbow housing	exotic metal, steel (fabricated)
131	wearing sleeve	exotic metal, steel (fabricated)
210	shaft	steel
220	propeller 0°	exotic metal (fabricated)
240	shaft sleeve	exotic metal
291	propeller nose	exotic metal
301/302	bearings	steel
400	double mechanical seal cartridge	exotic metal, (per)fluoro-elastomers
447/449	O-rings	(per)fluoro-elastomers
456	gasket	(per)fluoro-elastomer



↑ Sanicro 28 C600 pump cross-sectional drawing

Process Technology | SGL CARBON GmbH
Sales Europe/Middle East/Africa | pt-europe@sglcarbon.com
Sales Americas | pt-americas@sglcarbon.com
Sales Asia/Pacific | pt-asia@sglcarbon.com
www.sglprocesstechnology.com

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This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should therefore not be construed as guaranteeing specific properties of the products described or their suitability for a particular application. Any existing industrial property rights must be observed. The quality of our products is guaranteed under our “General Conditions of Sale”.

sgl carbon

POLYFLURON® PTFE lined steel pipes and fittings ASME

Lined pipe classes

Based on over 60 years of experience with paste-extruded PTFE and more than 1000 reference customers, we supply a comprehensive range of POLYFLURON lined piping systems, mainly for the transport of corrosive media.

The following pages provide information on available products, dimensions and design options, as well as the materials used and permitted operating conditions.

This brochure deals exclusively with pipes and fittings up to a diameter of 24 inch (DN600). Larger dimensions up to 120 inch (DN3000) for columns and vessels are covered by a separate brochure, which is available on request.

We offer our lined piping products in two different liner thickness classes.

- **Standard**
  Corrosion resistant and permeation reducing lining for aggressive media processed at moderate pressures and temperatures. This product series meets the standards of the chemical industry for paste extruded PTFE linings.

- **Heavy duty**
  Suitable for long term operation with highly permeable media processed at high pressures and temperatures.

From our many years experience, we recommend the use of standardized pipe lengths. These reduce inventory costs and allow greater flexibility in assembly.

Our product range includes pipes of the following dimensions:

Nominal diameters:	from 1 to 24 inch larger diameters available upon request
Lengths:	up to 20 feet, depending on the nominal diameter (20 ft.)

Technical specifications

POLYFLURON PTFE is a virginal paste extruded PTFE exhibiting exceptional thermal, chemical, mechanical and electrical properties.

Exceptional properties

- Nearly universal chemical resistance and insolubility
- High operating temperatures up to 500 °F
- Flexibility to – 110 °F
- High flexural fatigue resistance, nearly no material fatigue
- No aging by heat or UV radiation
- Exceptional electric insulator
- Very high purity (free of migrating additives or monomers), non-toxic
- Anti-adhesive surface, low coefficient of friction/wear, self-cleaning
- Excellent dimensional stability – no water absorption, no swelling
- Non-flammable

Field of use

Pressure load:	1 to 6 inch – up to 485 psi (PN40); 8 to 24 inch – up to 363 psi (PN25)
Vacuum:	Full vacuum (– 1 barg) for all dimensions up to 4 inch and 300 °F. Vacuum-resistant versions for larger dimensions and higher temperatures on request.
Lining:	Virginal paste-extruded PTFE meeting DIN 2874.
Temperatures:	14 °F up to 450 °F; lower service temperatures can be accommodated with the use of special steel materials.

Options

- Antistatic (electrically conductive) liner
- Stainless steel and low temperature steel
- Venting nozzles
- Grounding bolts and connections
- Custom shapes
- Special paint coatings

Stainless steel materials are available on request.

Pipes/Fittings

Material code
A 106 Gr. B
API 5L Gr. B
A 234 WPB
DIN EN 10213-2

Subject to technical changes.

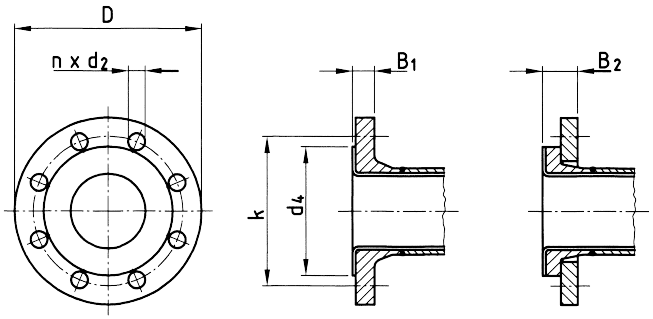
Flanges

Material code
A 105 (C21)
A 570 Gr. 36
A 515 Gr. 55

Subject to technical changes.

The standards given below are ASME standards. If you require pipes and fittings according to DIN standards, please refer to our respective EN/DIN brochure.

Pipe dimensions
The following table gives the standard wall thicknesses of steel pipes meeting ANSI B36.10.



Pipe dimensions

DN	Steel pipe	DN	Steel pipe
[in]	Outside ø x wall thickness [in]	[in]	Outside ø x wall thickness [in]
1	1.32 x 0.13	8	8.63 x 0.32
1 ¼	1.66 x 0.14	10	10.75 x 0.37
1 ½	1.90 x 0.15	12	12.75 x 0.37
2	2.37 x 0.15	14	14 x 0.37
2 ½	2.87 x 0.22	16	16 x 0.37
3	3.5 x 0.22	18	18 x 0.37
4	4.5 x 0.24	20	20 x 0.37
5	5.56 x 0.26	24	24 x 0.37
6	6.63 x 0.28		

Subject to technical changes.

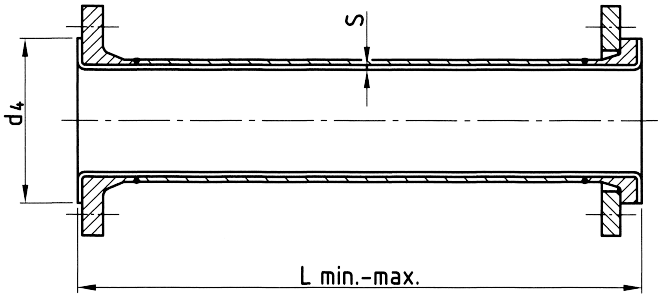
Flange dimensions

DN	Flange ø	Seal. surface	Bolt circle ø		Bolt holes	Flange thickness incl. collar	
[in]	D [in]	d4 [in]	k [in]	n x [Number]	d2 [in]	B1 [in]	B2 [in]
1	4.2	2.0	3.1	4	⅝	0.67	1.14
1 ¼	4.6	2.5	3.5	4	⅝	0.75	1.22
1 ½	5.0	2.9	3.9	4	⅝	0.83	1.30
2	6.0	3.6	4.7	4	¾	0.87	1.42
2 ½	7.0	4.1	5.5	4	¾	1.02	1.57
3	7.5	5.0	6.0	4	¾	1.06	1.69
4	9.0	6.2	7.5	8	¾	1.10	1.73
5	10.0	7.3	8.5	8	⅞	1.10	1.81
6	11.0	8.5	9.5	8	⅞	1.18	1.89
8	13.5	10.6	11.7	8	⅞	1.34	2.13
10	16.0	12.8	14.2	12	1	1.38	2.24
12	19.0	15.0	17.0	12	1	1.46	2.32
14	21.0	16.3	18.7	12	1 ⅛	1.57	2.44
16	23.5	18.5	21.2	16	1 ⅛	1.65	2.60
18	25.0	21.0	22.7	16	1 ¼	1.77	2.72
20	27.5	23.0	25.0	20	1 ¼	1.89	2.91
24	32.0	27.2	29.5	20	1 ⅜	2.09	3.11

Subject to technical changes.

POLYFLURON® PTFE lined pipes

The standardized diameters and lengths of POLYFLURON PTFE lined steel pipes are given in ASME B 16.5 standard.
We can supply all items listed in this standard. For larger diameters up to 120 inch (DN 3000), please refer to our separate brochure entitled “Columns and Vessels”.



Lined pipes

DN	L min	L max	Lining wall thickness		PTFE	Weight fix/loose	
			Standard	Heavy Duty	Flange ø d4	Lined pipe	Flange
[in]	[in]	[in]	[in]	[in]	[in]	[lb/ft]	[lb]
1	4.0	236	0.12		2.0	2.01	4.63
	4.0	236		0.16	2.0		
1 ¼	4.0	236	0.12		2.5	2.69	6.17
	4.0	236		0.16	2.5		
1 ½	4.0	236	0.12		2.9	3.29	7.28
	4.0	236		0.16	2.9		
2	4.0	236	0.12		3.6	4.36	11.68
	4.0	236		0.16	3.6		
2 ½	4.0	236	0.14		4.1	6.71	17.20
	4.0	236		0.16	4.1		
3	4.5	236	0.14		5.0	8.73	20.50
	4.5	236		0.16	5.0		
4	4.5	236	0.18		6.2	12.75	30.86
	4.5	236		0.20	6.2		
5	4.5	236	0.18		7.3	16.78	37.48
	5.0	236		0.20	7.3		
6	5.0	236	0.20		8.5	22.15	46.30
	5.0	236		0.24	8.5		
8	5.5	236	0.20		10.6	32.89	74.96
	5.5	236		0.31	10.6		
10	5.5	236	0.20		12.8	45.65	103.62
	5.5	236		0.31	12.8		
12	6.0	157	0.22		15.0	57.73	156.53
	6.0	157		0.31	15.0		
14	6.0	138	0.22		16.3	63.10	202.83
	6.0	98		0.31	16.3		
16	8.0	98	0.22		18.5	73.17	249.12
	8.0	98		0.31	18.5		
18	8.0	79	0.22		21.0	81.23	282.19
	8.0	79		0.31	21.0		
20	10.0	79	0.24		23.0	91.30	350.53
	10.0	79		0.31	23.0		
24	10.0	71	0.24		27.2	110.76	480.61
	10.0	63		0.31	27.2		

Subject to technical changes.

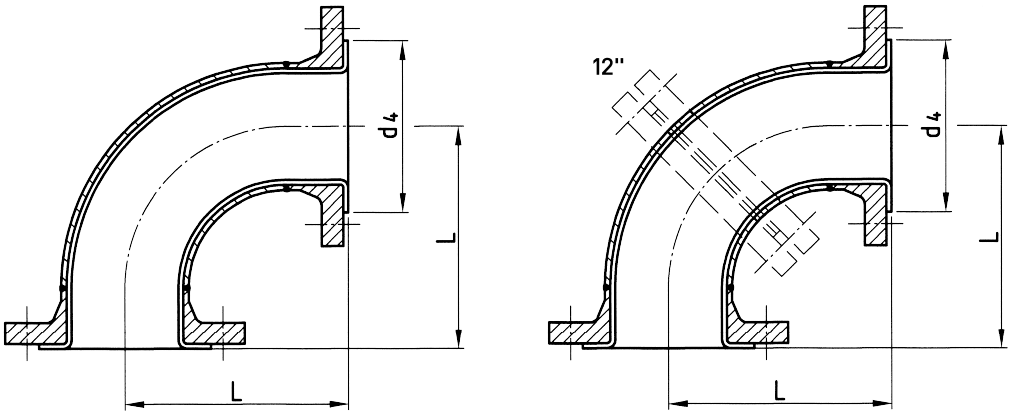
POLYFLURON® PTFE lined elbows

Elbows are manufactured with angles of 90°, 60°, 45° or 30°. Other angles are available on request. Please ask us for more information. 90° elbows are supplied with one fixed and one loose flange as standard. All 45° elbows come with fixed flanges. Alternatives are available on request. Products up to 10 inch diam. are manufactured in one part. Items of 12 inch diam. or above come in two parts.

Lined elbows

DN		L	PTFE	PTFE		Weight
[in]	90° elbow [in]	45° elbow [in]	S [in]	d4 [in]	90° elbow [approx. lb]	45° elbow [approx. lb]
1	3.5	2.0*	0.12	2.0	5.5	5.3
1 ¼	3.75	2.0	0.12	2.5	7.3	6.6
1 ½	4.0	2.2	0.12	2.9	9.2	7.9
2	4.5	2.5	0.12	3.6	14.1	11.9
2 ½	5.0	3.0	0.14	4.1	19.4	17.4
3	5.5	3.0	0.14	5.0	26.4	22.0
4	6.5	4.0	0.18	6.2	37.4	33.0
5	7.5	4.5	0.18	7.3	48.4	41.8
6	8.0	5.0	0.20	8.5	68.2	48.4
8	9.0	5.5	0.20	10.6	96.8	77.0
10	11.0	6.5	0.20	12.8	143.0	134.2
12	19.0	7.5	0.22	15.0	385.0	198.0
14	21.5	7.5	0.22	16.3	525.8	217.8
16	24.0	8.0	0.22	18.5	605.0	255.2
20	29.0	9.5	0.24	23.0	985.6	367.4
24	34.0	11.0	0.24	27.2	1375.0	514.8

* not included in ANSI B 16.5. Subject to technical changes.



POLYFLURON® PTFE and PFA lined tees and lined reducing tees

T-pieces up to 4 inch diam. are available with either of two different linings. The POLYFLURON PTFE lined variant is supplied with a high performance flange connection of well-proven design (see drawing A).

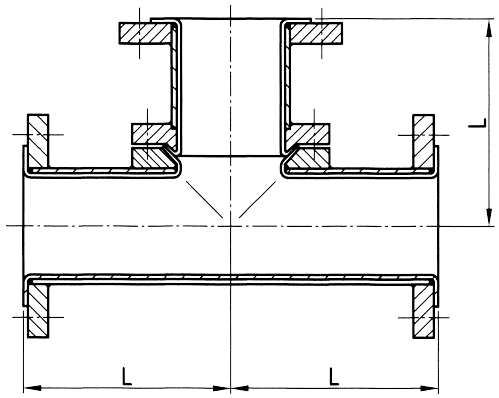
As an alternative, PFA-lined tees are available as shown on drawing B. PFA is a tetrafluorethylene-based copolymer with chemical and thermal properties comparable to those of PTFE. Fixed flanges are supplied as standard. Loose flanges are, however, also available on request.

Lined tees

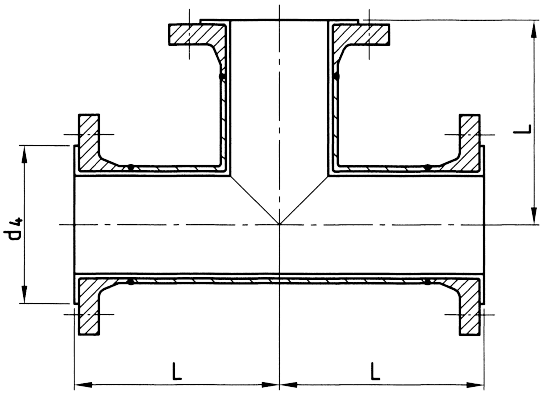
DN	L	Weight	
[in]	[in]	PTFE [approx. lb]	PFA [approx. lb]
1	3.5	16.5	11.0
1 ¼	3.75	16.5	14.3
1 ½	0.5	24.2	18.7
2	4.5	37.4	28.6
2 ½	5.0	39.6	38.5
3	5.5	57.2	61.6
4	6.5	88.0	103.4
5	7.5	99.0	
6	8.0	138.6	
8	9.0	235.4	
10	11.0	336.6	
12	12.0	473.0	
14	14.0	646.8	
16	15.0	792.0	
18	16.5	1001.0	
20	18.0	1254.0	

Subject to technical changes.

Steel pipe dimensions, lining wall thicknesses and flange diameters correspond to the standard dimensions.



↑ PTFE lined T-pieces (Drawing A)



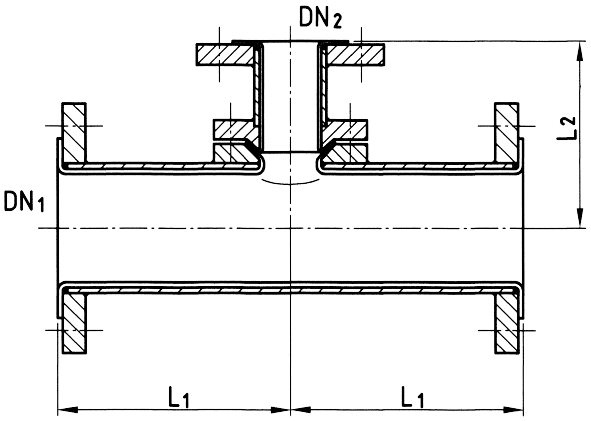
↑ PFA lined T-pieces (Drawing B)

Lined reducing tees

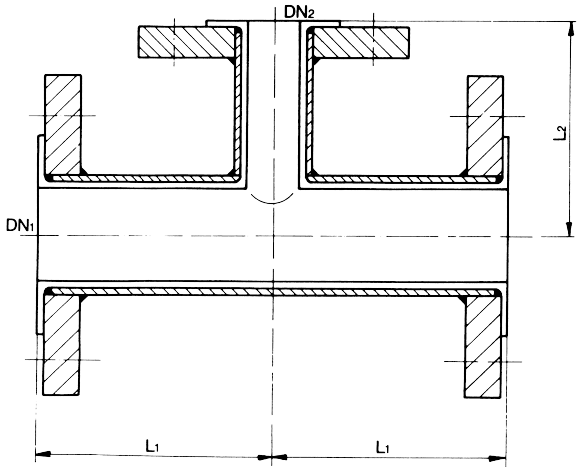
DN 1	DN 2	L 1	L 2	Weight	
[in]	[in]	[in]	[in]	PTFE lining [approx. lb]	PFA lining [approx. lb]
1 ¼	1	3.75	3.75	11.7	9.2
	1	4.0	4.0	1388.2	11.4
2	1 ½	4.5	4.5	21.3	19.1
	1	4.5	4.5	17.4	18.5
2½	2	5.0	5.0	33.0	23.1
	1 ½	5.0	5.0	30.8	20.9
3	2	5.5	5.5	39.6	41.8
	1 ½	5.5	5.5	35.2	39.6
	1	5.5	5.5	30.8	37.4
4	3	6.5	6.5	59.4	74.8
	2	6.5	6.5	50.6	68.2
	1	6.5	6.5	44.0	63.8
5	4	7.5	7.5	79.2	
	3	7.5	7.5	70.4	
6	4	8.0	8.0	94.6	
	3	8.0	8.0	85.8	
8	6	9.0	9.0	149.6	
	4	9.0	9.0	134.2	
10	8	11.0	11.0	231.0	
	6	11.0	11.0	206.8	
12	10	12.0	12.0	332.2	
	8	12.0	12.0	301.4	
	6	12.0	12.0	275.0	
14	12	14.0	14.0	442.2	
	10	14.0	14.0	404.8	
	8	14.0	14.0	376.2	
16	14	15.0	15.0	587.4	
	12	15.0	15.0	536.8	
	10	15.0	15.0	501.6	
18	16	16.5	16.5	682.0	
	14	16.5	16.5	631.4	
	12	16.5	16.5	578.6	
20	16	18.0	18.0	818.4	
	14	18.0	18.0	763.4	
	12	18.0	18.0	710.6	

Subject to technical changes.

All reducing tees are available with fixed flanges as standard. Loose flanges can also be supplied on request. PFA lined variants are also available up to 4 inch diam. Intermediate sizes and special dimensions are supplied on request. Dimensions meet ANSI B 16.5.



↑ PTFE lined reducing T-piece



↑ PFA lined reducing T-piece

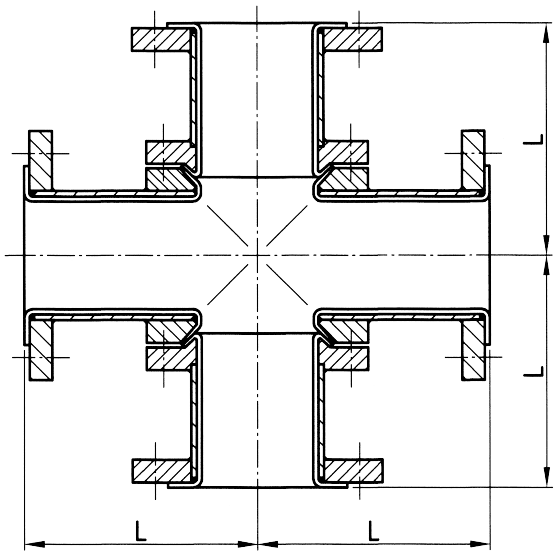
POLYFLURON® PTFE and PFA lined crosses and lined reducing crosses

All crosses are available with fixed flanges as standard. Loose flanges can also be supplied on request. PFA lined variants are also available up to 4 inch diam. Dimensions meet ANSI B 16.5.

Lined crosses

DN	L	Weight	
		PTFE	PFA
[in]	[in]	[approx. lb]	[approx. lb]
1	3.5	19.8	11.0
1 ¼	3.75	19.8	14.3
1 ½	4.0	26.4	18.7
2	4.5	39.6	28.6
2 ½	5.0	57.2	38.5
3	5.5	68.2	61.6
4	6.5	99.0	103.4
5	7.5	151.8	
6	8.0	156.2	
8	9.0	253.0	
10	11.0	376.2	
12	12.0	517.0	
14	14.0	708.4	
16	15.0	919.6	
18	16.5	1012.0	
20	18.0	1243.0	

Subject to technical changes.



↑ PTFE lined cross

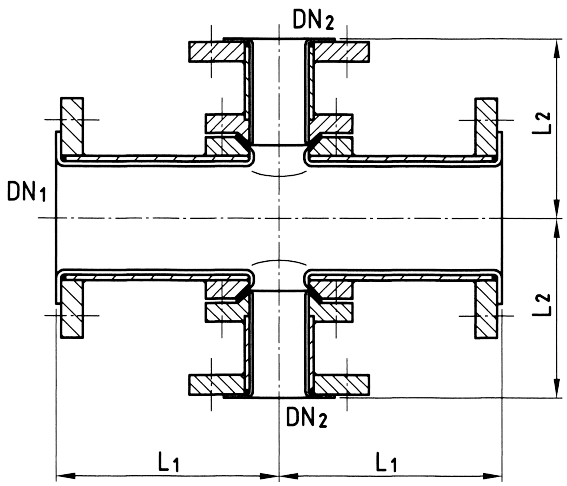
Steel pipe dimensions, lining wall thicknesses and flange diameters correspond to the standard dimensions.

Lined reducing crosses

DN 1	DN 2	L 1	L 2	Weight	
[in]	[in]	[in]	[in]	PTFE [approx. lb]	PFA [approx. lb]
1 ¼	1	3.75	3.75	18.7	9.9
1 ½	1	4.0	4.0	20.5	11.4
2	1 ½	4.5	4.5	30.8	19.1
	1	4.5	4.5	24.2	18.5
2 ½	2	5.0	5.0	39.6	26.4
	1 ½	5.0	5.0	35.2	24.2
3	2	5.5	5.5	48.4	41.8
	1 ½	5.5	5.5	41.8	39.6
	1	5.5	5.5	35.2	37.4
4	3	6.5	6.5	68.2	74.8
	2	6.5	6.5	57.2	68.2
	1	6.5	6.5	48.4	63.8
5	4	7.5	7.5	92.4	
	3	7.5	7.5	72.6	
6	4	8.0	8.0	107.8	
	3	8.0	8.0	94.6	
8	6	9.0	9.0	167.2	
	4	9.0	9.0	136.4	
10	8	11.0	11.0	363.0	
	6	11.0	11.0	237.6	
12	10	12.0	12.0	411.4	
	8	12.0	12.0	363.0	
	6	12.0	12.0	312.4	
14	12	14.0	14.0	569.8	
	10	14.0	14.0	508.2	
	8	14.0	14.0	466.4	
16	14	15.0	15.0	710.6	
	12	15.0	15.0	633.6	
	10	15.0	15.0	574.2	
18	16	16.5	16.5	913.0	
	14	16.5	16.5	838.2	
	12	16.5	16.5	763.4	
20	16	18.0	18.0	1009.8	
	14	18.0	18.0	917.4	
	12	18.0	18.0	781.0	

Subject to technical changes.

All crosses are available with fixed flanges as standard. Loose flanges can also be supplied on request.
Dimensions meet ANSI B 16.5.



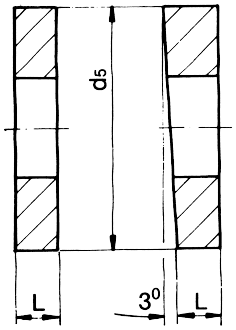
↑ PTFE lined reducing cross

Steel pipe dimensions, lining wall thicknesses and flange diameters correspond to the standard dimensions.

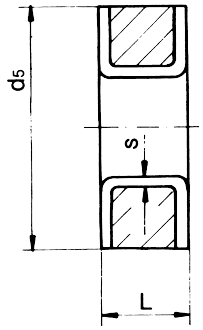
POLYFLURON®
PTFE and PTFE lined spacers

Spacers are used to compensate for deviations in the assembly of pipe systems. Depending on their size, they can be manufactured either from massive PTFE or PTFE lined steel. The different designs are named Type F, G and H.

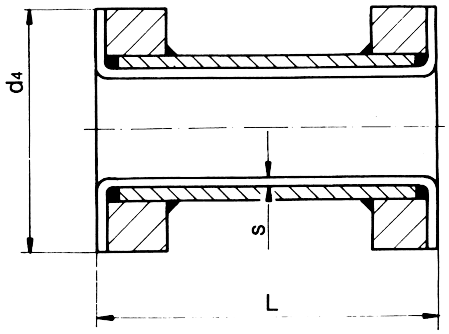
Their specific designs are shown in the illustrations below. Please refer to the table below and on the opposite page for dimensional details of the three spacer types. Nominal diameters of 1¼ inch, 2½ inch and 5 inch are also available.



↑ Type F1 (massive PTFE) Type F2



↑ Type G



↑ Type H

Lined spacers

DN1	Length of			PTFE			Weight
[in]	Type F1/2* [in]	Type G [in]	Type H [in]	s [in]	d4 [in]	d5 [in]	[approx. lb]
1	0.5					2.5	0.2
		1.0		0.12		2.5	1.1
		2.0		0.12		2.5	2.6
			3.0	0.12	2.0		1.5
1 ½	0.5					3.2	0.2
		1.0		0.12		3.2	2.2
		2.0		0.12		3.2	4.0
			3.0	0.12	2.9		2.4
2	0.5					4.0	0.2
		1.0		0.12		4.0	3.1
		2.0		0.12		4.0	5.1
			3.0	0.12	0.4		3.5
3	0.5					5.2	0.4
		1.0		0.14		5.2	4.6
		2.0		0.14		5.2	7.9
			3.0	0.14	5.0		6.2
			4.0	0.14	5.0		6.6
4	0.5					6.8	0.4
		1.0		0.18		6.8	5.5
		2.0		0.18		6.8	11.0
			3.0	0.18	6.2		7.7
			4.0	0.18	6.2		8.4

* please state F1 or F2.

Subject to technical changes.

Lined spacers

DN1	Length of					PTFE	Weight
[in]	Type F1/2* [in]	Type G [in]	Type H [in]	s [in]	d4 [in]	d5 [in]	[approx. lb]
6	0.5					8.6	0.9
		1.0		0.20		8.6	8.6
		2.0		0.20		8.6	15.8
			3.0	0.20	8.5		13.2
			4.0	0.20	8.5		14.3
8	0.5			0.00		10.9	1.3
		1.0		0.20		10.9	11.7
		2.0		0.20		10.9	24.2
			3.0	0.20	10.6		33.0
			4.0	0.20	10.6		21.6
10		1.0		0.20		13.3	15.4
		2.0		0.20		13.3	28.6
		3.0		0.20		13.3	39.6
			4.0	0.20	12.8		28.6
12		1.0		0.22		16.0	18.0
		2.0		0.22		16.0	33.0
		3.0		0.22		16.0	46.2
			4.0	0.22	15.0		35.2
14		1.0		0.22		17.6	30.8
		2.0		0.22		17.6	61.6
		3.0		0.22		17.6	92.4
			4.0	0.22	16.3		48.4
16		1.0		0.22		20.1	39.6
		2.0		0.22		20.1	79.2
		3.0		0.22		20.1	118.8
			4.0	0.22	18.5		59.4
18		1.0		0.22		21.5	41.8
		2.0		0.22		21.5	85.8
		3.0		0.22		21.5	129.8
			4.0	0.22	21.0		74.8
20		1.0		0.24		23.7	46.2
		2.0		0.24		23.7	92.4
		3.0		0.24		23.7	140.8
			4.0	0.24	23.0		83.6
24		1.0		0.24		28.1	46.2
		2.0		0.24		28.1	88.0
		3.0		0.24		28.1	143.0

* please state F1 or F2.

Subject to technical changes.

POLYFLURON®
PTFE and PFA lined instrument tees

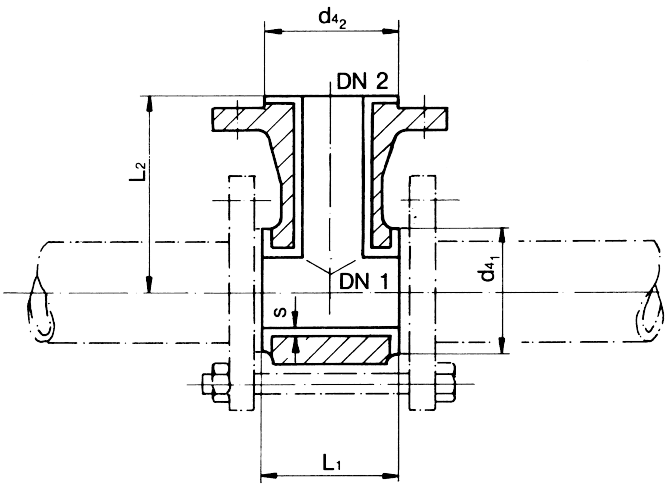
Instrument tees are used to connect manometers or thermometers, and also for sampling.

Instrument tees up to 10 inch diam. are supplied with a PFA lining. PFA is a tetrafluorethylene-based copolymer with chemical and thermal properties comparable to those of PTFE.

PFA lined instrument tees

DN 1	DN 2	L 1	L 2	Weight
[in]	[in]	[mm]	[mm]	[approx. lb]
1	1	50	89	4.2
1 ¼	1	50	95	6.2
1 ½	1 ½	75	102	9.7
	1	50	102	0.9
2	2	90	114	17.8
	1 ½	75	114	13.6
	1	50	114	7.0
2 ½	2	90	127	24.2
	1 ½	75	127	19.8
	1	50	127	11.0
3	2	90	140	30.8
	1 ½	75	140	18.3
	1	50	140	9.5
4	2	90	165	38.5
	1 ½	75	165	22.0
	1	50	165	12.1
5	2	90	190	48.4
	1 ½	75	190	30.8
	1	50	190	19.8
6	2	90	203	52.8
	1 ½	75	203	33.0
	1	50	203	16.9
8	2	90	229	57.2
	1 ½	75	229	39.6
	1	50	229	24.2
10	2	90	279	61.6
	1 ½	75	279	52.8
	1	50	279	33.0

Subject to technical changes.



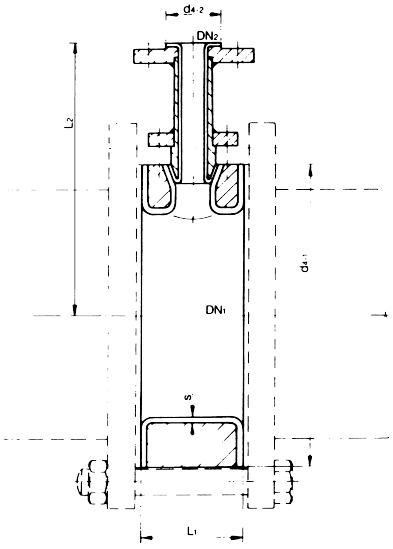
↑ 10 inch diameter

Products of 12 inch diam. or above are available in POLYFLURON PTFE lined steel (see table and drawings below).
Dimensions meet ASME B 16.5.

PTFE lined instrument tees

DN 1	DN 2	L 1	L 2	Weight
[in]	[in]	[mm]	[mm]	[approx. lb]
12	2	120	330	66.0
	1 ½	105	330	63.8
	1	90	330	59.4
14	2	120	360	96.8
	1 ½	105	360	94.6
	1	90	360	92.4
16	2	120	390	112.2
	1 ½	105	390	107.8
	1	90	390	105.6
18	2	120	430	127.6
	1 ½	105	430	125.4
	1	90	430	123.2
20	2	120	450	145.2
	1 ½	105	450	143.0
	1	90	450	140.8

Subject to technical changes.



↑ 12 inch diameter

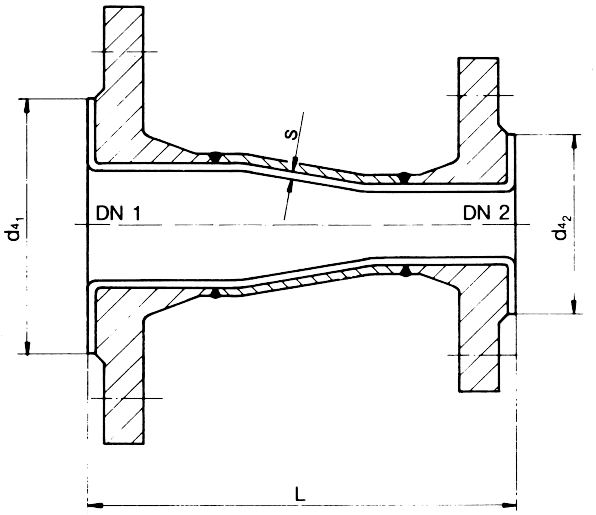
POLYFLURON® PTFE lined reducers and lined reducing flanges

Reducers are used to reduce/enlarge the pipe diameters in order to improve liquid flow. Eccentric reducers often allow better emptying of pipe systems. Dimensions meet ANSI B 16.5.

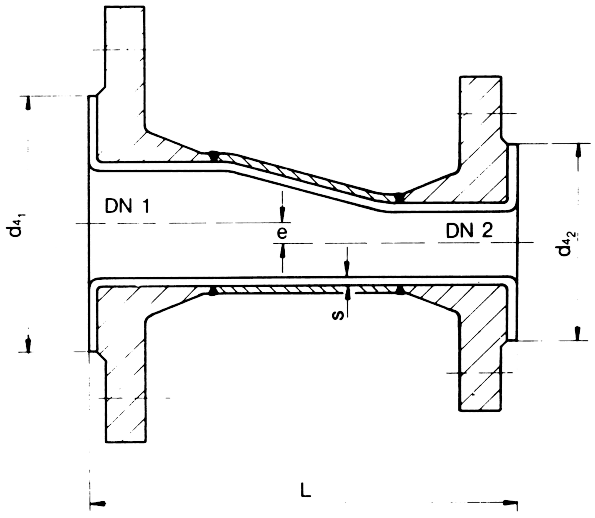
Lined reducers

DN 1	DN 2	L	Lining	Weight
[in]	[in]	[in]	s [in]	[approx. lb]
1	¾	4.5	0.12	5.3
1 ½	1	4.5	0.12	7.5
2	1	5.0	0.12*	9.9
	1 ½	5.0	0.12	11.4
3	1	6.0	0.14*	14.7
	1 ½	6.0	0.14*	16.5
	2	6.0	0.14	15.2
	2 ½	6.0	0.16	16.5
4	2	7.0	0.18*	21.8
	2 ½	7.0	0.18	23.3
	3	7.0	0.18	28.6
6	3	9.0	0.20*	44.0
	4	9.0	0.20	48.4
8	4	11.0	0.20*	68.2
	6	11.0	0.20	77.0
10	6	12.0	0.20	99.0
	8	12.0	0.20	114.4
12	6	14.0	0.22**	136.4
	8	14.0	0.22	151.8
	10	14.0	0.22	167.2
14	8	16.0	0.22**	154.0
	10	16.0	0.22**	200.2
	12	16.0	0.22	231.0
16	10	18.0	0.22**	215.6
	12	18.0	0.22**	253.0
	14	18.0	0.22	275.0
18	12	19.0	0.22**	297.0
	14	19.0	0.22**	327.8
	16	19.0	0.22	352.0
20	14	20.0	0.22**	369.6
	16	20.0	0.22**	396.0
	18	20.0	0.22	418.0

* isostatic PTFE or PFA lining.
** two-part paste-extruded PTFE lining.
Subject to technical changes.



↑ Type K



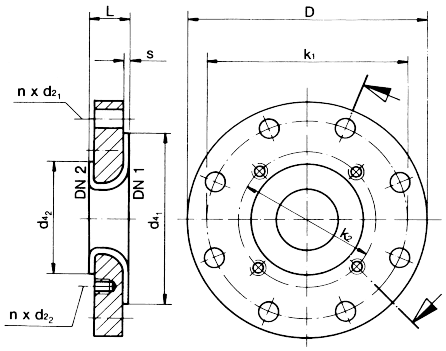
↑ Type E

Single-part paste-extruded PTFE lining

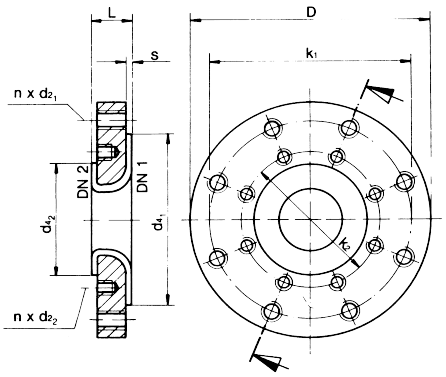
Reducing flanges are provided with holes as shown below (smaller diameter flanges are always threaded):

Type A: With clearance holes for larger nominal diameters
Type B: With threaded holes for both nominal diameters

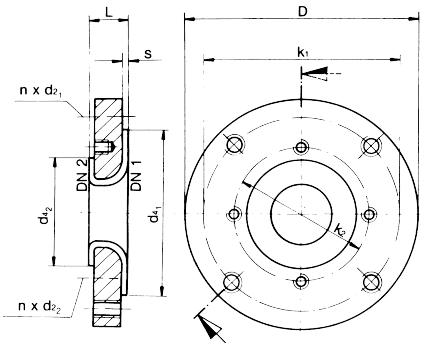
Type C: With threaded holes, holes on small diameter side are not straddled
Connections to diameters of 1¼ inch, 2½ inch and 5 inch, as well as larger dimensions and diameter combinations not stated here, can also be supplied on request.



↑ Type A



↑ Type B



↑ Type C

Lined reducing flanges

DN1	DN 2	L			PTFE						Metal	Weight	Type
[in]	[in]	[mm]	s [in]	d4 – 1 [in]	d4 – 2 [in]	D [in]	k1 [in]	n x d2 – 1 [in]	k2 [in]	n x d2 – 2 [in]	[approx. lb]	
1	¾	25	0.12	2.0	1.7	4.3	3.1	4 x ½ UNC	2.7	4 x ½ UNC	3.3	C
1 ½	1	25	0.12	2.9	2.0	5.0	3.9	4 x ½ UNC	3.1	4 x ½ UNC	4.2	C
2	1	25	0.12	3.6	2.0	6.0	4.7	4 x ⅝ UNC	3.1	4 x ½ UNC	6.4	B
2	1 ½	25	0.12	3.6	2.9	6.0	4.7	4 x ⅝ UNC	3.9	4 x ½ UNC	5.9	C
3	1	30	0.16	5.0	2.0	7.5	6.0	4 x Ø ¾	4.7	4 x ⅝ UNC	12.1	A
3	1 ½	30	0.16	5.0	2.9	7.5	6.0	4 x ⅝ UNC	3.9	4 x ½ UNC	11.7	B
3	2	30	0.16	5.0	3.6	7.5	6.0	4 x ⅝ UNC	4.7	4 x ⅝ UNC	11.4	C
4	1	30	0.12	6.2	2.0	9.0	7.5	8 x Ø ¾	3.1	4 x ½ UNC	17.6	A
4	1 ½	30	0.16	6.2	2.9	9.0	7.5	8 x Ø ¾	3.9	4 x ½ UNC	17.2	A
4	2	30	0.16	6.2	3.6	9.0	7.5	8 x Ø ¾	4.7	4 x ⅝ UNC	16.7	A
4	3	30	0.20	6.2	5.0	9.0	7.5	8 x ⅝ UNC	6.0	4 x ⅝ UNC	14.5	B
6	1	35	0.12	8.5	2.0	11.0	9.5	8 x Ø ⅞	3.1	4 x ½ UNC	26.4	A
6	1 ½	35	0.16	8.5	2.9	11.0	9.5	8 x Ø ⅞	3.9	4 x ½ UNC	28.6	A
6	2	35	0.16	8.5	3.6	11.0	9.5	8 x Ø ⅞	4.7	4 x ⅝ UNC	28.6	A
6	3	35	0.20	8.5	5.0	11.0	9.5	8 x Ø ⅞	6.0	4 x ⅝ UNC	26.4	A
6	4	35	0.20	8.5	6.2	11.0	9.5	8 x ¾ UNC	7.5	8 x ⅝ UNC	24.2	B
8	2	35	0.16	10.6	3.6	13.5	11.7	8 x Ø ⅞	4.7	4 x ⅝ UNC	41.8	A
8	3	35	0.20	10.6	5.0	13.5	11.7	8 x Ø ⅞	6.0	4 x ⅝ UNC	39.6	A
8	4	35	0.20	10.6	6.2	13.5	11.7	8 x Ø ⅞	7.5	8 x ⅝ UNC	37.4	A
8	6	35	0.20	10.6	8.5	13.5	11.7	8 x ¾ UNC	9.5	8 x ¾ UNC	33.0	B
10	2	35	0.20	12.8	3.6	16.0	14.2	12 x Ø 1	4.8	4 x ⅝ UNC	59.4	A

Subject to technical changes.

Lined reducing flanges

DN1	DN 2	L			PTFE					Metal	Weight	Type
[in]	[in]	[mm]	s [in]	d4 – 1 [in]	d4 – 2 [in]	D [in]	k1 [in]	n x d2 – 1 [in]	k2 [in]	n x d2 – 2 [in]	[approx. (b]	
10	3	1.4	0.20	12.8	5.0	16.0	14.2	12 x Ø 1	6.0	4 x ⅝ UNC	57.2	A
10	4	1.4	0.20	12.8	6.2	16.0	14.2	12 x Ø 1	7.5	8 x ⅝ UNC	55.0	A
10	6	1.4	0.20	12.8	8.5	16.0	14.2	12 x Ø 1	9.5	8 x ¾ UNC	50.6	A
10	8	1.4	0.20	12.8	10.6	16.0	14.2	12 x ⅞ UNC	11.7	8 x ¾ UNC	44.0	B
12	2	1.6	0.20	15.0	3.6	19.0	17.0	12 x Ø 1	4.7	4 x ⅝ UNC	101.2	A
12	3	1.6	0.20	15.0	5.0	19.0	17.0	12 x Ø 1	6.0	4 x ⅝ UNC	99.0	A
12	4	1.6	0.20	15.0	6.2	19.0	17.0	12 x Ø 1	7.5	8 x ⅝ UNC	96.8	A
12	6	1.6	0.20	15.0	8.5	19.0	17.0	12 x Ø 1	9.5	8 x ¾ UNC	90.2	A
12	8	1.6	0.20	15.0	10.6	19.0	17.0	12 x Ø 1	11.7	8 x ¾ UNC	83.6	A
12	10	1.6	0.20	15.0	12.8	19.0	17.0	12 x ⅞ UNC	14.2	12 x ⅞ UNC	72.6	B
14	4	1.6	0.20	16.3	6.2	21.0	18.7	12 x Ø 1 ⅛	7.5	8 x ⅝ UNC	118.8	A
14	6	1.6	0.20	16.3	8.5	21.0	18.7	12 x Ø 1 ⅛	9.5	8 x ¾ UNC	112.2	A
14	8	1.6	0.20	16.3	10.6	21.0	18.7	12 x Ø 1 ⅛	11.7	8 x ¾ UNC	105.6	A
14	10	1.6	0.20	16.3	12.8	21.0	18.7	12 x Ø 1 ⅛	14.2	12 x ⅞ UNC	94.6	A
14	12	1.6	0.20	16.3	15.0	21.0	18.7	12 x 1 UNC	17.0	12 x ⅞ UNC	81.4	C
16	6	1.8	0.20	18.5	8.5	23.5	21.2	16 x Ø 1 ⅛	9.5	8 x ¾ UNC	158.4	A
16	8	1.8	0.20	18.5	10.6	23.5	21.2	16 x Ø 1 ⅛	11.7	8 x ¾ UNC	149.6	A
16	10	1.8	0.20	18.5	12.8	23.5	21.2	16 x Ø 1 ⅛	14.2	12 x ⅞ UNC	138.6	A
16	12	1.8	0.20	18.5	15.0	23.5	21.2	16 x Ø 1 ⅛	17.0	12 x ⅞ UNC	125.4	A
16	14	1.8	0.20	18.5	16.3	23.5	21.2	16 x 1 UNC	18.7	12 x 1 UNC	114.4	B
18	8	1.8	0.20	21.0	10.6	25.0	22.7	16 x Ø 1 ¼	11.7	8 x ¾ UNC	176.0	A
18	10	1.8	0.20	21.0	12.8	25.0	22.7	16 x Ø 1 ¼	14.2	12 x ⅞ UNC	162.8	A
18	12	1.8	0.20	21.0	15.0	25.0	22.7	16 x Ø 1 ¼	17.0	12 x ⅞ UNC	151.8	A
18	14	1.8	0.20	21.0	16.3	25.0	22.7	16 x 1⅛ 8UN	18.7	12 x 1 UNC	140.8	B
18	16	1.8	0.20	21.0	18.5	25.0	22.7	16 x 1⅛ 8UN	21.2	16 x 1 UNC	123.2	C
20	10	1.8	0.20	23.0	12.8	27.5	25.0	20 x Ø 1 ¼	14.2	12 x ⅞ UNC	204.6	A
20	12	1.8	0.20	23.0	15.0	27.5	25.0	20 x Ø 1 ¼	17.0	12 x ⅞ UNC	191.4	A
20	14	1.8	0.20	23.0	16.3	27.5	25.0	20 x Ø 1 ¼	18.7	12 x 1 UNC	182.6	A
20	16	1.8	0.20	23.0	18.5	27.5	25.0	20 x 1⅛ 8UN	21.2	16 x 1 UNC	165.0	B
24	12	2.0	0.20	27.2	15.0	32.0	29.5	20 x Ø 1⅛	17.0	12 x ⅞ UNC	297.0	A
24	14	2.0	0.20	27.2	16.3	32.0	29.5	20 x Ø 1⅛	18.7	12 x 1 UNC	281.6	A
24	16	2.0	0.20	27.2	18.5	32.0	29.5	20 x Ø 1⅛	21.2	16 x 1 UNC	264.0	A
24	18	2.0	0.20	27.2	21.0	32.0	29.5	20 x Ø 1⅛	22.7	16 x 1⅛ 8NC	242.0	A

Subject to technical changes.

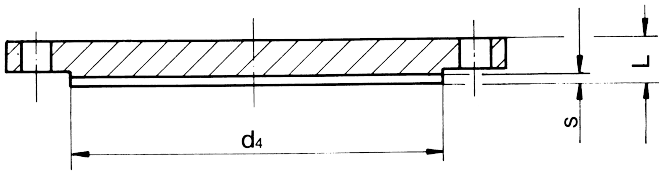
POLYFLURON®
PTFE lined blind flanges

The POLYFLURON PTFE lining is fixed to the steel surface to prevent it from separating during transport and assembly. Sealing surfaces meet ANSI B16.5.

Lined blind flanges

DN	L	PTFE	Weight
		s	
[in]	[mm]	[in]	[approx. lb]
1	17	0.12	2.0
1 ¼	19	0.12	2.9
1 ½	21	0.12	4.0
2	22	0.12	5.1
2 ½	25	0.12	7.0
3	27	0.12	9.0
4	27	0.12	16.9
5	28	0.16	20.2
6	29	0.16	26.4
8	33	0.16	46.2
10	35	0.20	70.4
12	37	0.20	112.2
14	40	0.20	143.0
16	42	0.20	182.6
18	45	0.20	209.0
20	48	0.20	224.4
24	53	0.20	290.4

Subject to technical changes.



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sgl carbon

Carbon based axial flow pump

For nearly 50 years, SGL Carbon has been developing axial flow pumps able to deliver the highest flow rates required by the chemical process and wastewater industries.

SGL Carbon is uniquely capable of manufacturing such pumps from massive blocks of impervious and fully corrosion-resistant graphite, and offers a complete product range with design stability and customization.

Installed all over the world – typically on evaporation, crystallization or distillation loops – these heavy-duty motor-pump groups ensure an extended level of reliability at our valued customer's production plants.

↑ DIABON®/DURABON® C400 bare-shaft pump

Customer benefits

Extreme corrosion resistance
A wide range of graphite qualities fully impregnated with first-class phenolic resins: the perfect chemical compatibility even at high temperatures.

Total life-cycle costs under control
Robust construction and the exceptional dimensional stability of graphite enable increased service life even at higher temperatures. Additionally, graphite can be easily repaired.

High flexibility
Multiple design options available to optimize performance of both new plants as well as existing installations.

Unique durability
There is no diffusion through graphite, its chemical and mechanical properties are unaffected by time.
Most of our references have operated since decades.

Applications examples

- Circulation of corrosive fluids at high flow rates in loops with reduced head losses.
- Hydrochloric, sulfuric, phosphoric, sulfonic, hydrofluoric, fluosilicic acids, pickling liquors, chlorinated organics, industrial effluents, wastewaters and even more...

Product information

- Outstanding shaft rigidity preventing deflection at seal and vibrations, also allowing the lowest hydraulic gaps for enhanced efficiencies
- Steep and continuous decline of performance curve for operating stability
- Customized propeller blades to fit with customers operating conditions
- Several carbon-based materials available to achieve corrosion and abrasion resistance
- Replaceable wearing sleeve permitting easy maintenance
- Compliance with ATEX 2014/34/UE directive
- Multiple motor-pump group arrangements: ground-based baseplate, spring-mounted, suspended, V-belts transmission, gear-box, cardan or direct coupling

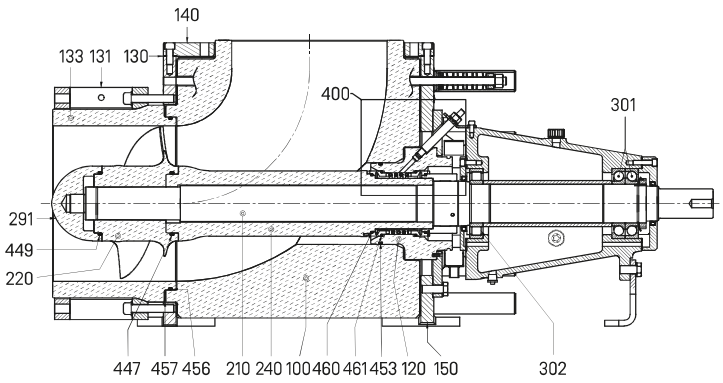
By the way: Axial flow pumps are also available in exotic metals, offering flow rates up to 35000 m^3/h and chemical compatibility with chlor-alkaly applications. See TIS EM C pump.

Data of graphite axial flow pump

Technical specification	Units	Type C200 to C600
Propeller diameters	mm	from 200 to 600
Flow directions		top suction or end suction
Flow rates	m^3/h	from 120 to 5500
Total Dynamic Heads	mlc	up to 10
Rotation speeds	min^{-1}	from 500 to 2100
Operating temperatures	°C	from -40 to +200
Design pressures	barg	up to 10
Flanges standards		ISO PN metric, ANSI 150 lbs metric, ANSI 150 lbs UNC
Materials		DIABON® graphite, DURABON®, SIGRASIC®
Sealing technologies		component or cartridge mechanical seals (balanced single or double, tandem)

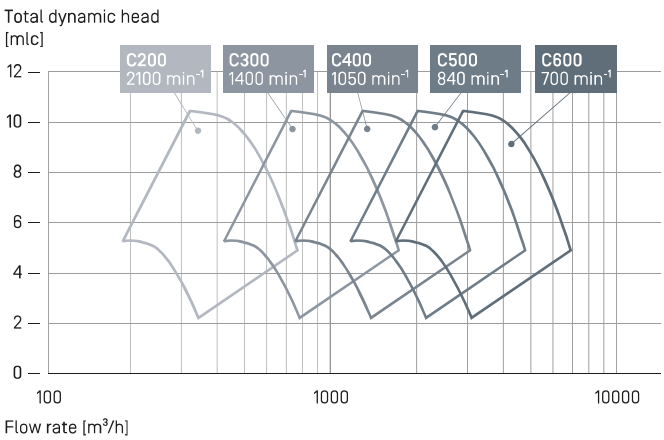
Typical graphite axial flow pump – bill of material

Item	Description	Material
100	elbow housing	DIABON, DURABON
120	seal casing	DIABON, DURABON
130/131 140/150	flanges	steel, stainless steel
133	wearing sleeve	DIABON, DURABON, SIGRASIC
210	shaft	carbon steel
220	propeller 0°	DIABON, DURABON, SIGRASIC
240	shaft sleeve	DIABON, DURABON
291	propeller nose	DIABON
301/301	bearings	steel
400	mechanical seal	SiC-SiC, SiC-Carbon
447/449/456 453/460/461	O-rings	FKM, FFKM
457	gasket	SIGRAFLEX®



↑ DIABON C400 cross sectional drawing

Graphite axial flow pumps performance chart



↑ DIABON C500 motor-pump groups

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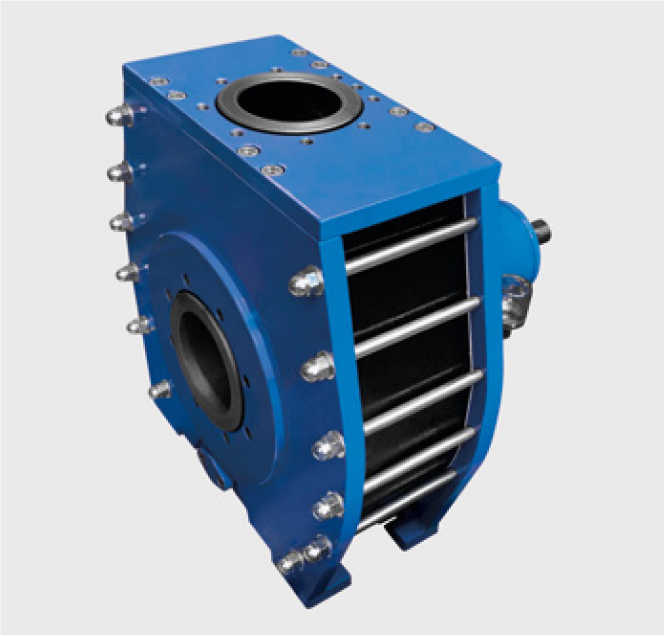
Carbon based centrifugal pump

For more than 60 years, SGL Carbon has been designing centrifugal process pumps from its wide range of impregnated, impervious carbon and graphite materials. These materials offer an excellent corrosion resistance and an unmatched thermal stability at temperatures up to 200 °C.

SGL Carbon is offering a full product portfolio with international manufacturing standards compliance and customization possibilities of the massive base construction.

Distributed worldwide, these heavy-duty motor-pump groups ensure an extended service life and stand for an indisputable alternative to thermoplastic, metallic or ceramic pumps at our valued customer's production plants.



↑ DIABON® NG 150-125-315 bare-shaft pump

Customer benefits

Extreme corrosion resistance
A range of carbon and graphite qualities, impregnated with first-class phenolic resins: this tailored solution guarantees a perfect chemical compatibility.

Total life-cycle costs under control
Robust construction and the ability of graphite to endure accidental overtemperature or vacuum enables increased service life. Additionally, graphite parts can be repaired and tolerate several overhauls.

Constant efficiency
The dimensional stability of carbon up to high temperatures allows low internal clearances for enhanced performances.

Unique durability
There is no diffusion through impregnated carbon and graphite: chemical and mechanical properties are unaffected by time. Most of our units have operated since decades.

Applications examples

- Base and fine chemicals, hydrometallurgy, mining, fertilizer, food, paper, resins or plastic industries
- Hydrochloric, sulfuric, phosphoric, sulfonic acids, pickling liquors, chlorinated organics and even more

Product information

- Design according ISO 2858 and ISO 5199
- Outstanding shaft rigidity preventing deflection at seal and vibrations: safe and reliable operation
- Three standardized mechanical seal sizes for easier maintenance and spare part management
- Magnetic drive, seal-less option
- Several construction materials available to refine corrosion and abrasion resistance
- Vortex and free-flow range developed for slurry pumping
- Compliance with ATEX 2014/34/UE directive
- Multiple motor-pump group arrangements: ground-based baseplate or anti-vibrating stands, direct flexible or rigid coupling, V-belts transmission

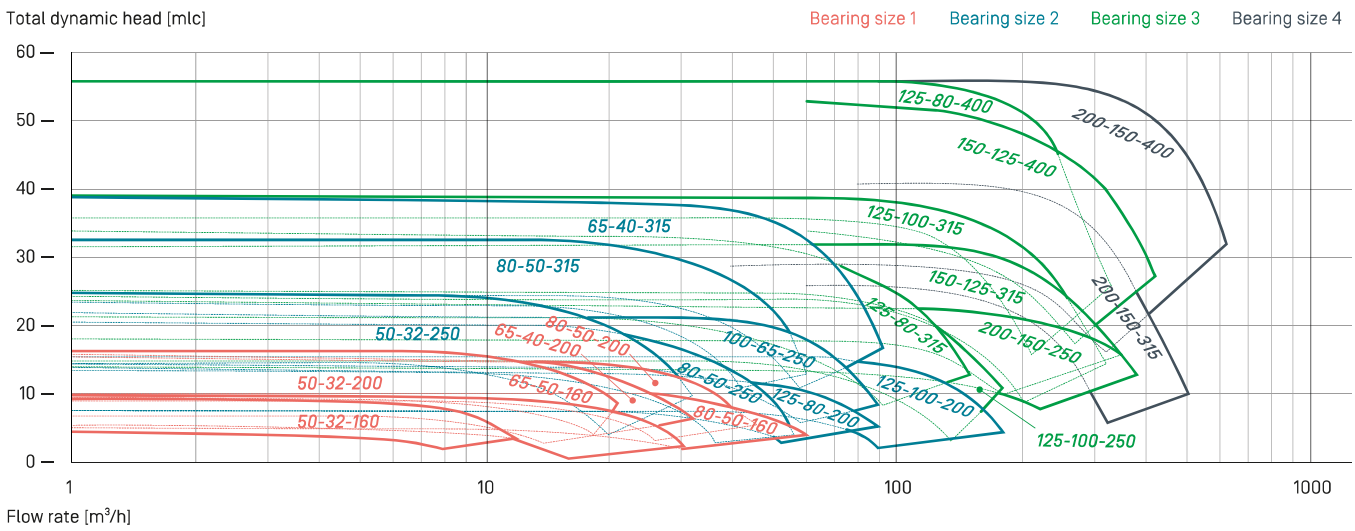
By the way: DIABON® centrifugal pumps are manufactured in sizes going beyond the range defined by ISO 2858. Please also ask for our specific documentation, available for capacities up to 3000 m^3/h.

Data of graphite centrifugal pump

Technical specification	Units	Types NG 50-32-160 to NG 350-350-450
Assembly		back-pullout unit into pump head
Impeller diameters	mm	from 110 to 550 (closed, semi open or free flow)
Flow rates	m^3/h	from 2 to 3000
Total Dynamic Heads	mlc	from 3 to 180
Rotation speeds	min^{-1}	1500 or 3000 (customisable with variable frequency drive)
Operating temperatures	°C	from -40 to +200
Design pressures	barg	up to 16 (carbon-fiber wrapping option for higher values)
Flanges standards		ISO PN metric, ANSI 150 lbs metric, ANSI 150 lbs UNC
Materials		DIABON® graphite, DURABON® carbon, SIGRASIC® SiC
Sealing technologies		balanced component or cartridge mechanical seal, magnetic drive

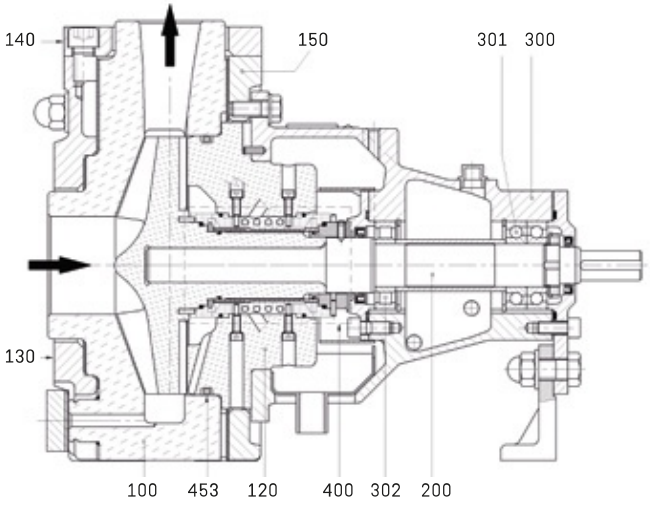
↑ DIABON NG 300-250-450 motor-pump group

ISO 2858/5199 DIN carbon composite pumps @ 1450 rpm



Typical graphite centrifugal pump – bill of material

Item	Description	Material
100	volute casing	DIABON, DURABON, SIGRASIC
120	seal casing	DIABON, DURABON, SIGRASIC
130	suction flange	steel, stainless steel
140/150	discharge, rear flange	steel, stainless steel
200	impeller-shaft assembly	DIABON, DURABON, SIGRASIC
300	bearing housing	cast iron
301/302	bearings	steel
400	mechanical seal	SiC-SiC, SiC-Carbon
453/460/461	O-rings	FKM, FFKM



↑ DIABON NG 80-50-200 cross-sectional drawing

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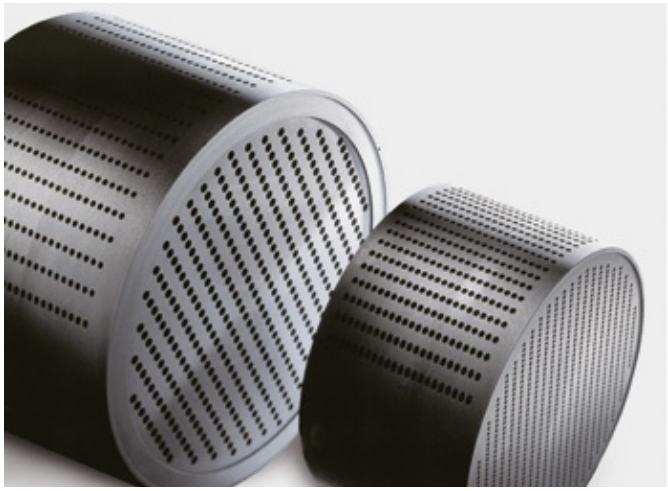
sgl carbon

DIABON® graphite block heat exchanger

DIABON graphite block heat exchangers are one of the most robust and flexible types for heat exchange of corrosive media available on market. SGL Carbon's advanced constructive design in combination with superior graphite qualities ensures an efficient and reliable operation for our customers even at toughest applications.

SGL Carbon's outstanding reputation as the global leading supplier is based on more than 10000 references for graphite block heat exchangers – the largest reference base in industry for block types. Deep understandings of our customer's applications in combination with optimized designs are the benefits for our customers based on our large source of experience.



↑ DIABON blocks

Customer benefits

- **Long lifetime:** e. g. superior corrosion resistance by full range of graphite and impregnation qualities available (Ultra fine & fine grain graphite, PTFE or phenolic resin impregnation, etc.)
- **High plant availability:** sturdy design, superior graphite and soft gaskets between blocks result in significant reduced risk of block damages/unplanned production stops
- **Compactness:** ultra efficient block drillings and resin film free holes available
- **Low maintenance costs:** ease of handling for fast and cost effective maintenance
- **Flexibility:** large range of design options available to allow optimized heat exchanger for a wide range of applications
- **Service excellence:** fast and competent services for repairs and spare parts

Example applications

- Heat exchange of corrosive applications e. g. hydrochloric acid, sulphuric acid, phosphoric acid, hydrofluoric acid, pickling liquors etc.
- Functions: Heating, cooling, condensation, evaporation, absorption, heat recovery by interchanger

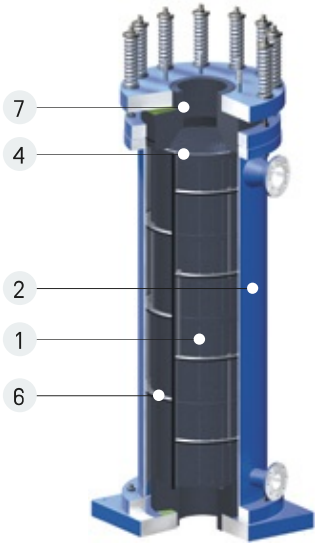
Product information

- 3 base types: CK/NCK (cylindrical), NEC (cubical), KU (monolithic)
- Heat Exchange area: from 0.5 m^2 up to 850 m^2
- Base design: a stack of graphite blocks or one monolithic block mounted into steel shell/steel plates
- blocks up to 1500 mm diameter from one piece of graphite
- No. 1 supplier worldwide with > 10000 references
- Full range of graphite qualities: fine grain, ultra fine grain, phenolic resin/PTFE impregnation
- Design options for falling film, multi-pass, both sides' corrosives, temperature crossing etc.

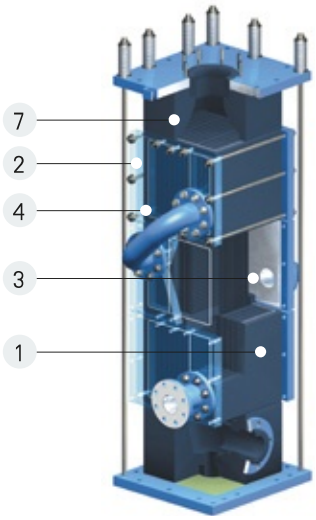
By the way: DIABON phenolic resin impregnated graphite is certified by FDA (Food and Drug Administration)

Data of DIABON® graphite block heat exchanger

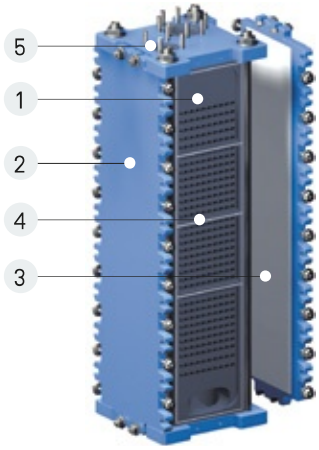
Technical specifications	Units	Type CK/NCK	Type NEC	Type KU
Block shape		cylindrical	cubical	monolithic
Main application		universal	pharmaceutical/fine chemicals	interchanger (two corrosives)
Specific advantages		Sturdy design, compactness, easy handling	Both sides corrosive, no risk of cross-contamination, more than one service media, modular expansion	Both sides corrosive, no gaskets, monolithic block, small temperaure gradients, ultra efficient
Block gaskets		soft PTFE	soft PTFE	
Standard drilling diameter		8/16 mm	10 mm	8/16 mm
Drilling patterns		single or double	single	single
Max. design temperature	°C	220	220	220
Standard design/test pressure (higher pressure on request)	barg	6/7.8	6/7.8	9/11.7
Max. heat exchange area	m^2	850	150	46
Standard connections		DIN/ANSI	DIN/ANSI	DIN/ANSI
Standard painting		sandblasting according to SA 2 ½, DIN 55928 one base coat with 1-component epoxy-zinc primer; dry film thickness 40 µm		
Available pressure codes		PED 2014/68/EU, AD2000-Merkblatt, GB Code, ASME acc. Sec. VIII Div. 1 (U-stamp) etc.		



↑ Cylindrical (universal)



↑ Cubical (e. g. pharmaceutical)



↑ Monolithic (e. g. interchanger)

1 DIABON graphite block
2 Steel shell/plate
3 PTFE protection lining
4 PTFE gasket
5 Connections bolts
6 Baffles
7 DIABON headers

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sgl carbon

DIABON® graphite plate heat exchanger

In case of heat exchange of corrosive media, DIABON plate heat exchangers are first choice.
Plate heat exchangers are the most modern and efficient heat exchange technology on the market. They replace more and more traditional types like block, annular groove or shell & tube heat exchangers.
In cooperation between Alfa Laval and SGL Carbon plate heat exchangers made out of DIABON graphite are established.
More than 3000 references worldwide and continuous innovations like the world largest graphite plate heat exchanger type P90 are our proof of outstanding customer benefits.

Customer benefits

- **Most efficient and economic heat exchanger technology:** lower invest cost compare to other heat exchanger types highest heat recovery for interchanger (narrow temperature gradients possible)
- **High flexibility:** modular expansion possible
- **Compact design:** up to 75 % less space requirement (advantage at e. g. capacity expansion/retrofit)
- **High plant availability:** up to 50 % less production stops for maintenance, repair and service
- **Extreme short delivery time: standard delivery time:** 8 weeks (about half of the delivery time of other types)

Example applications

- Heat exchange for corrosive media e. g. hydrochloric acid, sulphuric acid, phosphoric acid, hydrofluoric acid, etc.
- Function: heating, cooling, condensation or heat recovery by interchanger

↑ DIABON graphite plate heat exchangers P90 and P40

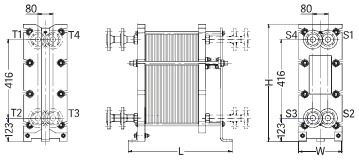
Product information

- 4 standardized types: P05, P25, P40, P90
- dimensions (W x H x L)
  from (P05) 230 x 620 x 850 mm
  up to (P90) 675 x 2245 x 1892 mm
- > 3000 references worldwide
- plates: DIABON NS1, NS2 and F100
  gaskets: SIGRAFLEX®/POLYFLURON® PTFE
- Heat exchange area: 0.1 up to 60 m^2; corresponds to > 150 m^2 block heat exchanger
- flow rates from 0.1 m^3/h up to > 250 m^3/h
- 100 % counter-current, temperature crossing allowed

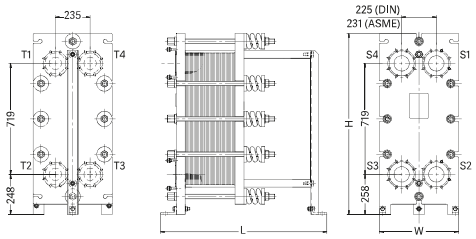
By the way: DIABON phenolic resin impregnated graphite is certified by FDA (Food and Drug Administration)

Data of DIABON® graphite plate heat exchanger

Technical specifications	Units	Type P05		Type P25		Type P40		Type P90
Dimensions W x H x L	mm	230 x 620 x 350 – 850		512 x 1170 x 912 – 1762		570 x 1473 x 912 – 1762		675 x 2245 x 942 – 1892
Connections DIN/ANSI		DN25/1"		DN100/DN80/4"/3"		DN100/4"		DN150/6"
Plate gasket		PTFE/SIGRAFLEX		PTFE/SIGRAFLEX		PTFE		PTFE
Max. working pressure ASME/PED	barg	7/8		7/8		7/8		7/8
Max. test pressure	barg	10.4		10.4		10.4		10.4
Lining of frames		PTFE		PTFE		PTFE		PTFE
DIABON plate material		F100	DIA-NS2	F100	DIA-NS1/2	F100	DIA-NS1/2	DIA-NS1/2
Max. number of plates		80	64	160	100	130	96	96
Max. exchange area	m²	4.0	2.56	40	18	52	29	60
Exchange area per plate	m²	0.05	0.04	0.25	0.18	0.40	0.30	0.63
Max. design temperature	°C	140	200	140	200	140	200	200
Weight	kg	100 – 190	100 – 200	610 – 1080	620 – 1070	910 – 1730	920 – 1600	1540 – 6400
Standard painting		One priming coat with two component, polyamide-adduct cured epoxy paint, 100 µm One intermediate coat ditto, 100 µm One top coat with two component, polyurethane coating, 60 µm – final color RAL 5002 medium blue						
Available pressure codes		PED 2014/68/EU, AD2000-Merkblatt, ASME acc. Sec. VIII Div. 1 (U-stamp)						



↑ Type P05



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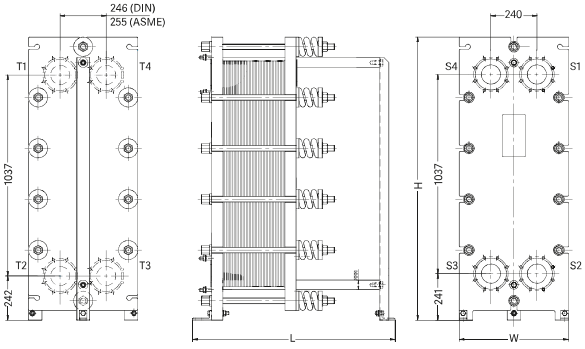
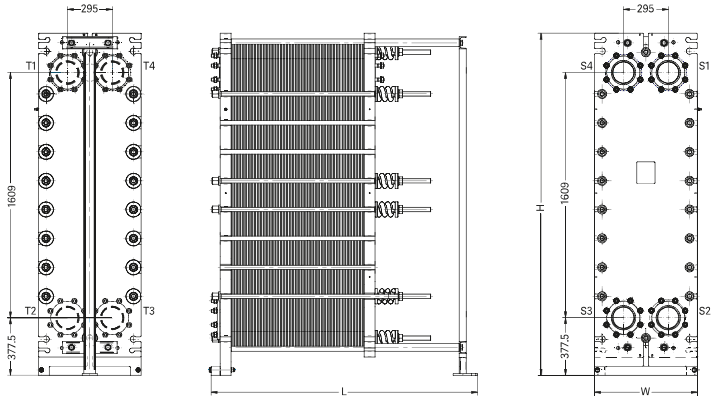


↑ Type P40



↑ Type P90

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