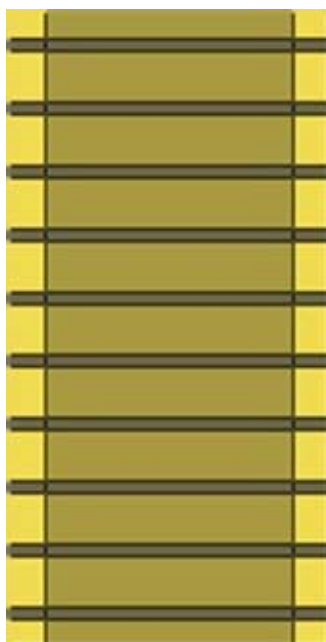




Superior Carbon Products, S.A.

C/ Alondra, 3 Pol.Ind. Los Gallegos · Teléfono 34 91 642 29 76 – 34 91 642 26 28 · Telefax: 34 91 642 25 04 · 28946 FUENLABRADA (Madrid)

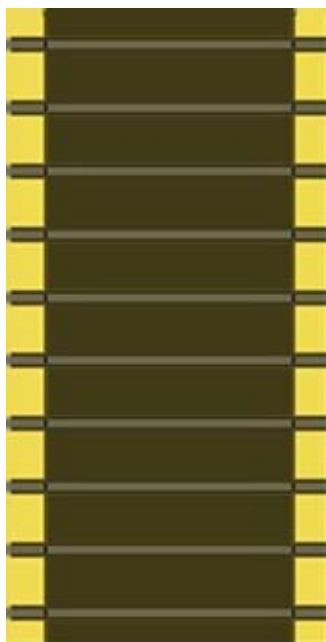
## *Patina appearance on electrical rotary commutator machines*



### **1. GOOD APPEARANCE**

#### *LIGHT BROWN PATINA*

The uniform patina color indicates a good machine and carbon-brush operating. The color of the patina can be attributed mainly to its thickness and whenever it is uniform it is completely acceptable.



### **2. GOOD APPEARANCE**

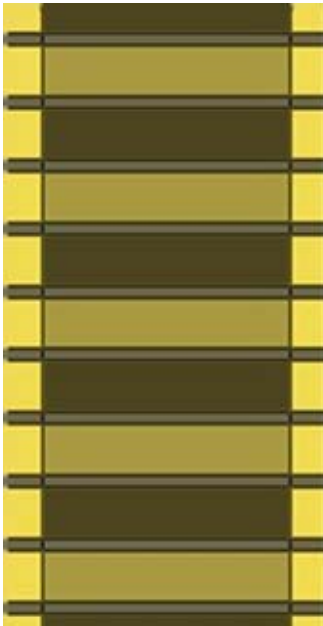
#### *DARK BROWN PATINA*

Another commutator example of excellent operating conditions. Patina is much darker than above in figure 1, but the really important fact is the color's uniformity.



Superior Carbon Products, S.A.

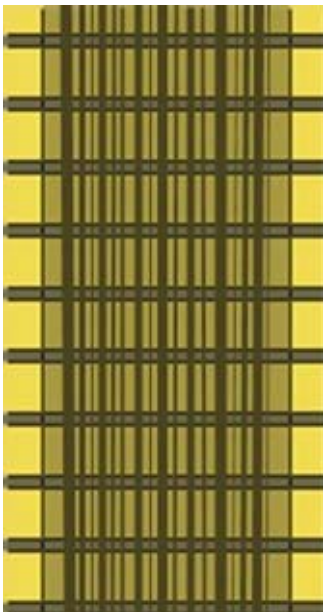
C/ Alondra, 3 Pol.Ind. Los Gallegos · Teléfono 34 91 642 29 76 – 34 91 642 26 28 · Telefax: 34 91 642 25 04 · 28946 FUENLABRADA (Madrid)



### 3. ACCEPTABLE APPEARANCE

#### *ALTERNATING LIGHT -DARK BROWN PATINA*

This is not as good status as figures 1 and 2, but from our experience we know, that there are lots of machines that operate satisfactorily during long time in spite of having this commutator appearance. Sometimes, commutator segments are alternatively dark and light, sometimes there is only one dark segment each 3 or 4 segments. This appearance is attributed to winding aspects.



### 4. INADECUATE APPEARANCE

#### *GROOVED PATINA WITHOUT COMMUTATOR SURFACE WEAR*

This is frequently attributed to low load operations, excessive brush quantities, or an inadequate brush grade for the machine's application. Also the environmental conditions and the atmosphere may influence here.



### 5. INADECUATE APPEARANCE

#### *UNEVEN PATINA*

Different color, dark-light tone or forms of spot formation. This is caused due to highly clean operating conditions or due to commutators physical status.



Superior Carbon Products, S.A.

C/ Alondra, 3 Pol.Ind. Los Gallegos · Teléfono 34 91 642 29 76 – 34 91 642 26 28 · Telefax: 34 91 642 25 04 · 28946 FUENLABRADA (Madrid)

## 6. INADECUATE APPEARANCE

### *PATINA WITH DARK AREAS*

These areas may be regularly disseminated or insulated. Causes could be:

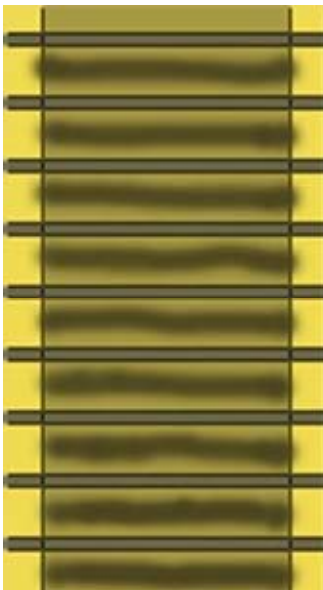
- Commutator out of roundness or oval-shaped
- Vibrations or mechanical facility deficiencies, bearings, coupling, etc.



## 7. INADECUATE APPEARANCE

### *DEFFECTIVE MACHINING OF COMMUTATOR SURFACE*

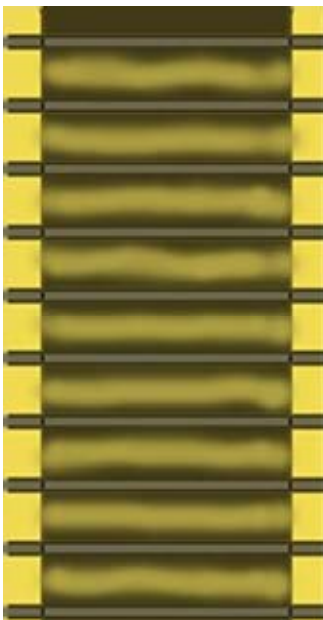
Protruding mica of commutator segments so that brushes only have contact on the middle of the segment.



## 8. INADECUATE APPEARANCE

### *DEFFECTIVE MACHINING OF COMMUTATOR SURFACE*

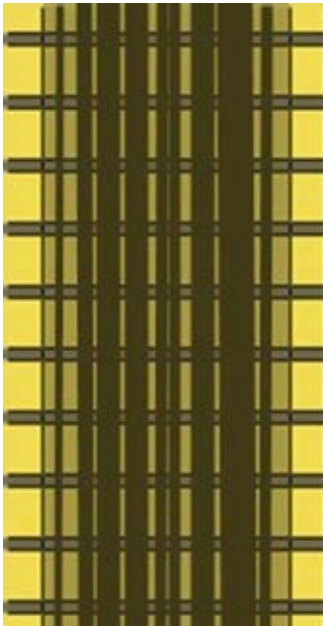
Segments are decreased on the middle, so that brushes only have contact on the borders. This figure and the aforementioned both need a more carefully maintenance.





Superior Carbon Products, S.A.

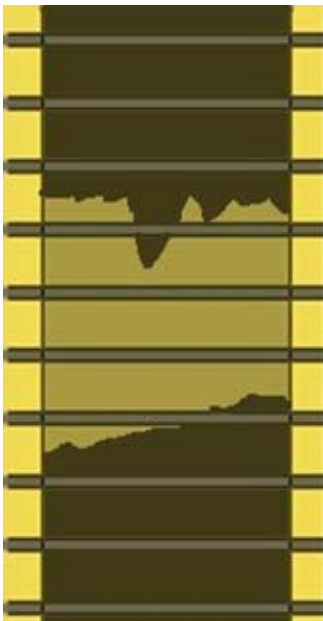
C/ Alondra, 3 Pol.Ind. Los Gallegos · Teléfono 34 91 642 29 76 – 34 91 642 26 28 · Telefax: 34 91 642 25 04 · 28946 FUENLABRADA (Madrid)



### 9. INADEQUATE APPEARANCE

#### *GROOVED PATINA WITH COMMUTATOR SURFACE WEAR*

This is a more advanced stage of figure 4. The adequate carbon brush grade, machine's operating service and environmental conditions have to be checked. Also maintenance has to be improved, it should have required earlier actuation before reaching this appearance stage .



### 10. INADEQUATE APPEARANCE

#### *BLACKENING OF COMMUTATOR AT BOTH POLE PITCHES*

This can be attributed to a winding failure or a defective coil.



### 11. INADEQUATE APPEARANCE

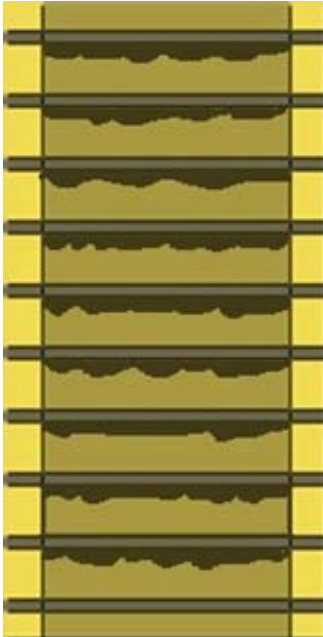
#### *CARBON BRUSH FOOTPRINTS*

Due to long storage of the machine with already assembled brushes. Also due to a long starting of the stopped machine.



Superior Carbon Products, S.A.

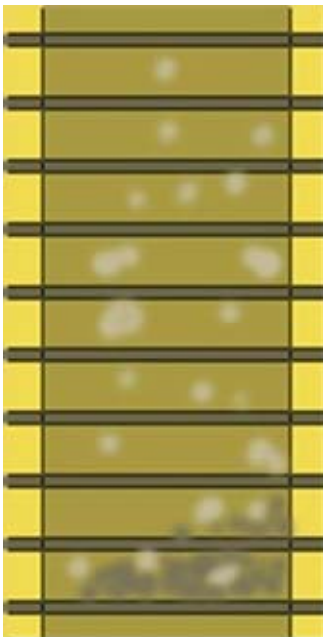
C/ Alondra, 3 Pol.Ind. Los Gallegos · Teléfono 34 91 642 29 76 – 34 91 642 26 28 · Telefax: 34 91 642 25 04 · 28946 FUENLABRADA (Madrid)



## 12. INADECUATE APPEARANCE

### *BURN MARKS ON PROTRUDING MICA SEGMENT EDGES*

Here it is shown a case with all segments protruding micas, but this same appearance may occur at only one segment. Similar conditions can be found due to one protruding or decreased segment.



## 13. INADECUATE APPEARANCE

### *SMALL BRIGHT DOTS*

Generally it occurs on machines with overload and low carbon brush pressure. Due to the brush sparking small bright disseminated dots appear. If proper measures aren't implemented, grooves will appear on the commutator surface.

**SUPERIOR CARBON PRODUCTS, S.A.**

TELF. 00 34 91 642 29 76 FAX. 00 34 91 642 25 04

[scp@superiorcarbon.com](mailto:scp@superiorcarbon.com)