Commutator Conditions
Problems and Causes

Acceptable Commutator Film

Light Film
Indicates good brush performance. Lighter color results from high current loads, low humidity conditions, film reducing contamination, or brush grades with low filming rates.

Medium Film
Ideal commutator condition for maximum brush and commutator life. The film will be even and the color is coppery brown to dark brown.

Heavy Film
Results from high current load, high humidity, high temperature or heavy film reduction rates. Colors not in the brown tones indicate contamination, resulting in high friction and high resistance.

Streaking

Causes
• Low spring pressure
• Low current loads
• Contaminated atmosphere
• High humidity
• Copper particle pickup from commutator

Threading

Causes
• Commutator damage from long term streaking conditions
• Low spring pressure
• Low current loads
• Contaminated atmosphere
• High humidity

Grooving

Causes
• Arcing due to low spring pressure
• Abrasive brush grades
• Vibration
• Contaminated atmosphere
• Low humidity and temperature

Photographing

Causes
• Condensation under brush face from extended shutdown time
• A jolt on the brushes and interruption of contact or electrical spike at the same point in rotation

Slot Bar Marking

Causes
• Uneven current distribution in armature windings
• Unequal number of windings in adjacent slots
• Inconsistency in armature windings related to number of coils, slots, and commutator bars

Bar Edge Burning

Causes
• Incorrect brush alignment/ off neutral
• Incorrect interpole strength
• Inappropriate brush grade
• Low spring pressure
• Sparking caused by commutation problems

Copper Drag

Causes
• Overheating and softening of the commutator
• Low spring pressure
• High friction brush grades
• Excessive vibration

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