SINCE : 1970

GUJARAT CARBON PRODUCTS GROUP

Presents Carbon Bushes

Mfg. By :

GRAPHICARB PRODUCTS

AN ISO 9001 - 2015 COMPANY

Mfg. of Carbon Bushes

For Submersible Pump

Using Carbon Bushes in Sub Motor

- Saves electricity upto 10%
- Increases Pump efficiency upto 5%
- Starts & runs the Pump even at low/fluctuating voltage
- Motor runs ar full RPM
- Gives upto 10% more output of water in LPM as compared to fibre/polymer/metal
- Makes pump rotates freely & silently
- The motor does not get locked even offer prolonged rest

Carbon Bush Benefits

At high temperatures, plastic and composite bearings are subject to other problems such as softening, melting, deformation and may extrude out of the bearing area all together. Because the carbon graphite matrix is very strong, it is not subject to the deformation, melting, or even softening that can occur with plastic bearings at these elevated temperatures.

Advantages of using Carbon Bushes in Submersible Motors

- **Helps the pump to run in dry condition.**
- **Low generation of heat due to self lubricating property.**
  When carbon is used as material for sliding purpose, there is no generation of heat in that area due to excellent self lubrication available from carbon. This helps to improve the life of thrust bearing as well as other parts of the pump which may be damaged due to high temperature.
- **Contributes in saving of power.**
  As the electricity goes costlier day by day, carbon is the best solution for decreasing running cost of the pump.
- **Runs with low input power as compared to ferro asbestos/teflon.**
  As ferro asbestos is a breaking materials, it cause friction between the thrust pad and bearing resulting in higher requirements of power where as the carbon causes a free movement and the pump starts & runs with minimum energy.
- **The motor with carbon thrust bearing and bush does not seize even after prolonged rest.**
  Even if the pump is not in use for a long period, the pump with carbon bearing starts immediately with the supply of power.
- **The low hp pump with carbon provides same output as high hp pump with ferro asbesotos, teflon or nylon.**
  Due to excellent self lubricating properties of carbon, there is no friction between the thrust pad and bearing and as result there is no energy loss and so the pump gives the maximum output.
- **The pump with carbon bearing starts at lower voltage compared to the pump with ferro asbestos or other bearing materials which require higher voltage to start.**
  As there is a shortage of electricity and problems of the voltage drop in the villages and urban areas, carbon enables the pump to start at low voltage available whereas ferro-asbestos or other materials fails to start the pump at low voltage of power.

Operating Temperature

The temperature resistance in an oxidizing atmosphere can be specified as 400°C maximum for G10 bearing qualities. In a non-oxidizing atmosphere the temperature resistance is determined by the final graphitizing treatment of each individual grade (e.g. upper application limit for graphite is approximately 3000°C). Temperature resistance is also affected by various impregnations. In the case of resin impregnation the maximum operating temperature is 180°C, for lead impregnation 200°C and antimony impregnation 500°C.

Frictional Behaviour

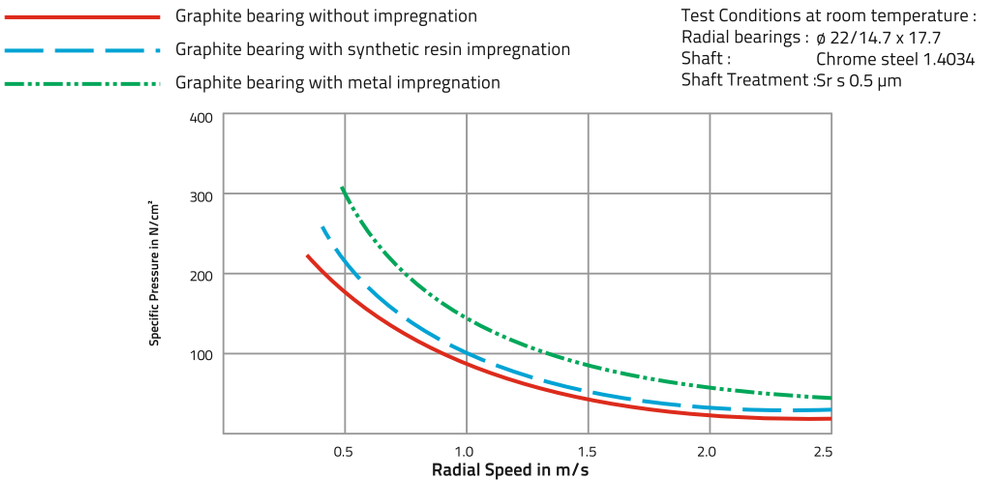
Carbon-Graphite has self-lubricating properties because of its crystalline structure. The low friction coefficient is a function of the low bonding between the structural lattice planes. Dislocation of one against the other is therefore easy. The friction coefficient is particularly low if traces of water or other vapours are present. The friction coefficient is greatly increased when a vacuum is created. Because of the varying conditions of application, no exact data can be given for friction coefficients. In general the following values can be expected for sliding friction:

- Dry friction 0.10... 0.30
- Mixed friction 0.05 ...0.10
- Hydraulic friction 0.01 ... 0.05

The frictional behavior of carbon is also affected by the following factors :

- Running in • Specific pressure • Running speed

When running in carbon and graphite bearings, the friction coefficient drops until a constant value is reached once the surfaces are smoothed. The coefficient of friction also drops in the case of constant specific strain and increasing running speed, or inverse.



The permissible bearing pressure is determined by the surface speed of the shaft and the friction ratio of the carbon or graphite bearings. The permissible pressure values for dry-running bearings have been determined by laboratory trials. The corresponding values can be seen in the following v-diagram. The permissible bearing wear rate was selected as 1 (chrome steel) µm/h. In practice the media often increases lubrication. This means that the values in the p ▪ v-diagram can be increases considerably whilst wear remains constant.

Carbon Bush Fitting Recommendations

1) Fitting: Clearance fit with suitable adhesive

2) Housing Size : ID size to be maintained :- H7

3) Shaft size : To be maintained : 0.25% to 0.3% less than bush ID

Shaft Finish & Material Recommendations

The best running performance is Achieved with a surface roughness of the counterpart material of $R_{t\leq 1}$ m. A higher surface roughness of $R_t = 2$ m will only result in higher initial wear during the running in period.

Finely ground Shafts, super finished for more onerous requirements, are recommended for carbon bearings.

Not only the surface finish of the counterpart surface is highly important for the running behaviors of the carbon bearing. But also the counterpart material itself has a certain impact.

The use of low hardness, nickel containing stainless steel as counterpart material is not recommended, especially if other more suitable materials can be used. Dry Running, where there is insufficient fluid lubrication or highly contaminated liquids may lead to undesired scoring, resulting, in and increase in wear. Harder nickel free stainless steel type are preferred, at least for use at low or medium load, hardness chrome steel (13 17% Cr) has proved to be best, also at higher loads.

The preference for hard counterpart materials is mainly based on the fact that the harder the counterpart material, the easier the formation of the graphite film on the counterpart material.

PHYSICAL PROPERTIES OF GRADE	Bulk Density (GM/CC)	Hardness (Scleroscope) (HSD)	Compressive Strength (KGF/CM^2)	Transverse Bend Strength (KGF/CM^2)	Porosity (%)	Co-efficient of Thermal Expansion $^0C^{-1}x10^{-5}$	Thermal Conductivity $W.M.^{-1}.K^{-1}$	Young's Modulas (KGF/CM^2)
G10Z (RESIN IMPREGNATED)	1.75-1.85	80-90	2000-2500	600-700	<2	4	12	230×10^3


Bureau Veritas Certification

GRAPHICARB PRODUCTS

49/50, ABAD INDUSTRIAL ESTATE, OPP.KASHIRAM TEXTILE MILL, NAROL, AHMEDABAD – 382 405, GUJARAT, INDIA.

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organization has been audited and found to be in accordance with the requirements of the Management System Standard detailed below.

Standard

ISO 9001:2015

Scope of certification

1. DESIGN, MANUFACTURE, DISPATCH AND SERVICES OF GRAPHITE BASE PROCESS EQUIPMENTS FOR HEAT AND MASS TRANSFER APPLICATION.
2. MANUFACTURE OF CARBON PRODUCTS FOR MECHANICAL APPLICATION.

Original cycle start date: **22 September 2021**
Expiry date of previous cycle: **Not Applicable**
Certification Audit date: **21 August 2021**
Certification cycle start date: **22 September 2021**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: **21 September 2024**
Certificate No. **IND.21.3875/QM/U** Version: **1** Revision date: **22 September 2021**

Signed on behalf of BVCH SAS UK Branch
Jagdheesh N. MANIAN
Head – CERTIFICATION, South Asia
Commodities, Industry & Facilities Division

Certification body address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom.

Local office: Bureau Veritas (India) Private Limited (Certification Business) 72 Business Park, Marol Industrial Area, MIDC Cross Road "C", Andheri (East), Mumbai – 400 093. India.

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization. To check this certificate validity please call + 91 22 6274 2000.

Our Products

- CARBON BUSHES
- CARBON THRUST BEARINGS

Manufacturing Plant & Regd. Office

GRAPHICARB PRODUCTS

AN ISO 9001 - 2015 COMPANY

Regd. Office & Works:
49/50, Abad Ind. Estate, Opp. Kashiram Textile Mill,
Narol, Ahmedabad - 382 405 (Gujarat) India
Tel.: +91-7600127277
Mobile : 97379 51998 / 98248 49997
E-mail : mktg@graphicarb.com / manager@graphicarb.com
www.gujcarbon.in

BUREAU VERITAS 1828

UKAS QUALITY MANAGEMENT 008

D&B

SMERA SME Rating Agency of India Ltd.

IPMA INDIAN PUMP MANUFACTURERS' ASSOCIATION

JULY/2023