

# IEEE Standard 841

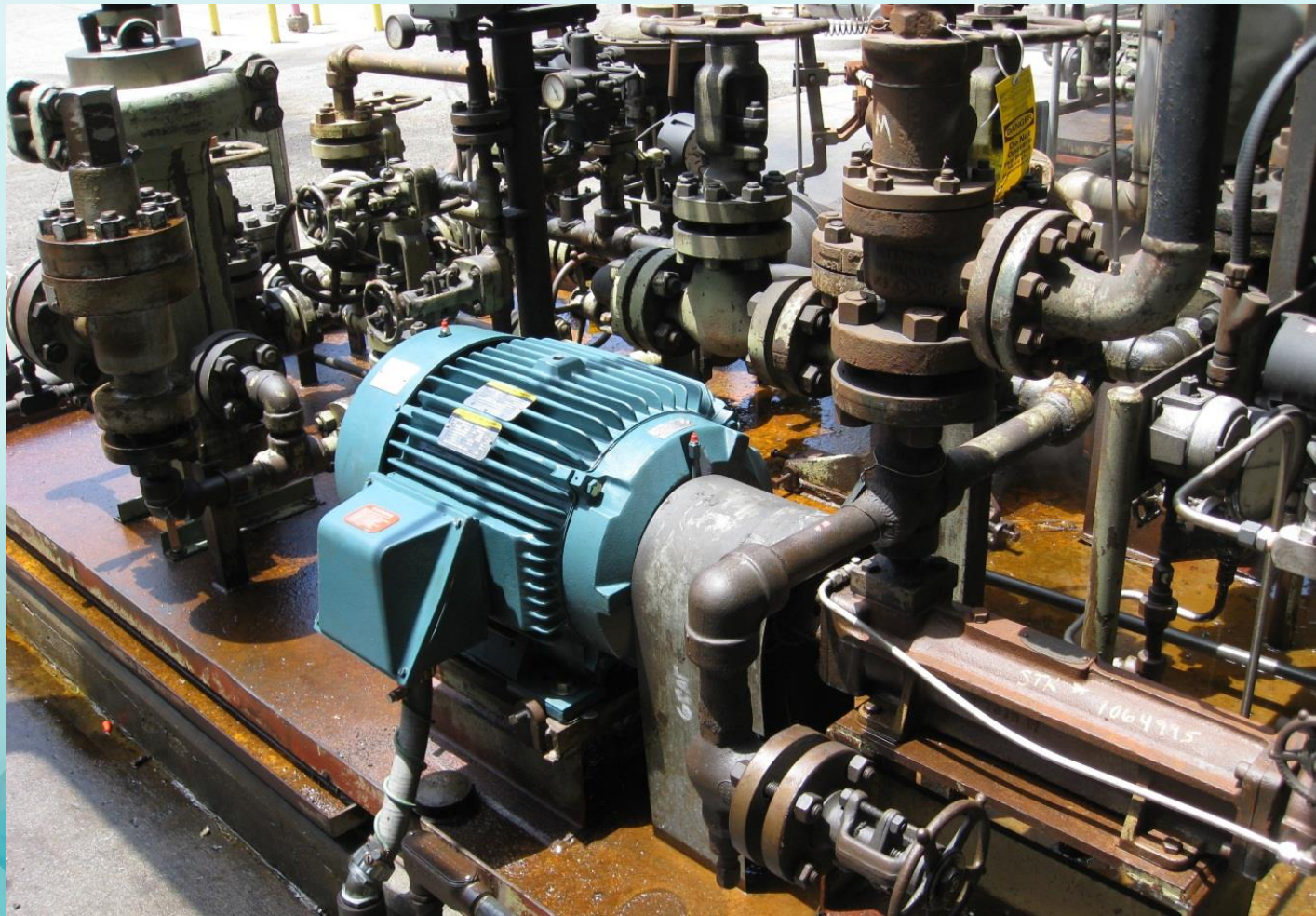
# IEEE Standard 841

- Overview/Objectives:
  - Purpose
  - Key Requirements
  - Testing

# IEEE Standard 841-2009

*Severe Duty, TEFC, Squirrel Cage Motors*

*Up to and Including 370 KW (500 HP)*



# Purpose of IEEE 841

- Define an Industry Acceptable Severe Duty Motor
- Eliminate Individual User Specs
- Readily Available Feature Rich Motors
- Reliability Focus by Defining:
  - Mechanical and electrical performance
  - Insulation systems
  - Corrosion protection
  - Testing

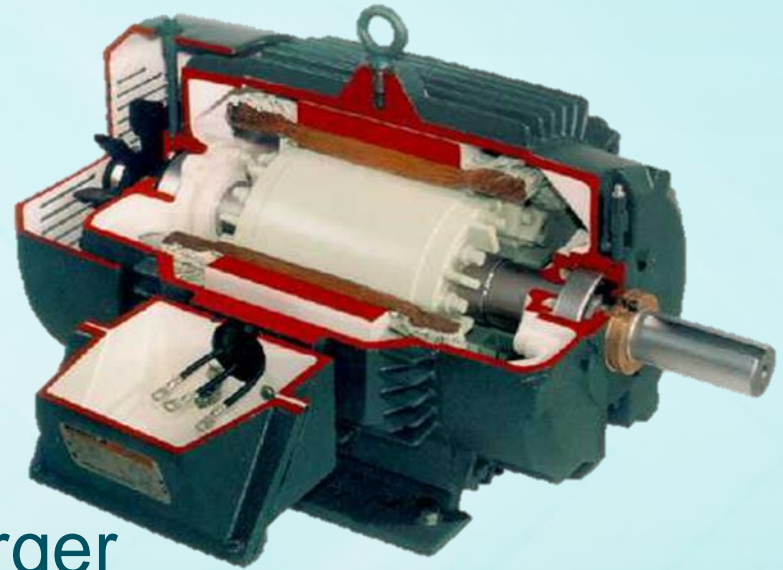


# Background:

- 1986 – IEEE RP 841 – IAS Petro-Chemical Committee
  - 250HP and Below
  - 600V and below
  - Severe duty
  - High efficiency
- 1994 - IEEE 841
  - Increased ratings to 500 HP or less
  - Increased voltage up to 4000V
  - Added TEFC in the title
- 2001 – IEEE 841
  - Included the IAS Pulp and Paper Committee in the working group
  - Added Metric Units
  - Data Exchange – Added PIP data sheet
- IEEE 841-2009
  - Premium Efficient
  - Added Class 1, Division 2 as a “Usual service condition”
  - Increased use of metric equivalents
  - IP 55 for all ratings

# IEEE 841 Key Requirements

- Premium Efficient
- TEFC (TENV)
- 500 HP and Below
- 4000V and Below
- NEMA Frames 143T and Larger
- Severe Duty



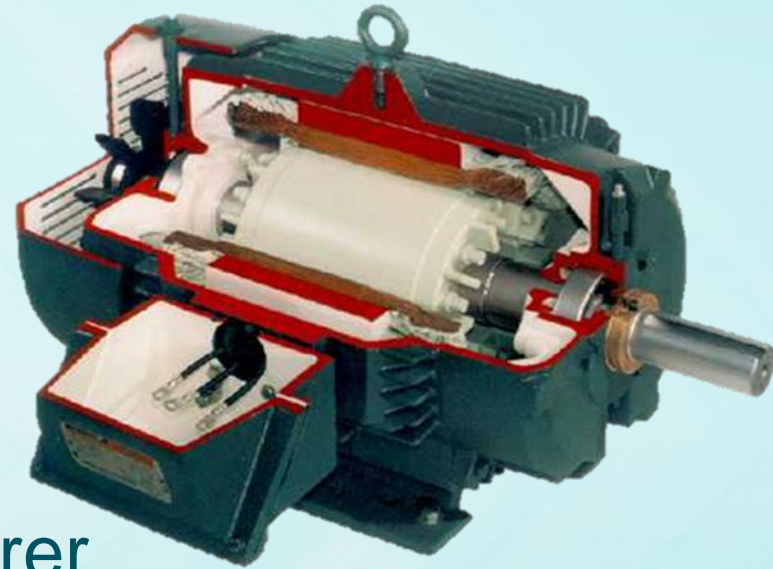
# IEEE 841 Key Requirements

- Usual Service Conditions
  - -25°C to +40°C ambient
  - Maximum altitude = 1000M
  - Humid, chemical (corrosive), or salty atmospheres
  - Full voltage starting
  - Class I, Division 2 atmosphere



# IEEE 841 Key Requirements

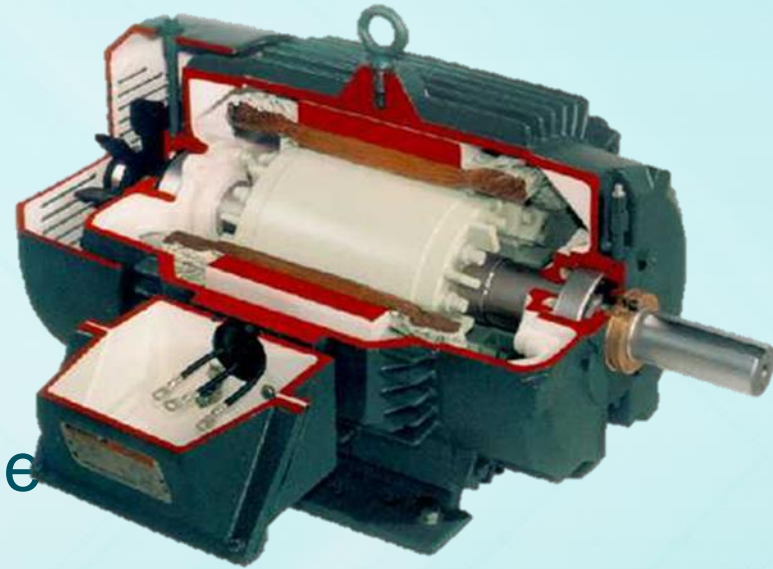
- NEMA Frame assignments
- 2, 4, 6, and 8 pole only
- IP55
- NEMA Design B
- If on ASD, consult manufacturer
- Class F Insulation
- Form Wound, Sealed Insulation for 2300V and above.





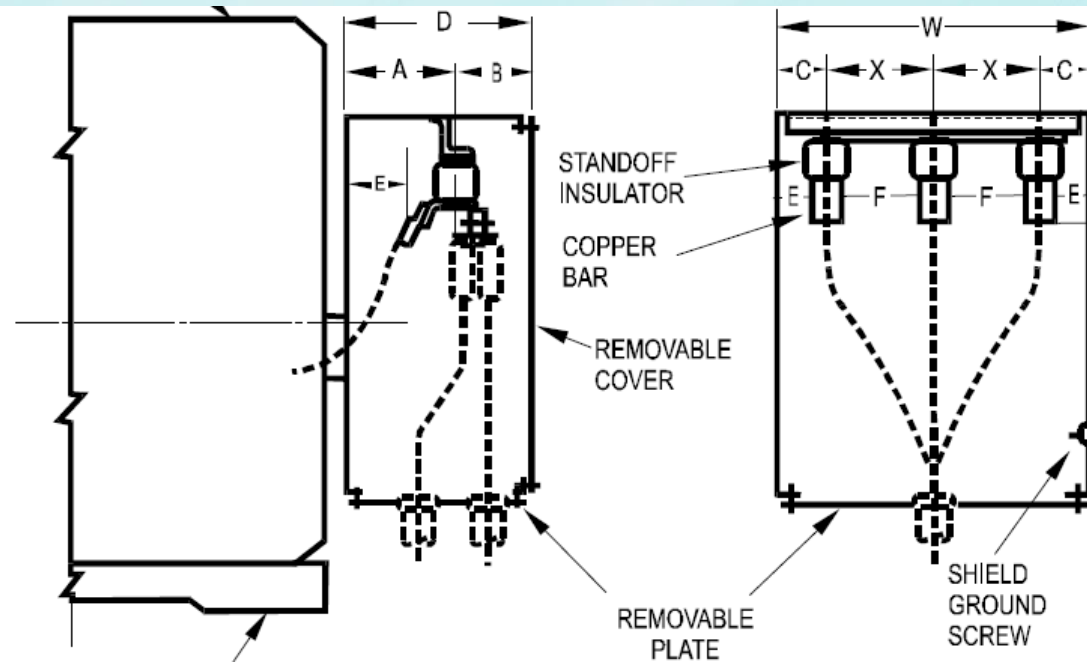
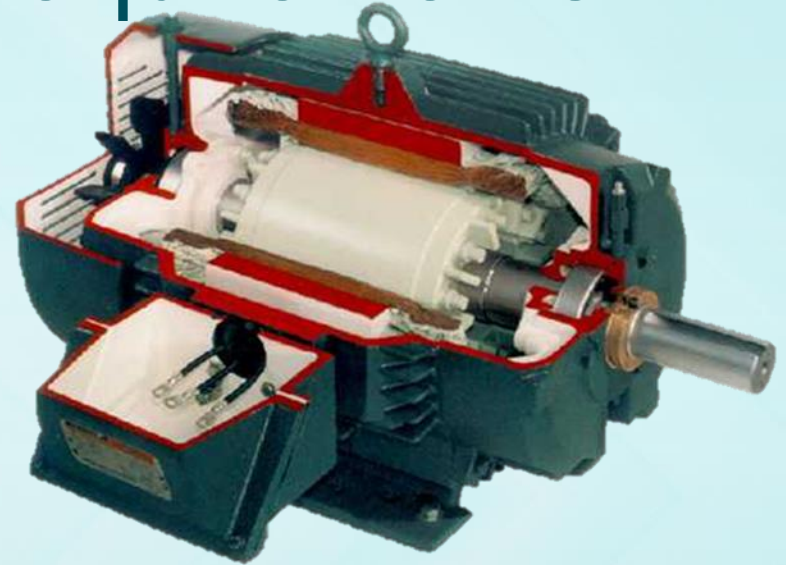
# IEEE 841 Key Requirements

- B Rise by Resistance at FL
- Max 200°C Surface Temps
- Anti-friction Bearings
  - 45°C rise (50°C on 2P)
- Copper or Aluminum Rotor Cage
- “T” or “TS” Shaft Extensions
- Cast Iron Construction
- Coplanar feet within 0.005 in
- Maximum 1.5 draft angle at feet
- Non-sparking fan (Bronze alloy or conductive plastic)



# IEEE 841 Key Requirements

- Main Terminal Box
  - Cast Iron
    - Max 600V
    - Max 445T
    - Defined Volume
  - NEMA Type II
    - Above 600V c
    - Above 445T



# IEEE 841 Key Requirements

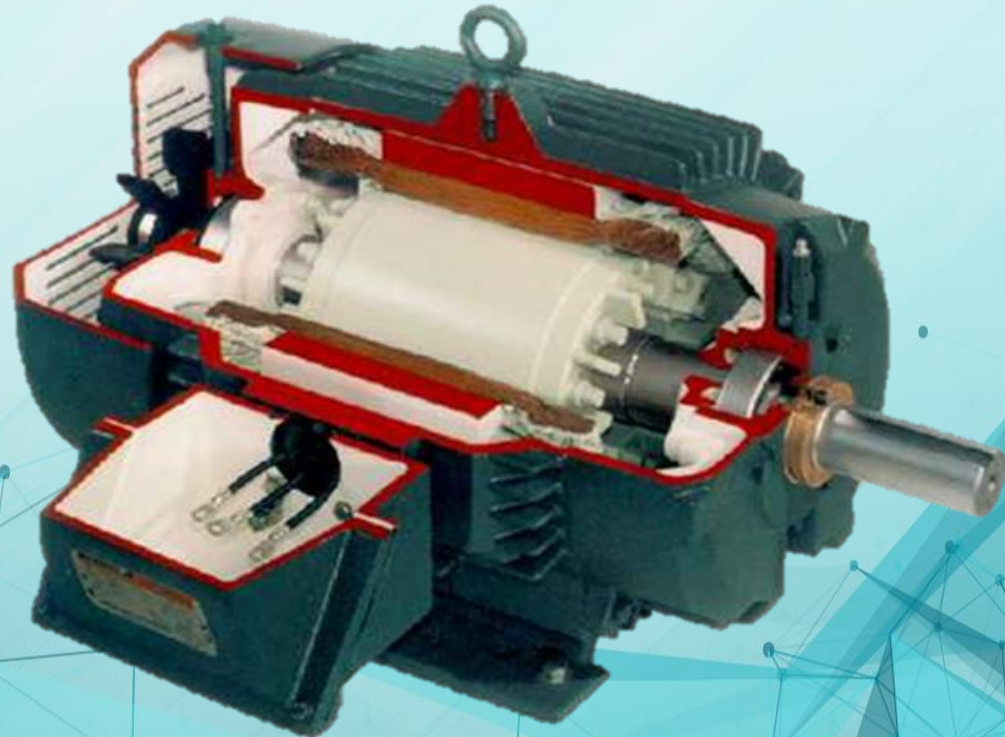
- Main Terminal Box

- Barrier at Frame
- Ground Lug
- 3 Leads
  - Some allowance for 2/phase
- Copper Alloy, Seamless Compression Type Lugs



# IEEE 841 Key Requirements

- Automatic Drains
  - All Frames
  - Terminal Boxes Above 600V and Above 445T Frames
- Blind Hole for Eyebolt
- 90 dBA Sound Power
- Vibration - Unfiltered
  - 0.08 in/s – 2P, 4P, and 6P
  - 0.06 in/s – 8P
  - 0.06 in/s - Axial
- Vibration – 2n & 2f
  - 0.05 in/s



# IEEE 841 Key Requirements

- Corrosion Resistance

- 96 Hr. Salt Spray Type Test

- Frame
    - Endshields
    - Fan Covers
    - Terminal Housings

- 720 Hr. Salt Spray Type Test

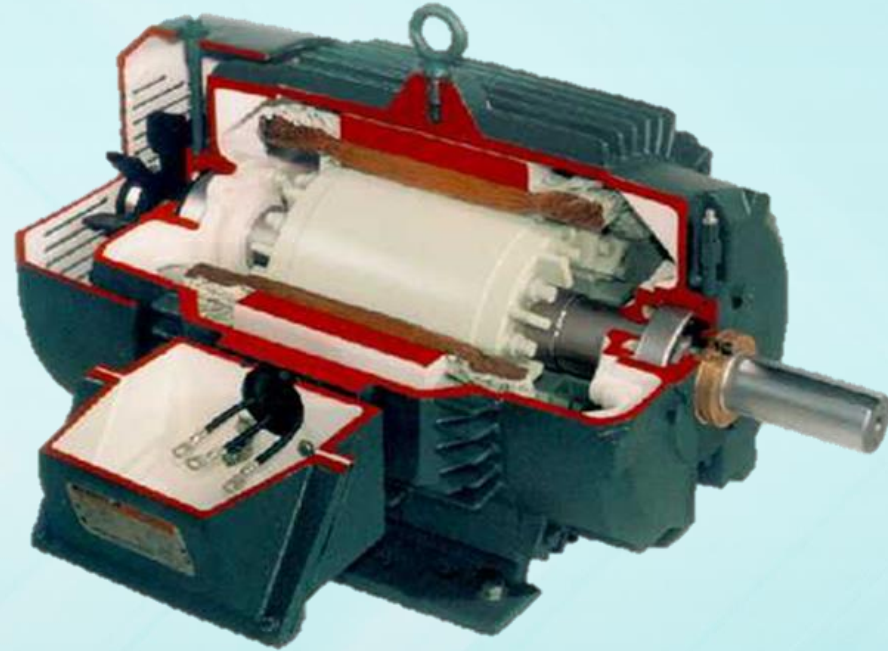
- Nameplate

- Internal Corrosion Resistance

- Stator, Rotor, and Shaft

- Assembly

- Corrosion Preventative to Frame to Endshield Fits
    - Lubricant Added to Threaded Surfaces



# 841 Testing

## 9.4 Test information supplied with motor

Winding resistance; no load current, voltage, and speed; and **five unfiltered vibration readings (velocity)** shall be supplied with the motor at the time of shipment. Vibration measurements shall include two readings, perpendicular to each other, in the radial plane on both ends of the motor (near each bearing) plus one axial reading.

**Typical report of test form for routine tests**

Name of Manufacturer \_\_\_\_\_  
 Address of Manufacturer \_\_\_\_\_ Date of Test \_\_\_\_\_  
 \_\_\_\_\_ Manufacturer's Order No. \_\_\_\_\_  
 Purchaser \_\_\_\_\_ Purchaser's Order No. \_\_\_\_\_

**Nameplate Data**

Rated hp/kW	Service Factor	Rated Speed r/min	Phase	Frequency Hz	Volts	Amperes

Type	Frame	(Temp Rise by method Indicated)	(Ambient temp and Insulation Class)	Time Rating	Design Letter	Code Letter for Locked kVA/hp

**Test Characteristics**

Serial No.	No Load					Locked Rotor				Wound Rotor Open-Circuit Voltage	High Potential Test Voltage	Stator Winding Resistance Between Terminals	
	Volts	Frequency Hz	Speed r/min	Amperes	Kilo-watts*	Volts	Frequency Hz	Amperes	Kilo-watts*			Ohms	Temp in °C

\*If measured, optional.

# Quiz

- True or False: IEEE 841 applies to motors 500HP and above
- True or False: a key requirement of IEEE 841 is that it involves NEMA Design B motors
- True or False: corrosion resistance testing for IEEE 841 involves a salt spray test

• False: 500HP and below  
• True  
• True