

## How To Order Carbon Brushes

### SPECIFICATIONS NEEDED ON BRUSH ORDERS

Brushes used on electrical equipment include a large variety of sizes and styles. Every detail of construction must be accurately specified or shown in the drawing sketch to enable us to supply a brush of the correct specifications. Please send a worn out brush also as a sample to avoid any variance. In case the drawing is incomplete or not available send a good sample.

Specifications given on orders for brushes should include the following items as stated in the order mentioned below:

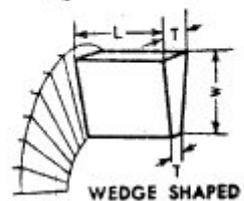
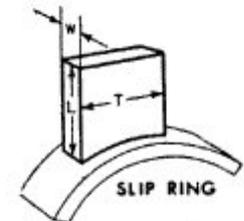
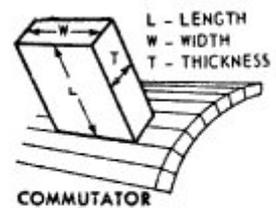
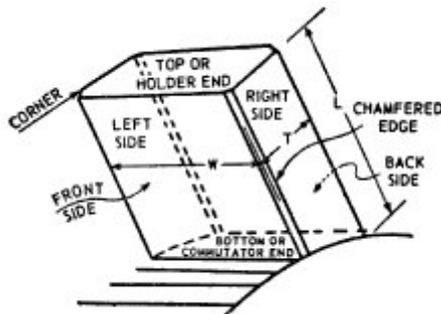
#### 1. QUANTITY

The price of brushes is dependent on the quantity ordered per item. Please make provision for a reserve stock in addition to the exact requirement to prevent expensive shut downs.

#### 2. DIMENSIONS

Please give all dimensions in the order: Length-Width-Thickness by measuring an unused sample and when no unused sample is available, determine the length of the brush by raising a brush in its holder to the proper operating position being careful not to introduce a side thrust from the spring by raising the brush too far. Please measure the distance from commutator to top of brush on the long side.

For round brush – Length,  
Diameter (L&D).



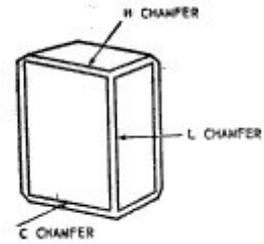
#### 3. GRADE

Please mention the grade of the carbon block and equivalent grade if available e.g. EG14, EG236S, M15E, H14, E55, B12, A23 etc.

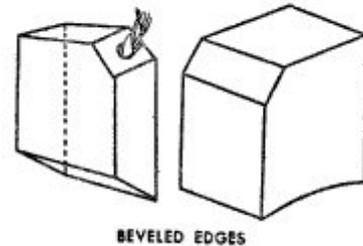
#### 4. DESIGN

**Special Machine Work** – Some machining operations, like drilling, boring, slotting etc. are required in preparing a brush for attaching permanently connected shunts. Some other machining operations are often required and such details should always be specified in the drawing sketch or details e.g.:

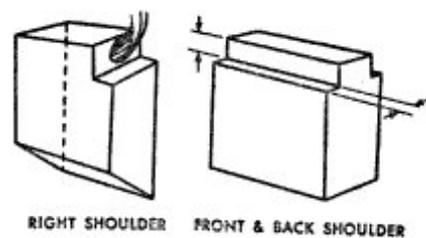
- (i) **Chamfered edges** – It refers to a slight breaking of the intersection of two surfaces. Location of the desired chamfer should be specified, viz., L Chamfer (lengthwise), H Chamfer or C chamfer (Chamfer edges on the holder end or Commutator end).



- (ii) **Beveled edge** – A beveled edge refers to the removal of the edge to provide a slanting surface from which a shunt connection can be made or for clearance of pressure fingers. Location as well as degree of bevel should be specified.

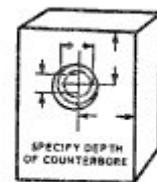


- (iii) **Shoulders** – When the top of a brush has a portion cut away by two planes at right angles to each other, this is designed as a shoulder-Right & Left shoulder-Front and Back shoulder.



- (iv) **Holes, Counter bores** – For drilled holes specify diameter, location and when not drilled through the brush, depth of hole.

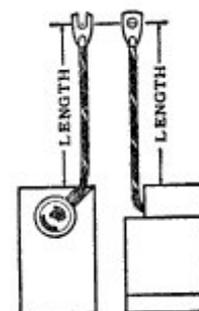
Counterbores should be specified by diameter, depth & location.



On beveled brushes, the side of brush on which the counterbore is to be made must be specified.

## 5. SHUNTS (FLEXIBLES)

- (i) **Length** – The size of the cable or cables to be used varies with the size, grade and current carrying capacity of the brush. To determine the length of the brush shunt extend the cable straight from the top end in a line parallel with the lengthwise edges of the brush and measure from the **extreme top of the brush** to the **centre of the hole or slot**.



With brushes connected in pairs, the length of the shunt will be the maximum cable length between the points where the cable enters the brush. When the cable enters the brush at beveled edges or sides, the shunt length will be measured between the top face of the brush.

- (ii) When giving details of shunt the diameter, wire gauge, number of strands and cross section should be mentioned. It should also be stated if the flexible is to be reinforced with stainless steel wires.
- (iii) Please indicate whether Bare, tinned or silvered flexibles are required.
- (iv) **Shunt (Flexible) Insulation** – In some cases it is necessary to cover the shunt cable with a permanent and flexible insulation or to use glass beads etc. to avoid shunt cable contacting with each other or ground on the end bells or frame. Insulation may be of different types. If insulation is required the type required should be mentioned. In absence of specific type we will use our discretion.
- (v) **Location** – Location from which the shunt cable leaves the brushes is fixed by the design of the brush holder and pressure hammer or by the location of the screw fastening the terminal to the stud. It is important to specify the shunt location.

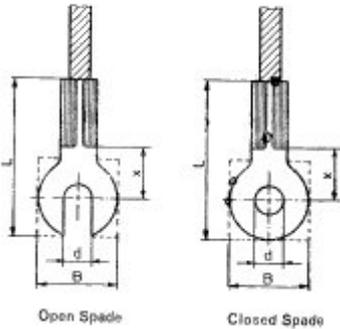
**NOTE** – (1) Carbon brushes with metal caps, clips and brackets are generally riveted. In case some other fixation of the flexible is required please indicate (for example soldering).

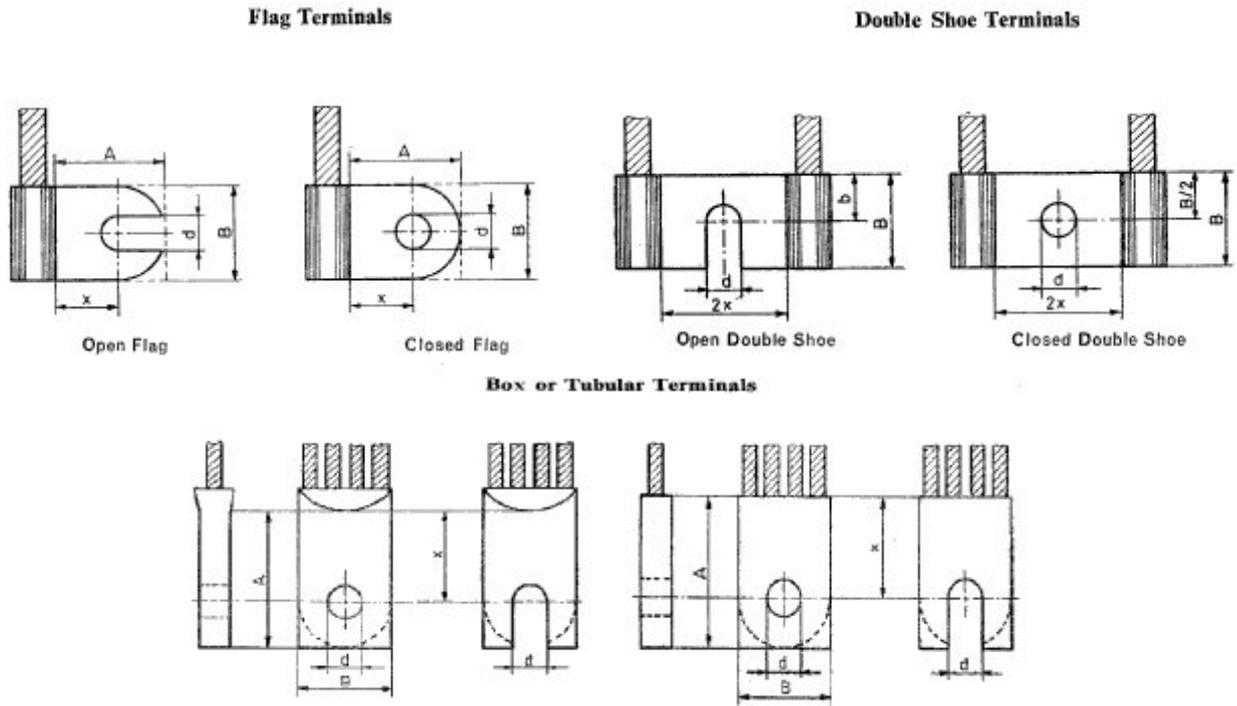
(2) Brush types not given here can also be supplied. In such cases please supply drawing and new or used sample.

**6. TERMINALS**

- (i) These are available in two styles, formed and cut, and in a large range of sizes. Both styles can be with either hole or slot to fit the attachment screw. Formed terminals are either the folded or pressed tube type. The cut type may be flag type or straight type. When giving dimensions of terminals give dimensions of slot, diameter of hole etc. as per IS 13466:1992.

Spade Terminals

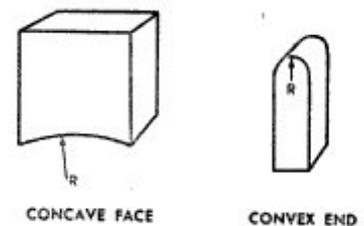




- (ii) In some cases, terminals require bending to ensure proper fit on the stud. In such cases slot or hole end of the terminal is bent to a specified angle. The angle of bend should be specified as angle from the original plane of the terminal.

## 7. SPECIAL DESIGN OR WORK

Any special work involving beveling, concaving or convexing (radial or off centre) shouldering, making of slots, notches and grooves will be done when required but in all such cases full details of the special work i.e. radius of curvature and depth of concave or degree of bevel in case of concaving or convexing and direction of slot or groove with its location, side and length, breadth or diameter and depth should be given.



8. Please indicate whether coppering, tinning or silver plating of contact areas are required.

## 9. SHUNT CONNECTIONS

There are different methods in securing the shunt cables to the brush. These may be classified as below:

- A. Embedded (Rammed-Tamped) connections** – In these connections flexible will be fixed by temping contact. It guarantees a low voltage drop and high mechanical strength. It is the most preferred connection. Hammer clips may also be available in this type.
- B. Riveted connections** – These are recommended for heavy duty motors and generators. These may be 'Single Rivet' and 'Double Rivet' with or without spring washer for fragile qualities which cannot sustain tamping e.g. soft graphite.

- C. Bolted Connections** – The principal use of these connections is on brushes for the A.C. side of heavy duty synchronous converters to assure uniform distribution of current between the brushes on the slip ring. These may be 'Single Bolt' or 'Double Bolt', with spring washer.
- D. Recessed Saddle connection** – This is a very satisfactory connection for carbon and graphite brushes of high current carrying capacity intended for use on large generators on the D.C. side of large synchronous converters.
- E. Resilient Pressure Pads for Top Protection** – These are provided on the holder end of the brush for protecting both the brush and brush holder rigging from mechanical vibrations where vibration is abnormally high.

**NOTE** – All the **FITTINGS** are made by us in our own works using specified material and accurate dimensions according to IS 13466:1992 to fit the brushes.  
In case of any difficulty please consult our technical services department who will send their recommendations based on long experience and advise you on all points e.g. grade, shape and connection, selection etc.