

Technical Support - Linear Current Collection

Symptoms of Common Difficulties in Service

A) Burnt Carbon Surface

Surface finish will vary with different applications and conditions.

If the normal current rating of a carbon grade is exceeded for long periods, its surface will become burnt or oxidised. Burnt carbon will appear crazed and open textured over the entire running surface. It will be dusty to touch.

Metallised grades are more resistant to the phenomenon.

All carbons in use on the same equipment should be checked. This will establish whether the fault is endemic to the system or confined to one or two carbons.

The full duty cycle of the equipment should be recorded.

If damage is apparent only on the leading or trailing edges, it may be caused by arc damage.

B) Uneven Wear along Strip Length

The wear pattern on the carbon will vary with individual systems. Any perceived variation in pattern should be compared with previously used material. Uneven wear indicates that the full surface is not being used.

In comparison with metal collectors, carbon has a much greater wearing depth. Thus, an uneven pattern will be more apparent with carbon collectors than with metal.

If this occurs as a result of a fault on the system, all carbons will show a similar pattern.

C) Uneven Wear Strip to Strip

A standard two-strip pan-head should show similar wear on both carbon strips. In addition the wear should be parallel in both directions of running.

If there are differences between the two strips, other carbons on the same equipment or system should be examined to determine the normal wear pattern.

D) Grooving

This should not be confused with uneven wear.

All strips exhibiting this problem need to be recorded and closely inspected to determine the actual cause. In some cases, grooving may be confined to one pan-head, in others the fault may be more general.

E) Edge Chipping

Degree and type of chipping will vary with the system and running conditions. Several affected pieces should be inspected to determine pattern or area damage.

F) Cracked Carbon

Cracked carbons should be inspected to establish type and position of the crack. Any impact damage on the front edge or top surface should be noted.

The condition of the carriers will reveal any signs of distortion or lack of support for the carbons.

G) Sparking Damage on Sheath

Sheath condition varies greatly with system and environmental conditions. Arcing will often cause damage to the metal sheath. The level of damage experienced depends on system voltage and current.

H) Sheath Overheating

Sheath overheating can appear as changes in the appearance of the metal, as well as burning or discoloration.

Particular attention should be paid to the area around electrical terminations and the normal current path.

J) Short Life

Carbon life figures are impossible to give due to widely varying systems and conditions.

If short life is suspected, all available data on the system, conditions, materials used and historical life will be required to determine a course of action.

A change in weather conditions alone can account for a four-fold increase in wear rate.

K) Loose Carbons

The method of attachment of carbon to sheath must be mechanically strong and give a good electrical contact.

Clamping or crimping alone can give rise to loose carbons due to mechanical damage or poor assembly. This, in turn, affects electrical resistance causing arc erosion of sheath and carbon and overheating. Once this process begins, further deterioration is inevitable.

Soldered and bonded assemblies can be affected by temperatures in excess of the bond melting point.

In all cases, the primary cause of the loosening must be identified.

L) Broken Carbons

Carbon is relatively brittle compared with metal or sintered metal materials. If breakage's occur in service, it is important to check the sheath and end-horns for damage. This will help to determine the cause of failure.

Other factors to be considered are frequency of breakage and the number and position of strips involved.

Correct support and fitting are vital. Poor support can result in damage no matter how good the carbons are.

M) Missing Carbon

Major problems can result in loss of carbons or even whole assemblies. All details of the remaining carbons, the system and its history need to be considered to determine the cause.

Conductor faults can be to blame, while, in turn, missing carbons can result in conductor damage.