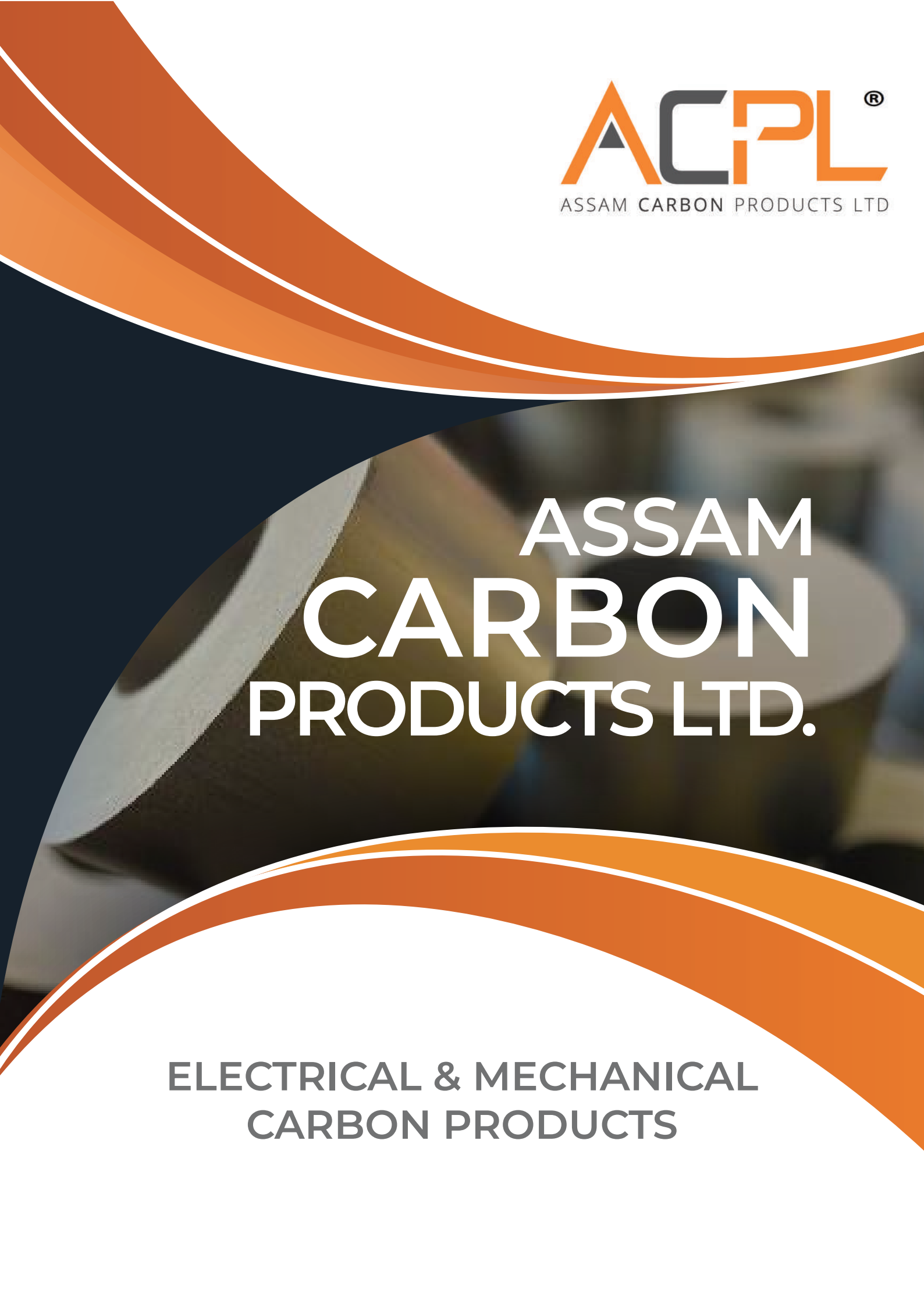




ASSAM CARBON PRODUCTS LTD.

ELECTRICAL & MECHANICAL
CARBON PRODUCTS



About Us

Assam Carbon Products Limited (ACPL) is a pioneer in the field of carbon and carbon-related products, with a vision to create innovative solutions that have the power to shape the future of industries. To this end, the company continuously strives to deliver customized products and solutions to help customers make their industrial processes safer, more efficient, and more sustainable.

Since its inception, ACPL has catered to an ever-growing industry portfolio, including Railway

Traction, Cement, Steel, Sugar, Mines, Power, Petrochemical, and Chemical Processes, by developing bespoke products for various applications.

ACPL's first manufacturing facility was commissioned in April 1963 at Guwahati, Assam, and gained prominence in the late sixties by indigenously manufacturing metal graphite carbon materials. To widen their grade portfolio, the company entered into a joint venture with Morganite Carbon Limited in 1972, acquiring some of the world's best technology and manufacturing practices. This partnership catapulted ACPL into a leadership position across India and opened up the global market.

ACPL's second manufacturing facility was established in 1984 at Patancheru, Telangana (earlier Andhra Pradesh), focusing on manufacturing fully finished mechanical carbon products, carbon brushes for traction and industrial applications, and metallized carbon strips for pantographs, including resin impregnation and various types of metal impregnation. In 1995, the Patancheru facility started supplying panto carbon strips to the Indian Railways.

ACPL has been awarded the ISO 9001:2015 UKAS Certification across both its manufacturing facilities.

As of May 2016, ACPL has once again become an independent entity after the present management took control from Morgan AM&T (formerly Morganite Carbon Limited). However, it retains the legal right in perpetuity to produce all the grades/products for which it has the requisite technical knowledge adopted from Morgan AM&T.

With over 400 people working across India, the company has created a diverse product portfolio in the fields of Electrical, Mechanical, and Specialty Graphite, encompassing a wide range of carbon and graphite products such as carbon brushes, current collectors, metallized carbon strips for pantographs, railway signalling contacts, carbon seals and bearings, carbon gland rings, steam joints, thrust pads, radial bearings, carbon vanes, and other specialty graphite products for varied applications.

In 2016, and again in 2024, the company embarked on a major expansion program to meet the rapidly growing domestic and export market demand.



Our Products



ELECTRICAL CARBON

Our product portfolio includes various types of carbon blocks, such as Electro Graphitise, Resin Bonded, Hard Carbon, Natural Graphite, and Metal Graphite. Our carbon brushes, manufactured in state-of-the-art fabrication facilities, are supplied to the Indian Railways and various industries.



SILVER IMPREGNATED GRAPHITE CONTACTS

Our range of Silver Impregnated Graphite (SIG) contacts is used in high-safety applications of railway signalling.



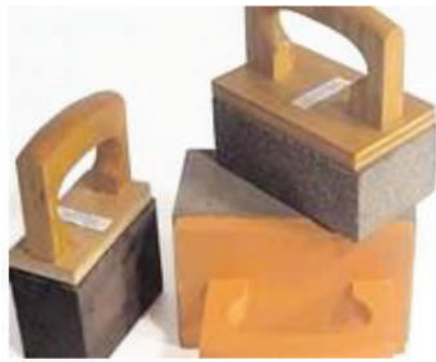
CURRENT COLLECTORS/ PANTOGRAPHS

Current collectors/pantographs are systems mounted on the roof of electric trains, trams, or electric buses to collect power through contact with an overhead line. As an approved source to many railway networks, our current collectors are both reliable and long-lasting.



MECHANICAL CARBON

Due to its self-lubrication, and both chemical and heat-resistant features, mechanical carbon is used for sliding parts in high-temperature or corrosive environments where metal cannot be used, as well as for submersion in chemicals and in fields where lubricated parts cannot be used. Our range of mechanical carbon components includes seal rings, bearings, vanes, stoker bush and thrust pads.



DIAGNOSTIC TOOLS

The company supplies diagnostic tools such as commutator profilers, vibration analysers, and consumables for commutator and motor maintenance, including brush bedding stones, glass fibre rods/brushes, chamferers, scrapers, mica undercutters, and more. The company also deals in carbon brush holders, springs, and other accessories, as well as brush pressure meters.



SPECIALTY PRODUCTS

Our range includes high-temperature insulators (like steam-heated rolls), heating elements for fuel cells, continuous casting dies, lubricating blocks, crimper discs, and jigs and fixtures.

Our Process

MIXING

Different mixing technologies are used depending on the grade to be produced. The mixed powder / material is sent to the laboratory to validate physical and chemical component.

PRESSING

The powders are then pressed into a semi-finished form. We use a range of different Hydraulic and Mechanical Presses depending on the end use of the product.

RAW MATERIAL QUALITY VALIDATION

Raw material is procured from the most reliable and approved sources. Every batch of raw material has to go through ACPL's 3-stage quality check at our laboratories before it is made available for production.

BAKING

Once pressed, materials are baked in state-of-the-art furnaces using the latest hot air flow technology.

GRAPHITIZATION

Post baking, the carbon undergoes graphitization in specialized designed chambers. During this process the carbon undergoes structural changes.

MACHINING

The carbon material is lastly cut and machined to its finished state.

IMPREGNATION

Depending on the end use, the pores of the carbon material are impregnated under high pressure with different materials such as Resins, Chemicals, and Molten Metal.

Why do we recommend Carbon?

Carbon is known as the most essential element for life and is second most abundant — after oxygen — in the human body. In nature, carbon is similarly abundant and available in two allotropic forms- Amorphous and Crystalline.

Carbon is chemically inert with good chemical resistance, has high thermal conductivity and low thermal expansion. This makes it useful in tribological applications dealing with 'friction, wear and lubrication'. Carbon fibre is stronger than steel but lighter, making it ideal for manufacturing. Carbon also has a higher resistance to thermal shocks and stability at elevated temperatures, making it most suitable for innumerable applications across various industries.

Graphite, a crystalline form of Carbon that is available both naturally and can be artificially produced has some peculiar properties, making it extremely important to various industries globally. Graphite is soft, greasy and has good lubricating properties which makes it an ideal material for mechanical seals. Furthermore, it is a good conductor of electricity, making carbon brushes widely used to transfer current from stationary to rotary surfaces and in linear current collectors.

ISO 9001

BUREAU VERITAS
Certification



Achieving Quality

ACPL believes that "Quality is produced and not tested." We have a sophisticated Quality Control Laboratory staffed by a qualified technical team who (1) ensure strict compliance with the quality of all incoming raw materials and consumables, (2) continuously work on product and process improvement and development, and (3) inspect every finished product before delivery to the customer.

Material Testing

Various types of graphite, cokes, and blacks are used, such as natural and artificial graphite, petroleum cokes (both raw and calcined), low ash metallurgical cokes, foundry cokes, carbon black and lamp black, coal tar pitch, anthracite and tar oil, resins, chemicals, and molten metals. Our products are tested across multiple parameters including.

- Apparent Density
- Porosity
- Hardness
- Specific Resistance
- Transverse Strength
- Coefficient of Friction
- Contact Drop

These properties are inherent in the materials themselves, distinct from performance characteristics in operation on electrical rotating machines.



Pre and After Sales Service

ACPL provides application engineering support to its customers through its customer service centres. Our quality strategy is to provide complete satisfaction to our customers by producing material of consistent quality and delivering on time.

Stringent Quality Assurance

All mechanical and electrical products strictly undergo stringent quality control at various stages, including contact resistance tests, mV drop tests, and pull-out strength tests for brushes, as well as pressure tests, light band tests, and surface roughness tests for mechanical carbon products.



Process

The company has a strong focus on getting the process right. We know that sourcing quality raw materials and rigorously following each step within our process will yield the desired quality every time.



Electrical Carbon

ACPL produces a wide range of Carbon Brushes for Railway Systems, the entire range of DC Motors and Generators, and for Fractional Horse Power (FHP) motors. These are used across multiple industries including Power, Cement, Sugar, Boiler, Agriculture, Mining, Paper, Defence, Automotive, Power Tools, Domestic Appliances, etc. We also produce a wide range of carbon blocks and blanks in various grades.

For Railways system in addition to the Traction Brushes includes Carbon Strips for Pantographs, Current Collectors for the Metro/ Underground railway system and Railway Signaling Contacts.

BRUSH FOR INDUSTRIAL APPLICATIONS

Our Industrial Brush applications cover an extremely wide field: from very large motors found in heavy industries and turbo alternators used in power generation plants, to smaller fractional horsepower motors delivering or consuming less than 750Watts for power tools and domestic appliances.

Given India's drive towards "Atmanirbharta", our focus has been on grade development to meet the operating conditions for newer motors. Our need to deliver superior quality products has also motivated our industrial preference towards using high quality manufacturer and suppliers and we have successfully indigenised all such requirements based on decades of experience in assessing and evaluating product + grade performance across local environments.

ACPL offers a complete range of carbon brushes in various grades such as Electro Graphite (EG), Resin Bonded (RB), Natural Graphite (NG), Hard Carbon (HC), and Metal Graphite (MG) to meet different motors' operating conditions

Various ACPL grades are produced and, when required, additionally treated with chemicals and resin impregnations to meet special operating conditions. These conditions include eccentricity in the running surface, current distribution between individual brushes, brush pressures, short-term loads, rapid rates of rise and fall of current, low load or overload operation, chemically corrosive gases or vapour, very high to very low ambient temperatures, oils, high dust, ash content, and varied humidity levels in the atmosphere etc.

ACPL's expert technical and quality teams can provide support on all operational issues, such as:

- High or uneven brush wear
- Brush sparking
- Patchiness and burns on segments
- Grooving
- High humidity, foreign bodies
oil and grease layers, gas pollution
- Brush oscillation
- Surface condition of slip ring or commutator
- Condition of running surface
- Collector run-out





**ACPL is an
approved source for the
Indian Railways**

BRUSH FOR TRACTION APPLICATIONS

Performance requirements for Railways Traction motors are significantly different from those of industrial motors. ACPL is one of only three companies worldwide with full approval from Indian Railways- RDSO, CLW, DMW, ICF, RCF to supply the India Railways with brushes meeting all their diverse requirements for their entire fleet of locomotives, whether they use Japanese, German, USA or French technology.

The company fabricates all its traction brushes for the railways from Electro Graphitised (EG) blocks produced at its modern factory in Guwahati and has been successfully supplying to the railways for over four decades.

Electro Graphitised material provides excellent frictional properties, good electrical and thermal conductivity, and high-temperature resistance, especially in the most demanding operating conditions in India. To meet the different operating requirements of various railway traction motors, whether for specific climatic or performance conditions, the company imparts special supplementary treatments to its various grades of EG blocks. Over the years, ACPL has continued to meet the most stringent quality, life, and performance standards.

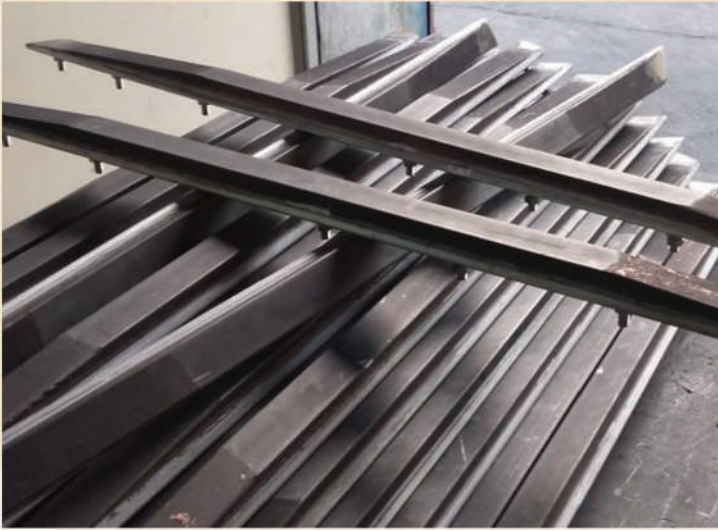
Below is a chart showing the EG grades for different applications and locomotives:

		EGO	EG14	EG14D(I)	EG16K	EG105(I)	EG105S	EG116S	EG224	EG225	EG236S	EG251	EG284	EG3	BM51	M14Z1	HM6
Diesel Locomotive				•													
	Generator	•								•	•						•
Electric Multiple Unit	D.C			•											•		
	A.C			•											•		
Electric Locomotive	D.C			•											•		
	A.C					•	•	•					•		•		
Metro Railway				•											•		
Auxilliary Application		•	•	•	•			•	•	•	•	•		•	•	•	

Our recommendations on various applications of our standard grades are the result of extensive research and analysis, both in our laboratories and from decades of practical experience. Operating conditions play a crucial role in the performance of carbon brushes, such as the eccentricity of the running surface, current distribution between individual brushes, brush pressure, short-term loads, rapid rates of rise and fall of current, low load or overload operation, chemically corrosive gases and vapour, high or low ambient temperatures, oil fumes, high dust and ash contents, and humidity levels in the atmosphere. Therefore, users must consider all these parameters for better performance of carbon brushes.

The below table is a guide for our grades based on application and performance:

Grade Chart- Railways										
Grade	Resistivity (Micro-ohm-cm)	Transverse strength (Kgf/cm ²)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm ²)	Application Guide
BM51	28.5-47.5	920-1380	5.35-5.91	Nov-15	0.4	23.1	0.08-0.20	30	140	Suitable for earth return applications of Electric locos/EMU/LHB Coaches
EG105(I)	3940-6560	168-252	1.54-1.70	59-80	0.87	12.5	0.05-0.15	50	490	Suitable for traction motors TAO 659 used in electric locomotives/type WAM4. WAP 1/3, WAG5A.
EG105S	3937-6562	168-252	1.54-1.70	60-81	0.87	12.5	0.07-0.18	50	490	Specially treated grade. Suitable for traction motor Hitachi HS15250A/HS1050 used in WAM4A WAG5, WAG7 locomotives.
EG116S	3750-6250	168-252	1.59-1.75	60-81	0.87	12.5	0.07-0.22	50	490	Especially built for rectified A.C. and D.C. Traction applications. Approved grade for TAO 659 and also for auxiliary blower motors
EG14	3675-6125	140-210	1.49-1.65	52-71	0.92	12	0.05-0.20	50	210	Widely used grade, suitable for Main compressors, auxiliary compressors etc.
EG14D(I)	3700-6100	180-270	1.58-1.75	56-75	1.1	12	0.06-0.16	50	210	Particularly suitable for traction motor applications of Diesel locomotives, MEMU, EMU, DEMUs, Kolkata Metro
EG16K	3940-6560	128-192	1.47-1.63	49-66	1.05	12	0.06-0.18	50	210	Suitable for wide range of blower motors used in diesel locomotives.
EG224	3600-6000	120-180	1.52-1.68	51-69	1	12	0.1	50	180-350	Suitable for motors used in auxiliary applications in locomotives and EMU
EG225	2700-4500	112-168	1.52-1.68	36-50	1.07	10	0.07-0.18	50	210	Suitable for BHEL Traction generators used in Diesel locomotives and Auxiliary generators
EG236S	3940-6566	128-192	1.47-1.63	49-66	1.05	12	0.06-0.20	50	210	Suitable for GE Traction generators of Diesel locomotives and compressors.
EG251	3900-6500	136-204	1.54-1.70	51-69	1.15	10	0.06-0.18	50	210	Suitable for peak loads as well as periods of light load running, such as auxiliary generators of Diesel locomotives.
EG284	3860-6440	176-264	1.55-1.71	58-78	1.12	12.5	0.06-0.18	55	560	Suitable for most Heavy-duty Traction application.
EG3	2175-3625	132-198	1.59-1.75	45-61	1.15	8.5	0.06-0.18		560	Suitable for Railway Carriage Fan Brush.
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Widely used grade in auxiliary motors of diesel locomotives like fuel pump motors, Eddy Current Clutch motors, Crank case motor etc.
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	50	180	Specially treated grade to increase its operating speed. Recommended for steel and bronze sliprings. Used on Companion and Main Alternators of EMD locomotives
HM6	1387-2312	120-180	1.39-1.54	15-21	1.66	12.5	0.07-0.20	80	140 - 180	Suitable for Traction alternators used in Diesel locomotives.
M14Z1	May-15	300-800	5.30-5.80		0.4	25	0.17	30	175	Suitable for earth return applications of Electric locos/EMU/LHB Coaches



The advent of the diesel engine revolutionized railway operations, making them more comfortable, faster, and reliable compared to the steam engines it replaced. Diesel engines were the first to incorporate carbon brushes on their generators to power the locomotive motors. However, with the increased demand for higher speeds, greater load-carrying capacities, and changing environmental conditions, diesel engines began to be replaced by Electric Locomotives. Initially both diesel & electric locomotive had Direct Current (DC) motors but these are now getting replaced by brushless Alternating Current (AC) motors.

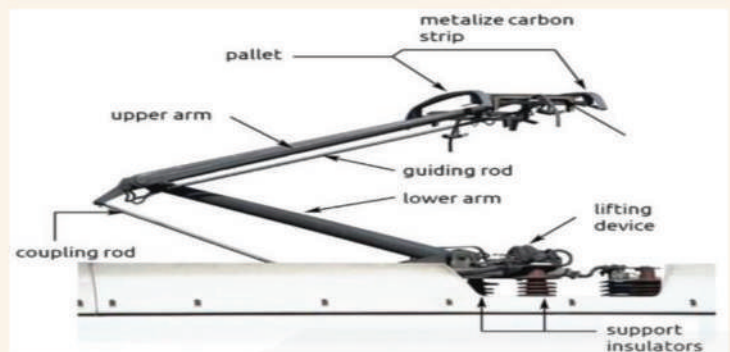
These AC motors are brushless but derive electrical power through overhead cables using current collectors made from carbon, known as Linear Current Collectors.

CURRENT COLLECTOR & PANTOGRAPHS

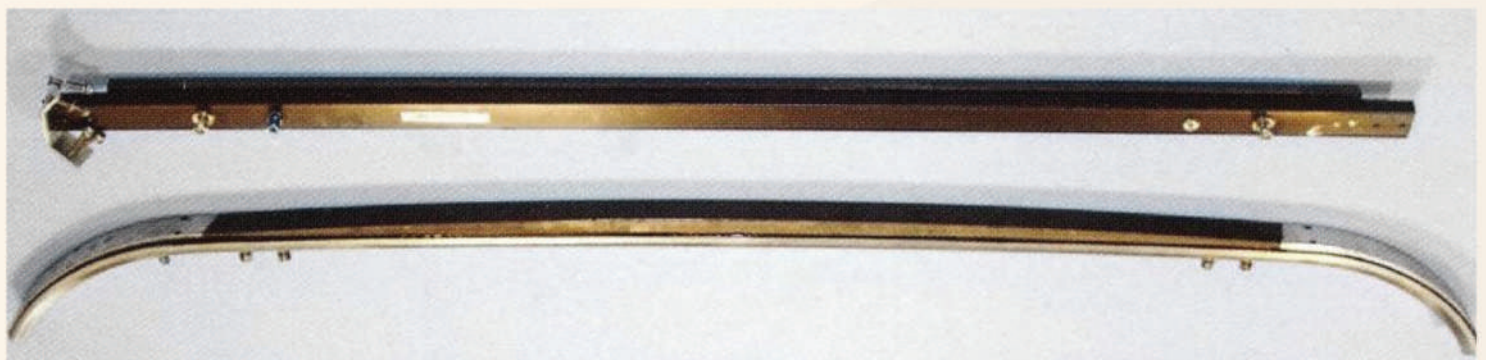
Linear current collection is similar to carbon brush collection, except in linear collection, the collector moves rather than the conductor. Current collectors have relative motion along a line instead of around a rotating cylinder; point or line contact is present, as opposed to the area contact of a brush. This leads to more frequent and complete rupture of contact, causing sparking and arcing. Additionally, linear current collectors are often used outdoors, subjecting them to environmental and weather variations. To cope with these disadvantages, collector materials must be much harder, denser, and more abrasive than brush materials.

The main benefit of using carbon collectors is the development of a skin (film formation) on the contact wire, which substantially reduces overhead wire wear and increases wire life compared to metal-to-metal surfaces. Since carbon has no molten state, it eliminates welding, a major problem arising from metal-to-metal contacts under arcing conditions, enhancing safety.

As an approved source to the Indian Railways, Assam Carbon Products Limited executed and delivered its



first order of pantographs in 1993-94.





SILVER IMPREGNATED GRAPHITE CONTACTS

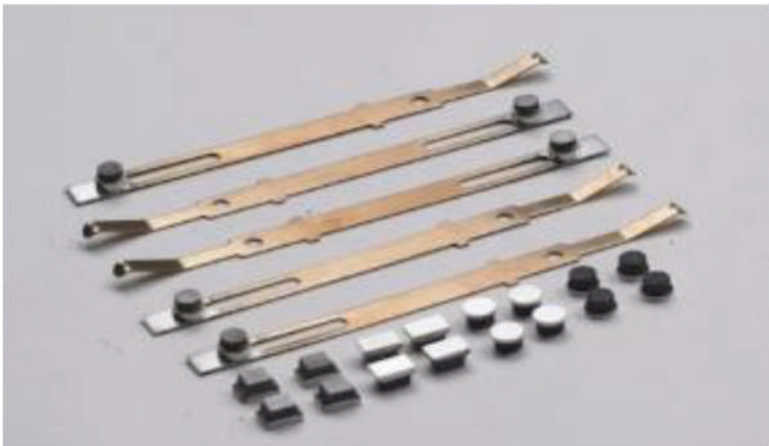
for Railway Signalling Relays

This combination of properties makes these contacts suitable for high safety applications such as railway signalling/traffic signalling and numerous other applications.

Silver Impregnated Graphite (SIG) contacts are used in high safety applications of Railway signalling, Traffic signalling, and numerous other applications due to the high silver content, which eliminates the risk of welding in the presence of graphite.

Silver Impregnated Graphite relay contacts combine the best properties of silver (electrical conductivity) and graphite (lubricating nature) into a composite material. Distinctive features of the SIG material include its hard fusing characteristic, better conduction of heat and electricity, and easy brazing. Graphite carbon has a high heat of vaporization and appreciably low material transfer in the localized high-temperature spots developed during the mating of contacts. Additionally, due to a high percentage of silver, the desired electrical properties are retained with practically no risk of welding.

Silver Impregnated Graphite contacts are generally tested for dimensions, crushing strength, silver content, hardness, ash content, distribution of silver in the graphite matrix, contact resistance, X-ray mapping of silver, microstructure, life test, surface finish, and bulk density.



Material Specification for Silver Impregnated Graphite Contacts	
Quality Parameters	Value / Range
Grade (after Silver impregnation)	SM7
Silver Content (by weight of silver)	45 to 55 %
Hardness	38 to 52 Shore "C" scale (on Scleroscope)
Compressive Strength	800 Kg per Sq.Cm. (Min)
Specific Resistance	200 Micro Ohm-Cm (Max)
Contact Resistance	Not to exceed 0.05 Ohm when a Direct Current of 100 Milli-Amps is passed through the contact and at a contact pressure of 28 gms between the contact and the spring
Copper Plating Thickness	As per requirement of customer
Ash Content in the Base Grade	0.2 % (Max)





DIAGNOSTIC TOOLS

ACPL provide a wide range of Diagnostic Tools and accessories to help with Brush maintenance and Commutator maintenance

1. Commutator Profilers - measure and record linear displacement.

2. Diamond D Commstones - effectively and efficiently remove flat spots, high bars, grooves, ridges, high mica, and other commutator and slip ring defects. We provide 6 different grades for commutators and brass or copper slip rings, and another 3 different grades for cast iron and steel slip rings.

3. Commutator dressing and finishing stones

- Straight or right-angle tramway handles mounted at a 45-degree angle ensuring a good grip even in awkward positions
- Adjustable handles with a permanently mounted short knob and a removable handle that can be inserted in 3 different positions
- Railway handles with the handle mounted vertically allowing the user to apply even pressure
- Straight or right-angle handles with a long handle excellent for commutators that are difficult to reach.
- Unmounted stones are available in a complete range of sizes up to a maximum of 14" x 14" x 3"
- Saw Handle stone is mainly used on larger motors and generators, and its large handle provides excellent control.
- Double Saw Handles offer excellent leverage and control when used on very large rotating equipment.
- Small motor combination stones are used on fractional horsepower motors.
- Pencil type/plain lathe type stones are unmounted, with smaller sizes used on small motors and generators, and larger sizes in a lathe or portable grinder.
- Lathe type with handle is supplied with a wooden block handle, allowing the entire stone to be used in a lathe or portable grinder.

4. Brush seating and cleaning stones,

5. Brush seater holders which add an element of safety when seating brushes whilst the motor is running,

6. Arrangement and mounting of brush holders

7. Contact pressure for carbon brushes.





Mechanical Carbon

ACPL's Mechanical Carbon division manufacture a large range of Carbon Seal Ring, Gland Ring, Stoker Bush Bearing, Radial Bearing, Clutch Release Bearing, Steam Joint, Thrust Pad and Vanes, with applications across multiple industries and sectors.

Our Speciality Graphite division further offers solutions including Fuel Cell Plates, Heating elements, Continuous Casting Dies, Lubricating Blocks, Crimper Disc, Jigs and Fixture for the various industries such as Diamond tool

industry, Optical Fiber industry, Rotary kiln in Cement plants, Hard metal sintering and Electronics industry.

Our materials have good self-lubricating properties, making them an ideal material for Mechanical Seals. Furthermore, Carbon is chemically inert with good chemical resistance, has high thermal conductivity and low thermal expansion. It has a higher resistance to thermal shocks and stability at elevated temperatures making it highly useable for tribological applications (excavators, oil rigs, mine slurry, pumps, and tunnel digging drills) in industry.

Our machining unit in Hyderabad, Telangana, India is equipped with the latest state of the art machines to offer multiple grades and customised sizing to suit the needs of the customer.

CARBON SEALING RING

Carbon Seal Rings are used as the wear face of most mechanical seals to minimise or eliminate leakage of process fluid to the atmosphere. The carbon used in seal faces is a mixture of amorphous carbon and graphite. This is impregnated with resin or metal which greatly increases strength and makes the carbon impermeable. Furthermore, we lap these to within 2-3 helium light bands for flatness and polish the sliding surface of the seal ring for even better performance. [Carbon face: Ra 0.2 to 0.4 μm , Counter face: Ra 0.15 to 0.4 μm]



Pressure tightness test

At ACPL, the pressure tightness of carbon seal rings is inspected by pressuring carbon seal using nitrogen and dipping in water for 2-3 minutes. Large quantities are inspected on statistical base. Usual test pressure at 6, 10 or 14 bar

Suitable counter face material includes Tungsten Carbide, Chromium Oxide (Plasma Coating), Sintered Ceramics (for wet running), Silicon Carbides

We have a wide range of grades for various applications of Seal rings including CY2C, CY10C, MY3B, AC4000, MY10D, MY3K, MY10K. The selection of the grade depends on other factors like temperature, PV value, working media (type of lubrication), counter-face material etc. and our experienced technical team can help you find the grade most suitable for your applications

Applications include:

Centrifugal pumps, Mixers, Agitators, Turbines, Compressors, Centrifuge Blowers etc.

CARBON & GRAPHITE BUSH BEARING

The generic term 'Carbon Bearings' includes all possible variations of the basic material 'Carbon'. Therefore, it covers 'carbon-graphite', 'metal-graphite' and 'electro-graphite'. Carbon is self-lubricating and has a low coefficient of friction at high and low temperatures. Its use as a bearing material is extensive when a conventional lubricant is not possible, and where the performance of other lubrication is poor. Carbon can run dry or in fluids which are corrosive or unsuitable as lubricants.

Grades such as CY2, CY2C, CY10C, MY10K, MY3A, MY3B, MY3D and EY9106 are most suitable for Bearings.



Our Carbon Bearings are widely used for Industrial Pump Shaft Support & Sealing:

- Where oil contamination cannot be tolerated, e.g. in textile and food machinery
- Where temperature exceeds the limits of normal lubricants, as in furnace and boilers
- Where the bearings are immersed in a liquid like hot thermic fluid, hot and cold water, seawater, acids or alkaline solutions or all solvents such as benzene, etc.

Applications include:

Dry Operations (Conveyors, Traveling grate stokers, Flue gas damper, Furnace roller and charger bearing, Veneer and paper-drying machines, Rollers on micro-switches).

Wet Operations (Centrifugal pumps, Geared pumps, Fuel metering pumps, Liquid measuring machines, Submersible pumps, Central heating circulating pumps, Automatic washing machines, Aircraft fuel pumps, Seal-less zero emission pumps).

- **Chain/ Travel Grate Boiler of Stoker and Flue Gas Damper:** Traditionally used grease lubricated cast iron bearings needed to be replaced at approximately 18-month interval due to radial wear (+9.5mm). Subsequent seizures and shaft wear also needed rebuild-up, re-grinding, excessive consumption of grease and frequent maintenance. After switching to our Carbon bearings, shafts remain highly polished with negligible wear across several years with zero maintenance and minimal replacement.
- **Ten- ton Furnace charging machine:** Our carbon bearings have proved successful despite high operating temperatures, not achievable before.
- **Veneer Drying Oven:** Carbon bearings have replaced the traditional grease lubricated ball bearings and now require only nominal service. A total of 850 carbon bearings are fitted in these types of ovens, where each pair of bearings supports 400mm long hollow steel roller.
- **Rust Proofing Conveyor:** Despite the high temperatures (up to 230 °C) and corrosive materials (caustic solution, phosphate solution, chronic acid) across the bonderising cycle, our bearings have proven to need nominal replacement. This is in significant contrast to the original oil-retaining sintered bronze bearings which gave constant trouble- excessive wear, high friction and frequent seizures due to high temperature.
- **Submersible pump motor:** Our carbon bearings can withstand being completely immersed in circulating distilled water in a 260kW motor with negligible bearing or shaft wear after several years continuous service. This is not the case with lignum vitae bearings that would swell over time.

- **Vertical Centrifugal Pump:** Our bearings have shown negligible wear when immersed in circulating 10% caustic solution. Previous pumps employed Bakelised fabric composition bearings, which gave trouble due to swelling.
- **Aircraft Fuel Pump, "Swash Plate" Type:** Carbon bearings have proved to be most suitable as main rotor bearings, completely immersed in circulating fuel, i.e., petrol, paraffin, kerosene, etc.

RADIAL BEARING

A Radial bearing works significantly better than a LTB bearing. The low coefficient of friction improves the overall efficiency and is able to achieve better machining tolerances. Salient features include:



- Helps pump run in dry conditions
- Lowers heat generation
- Contributes towards conservation of power
- Is able to withstand unpredictable load
- No seizure of motor after prolonged rest
- Lower maintenance cost
- Performance of low HP pump at par with that of higher HP pump
- Start up at 90 volts vs 120 volts for Ferro Asbestos
- Improves pump efficiency by minimum 3-5%,

Our CY10C Resin impregnated and MY10K Antimony metal impregnated are both strong general purpose carbon graphite grades with good chemical resistance and suitable for Radial Bearings, especially where a strong impervious grade is required.

CARBON THRUST PAD

Carbon Thrust Pads used mainly for Submersible Pumps and Motors and can be resin impregnated or metal impregnated depending on the application. All our carbon grades retain the basic properties and can operate in conditions beyond the limits of other materials, making them ideally suited for Thrust pads.

Submersible motor type	Standard size of carbon thrust pad	Recommended grades
V3	30 x 20 x 5.5 44 x 22 x 5.5	CY10C
V4: 0.5 to 5 HP Single & 3ø	48 x 22 x 6 59 x 31.5 x 6	CY10C/ MY10K
V6: 2 to 20 HP Single & 3ø	80 x 31.5 x 6/8 85 x 35 x 6.5	CY10C/ MY10K
V8: 5 to 90	105 x 51 x 8 110 x 52 x 10	CY10C / MY10K/ MY10D
V10	130 x 62 x 15	MY10K
V12	170 x 67 x 20	MY10K





CARBON GLAND RING

The self-lubricating properties of Carbon make it an ideal material for both contact and non-contact types of gland rings, which are used for sealing liquids and gasses, restricting leakage to a minimum.

Our Carbon Graphite Gland Rings for Water Turbines (Steam and Gas) provide a simple and effective seal and are the most reliable choice over soft gland packing. These can be fitted and do not require frequent adjustment, which does not damage or wear the turbine shaft.

Our Resin impregnated CY10C and Electro-graphitised EY9106 grades are particularly used for Gland Rings. EY9106 is also suitable at very high temperatures of over 450 °C.

Applications include

- Steam G Gas Turbine- Non-contact gland rings which seal by throttling are used. The bore of the carbon ring is designed to match the shaft diameter at the operating temperature.
- Water Turbines (Kaplan G Francis Water Turbine)- Segmental carbon rings with special joints enabling the rings to maintain contact with the shaft as wear of the carbon occurs are widely used.
 - Rings can be either Tenon type (where each segment is mated to its neighbour by an internal tongue fitting into its recess) or Wedge type (a series of long segments and short wedge pieces where the ends of the segments are angled to present sliding surfaces to the tapered wedge pieces).
 - Radial Face seals are also used in Francis Turbines. Here two concentric carbon rings run against a counter face fixed to the turbine shaft.
- Labyrinth Glands- Carbon Labyrinth glands have smaller radial clearances as compared to metal labyrinths and can be used at higher pressures, and through a shorter axial length can be sealed effectively. They are used as main shaft seals in gas turbines, auxiliary steam turbines, rotary compressors and blowers.

CARBON STEAM JOINT

A Rotary Joint or Rotary union provides a mechanical seal between a stationary supply pipe and a rotating drum or cylinder to permit the flow of heat transfer media into and/or out of the rotating roll. Heat transfer media typically used with rotating joints includes steam, water, thermal oil, hydraulic oil and coolant. These seals are used across multiple industries including Pulp and Paper, Textiles, Chemicals, Rubber, Plastics and Tyres.

Our Carbon Graphite Resin-impregnated CY10C grade is suitable for medium pressure of 8 to 14 kg/cm² and Carbon Graphite Antimony (metal)-impregnated MY10K grade for high pressure 14 to 40 kg/cm².

Applications include

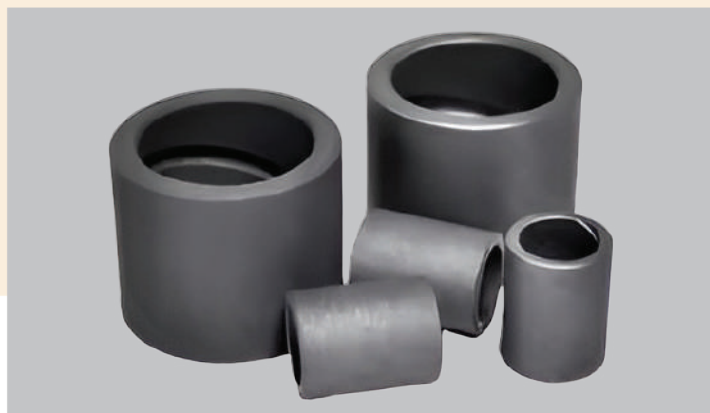
Steam-heated rolls and Steam nozzle joint



CARBON STOKER BUSH

Our Carbon Graphite Stoker Bush is widely used for Traveling Grate Boilers across multiple industries, including Sugar, Rice, Agro, Jute and Turbine-based, as well as in process industries such as Paints, Chemicals, Paper & Pulp, Edible Oil, Food Processing and Distilleries. This is because they:

- Are self-lubricating and preferred when conventional lubrication is not possible prevent
- Prevent all contamination from Oil, Grease or Dust
- Are functional at temperatures that are typically too high (above 550°C) for conventional lubricants and where operating conditions make it impractical to use other material. Other metal bush mostly needs oil and grease for lubrication which starts to volatilize or carbonize above temperatures of 200 °C
- Can run satisfactorily under varied conditions



Our MY3A copper-impregnated grade is universally approved for Stoker Bush. It has good mechanical strength, resistance to thermal shock, is suitable for dry conditions at high temperature up to 350 °C and low speed.

CARBON VANE

Carbon Vanes are an essential component in oil-free vacuum pumps and compressors and provide cushioning and lubrication. ACPLs Carbon Vanes come in various grades and used for rotary gas compressors, vacuum and liquid pumps. They meet the following requirements:

- Have **high mechanical strength**
- Are **chemically inert and non-toxic** which cannot contaminate the liquid or gas being handled. They can safely be used in food-processing equipment and in other fields where purity is essential
- Are totally **unaffected by water (pure or salt), most acids, alkalis or oil solvents** such as petrol or paraffin. In these conditions, the liquid can reduce friction and wear by providing lubrication between vane and rotor slots and vane top and cylinder wall
- Are **self-lubricating** and therefore ideal for pumps, and for handling of liquids such as petrol which has poor lubricating properties. They can also. operate in unlubricated compressors to deliver air or gas uncontaminated by lubricating oil or grease, in which case. Carbon gives a fine polish to the cylinder wall which reduces the wear rate of the vane after bedding almost negligible proportions.
- Have **fine tolerances & surface finish**. Even at 400 C thermal expansion in Carbon is minimal (they are also non- hygroscopic and do not swell after immersion in hot or cold water) the vane clearance in its rotor slot can therefore be fine. A tolerance of ± 0.02 mm can be maintained in bulk production.



Our CY10C, CY10F, MY10A grades are strong, impervious and suitable for Vanes.

Applications include:

Dry running rotary compressors and vacuum pumps, Mobile compressors fitted to bulk delivery tankers, Printing machine compressors Spray paint equipment, Packing machinery, Food processing equipment, Wet running vane pumps and meters Automotive diesel fuel pumps, Drink vending machines, Fuel tanker meters, Sea water pumps, Kerb-side petrol pumps and Bulk metering pumps

SPECIALITY GRAPHITE

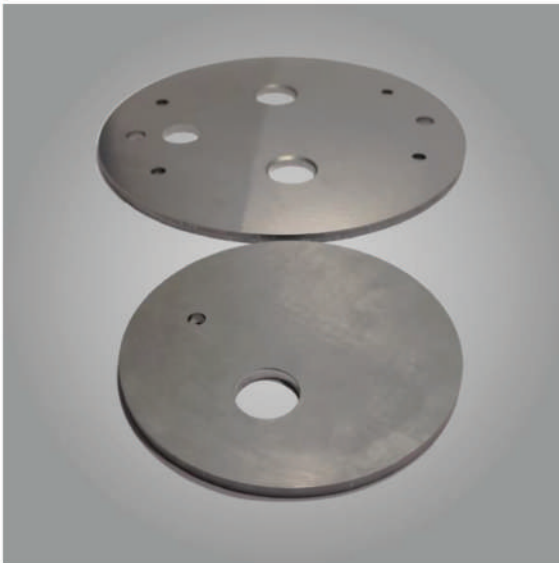
Specialty graphite is very special material with high density, high strength and fine micro-structure. They feature good dry-running properties when used in tribological systems.

Heating elements:

Our Graphite Heating elements are available in all standard diameters and lengths, and are supplied with matching precision

Properties include:

- 1) High electrical loading capacity,
- 2) High thermal shock resistance,
- 3) High mechanical strength,
- 4) Good oxidation resistance and
- 5) Resistivity is very high in heating elements and very low in contacts.

**Continuous Casting Dies:**

Whilst the Semifinished products are used in cylindrical and rectangular formats with specific property combinations, the Ready-made dies are precision-machined with optimum surface finish, for the continuous casting of precious metals.

Properties include:

- 1) High Density,
- 2) Good Thermal Conductivity,
- 3) High Chemical Resistance,
- 4) Minimal wettability by molten metal, and
- 5) High Resistance to wear



ACPL'S RANGE OF MECHANICAL CARBON GRADES

Mechanical Carbon - Graphitised Grades										
Grade	Apparent Density (gm/cc)	Hardness (shore)	Transverse Strength (kgf/cm ²)	Compressive strength (kgf/cm ²)	Dynamic Elastic modulus (kg/cm ² x 10 ³)	Porosity (apparent) (%)	Coefficient of Thermal expansion (°C ⁻¹ x 10 ⁻⁶)	Thermal Conductivity (cal.cm ⁻¹ .s ⁻¹ .°C ⁻¹)	For usage at Max temp	Application
AC4000	1.58-1.68	60-70	300-450	1050-1550	175	6.0-13.0	4.5	0.05	350 °C	A strong dense fine grain Carbon-Graphite used in particular seal rings applications
CY2	1.59-1.75	51-69	248-371	815-1225	180	7.0 -15.0	3.4	0.05	350 °C	A strong dense and fine-textured hard carbon graphite suitable for most Bearings
CY10	1.50-1.66	57-77	334-502	1120-1680	180	10.0-21.0	3.6	0.03	350 °C	A strong carbon graphite material used mainly for Seal Rings
CY9106	1.52-1.68	76-103	338-506	1296-1944	150	9.0-17.0	4.2	0.02	350 °C	A high sulphur/ acidic media, used for Seal and Piston Rings
EY9106	1.60-1.80	50-65	250-450	480-720	84	9.0-17.0	4.1	0.15	450 °C	A stronger electrographite grade suitable for very high temperature application up to 500°C - mainly in Steam joints and Gland packing rings
MAT	1.66-1.84	64-86	448-672	1350-2000	175	6.0-13.0	4.5	0.05	350 °C	Seal Rings

Mechanical Carbon - Impregnated Grades										
Grade	Apparent Density (gm/cc)	Hardness (shore)	Transverse Strength (kgf/cm ²)	Compressive strength (kgf/cm ²)	Dynamic Elastic modulus (kg/cm ² x 10 ³)	Porosity (%)	Coefficient of Thermal expansion (°C ⁻¹ x 10 ⁻⁶)	Thermal Conductivity (cal.cm ⁻¹ .s ⁻¹ .°C ⁻¹)	For usage at Max temp	Application
CY1X	1.61-1.85	51-69	252-378	816-1224	240	10.0-14.0	3.4	0.05	200 °C	Used mainly for Automotive clutch release bearings
CY2C	1.70-1.94	70-95	500-700	1700-3500	240	0.05-2.0	4.5	0.05	350 °C	Impervious Carbon graphite grade having good chemical resistance. Used mainly for bearings, sealing rings and gland rings applications.
CY10C	1.70-1.90	70-95	600-825	1700-3500	230	0.05-2.0	4.0	0.03	350 °C	A strong general-purpose carbon-graphite with good chemical resistance. Used for bearing, sealing rings, piston rings, vanes and steam joint rings. Often used where a strong impervious grade is required.
CY10F	1.50-1.66	68-92	504-756	1120-1680	200	10.0-21.0	3.8	0.03	350 °C	Piston rings & vanes
CY4000	1.74-1.92	72-98	490-750	1960-3200	224	Max. 3.0	5.2	0.03	350 °C	Seal Rings
CY2T	1.61-1.79	51-69	236-394	765-1275	180	Max. 4.0	3.4	0.05	350 °C	Water turbine rings
CY2W	1.75-1.93	60-85	263-438	952-1588	210	Max. 2.0	4.2	0.05	170 °C	Gland & sealing rings
CY2WA	1.73-1.92	68-92	424-636	1352-2028	250	Max. 2.0	4.2	0.05	170 °C	Sealing rings
CY10W	1.66-1.84	66-90	424-636	1296-1944	220	Max. 2.0	3.8	0.027	170 °C	Piston & sealing rings
CY10WA	1.71-1.89	71-96	560-840	1720-2580	210	Max. 2.0	4.2	0.03	170 °C	Piston & sealing rings
CY3000	2.00-2.23	70-95	690-1050	2200-3400	340	Max. 3.0	4.5	0.03	350 °C	Seal Rings
EY9106A	2.00-2.50	45-55	475-520	1400-1800	84	Max. 2.0	4.1	0.15	450 °C	Piston Rings, Gland packing Rings
MAT4000	1.74-1.92	72-98	490-750	1660-2500	224	Max. 3.0	5.2	0.03	350 °C	Seal Rings
MY3A	2.00-2.70	65-80	500-800	1500-3500	309	Max. 3.0	5	0.04	350 °C	Good mechanical strength and resistance to thermal shock. Preferred for large bearings and suitable for dry condition at high temperature and low speed e.g., mechanical stoker bush, steam flap valves, dampers etc
MY3B	2.00-2.70	65-85	500-800	1700-4500	260	Max. 2.0	4.2	0.055	120 °C	Suitable for water and conveyor bearings limited to 120°C operating temperature this material is impervious.
MY3D	2.00-2.70	65-85	600-900	1800-4500	300	Max. 2.0	5.4	0.06	350 °C	A general-purpose material for Bearings and Seal Rings, used for a wide range of applications involving arduous running conditions. Under wet conditions very high PV values are possible.
MY3K	2.20-2.50	70-75	700-900	1680-2520	210	Max. 2.0	4.4	0.04	350 °C	Bearing & Sealing rings
MY10A	2.35-2.95	70-95	700-1100	2000-4500	340	Max. 2.0	5.2	0.05	350 °C	Piston rod packing rings, Vanes
MY10B	2.45-2.75	65-85	675-1015	1950-2950	260	Max. 2.0	5	0.035	120 °C	Has good running properties in wet applications. Used mainly for sealing rings and some bearing applications.
MY10D	2.40-3.20	70-95	700-1100	2000-4500	300	Max. 2.0	5	0.04	350 °C	Bearing & Sealing rings
MY10K	2.15-2.80	70-85	700-1100	2500-5000	340	Max. 3.0	4.7	0.03	350 °C	Bearing & Sealing rings
MY3D (AERO)	2.35-2.95	65-90	840-1260	2000-3050	310	Max. 2.0	5.7	0.05	350 °C	Bearing, sealing & thrust rings in aircraft applications

CARBON BRUSH GRADE RECOMMENDATION FOR INDUSTRY SPECIFIC APPLICATION

NON FERROUS

Grade	Resistivity (Micro-ohm-cm)	Transverse strength (kgf/cm ²)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm ²)	Application Guide
EG105S	3937-6562	168-252	1.54-1.70	59-80	0.87	12.5	0.07-0.18	50	400	Particularly suitable for motor applications of freightline and shovel. Also suitable for traction motors of dumpers
EG14	3675-6125	140-210	1.49-1.65	52-71	0.92	12	0.05-0.20	50	210	Widely used grade suitable for medium-large D.C machines. Has good commutating abilities.
EG224	3600-6000	120-180	1.52-1.68	51-69	1	12	0.1	50	180-350	Suitable for D.C motors of lifttrucks
EG225	2700-4500	112-168	1.52-1.68	36-50	1.07	10	0.07-0.18	50	210	Well suited for large D.C machines with varying load conditions.
EG284	3860-6440	176-264	1.55-1.71	58-78	1.12	12.5	0.06-0.18	55	560	A good commutating grade having excellent life forming ability. Suitable for D.C generator applications, specifically for dragline
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Suitable for slip ring applications of synchronous motors
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	50	180	Specially treated EGO, having better life and film forming ability
HM24	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	80	140-180	Suitable for very high speed turbo alternators with helically grooved sliprings
M145E	5.5-17.5	340-620	4.56-4.80	43647	0.4	23	0.17	30	175	Most suitable for induction motor sliprings. Approved for KEC. Spring motors
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Rotary convertors and induction motor slipring of AEI

STEEL

Grade	Resistivity (Micro-ohm-cm)	Transverse strength (kgf/cm ²)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm ²)	Application Guide
EG10	2300-3800	140-210	1.60-1.76	60-81	0.6	9.5	0.07-0.22	30	175	Used on DC motors
EG116S	3750-6250	168-252	1.59-1.75	60-81	0.87	12.5	0.07-0.22	50	490	Used on Large DC motors
EG14	3675-6125	140-210	1.49-1.65	52-71	0.92	12	0.05-0.20	50	210	Widely used grade suitable for medium-large D.C machines. Bench drive motors. Has good commutating abilities.
EG224	3600-6000	120-180	1.52-1.68	51-69	1	12	0.1	50	180-350	Suitable for D.C motors of KEC, IECL make
EG236S	3940-6566	128-192	1.47-1.63	49-66	1.05	12	0.06-0.20	50	210	Suitable for all types of D.C motor and generator applications, specially BHEL make
EG284	3860-6440	176-264	1.55-1.71	58-78	1.12	12.5	0.06-0.18	55	560	A good commutating grade having excellent life forming ability. Suitable for D.C generator applications, specifically for dragline
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Suitable for slip ring applications of synchronous motors
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	50	180	Specially treated EGO, having better life and film forming ability
HM24	1400-2300	120-180	1.39-1.54	15-21	1.56	10	0.14	80	140-180	Suitable for very high speed turbo alternators with helically grooved sliprings
M145E	5.5-17.5	340-620	4.56-4.80	43647	0.4	23	0.17	30	175	Most suitable for induction motor sliprings. Approved for KEC. Spring motors
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Rotary convertors and induction motor slipring of AEI

PAPER

Grade	Resistivity (Micro-ohm-cm)	Transverse strength	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm2)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm2)	Application Guide
EG14	3675-6125	140-210	1.49-1.65	52-71	0.92	12	0.05-0.20	50	210	Widely used grade, suitable for medium-large d.c. machines. Has good commutating abilities.
EG224	3600-6000	120-180	1.52-1.68	51-69	1	12	0.1	50	180-350	Mainly used for Kirloskar make DC motors
EG236S	3940-6566	128-192	1.47-1.63	49-66	1.05	12	0.06-0.20	50	210	Used on various large and medium DC motors
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Suitable for slipring application synchronous motors
HM24	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	80	140-180	Suitable for high speed turbo alternators with helically grooved steel rings
HM6R	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	80	140-180	Suitable for high speed turbo alternators with helically grooved steel rings
M145E	5.5-17.5	340-620	4.56-4.80	7-19	0.4	23	0.17	30	175	Most suitable for induction motor sliprings. Approved for KEC slipring motors.
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Rotary converters and induction motor shprings of AEI, Siemens, BHEL and NGEF.
M16E	30-115	15-25	3.76-4.00	15-25	0.4	11.5	0.13	30	210	Rotary converters and induction motor shprings of NGEF, Siemens make
ASG1	10-80	400-600	3.80-4.60	14-20						Suitable for techogenerator application.
ASG6	50-320	250-550	2.80-3.60	12-20						Suitable for techogenerator application.

CEMENT

Grade	Resistivity (Micro-ohm-cm)	Transverse strength (Kgf/cm2)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm2)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm2)	Application Guide
BM51	28.5-47.5	920-1380	5.35-5.91	11 - 15	0.40	23.1	0.08-0.20	30	140	For earthing brushes of locomotives and for very special slipring applications.
EG14	3675-6125	140-210	1.49-1.65	52-71	0.92	12	0.05-0.20	50	210	Suitable for medium-large D.C. machines. Has good commutating abilities.
EG224	3600-6000	120-180	1.52-1.68	51-69	1	12	0.1	50	180-350	Suitable for all types of D.C. motor and generator application. used for rolling mill motors and B.E.V. motor applications > 100V.
EG236S	3940-6566	128-192	1.47-1.63	49-66	1.05	12	0.06-0.20	50	210	Suitable for all types of D.C. motor and generator application.
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Suitable for slipring application of synchronous motor.
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	50	180	Suitable for slipring motors of BHEL make
M145E	5.5-17.5	340-620	4.56-4.80	7-19	0.4	23	0.17	30	175	Most suitable for induction motor sliprings. Approved for KEC Slipring motors.
M14R	2.50-8.00	900-1500	6.00-6.80	6-12	0.40	23.1	0.175	20	140	Highly conductive and low wearing grade specially used on sliprings with high current density.
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Rotary converters and induction motor sliprings of BHEL, Siemens, and NGEF.
M16E	30-115	15-25	3.76-4.00	15-25	0.4	11.5	0.13	30	210	Rotary converters and induction motor sliprings of NGEF, CG Power make and generators from 12-30 volts.
ASG1	10-80	400-600	3.80-4.60	14-20	-	-	-	-	-	Suitable for technogenerator applications.
BM51	28.5-47.5	920-1380	5.35-5.91	11 - 15	0.40	23.1	0.08-0.20	30	140	For earthing brushes of locomotives and for very special slipring applications.

FHP(Fractinal House Power)

Grade	Resistivity (Micro-ohm-cm)	Transverse strength (Kgf/cm2)	Apparent Density (Gms/cc.)	Hardness (Shore)	Ash Content)	Application Guide
EG41	3700-6100	175-280	1.60-1.74	58-76	Max0.15%	Good grade for Heavy duty grinders, Drills, Magnetic Drilling machines and Rotary Hammers. A treated grade and can take on higher load and better life.
AC53	1.40-1.55	140-240	1000-1800	40-60	-	Good film forming & lubricating grade. Best suited grade for all drills, cutters, Hand grinders, Blowers etc. Higer controlled range of resistivity helps of less sparking and better life without damaging the commutator

MINING

Grade	Resistivity (Micro-ohm-cm)	Transverse strength (Kgf/cm ²)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm ²)	Application Guide
ASG1	Oct-80	400-600	3.80-4.60	14-20	-	-	-	-	-	Suitable for technogenerator applications.
BM51	28.5-47.5	920-1380	5.35-5.91	Nov-15	0.40	23.1	0.08-0.20	30	140	For earthing brushes of locomotives and for very special slipring applications.
EG14	3675-6125	140-210	1.49-1.65	52-71	0.92	12	0.05-0.20	50	210	Suitable for medium-large D.C. machines. Has good commutating abilities.
EG224	3600-6000	120-180	1.52-1.68	51-69	1	12	0.1	50	180-350	Suitable for all types of D.C. motor and generator application. used for rolling mill motors and B.E.V. motor applications > 100V.
EG236S	3940-6566	128-192	1.47-1.63	49-66	1.05	12	0.06-0.20	50	210	Suitable for all types of D.C. motor and generator application.
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Suitable for slipring application of synchronous motor.
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	50	180	Suitable for slipring motors of BHEL make
M145E	5.5-17.5	340-620	4.56-4.80	43647	0.4	23	0.17	30	175	Most suitable for induction motor sliprings. Approved for KEC Slipring motors.
M14R	2.50-8.00	900-1500	6.00-6.80	45632	0.40	23.1	0.175	20	140	Highly conductive and low wearing grade specially used on sliprings with high current density.
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Rotary converters and induction motor sliprings of BHEL, Siemens, and NGEF.
M16E	30-115	15-25	3.76-4.00	15-25	0.4	11.5	0.13	30	210	Rotary converters and induction motor sliprings of NGEF, CG Power make and generators from 12-30 volts.
M16EX	30-115	15-25	3.76-4.00	15-25	-	-	-	-	-	Rotary converters and induction motor sliprings of NGEF, CG Power make and generators from 12-30 volts.

POWER SECTOR

Grade	Resistivity (cm)	Transverse strength (Kgf/cm ²)	Apparent (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. (Metres/sec.)	Normal (gf./cm ²)	Application Guide
AC64	1000-2500	80-130	1.20-1.50	10-30	1.66	10	0.14	80	140-180	Widely used for High Speed Turbogenerator slipring application
BM51	28.5-47.5	920-1380	5.35-5.91	11 - 15	0.4	23.1	0.08-0.20	30	140	Used for Earthing application in Hydropower plants
EG10	2300-3800	140-210	1.60-1.76	60-81	0.6	9.5	0.07-0.22	30	175	Cool running grade. Can be used for exciter application
EG260	900-1500	124-186	1.55-1.71	35-47	0.8	10	0.17	30	210	Suitable for pilot exciters
EG284	3860-6440	176-264	1.55-1.71	58-78	1.12	12.5	0.06-0.18	55	560	Used on PMG set in Nuclear Power House
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Electrographite grade with low frictional properties suitable for Hydro Generator sliprings
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	20	180	A treated version of EGO, having better film forming ability and suitable for Hydro generator sliprings
HM100	1387-2312	120-180	1.39-1.54	15-21	1.66	12.5	0.07-0.20	80	140-180	A low inertia grade suitable for very high speed turbo alternator with helically grooved steel aliprings
HM24	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	8D	140-180	Suitable for high speed turbo alternators slipring
HM6R	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	80	140-180	A low inertia grade suitable for very high speed turbo alternator with helically grooved steel aliprings
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Used for Earthing application in Hydropower plants
ASG1	10-80	400-600	3.80-4.60	14-20						Used for Earthing application in High speed Turbogenerators
ASG6	50-320	250-550	2.80-3.60	12-20						Used for Earthing application in High speed Turbogenerators

PETROCHEMICAL, OIL & GAS

Grade	Resistivity (Micro-ohm-cm)	Transverse strength (kgf/cm ²)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm ²)	Application Guide
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Electrographite grade with low frictional properties suitable for Hydro Generator sliprings
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	50	180	A treated version of EGO, having better film forming ability and suitable for Hydro generator sliprings
HM6R	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	80	140-180	A low inertia grade suitable for very high speed turbo alternator with helically grooved steel slipring
HM100	1400-2300	120-180	1.39-1.54	15-21	1.66	12.5	0.07-0.20	80	140-180	A low inertia grade suitable for very high speed turbo alternator with helically grooved steel sliprings
EG14D(I)	3700-6100	180-270	1.58-1.75	56-75	1.1	12	0.06-0.16	50	210	Particularly suitable for traction motor applications of Diesel locomotives, MEMU, EMU, DEMUs, Kolkata Metro
EG284	3860-6440	176-264	1.55-1.71	58-78	1.12	12.5	0.06-0.18	55	350	Used on PMG set in Nuclear Power House
EG236S	3940-6566	128-192	1.47-1.63	49-66	1.05	12	0.06-0.20	50	210	Suitable for GE Traction generators of Diesel locomotives and compressors.
ASG1	10-80	400-600	3.80-4.60	14-20	-	-	-	-	-	Used for Earthing application in High speed Turbogenerators
ASG6	50-320	250-550	2.80-3.60	12-20	-	-	-	-	-	Used for Earthing application in High speed Turbogenerators
BM51	28.5-47.5	920-1380	5.35-5.91	11-15	0.40	23.1	0.08-0.20	30	140	Used for Earthing application in Hydropower plants
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Used for Earthing application in Hydropower plants

DEFENCE

Grade	Resistivity (Micro-ohm-cm)	Transverse strength (kgf/cm ²)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure (gf./cm ²)	Application Guide
EGOR	1000-1700	172-258	1.63-1.80	33-45	0.95	12.5	0.11	50	180	A treated version of EGO, having better film forming ability and suitable small slipring motors
EG14D(I)	3700-6100	180-270	1.58-1.75	56-75	1.1	12	0.06-0.16	50	210	Traction motor applications
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Slipring motors

SUGAR

Grade	Resistivity	Transverse strength (kgf/cm ²)	Apparent Density (Gms/cc.)	Hardness (Shore)	Voltage Drop (Volts/brush)	Normal current density (Amps/cm ²)	Coefficient of friction	Typical max. speed (Metres/sec.)	Normal pressure	Application Guide
EG14	3675-6125	140-210	1.49-1.65	52-71	0.92	12	0.05-0.20	50	210	Widely used grade, suitable for medium-large d.c. machines. Has good commutating abilities.
EG224	3600-6000	120-180	1.52-1.68	51-69	1	12	0.1	50	180-350	Mainly used for Kirloskar, Integrated Electric make D C motors
EGO	1000-1700	172-258	1.63-1.80	31-43	0.95	12.5	0.07-0.18	30	180	Suitable for slipring application synchronous motors
HM24	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	80	140-180	Suitable for high speed turbo alternators with helically grooved steel rings
HM6R	1400-2300	120-180	1.39-1.54	15-21	1.66	10	0.14	80	140-180	Suitable for high speed turbo alternators with helically grooved steel rings
M145E	5.5-17.5	340-620	4.56-4.80	43-64	0.4	23	0.17	30	175	Most suitable for induction motor sliprings. Approved for KEC slipring motors.
M15E	9.0-18.0	240-460	4.42-4.74	5.0-15.0	0.4	15	0.17	30	210	Rotary converters and induction motor sliprings of AEI, Siemens and NGEF.
M16E	30-115	15-25	3.76-4.00	15-25	0.4	11.5	0.13	30	210	Rotary converters and induction motor sliprings of NGEF make

Our Locations



Sales Office



Manufacturing Facility

Please visit our Website:
www.assamcarbon.in



Contact Us

Customer Care:
customercare@ascarbon.com
(+91) 73161 29162

Manufacturing Facility :
Birkuchi, Narengi Chandrapur Road,
Guwahati - 781026, Assam, India.

Manufacturing Facility :
2, I.D.A , Phase - 1, Patancheru - 502319,
Telangana, India