

Material and design considerations of slip rings

Materials

A wide array of ring and lead materials can be found in industrial applications. We have all had customers request conversions from one material to another, particularly for the rings themselves. The adjacent illustration shows the relative conductivity along a continuum of some common slip ring and lead materials. There are other materials available along the full length of the scale, but some may no longer be readily available in today's market.

In some instances, environmental conditions affecting slip ring wear may outweigh the need for high conductivity. In these cases, you may be asked to convert bronze rings to stainless steel. For example, in environments in which oil spray is a factor, this conversion may extend the life of the ring assembly by several times over.

As one of the limiting factors of overall ring performance, particular caution should be used when converting lead material from copper to an alloy of lesser conductivity. In addition, the integrity of the lead connection and the continuity between the ring and the lead is important to the overall performance. The use of non-conductive materials, such as Loc-tite®, should therefore be minimized.



Design

Besides the overall construction differences between types of slip ring assemblies (split, bolted, steel hub, molded), the use of venting, recessing, insulation and spiral grooving can sometimes be included or eliminated depending on the operational conditions.

Venting: Slip ring venting is usually included to reduce the operating temperature of the unit by increasing air flow. Sometimes, however, it is used as relief in cast units which need not be incorporated in replacement assemblies. By eliminating venting when possible, the reduction in labor required to machine the rings can result in a noticeable reduction in cost.

Recessing: As above, recessing may be the result of the casting process, but may also be included to reduce the weight of the ring assembly. Similarly, there are times when this can be eliminated, reducing cost.

Insulation: Phenolic insulation between rings, in place of air gap insulation, becomes an issue particularly in converting molded slip rings to steel hub assemblies. While in some instances the insulating material can provide a flashover guard in addition to insulation, in others air gap spacing is a desirable alternative, at lesser cost.

Spiral Grooving:

Designed to draw carbon away and eliminate hot spots on the brushes, spiral grooving can make a noticeable improvement to ring performance and should be considered in high operating temperature and contaminated environments.

