

# DIABON® graphite cylindrical block heat exchanger

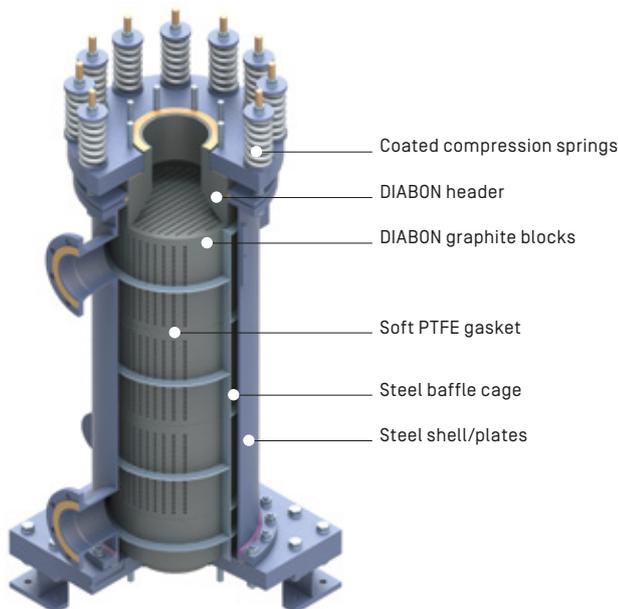
SGL Carbon has more than 50 years of experience in designing cylindrical graphite block heat exchangers (BHX). Our history includes types like SIGRI's DK72 and DK90, and the VICARB MP, HP and finally the CK line.

The CK line has proven to be an almost universal solution providing the best performance for a broad range of

- applications [heater, cooler, condenser, evaporator, thermosyphon, absorber],
- industrial fields [fine chemicals, commodities, agrochemicals, etc.], and
- corrosive media [HCl, H<sub>2</sub>SO<sub>4</sub>, H<sub>3</sub>PO<sub>4</sub>, etc.].

After more than 25 years of our CK type being the benchmark for cylindrical BHX, SGL Carbon now presents the NCK ["New CK"] line in addition to its CK line. With the NCK all the benefits of the CK block heat exchanger are kept.

In addition we now introduce a standard configuration which covers structural stability and enables us, SGL Carbon and you, the customer to reduce project complexity and lead time.



↑ NCK type

## Selected Customer benefits of DIABON CK and NCK

- **Long lifetime:** superior corrosion resistance due to the full range of graphite and impregnation qualities [ultra fine and fine grain graphite, phenolic resin or PTFE impregnation, etc.]
- **High plant availability:** sturdy design, high graphite quality and soft gaskets between blocks result in significantly reduced risk of block damage and thus unplanned production downtimes
- **Flexibility:** large range of design options available to allow optimized heat exchanger for a wide range of applications

## Technical key elements of CK and NCK line

- **Superior graphite:** an optimized graphite grain size distribution is used to balance brittleness and strength. Large grains give ductility and high thermal conductivity, small grains give strength.
- **Soft gaskets between the blocks:** gaskets are not used as baffles on the shell side. This enables us to use soft PTFE gaskets between graphite parts. Combined with a male/female block interface, tightening torques are significantly reduced. Alternative approaches with stiff gaskets/baffles result in additional stresses which can lead to premature failure of the blocks as well as leaks, especially when it comes to fluctuating process conditions. Since our baffle cage is completely independent from the graphite block column it also provides a perfect sealing with minimum cross flows.
- **Coated compression springs** are used with centering disks, avoiding housing to facilitate visual inspection and to avoid corrosion.

## Data of DIABON® graphite cylindrical block heat exchanger

Technical specifications	Units	Type NCK	Type NCK SPL	Type CK
Block shape		cylindrical	cylindrical	cylindrical
Main functions		heater, cooler, condenser, evaporator, thermosyphon	universal: heater, cooler, condenser, evaporator, thermosyphon, absorber (falling film) and interchanger	universal: heater, cooler, condenser, evaporator, thermosyphon, absorber (falling film) and interchanger
Preferred solution	m <sup>2</sup>	< 75 (NCKDS up to 107)	< 75 (NCKDS SPL up to 107)	75 – 850
General advantage		sturdy design, compactness, easy handling	sturdy design, compactness, easy handling	sturdy design, compactness, easy handling
Specific advantages		reduced delivery time, type testing, 3D hull model available	3D hull model available	3D hull model available
DIABON grades		NS1, NS2, N	NS1, NS2, N, CT	NS1, NS2, N, CT, NS+
Block gaskets		soft PTFE	soft PTFE	soft PTFE
Standard drilling dia.	mm	8 – 16	8 – 16	8 – 16
Drilling patterns		single or double	single or double	single or double
Max. design temp.	°C	200	220	220
Standard design/test pressure	barg	6/7.8	6/7.8 (higher pressure on request)	6/7.8 (higher pressure on request)
Standard connections		DIN	DIN	DIN/ANSI
Standard painting		sandblasted SA2½ according EN ISO 12944-4, 1 base coat with 1-comp. zinc rich primer, dry film thickness min. 40 µm, similar to RAL7001 (color grey); max. surface temperature 200 °C; deviating customer specifications possible		
Available pressure codes		PED 2014/68/EU according to AD2000-Merkblatt; with CE type examination (module B + D)	PED 2014/68/EU, AD2000-Merkblatt, GB Code, ASME acc. to Sec. VIII Div. 1 (U-stamp) etc.	PED 2014/68/EU, AD2000-Merkblatt, GB Code, ASME acc. to Sec. VIII Div. 1 (U-stamp) etc.
Structural analysis of stability [earthquake, wind and snow]		SGL Carbon specification *	according to selected pressure code and customer specification	according to selected pressure code and customer specification
Structural analysis of stability (nozzle load)		according to ASME regulation	according to selected pressure code and customer specification	according to selected pressure code and customer specification
Suitable for explosive atmospheres		no	upon request, e.g., according to ATEX	upon request, e.g., according to ATEX
Further specification		steel parts, graphite nozzles, gasket materials as per SGL Carbon standards	steel parts, graphite nozzles, gasket materials as per SGL Carbon standards; deviation upon customer request	steel parts, graphite nozzles, gasket materials as per SGL Carbon standards; deviation upon customer request

\* SGL Carbon's structural stability specification has been chosen to cover most regions of the world:  
**earthquake load** acc. to DIN EN 1998-1; earthquake load = 0.3; acceleration a = 0.75 m/s<sup>2</sup>; soil factor S ≤ 1.5; importance factor Y1 = 1.60; behavior factor q ≥ 1.50; Sd(T) acc. to DIN EN 1998-1 with Sd(T) = 3.00 m/s<sup>2</sup>.  
**wind load** acc. to DIN EN 1991-1-4; wind speed v = 40 m/s (installation altitude max. 40 m); wind gusts speed pressure q = 2.93 kN/m<sup>2</sup>; wind pressure coefficient cp = 1.0.  
**snow load** acc. to DIN EN 1991-1-3; snow load S = 1.0 kN/m<sup>2</sup>.



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