ASPECTS OF COMMUTATOR SKINS

Set out below are the various common and typical aspects of skin conditions and commutator faults. Below each general heading is shown the character and significance of these different skin types and faults.

P - SKIN

a - Colour intensity

- P2 - P4 - P6: show normal skins.
  Uniform, light maroon (P2) to darker maroon (P6).
  The machine and brushes working well.

b - Aspect of Skin deposit

- P12: Streaky skin.
  Lines and bands of varying size alternately light and darker without wear of the copper.
  Most frequent cause: excessive humidity, oil vapours and agressive gases in the atmosphere - under loaded brushes.
- P14: Raw grooved skin.
  As P12, but with bands of the colour of raw copper or very slightly skinned. The metal is being attacked.
  Most frequent causes: the same as for streaky skin but more intense or prolonged.
  Also the brush grade may be unsuitable.
- P16: Patchy skin.
  Of blotchy appearance having irregular and diverse colorations and dimensions without character of symmetry.
  Most frequent causes: commutator deformed or dirty.

c - Patchiness due to mechanical causes

- P22: Isolated or regularly distributed blotches.
  Dark blotches having blurred boundaries.
  Most frequent causes: commutators out of truth (isolated blotch) or out of balance vibrations, defective bearings or alignment imperfect etc. (blotches regularly distributed in one or more zones of the commutator).
- P24: Dark blotches with sharp or irregular edges followed by lighter areas in alternating fashion with gradual reducing intensity of colour.
  Most frequent causes: a fault affecting one bar or group of bars causing radial movement of the brush.
- P26 - P28: Bars marked at their centre or at their edges.
  Shading at the centre of the bar or fringe marking at the edges.
  Most frequent causes: defective maintenance of commutator, poorly turned or trued.

d - Bar marking due to electrical causes

- P42: Alternate bars light and dark.
  On each side of a variable number of clear bars the dark bars can have an aspect of polished, mat or blackened appearance. This characteristic is reproduced all round the commutator in a repetitive manner.
  The most frequent causes are of electrical origin. They are associated with the coils on the armature being commutated at successive intervals, the difficulty increasing with the rank of conductors in each slot as in multiplex windings.
  This can be corrected by the use of a grade having a better commutating ability.

- P46: Marking at double pole pitch.
  Marking is clear or hazy, its colour dark, with mat or black appearance, successive markings at double pole pitch.
  Most frequent causes: faulty soldering at equalizers, risers or in coils.

B - BURNING

- B2 - B6: Metallic erosion, burning and dark patches at edge of bar due to the degree of sparking.

- B8: Metallic erosion (burning) at centre of bars.

- B10: Pitted skin.
  Small clear, light spots of variable number and random distribution over a normal skin.
  Cause: sparking under the brushes.

T - GHOSTING AND BANDING

Aspects of certain particular marking

- T 10: The brush image.
  A dark or black mark reproducing all or part of the contact face of the brush in exact outline on the commutator.
  Most frequent causes: prolonged periods at rest without current or momentary stall of the machine under voltage.

- T 12: Dark fringe due to high bar L 2.

- T 14: Dark fringe due to low bar L 4.

- T 16: Dark fringes due to high micas L 6.

- T 18: Dark bar edge patches due to metallic fins at edge of bars.

L - COMMUTATOR BAR FAULTS

- L 2: High bar.
- L 4: Low bar.
- L 6: High micas.
- L 8: Copper fins.
- L 10: Copper drag.

R - WEAR OF COMMUTATOR BARS

- R 2: Commutator with axial profile showing track growing with correct stagger. This wear may appear after a very long period of operation.

- R 4: Commutator showing abnormal wear of the metal through incorrect stagger, or grade unsuitable or various atmospheric pollutions.

P - SKIN

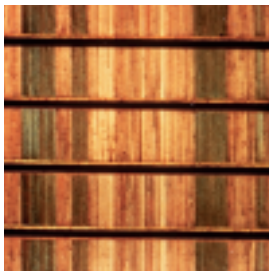
variation in colour

P 2

P 4

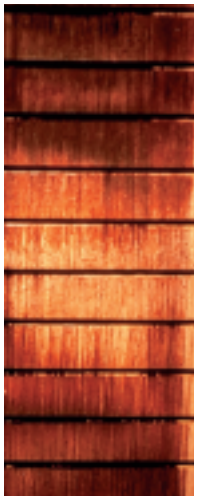
P 6

aspects of skin



P 12

P 14



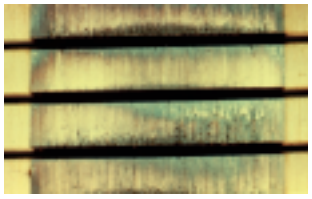
P 16

bar marking of mechanical origin

P 22

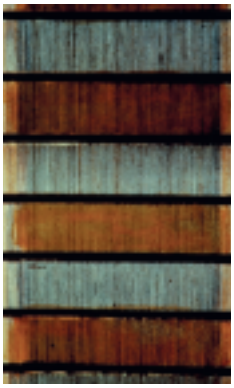
P 24

P 26



P 28

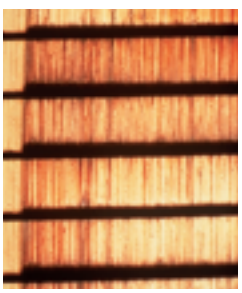
bar marking of electrical origin



P 42

P 46

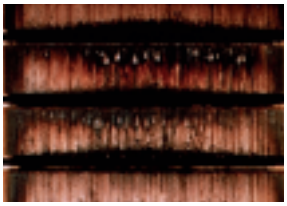
B - BURNING



B 2

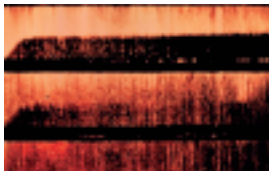
B 6

B 8



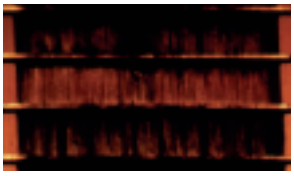
B 10

T - COMMUTATOR BAR MARKING

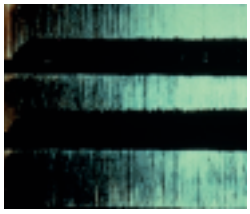


T 10

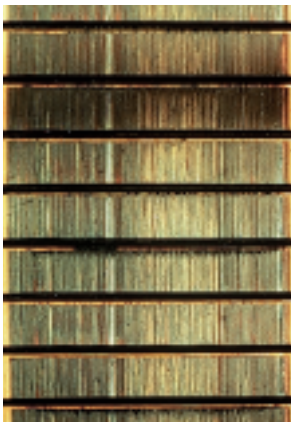
T 12



T 14



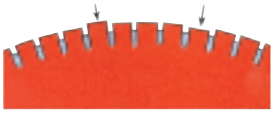
T 16



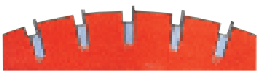
T 18

L - COMMUTATOR BAR DEFECTS

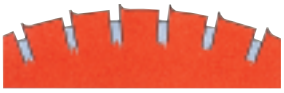
L 2 L 4



L 6

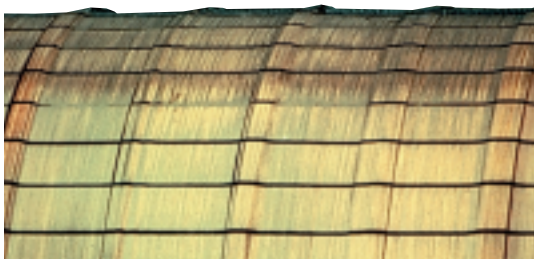


L 8



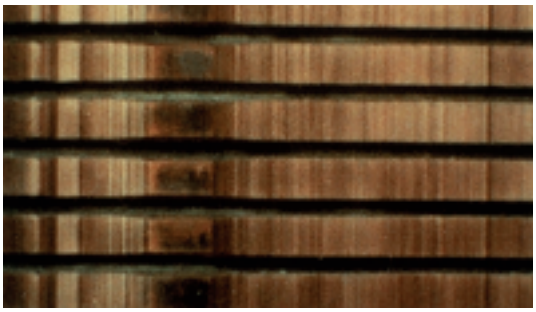
L 10

R - COMMUTATOR WEAR



R 2

R 4



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