



Characteristic Data Standard Materials

For the strictly determined manufacturing process of our carbon and graphite materials, only well-defined processed raw materials or those purchased according to fixed specifications are used. Our special brochure on the manufacturing process of carbon materials (SKT 03.05e) gives you further information. You can download this brochure from our homepage.

Schunk offers to you three different groups of carbon materials for mechanical applications. These groups are identified by the two initial letters of the grade code.

FH... carbon graphite

FE... electrographite

FF... resin bonded carbon

The two figures following these initial letters identify the different grades within the material groups.

Examples: FH42, FE45, FF52

A third figure indicates special manufacturing procedures, e. g.:

...1 pressing to size or partially pressing to size (only applies to FH and FF grades)

...9 isostatic pressing (only applies to FH and FE grades)

Examples: FH421, FE679, FF521

Additional processing steps such as infiltrations with metals, resins or special salts are indicated by a final letter/figure combination:

A	antimony impregnation
B	lead-antimony impregnation
C	copper impregnation
Z2, Z5	impregnation with phenolic resin
ZH2, ZH5	impregnation with phenolic resin for applications up to 260 °C
ZP2, ZP5	impregnation with polyester resin (Schunk Patents DE 2832048, EP 0007606)
S	redensification with carbon
Y2, Y5	redensification with carbon
Q	treatment to improve the oxidation resistance and dry running properties of FE grades
PS	treatment to improve the dry running properties of FE grades

Examples:

FH82A, FH42B, FH44C, FH42Z2/Z5, FH82ZH2/ZH5, FH42ZP2/ZP5, FE45S, FH42Y2, FE679Q, FE679PS

Z2, ZH2, ZP2:a

Porosity \leq 4 percent by volume

Z5, ZH5, ZP5:

Porosity \leq 1.5 percent by volume or gas tight

Based on standard procedures (typically DIN), the physical data of each material are determined.

The following table shows the physical data of Schunk standard materials for mechanical applications. For special applications a multitude of other materials is available.

Material type	Temperature limit	Temperature limit		Flexural strength	Compressive strength	Young's modulus	Rockwell Hardness (HR)			Hardness-Brinell HB 5/62,5
		Oxidizing atmosphere	Inert atmosphere				5/40	5/100	5/150	
		°C	°C							
-FH27S-	carbon graphite	350	1200	30	90	9	105	-	-	25
-FH42-	carbon graphite	350	1200	50	150	18	-	95	-	40
-FH42Y3-	carbon graphite	350	1200	55	170	18	-	110	-	60
-FH44Y2-	carbon graphite	350	1200	45	130	14	-	105	-	50
-FH82Y5-	carbon graphite	350	1200	70	250	24	-	-	110	80
-FE45S-	electrographite	500	2500	40	100	10	105	-	-	25
-FE45Y2-	electrographite	500	2500	40	100	12	-	85	-	30
-FE65-	electrographite salt impregnated	650	1000	45	110	13	110	-	-	30
-FE679Q-	electrographite salt impregnated	650	1000	70	145	15	-	110	-	60
-FE679PS-	electrographite salt impregnated	500	800	90	210	20	-	-	115	95
-FH27Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	45	170	12	-	105	-	50
-FH42Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	60	210	18	-	115	-	75
-FH42Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	60	210	18	-	115	-	75
-FH44Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	50	200	14	-	105	-	50
-FH44Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	50	200	14	-	105	-	50
-FH82Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	75	250	24	-	-	110	80
-FH82Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	75	250	24	-	-	110	80
-FE45Z(H)2-	electrographite resin impregnated	200 (260)	200 (260)	45	150	12	-	100	-	45
-FH71Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	75	170	27	-	105	-	50
-FH42A-	carbon graphite antimony impregnated	350	600	80	250	24	-	-	120	115
-FH42B-	carbon graphite lead antimony impr.	230	230	80	240	22	-	-	120	115
-FH44B-	carbon graphite lead antimony impr.	230	230	70	200	21	-	115	-	75
-FH44C-	carbon graphite copper impregnated	350	1000	75	210	20	-	115	-	75
-FH71A-	carbon graphite antimony impregnated	300	600	85	240	35	-	-	120	115
-FH82A-	carbon graphite antimony impregnated	350	600	90	350	26	-	-	120	115
-FE45A-	electrographite antimony impregnated	500	600	65	170	16	-	115	-	75
-FF46-	resin bonded	180	180	60	130	20	-	105	-	50
-FF521-	resin bonded	180	180	60	145	20	-	105	-	50
-FF541-	resin bonded	180	180	85	230	14	-	115	-	75
-FF601-	resin bonded	180	180	55	140	15	-	90	-	35
-FC941-	carbon graphite	350	1200	-	-	-	-	-	-	-

These data are provided as typical values based on our experience. As with any raw material or manufacturing process, variations can occur. Consequently, such values are not guaranteed and are subject to change without notice.

Bulk density g/cm ³	Porosity Vol.-%	Coefficient of thermal expansion (⊥ to the pressing direction)		Thermal conductivity W/mK	Main application fields
		20 – 200 °C x 10 ⁻⁶ /K	200 – 600 °C x 10 ⁻⁶ /K		
1.55	15	3.5	4.6	13	Segmental seal rings and carbon steam joint seals in larger dimensions.
1.65	11	4.0	4.4	11	Wet running bearings in liquid media and under dry running conditions at low speed.
1.65	10	4.2	5.0	12	Bearings in liquid media, submitted to higher loads (e. g. in chemical pumps and flow meters).
1.65	8	3.5	4,6	17	Segmental and single seal rings, rotary vanes and valve seats.
1.80	*	4.4	4.8	10	Sliding rings and bearings submitted to high loads, even at elevated temperatures and in chemically aggressive media.
1.70	15	3.6	4.2	65	Segmental seals, single end rings, metal-caged rings, end plates, thrust bearings.
1.70	8	3.6	4.2	65	Segmental seals, labyrinth rings and mechanical seals; dry and wet running bearings used at high temperatures and in chemically aggressive media.
1.80	8	3.1	4.2	65	Dry running carbon vanes and bearings applied at high temperatures.
1.85	8	4.0	5.0	45	Dry running vanes.
2.20	2	4.1	5.2	45	Dry running vanes submitted to high rotational speed.
1.70	3	4.2	-	13	Segmental seal rings and sliding rings in larger dimensions.
1.75	2	4.6	-	11	Bearings submitted to higher loads and used in liquid media; vanes for rotary pumps and flow meters; sliding rings; pump components; blanks.
1.75	*	4.6	-	11	Seal rings for mechanical seals and steam joint seals; thrust bearings submitted to high load.
1.70	2	4.5	-	13	Carbon bearings applied in liquid media; dry running carbon bearings used in industrial drying units; carbon vanes; sliding rings; rotary vanes; valve seats; blanks.
1.70	*	4.5	-	13	Sliding rings, even suited for applications with marginal lubrication; valve seats.
1.80	2	4.7	-	8	Mechanical seals; blanks.
1.80	*	4.7	-	8	Sealing rings for mechanical seals and steam joint seals applied at high load; highly loaded thrust bearings.
1.75	3	4.1	-	65	Segmental and mechanical seals; dry running carbon bearings; carbon bearings used in aggressive media.
2.80	*	7.0	-	6	Dry running seals and bearings, especially for extremely low humidity.
2.30	*	4.2	5.5	13	Highly loaded sealing rings and carbon bearings applied in liquids and liquefied gases.
2.80	1.5	4.2	-	18	Carbon bearings for circulating heating pumps and water pumps.
2.80	1.5	4.5	-	20	Single and segmental seals; dry and wet running carbon bearings.
2.50	3	5.0	5.5	20	Mechanical seals; carbon bearings.
3.30	*	6.4	-	9	Dry running seals and bearings, especially for extremely low humidity and liquefied gases.
2.25	*	4.5	5.0	9	Highly loaded mechanical seals, even at high temperatures; highly loaded thrust bearings.
2.50	1.5	4.5	5.0	67	Carbon bearings and mechanical seals applied at high temperatures.
1.70	< 1	16.0	-	4	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.
1.75	< 1	23.0	-	5	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.
1.70	< 1	22.5	-	2	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.
1.75	< 1	20.0	-	2	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.
1.75	< 4	-	-	-	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.

* gas tightness inspection on request

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