

LOGIC CONTROLS PRIVATE LIMITED

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TECHNICAL ASPECTS

ROLLER CARBON VERSES SLIDING CARBONS FOR VARIACS

A Roller Carbon of any diameter can make only a **line contact on a flat surface**. Thickness of the line may not be beyond 0.1 – 0.2 mm. Therefore, the current density (Amperes per sq. mm) increases to abnormal values thus causing over heating of the carbon as well as the surface of contact. Therefore one has to use roller carbon of longer lengths just to increase the contact area and reduce the current density. The longer carbons are more unstable mechanically. Apart from this it is moving on a surface where the conductors are always skewed and therefore longer carbon roller may touch two or more wires at a time, thus causing circulating current between the conductors. This may ultimately damage the Variac after sometime. Therefore, roller contacts are generally preferred where the current requirement is low, secondly where the unit is generally oil cooled so that the heat could be dissipated faster. Nevertheless the conductors of the Variac will definitely suffer damages if the current densities are not within control which possibly does not happen unless abnormal length of the carbon rollers are used.

Apart from the above a carbon roller since it is rolling does not feed the current directly but through some metallic bushes on which it is moving. This is another factor causing sparking if the fitness are not very precise. On the contrary the flat carbon do not inhere the above defects because they make slide contacts on a flat to flat surface and are directly connected to the output circuit, thus avoiding any bushes or other current carrying elements. Flat contact carbon brush is therefore more superior and preferred particularly when the output currents are high. We would not recommend ever the use of carbon rollers for ratings beyond 40 to 50 KVA and that too only in oil cooled application. The roller contacts will fail miserably in Air cooled version.

The normal life of a Flat Carbon is 3 to 5 Years. The cost of replacement of a Flat Carbon is minimal where as the cost of a Roller Carbon replacement is atleast 15-20 times more flat carbon. As such commercially also the flat carbons are most favored.