

BRUSH SPARKING

TECHNICAL NOTE ■ STA BE 16-33 GB

CAUSES

The brush sparking, which is most frequently seen at the leaving (trailing) edge occurs for two reasons:

- Electrical: faulty commutation, over-loading, excessive di/dt , brush unsuitable, etc.,
- Mechanical: shock and vibrations – excessive friction – out of round, out of balance or deformed commutator (or rings), insufficient spring pressure on the brushes, etc.

EFFECTS

Whatever the reason may be, the sparking is always noxious:

- for the brush whose rate of wear increases,
- to the commutator (or the rings) which is damaged by burning of the metal.

CHARACTERISTICS

Their degree of aggressiveness depends upon:

- their volume: which can go from being barely perceptible at the edge, intermittent or continuous, to sustained arcing, static or mobile, with or without the expulsion of incandescent particles (streamers),
- their colour:
 - small **violet** sparks are fairly inoffensive, they only affect the brush,
 - **red** sparks, with or without expulsion of incandescent carbon appearing during overloads; these cause a higher rate of brush wear,
 - **blue** sparks, brilliant and noisy, with burning, generally indicates a serious commutation fault, it accelerates the rate of brush wear and damages the commutator,
 - **green** sparks which are voluminous, always with burning, indicates a serious fault in machine operation and precedes a flash over. It brings about rapid and profound damage to the commutator and to the brushes.

NOTATION

It is often useful to be able to define concisely and precisely the degrees of brush sparking of a machine for a determined operating duty.

The Westinghouse system of classification, one which is most frequently used, is acceptable in the majority of cases and has proved to be satisfactory throughout the world.

We give below these definitions with the corresponding schematic representation.



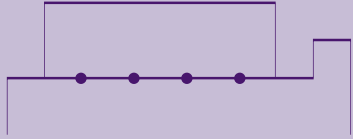
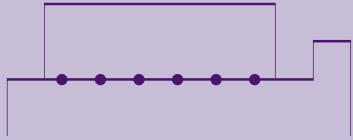

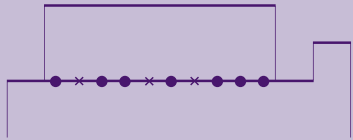


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CLASSIFICATION OF SPARKING IN ACCORDANCE WITH WESTINGHOUSE GENERATORS AND MOTORS

Diagram	N°	Description
	1	Black
	1 1/4	Intermittents beads
	1 1/2	Several beads
	1 3/4	Numerous beads
	2	Intermittent streamers
	2 1/4	Several streamers
	2 1/2	Numerous streamers
	3	Large and continuous streamers

● Beads without streamers × Beads with streamers

Usually the admissible limits are:

Normal operating conditions: 1 1/2

Rush operating conditions – Overcharge: 1 3/4

PLEASE NOTE

We would draw your attention to the fact that filter LCL 6402 C (see notice AE 24) gives by direct reading on a scale, the world-wide level (or degree) expressed in micro amperes, of brush commutation sparking.

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