

CARBOLVE

Carbon Brush Material Selection Guide

Material Grades for Motors, Generators, Slip Rings and Electrical Applications

Electrographite	Copper Graphite	Silver Graphite
Carbon Graphite	Natural Graphite	Resin-Bonded

Version 1.0 | Development Target Values

carbolve.com

1. Material Grade Overview

CARBOLVE brush materials are organized by material family and application direction. Grade numbers identify the position within each family; they do not equal metal content, density, current density or a competitor grade.

Series	Material Family	CARBOLVE Grades	Typical Applications
CVB-EG	Electrographite	EG20 / EG30 / EG35 / EG40 / EG45 / EG50	Electric motors, generators, industrial drives
CVB-CU	Copper Graphite	CU20 / CU30 / CU40 / CU50	Low-voltage, high-current collection
CVB-AG	Silver Graphite	AG20 / AG30 / AG40	Slip rings, precision current / signal transfer
CVB-CG	Carbon Graphite	CG20 / CG30	Older motors, cleaning-duty brushes
CVB-NG	Natural Graphite	NG20 / NG30	High-speed, low-friction current collection
CVB-RB	Resin-Bonded Carbon / Graphite	RB20 / RB30 / RB35 / RB40	Power tools, vacuum motors, appliances

Grade Code Example

CVB-EG30 = CARBOLVE Brush Material / Electrographite / High Performance Grade.

20 = general family grade **30** = high performance **35** = specialized low-friction / low-noise / high-speed direction **40+** = heavy-duty / application engineered.

2. Carbon Brush Material Grade Table

The values below are provisional typical development targets for preliminary material selection.

Grade	Material	Density g/cm³	Resistivity μΩ·m	Shore Hardness	Flexural MPa	Current A/cm²	Speed m/s	Typical Application
CVB-EG20	Electrographite	1.65	35	52	26	10	40	General DC motors
CVB-EG30	Electrographite	1.70	26	55	32	12	45	Industrial motors / generators
CVB-EG35	Electrographite	1.65	38	40	24	10	55	High-speed motors
CVB-EG40	Electrographite	1.75	18	50	35	14	45	High-current DC machines
CVB-EG45	Electrographite	1.75	20	55	38	14	45	Heavy-duty motors
CVB-EG50	Electrographite	1.78	16	58	40	14	40	Severe-duty industrial
CVB-CU20	Copper Graphite	2.10	14	35	24	14	25	Low-voltage collection
CVB-CU30	Copper Graphite	2.70	6	38	28	18	25	Low-voltage DC motors
CVB-CU40	Copper Graphite	3.80	2.5	32	30	22	22	Starter / high-current
CVB-CU50	Copper Graphite	5.20	0.8	30	32	26	18	Extreme high-current

2. Material Grade Table - Continued

Grade	Material	Density g/cm ³	Resistivity μΩ·m	Shore Hardness	Flexural MPa	Current A/cm ²	Speed m/s	Typical Application
CVB-AG20	Silver Graphite	2.80	10	22	14	11	25	Signal slip rings
CVB-AG30	Silver Graphite	5.00	2.0	22	25	19	22	Precision slip rings
CVB-AG40	Silver Graphite	7.50	0.30	18	35	25	18	Ultra-low-drop contact
CVB-CG20	Carbon Graphite	1.55	50	52	24	7	22	Older / cleaning-duty motors
CVB-CG30	Carbon Graphite	1.60	40	65	35	8	22	High-strength carbon
CVB-NG20	Natural Graphite	1.55	25	22	18	8	55	Low-friction slip rings
CVB-NG30	Natural Graphite	1.60	22	25	20	9	70	High-speed slip rings
CVB-RB20	Resin-Bonded	1.65	150	55	35	6	20	Small / universal motors
CVB-RB30	Resin-Bonded	1.70	110	65	45	7	25	Power tools / vacuum motors
CVB-RB35	Resin-Bonded	1.65	150	50	35	6	28	Low-noise appliances
CVB-RB40	Resin-Bonded	1.70	100	60	40	7	30	High-speed universal motors

Additional performance indicators

Voltage drop, friction, film formation, brush pressure, wear rate and commutation performance should be validated on a defined brush/contact system before they are published as released values.

3. Quick Material Selection Guide

Operating Need	Recommended Grade	Alternative
General industrial DC motor	CVB-EG20	CVB-EG30
Higher-load motor / generator	CVB-EG30	CVB-EG40
High-speed motor	CVB-EG35	CVB-NG30
Large DC machine / high current	CVB-EG40	CVB-EG45
Low-voltage, high-current system	CVB-CU30	CVB-CU40
Extreme low voltage / very high current	CVB-CU40	CVB-CU50
Precision signal / slip ring	CVB-AG30	CVB-AG40
Older machine / cleaning action	CVB-CG20	CVB-CG30
Very high speed / low current	CVB-NG30	CVB-EG35
Power tool / universal motor	CVB-RB30	CVB-RB40
Vacuum motor / low-noise appliance	CVB-RB35	CVB-RB30

Information Required for Final Grade Selection

Motor type - operating voltage - current density - peripheral speed - brush dimensions - commutator or slip-ring material - spring pressure - duty cycle - cooling - temperature - humidity - environment - required service life.

Engineering note: A brush grade is only one part of the contact system. The same material can perform differently when brush size, current, spring pressure, speed, commutator condition or atmosphere changes.

4. Technical Notes

Development status

All material values in this guide are development targets intended for preliminary selection. They are not guaranteed specification limits.

Resistivity

Electrical resistivity should be measured using a fixed specimen geometry and test direction. It is one of the most important indicators for brush electrical behavior.

Current density and speed

Recommended current density and peripheral speed are application guidance, not universal maximum ratings. Actual limits depend on brush geometry, cooling, contact material and duty cycle.

Metal graphite grades

Copper and silver content must be controlled independently from the grade number. For example, CVB-CU30 does not mean 30% copper.

Website publication

After CARBOLVE completes stable batch testing, the heading 'Development Target Values' can be replaced with 'Typical Material Properties'.

CARBOLVE
Carbon Brush Manufacturer
carbolve.com

For material recommendations, provide your motor model, brush size, operating voltage, current, speed, spring pressure and application environment.