



## 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:  
low residual porosity

Z5, ZH5, ZP5:  
dense, gas leakage test on demand

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.

See also brochure 03.35e "SiC30 - Silicon carbide/graphite/composite material".

Material type	Temperature limit		Flexural strength	Compressive strength	Young's modulus	Rockwell Hardness (HR)			Hardness-Brinell HB 5/62,5	Bulk density g/cm <sup>3</sup>	Porosity Vol.-%	Coefficient of thermal expansion (⊥ to the pressing direction)		Thermal conductivity W/mK	Main application fields	
	Oxidizing atmosphere	Inert atmosphere				5/40	5/100	5/150				20 – 200 °C x 10 <sup>-6</sup> /K	200 – 600 °C x 10 <sup>-6</sup> /K			
	°C	°C	MPa	MPa	GPa											
-FH27S-	carbon graphite	350	1200	30	90	9	105	-	-	25	1.55	15	3.5	4.6	13	Segmental seal rings and carbon steam joint seals in larger dimensions.
-FH42-	carbon graphite	350	1200	50	150	18	-	95	-	40	1.65	11	4.0	4.4	11	Wet running bearings in liquid media and under dry running conditions at low speed.
-FH42Y3-	carbon graphite	350	1200	55	170	18	-	110	-	60	1.65	10	4.2	5.0	12	Bearings in liquid media, submitted to higher loads (e.g. in chemical pumps and flow meters).
-FH44Y2-	carbon graphite	350	1200	45	130	14	-	105	-	50	1.65	8	3.5	4,6	17	Segmental and single seal rings, rotary vanes and valve seats.
-FH82Y5-	carbon graphite	350	1200	70	250	24	-	-	110	80	1.80	*	4.4	4.8	10	Sliding rings and bearings submitted to high loads, even at elevated temperatures and in chemically aggressive media.
-FE45S-	electrographite	500	2500	40	100	10	105	-	-	25	1.70	15	3.6	4.2	65	Segmental seals, single end rings, metal-caged rings, end plates, thrust bearings.
-FE45Y2-	electrographite	500	2500	40	100	12	-	85	-	30	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.
-FE65-	electrographite salt impregnated	650	1000	45	110	13	110	-	-	30	1.80	8	3.1	4.2	65	Dry running carbon vanes and bearings applied at high temperatures.
-FE679Q-	electrographite salt impregnated	650	1000	70	145	15	-	110	-	60	1.85	8	4.0	5.0	45	Dry running vanes.
-FE679PS-	electrographite salt impregnated	500	800	90	210	20	-	-	115	95	2.20	2	4.1	5.2	45	Dry running vanes submitted to high rotational speed.
-FH27Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	45	170	12	-	105	-	50	1.70	3	4.2	-	13	Segmental seal rings and sliding rings in larger dimensions.
-FH42Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	60	210	18	-	115	-	75	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.
-FH42Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	60	210	18	-	115	-	75	1.75	*	4.6	-	11	Seal rings for mechanical seals and steam joint seals; thrust bearings submitted to high load.
-FH44Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	50	200	14	-	105	-	50	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.
-FH44Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	50	200	14	-	105	-	50	1.70	*	4.5	-	13	Sliding rings, even suited for applications with marginal lubrication; valve seats.
-FH82Z(H)2-	carbon graphite resin impregnated	200 (260)	200 (260)	75	250	24	-	-	110	80	1.80	2	4.7	-	8	Mechanical seals; blanks.
-FH82Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	75	250	24	-	-	110	80	1.80	*	4.7	-	8	Sealing rings for mechanical seals and steam joint seals applied at high load; highly loaded thrust bearings.
-FE45Z(H)2-	electrographite resin impregnated	200 (260)	200 (260)	45	150	12	-	100	-	45	1.75	3	4.1	-	65	Segmental and mechanical seals; dry running carbon bearings; carbon bearings used in aggressive media.
-FH71Z(H)5-	carbon graphite resin impregnated	200 (260)	200 (260)	75	170	27	-	105	-	50	2.80	*	7.0	-	6	Dry running seals and bearings, especially for extremely low humidity.
-FH42A-	carbon graphite antimony impregnated	350	600	80	250	24	-	-	120	115	2.30	*	4.2	5.5	13	Highly loaded sealing rings and carbon bearings applied in liquids and liquefied gases.
-FH44C-	carbon graphite copper impregnated	350	1000	75	210	20	-	115	-	75	2.50	3	5.0	5.5	20	Mechanical seals; carbon bearings.
-FH71A-	carbon graphite antimony impregnated	300	600	85	240	35	-	-	120	115	3.30	*	6.4	-	9	Dry running seals and bearings, especially for extremely low humidity and liquefied gases.
-FH82A-	carbon graphite antimony impregnated	350	600	90	350	26	-	-	120	115	2.25	*	4.5	5.0	9	Highly loaded mechanical seals, even at high temperatures; highly loaded thrust bearings.
-FE45A-	electrographite antimony impregnated	500	600	65	170	16	-	115	-	75	2.50	*	4.5	5.0	67	Carbon bearings and mechanical seals applied at high temperatures.
-FF46-	resin bonded	180	180	60	130	20	-	105	-	50	1.70	1	16.0	-	4	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.
-FF521-	resin bonded	180	180	60	145	20	-	105	-	50	1.75	1	23.0	-	5	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.
-FF541-	resin bonded	180	180	85	230	14	-	115	-	75	1.70	1	22.5	-	2	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.
-FC941-	carbon graphite	350	1200	-	-	-	-	-	-	-	1.75	4	-	-	-	Small parts pressed to size in series production such as mechanical seals, bearings, and components used in pumps.

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. Please find the standards for the determination of our material properties at: [www.schunk-group.com/skt/dm](http://www.schunk-group.com/skt/dm)

\* gas tightness inspection on request

# Worldwide Locations

## Germany

- Schunk Kohlenstofftechnik GmbH  
Germany/Heuchelheim  
Telephone: +49 (641) 60 80  
E-Mail: sse@schunk-group.com

## Europe

- Schunk Nordiska AB  
Sweden/Lenhovda  
Telephone: +46 (474) 2 95 00  
E-Mail: info@schunk.se
- Schunk UK Ltd.  
Great Britain/Pudsey  
Telephone: +44 (113) 2 56 72 38  
E-Mail: schunk.uk.sales@schunk-group.com
- Schunk Benelux B.V.  
Netherlands/Rotterdam  
Telephone: +31 (10) 4 14 47 66  
E-Mail: info@schunk-rotterdam.nl
- Schunk Electrographite S.A.S.  
France/Nanterre Cedex  
Telephone: +33 (1) 41 19 52 52  
E-Mail: schunk-electrographite@schunk-group.com
- Schunk Ibérica S.A.  
Spain/Pinto  
Telephone: +34 (91) 6 91 25 11  
E-Mail: mail@schunk.es
- Schunk Portugal Lda  
Portugal/Marinha Grande  
Telephone: +351 (244) 57 24 80  
E-Mail: sede@schunk.pt
- Schunk AG  
Switzerland/Adliswil  
Telephone: +41 (44) 7 16 46 46  
E-Mail: info@schunk.ch

- Schunk Wien Gesellschaft m.b.H.  
Austria/Vienna  
Telephone: +43 (1) 61 66 80 70  
E-Mail: swa.office@schunk-group.com

- Schunk Bahn- und  
Industrietechnik GmbH  
Austria/Bergheim  
Telephone: +43 (662) 45 92 00  
E-Mail: office@schunk-group.at

- Hoffmann & Co. Elektrokohle AG  
Austria/Bad Goisern  
Telephone: +43 (6135) 40 00  
E-Mail: office@hoffmann.at

- Schunk Italia S.r.l.  
Italy/Magenta  
Telephone: +39 (02) 9 72 19 01  
E-Mail: info@schunkitalia.it

- Schunk Bahntechnik Polska Sp. z. o. o.  
Poland/Warszawa  
Telephone: +48 (22) 8 24 04 11  
E-Mail: maciej.witczynski@schunk-group.com

- Schunk Praha s.r.o. (Prague)  
Czech Republic/Pilsen  
Telephone: +420 (377) 45 41 11  
E-Mail: milan.kroc@schunk-group.com

- Schunk Carbon Technology SRL  
Romania/Bucharest  
Telephone: +40 (21) 3 37 28 59  
E-Mail: office@schunk.ro

- SIRMA Elektrik Kömürleri SAN TIC AS  
Turkey/Istanbul  
Telephone: +90 (212) 2 78 99 70  
E-Mail: info@schunkturkey.com

## America

- Schunk Graphite Technology LLC  
USA/Menomonee Falls  
Telephone: +1 (262) 2 53 87 20  
E-Mail: info@schunkgraphite.com

- Schunk Electro Carbón, S.A. de C.V.  
Mexico/Ocoyoacac  
Telephone: +52 (728) 2 82 78 90  
E-Mail: informacion@schunk.com.mx

- Schunk do Brasil Ltda.  
Brazil/São Paulo  
Telephone: +55 (11) 47 02 32 53  
E-Mail: schunk@schunk.com.br

## Australia

- Schunk (Aust) Pty., Ltd.  
Australia/Rowville  
Telephone: +61 (3) 97 53 35 88  
E-Mail: admin@schunk.com.au

## Asia

- Schunk General Carbon  
(Guangzhou) Co., Ltd.  
China/Guangzhou  
Telephone: +86 (20) 34 63 48 88  
E-Mail: scc@schunkchina.com

- Schunk General Carbon Ltd.  
China/Hong Kong  
Telephone: +852 (2) 4 08 66 88  
E-Mail: sgc@schunkhk.com

- Seung Lim Carbon Metal Co., Ltd.  
South Korea/Ansan-City  
Telephone: +82 (31) 4 91 27 22  
E-Mail: shcho@seunglim.co.kr

- Schunk Metal & Carbon (I) PVT. Ltd.  
India/Bangalore  
Telephone: +91 (80) 28 51 67 08  
E-Mail: schunk@schunk-india.com

**Schunk Kohlenstofftechnik GmbH**

Rodheimer Strasse 59  
35452 Heuchelheim  
Germany

Phone: +49 (0) 641 608-0  
Fax: +49 (0) 641 608 1223

[sse@schunk-group.com](mailto:sse@schunk-group.com)  
[www.schunk-tribo.com](http://www.schunk-tribo.com)