

## **Knowledge Domain: Motors**

### **Unit: Cleaning/Lubrication**

#### **Skill: Arcing grooves in commutator with emery paper**

#### **Tools and Parts Required:**

- 1. Emery paper**
- 2. Commutator**
- 3. Piece of cloth**
- 4. Gasoline**

#### **Introduction**

Friction between the copper segments of the commutator and the brushes eventually wears both surfaces. Older copper brushes can cause more wear to the commutator. Copper brushes can cause deep grooves and notches on the surface over time.

The commutator on small motors is not designed to be repaired. On large industrial equipment, the commutator may be re-surfaced with abrasives. Emery paper is like sandpaper. It can be used for sanding down hard and rough surfaces.

#### **Identification and Diagnosis**

Arcing at brushes is usually caused by mica protruding above the commutator segments. Mica protrudes because the commutator surface has worn down. The brushes cannot make good contact and arcing occurs. The commutator burns and blackens and becomes rough. This trouble is more common on generators.

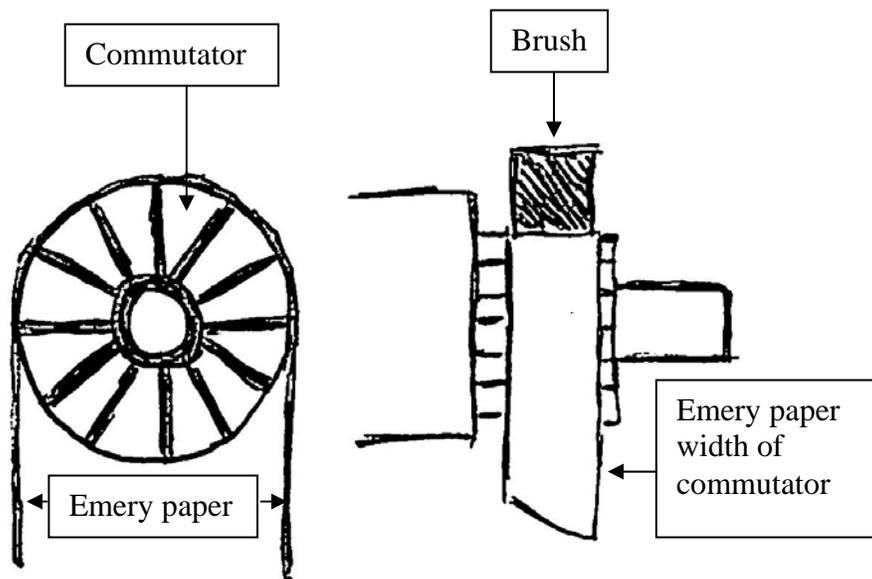
A blackened and burned commutator is not always caused by mica. Other causes are:

- having brushes of improper size or material
- an insufficient spring tension on the brushes
- an overload on the generator
- an open or short circuit in the generator windings
- two windings on one armature with two commutators
- a short-circuit between the motor and generator windings

Check for these before attempting to repair the grooves with emery paper.

#### **Procedure**

1. Cut a piece of emery paper that is 2 cm wider than the brush of the commutator.
2. Wrap the emery paper around the commutator as shown in the picture. Ensure that the paper makes contact with at least half of its circumference. The right illustration illustrates a method to properly seat the brushes to the rounded surface of the commutator.



3. Hold the emery paper on each end with your hands and move the paper back and forth along the commutator to remove the black charring.
4. If the commutator still makes a noise after the protruding mica is cleaned, the commutator can be cleaned by speeding the engine up to about 1000 r.p.m., Then, wipe off the commutator with a piece of cloth dampened with gasoline to remove grease and dirt. Or, new brushes can be fitted.
5. Noise can also sometimes be eliminated by slightly setting the brush to one side with a small wood stick. Never use a screwdriver or metal.

### **Exercise**

Your instructor will provide you with a dirty commutator. Your task is to repair the grooves with emery paper.

### **Preventative Maintenance and Calibration**

Check the motor for noises and inconsistent machine-running every 6 months. Replace as needed.