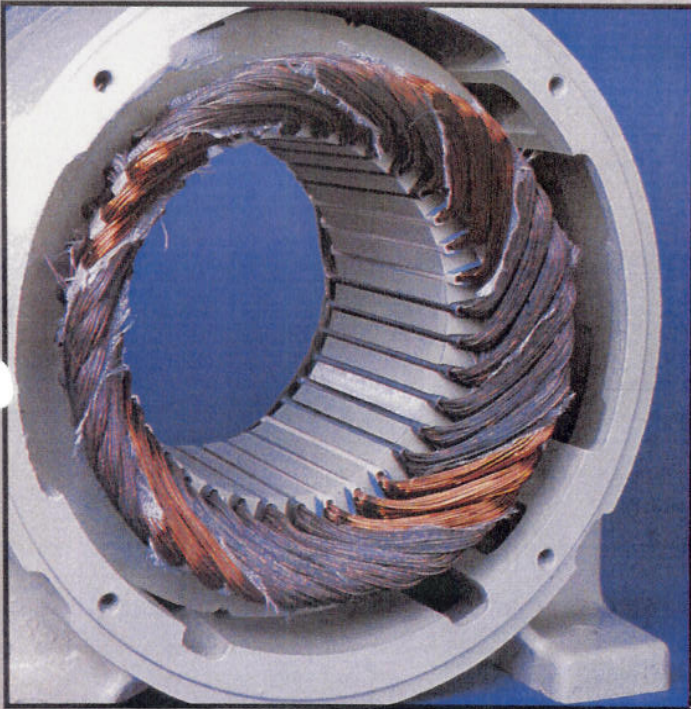
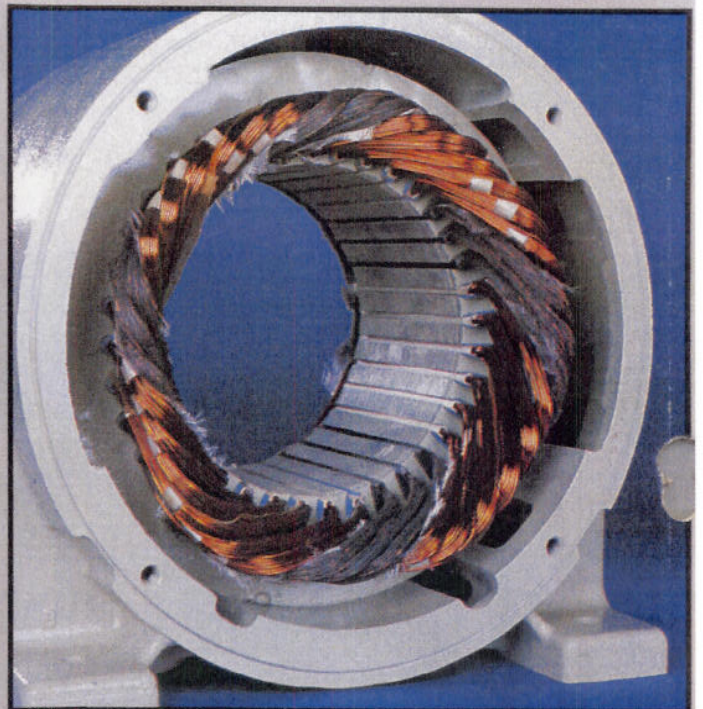


# FAILURES IN THREE-PHASE STATOR

*2 Phases Only*



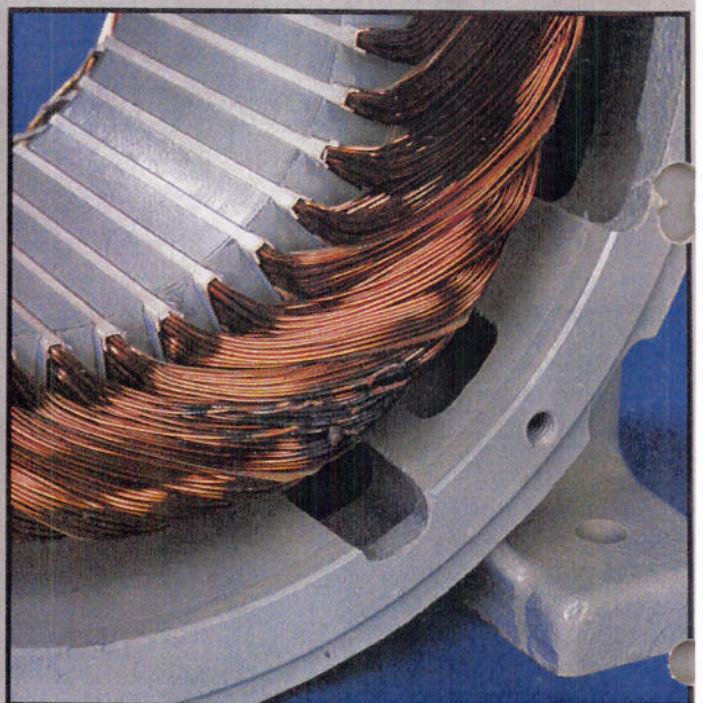
**1** Winding Single-Phased  
(Y - Connected)



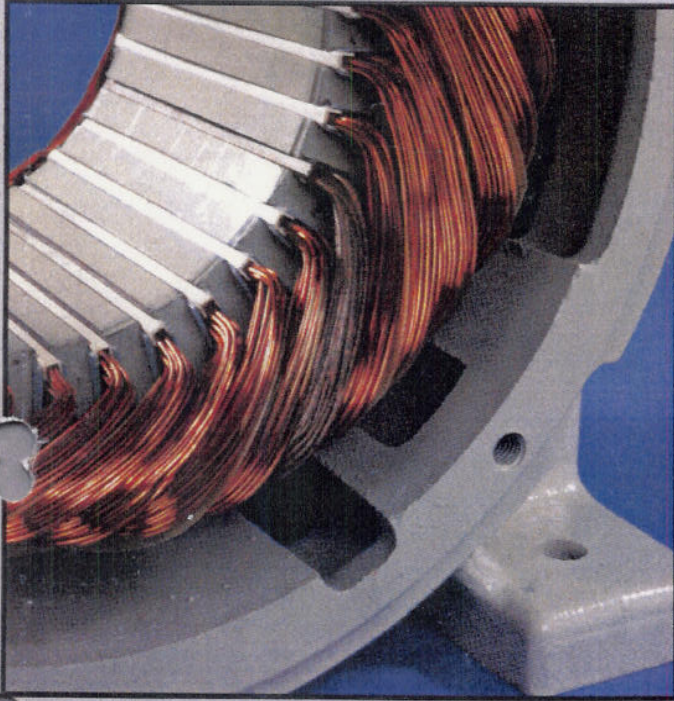
**2** Winding Single-Phased  
( $\Delta$ - Connected)



**3** Winding Shorted  
Phase-To-Phase



**4** Winding Shorted  
Turn-To-Turn



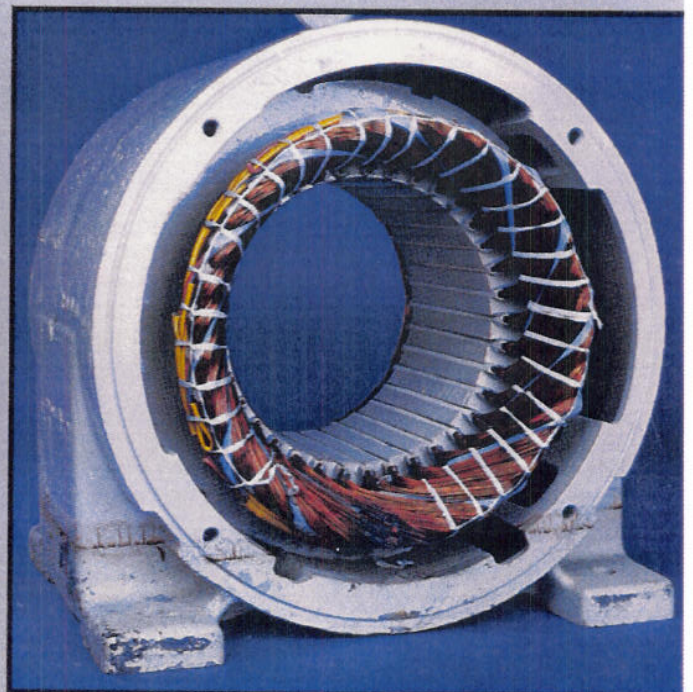
**5** Winding with Shorted Coil



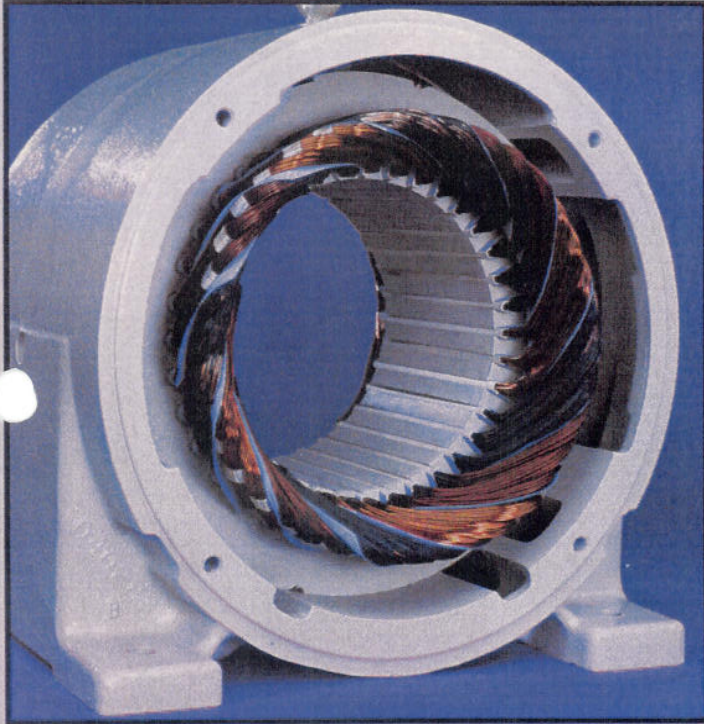
**6** Winding Grounded at Edge of Slot



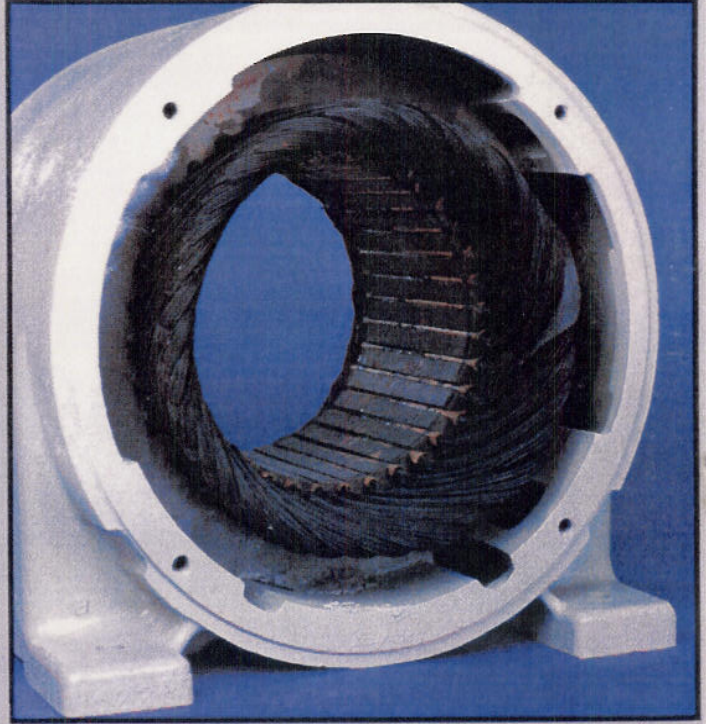
**7** Winding Grounded in the Slot



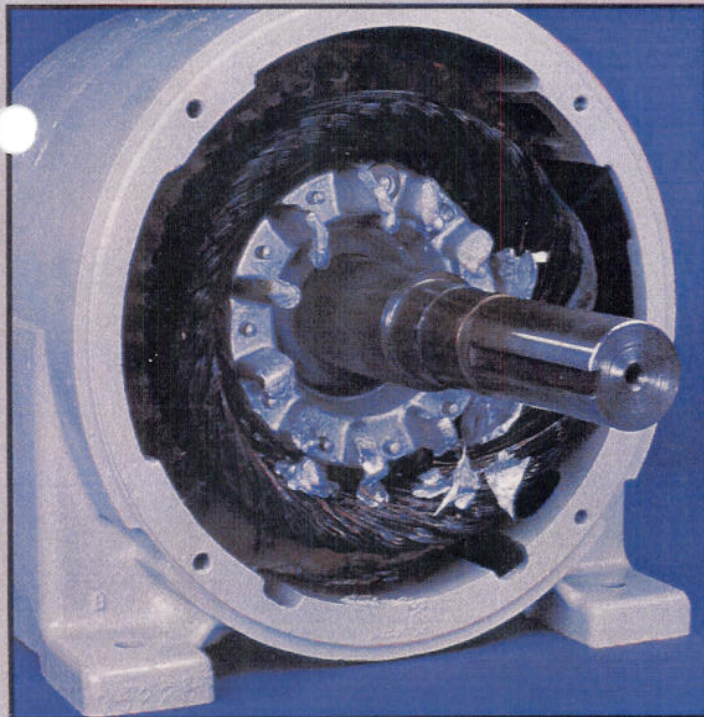
**8** Shorted Connection



**9** Phase Damage Due to Unbalanced Voltage



**10** Winding Damaged Due to Overload



**11** Damage Caused by Locked Rotor



**12** Winding Damaged by Voltage Surge

# TYPICAL CAUSES OF WINDING FAILURES IN THREE-PHASE STATORS

## Photo Number

- 1&2** A single-phased winding failure is the result of an open in one phase of the power supply to the motor. The open is usually caused by a blown fuse, an open contactor, a broken power line or bad connections.
- 3,4,5, 6,7 &8** These photos illustrate insulation failures that typically are caused by contaminants, abrasion, vibration or voltage surge.
- 9** Thermal deterioration of insulation in one phase of the stator winding can result from unequal voltage between phases. Unequal voltages usually are caused by unbalanced loads on the power source, a poor connection at the motor terminal, or a high resistance contact (weak spring).  
NOTE: A one-percent voltage unbalance may result in a six- to ten-percent current unbalance.
- 10** Thermal deterioration of the insulation in all phases of the stator winding typically is caused by load demands exceeding the rating of the motor.  
NOTE: Under-voltage and over-voltage (exceeding NEMA standards) will result in the same type of insulation deterioration.
- 11** Severe thermal deterioration of the insulation in all phases of the motor normally is caused by very high currents in the stator winding due to a locked rotor condition. It may also occur as a result of excessive starts or reversals.
- 12** Insulation failures like this usually are caused by voltage surges. Voltage surges are often the result of switching power circuits, lightning strikes, capacitor discharges and solid-state power devices.



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