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### Guide to Motor Classifications

The National Electrical Manufacturers Association (NEMA) defines several standardized classes of industrial motors. Open Drip-Proof (ODP) and Totally Enclosed Fan Cooled (TEFC) are two of the most commonly encountered types in HVAC applications.

#### Open Drip-Proof (ODP)

Angled openings in motor shield and/or frame prevent most drops of liquid from falling into the motor while also cooling the motor. Further protection is granted by being installed inside unit casings. These motors are typically suitable for dry, clean, or indoor areas. ODP motors should be standard selections. These motors offer great motor protection for the cost. As fan motors are often additionally protected by the unit enclosure, more expensive motor casings are often not required.



Figure 1: ODP motor<sup>1</sup>

#### Totally Enclosed Fan Cooled (TEFC)

This classification of fan motor features a cooling fan built into the motor housing. These motors also typically feature moderate sized fins to aid in heat dispersion. TEFC motors are dust tight with moderate water resistance. This versatile style of motor is commonly used by ThermoTek when moisture, corrosion, or dust is a concern. Note that TEFC motors are similar to PSC motors in regards to turndown, margins, etc. These motors are first choice selections in the following scenarios:



Figure 2: TEFC motor<sup>2</sup>

1. Applications within 5 miles of the coast
2. Dishwashers, especially if caustic cleaning agents present
3. Extreme latent load applications
4. Swimming pools
5. High dust applications.

#### Totally Enclosed Air Over (TEAO)

TEAO fans must be mounted in the airstream of the fan or blower that they drive in order to prevent overheating. TEAO fan enclosures are typically dust tight. These motors should be used with caution as insufficient airflow (due to design, VAV, etc.) will lead to overheating.



Figure 3: TEAO motor<sup>3</sup>



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### **Totally Enclosed Wash Down (TEWD)**

This class of motor is suited for applications where wash down procedures are commonplace as they are built to withstand repeated high pressure and wet environments. Common applications for these motors include pharmaceuticals, food processing facilities, and food packaging plants. ThermoTek uses these motors in PCUs.



**Figure 4: TEWD motor<sup>4</sup>**

### **High vs. Premium Efficiency Motors**

Another manner to distinguish between different motors references their respective efficiency levels. In this case, Premium efficiency motors operate at higher levels of efficiency than High efficiency motors. This efficiency directly translates into reduced energy costs; the U.S. Department of Energy estimates that a Premium 10 horsepower motor will save \$250 each year when compared to a standard efficiency motor. In addition to energy savings, Premium motors have increased reliability and compatibility with variable speed drives.