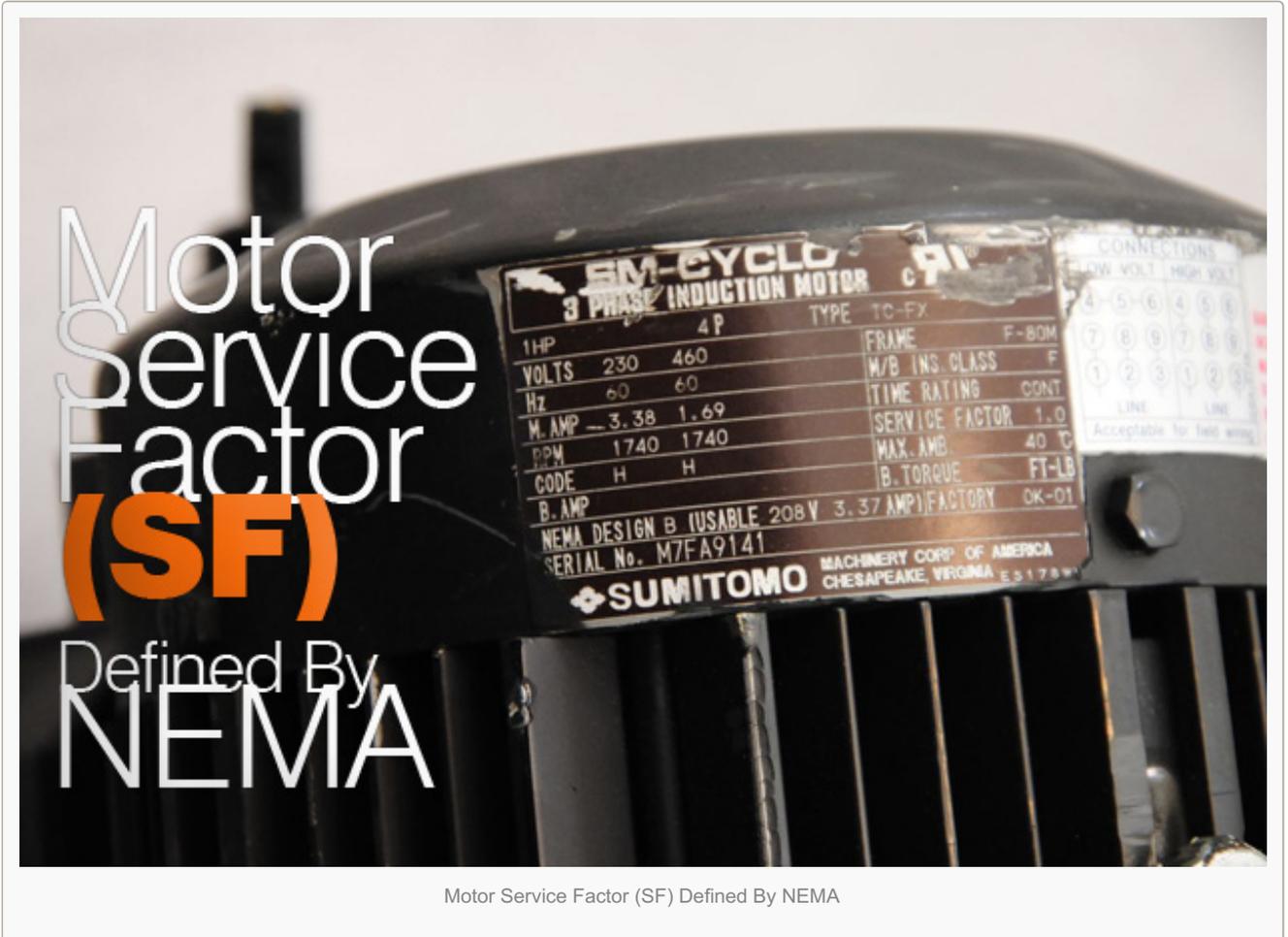


Motor Service Factor (SF) Defined By NEMA

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Permissible horsepower loading

Motor Service Factor (SF) is the percentage of overloading the motor can handle for short periods when operating normally within the correct voltage tolerances. This is practical as it gives you some 'fudge' in estimating horsepower needs and **actual running horsepower requirements**.

It also allows for **cooler winding temperatures** at rated load, protects against intermittent heat rises, and helps to offset low or unbalanced line voltages.

For example, the standard SF for **open drip-proof (ODP)** motors is **1.15**. This means that a 10-hp motor with a 1.15 SF could provide 11.5 hp when required for short-term use. Some fractional horsepower motors have higher service factors, such as 1.25, 1.35, and even 1.50.

NEMA defines service factor as a **multiplier**, when applied to the rated **horsepower**, indicates a **permissible horsepower loading**, which may be carried under the conditions specified for the service factor at rated voltage and frequency.

This service factor can be used for the following:



BALDOR Open Drip Proof C-Face Foot Mounted motor - 1/3Hp-100Hp NEMA 56C-404TC

1. To accommodate inaccuracy in predicting intermittent system horsepower needs.
2. To lengthen insulation life by lowering the winding temperature at rated load.
3. To handle intermittent or occasional overloads.
4. To allow occasionally for ambient above 40°C.
5. To compensate for low or unbalanced supply voltages.

NEMA does add some cautions, however, when discussing the service factor:

1. Operation at service factor load for extended periods will usually reduce the motor speed, life and efficiency.
2. Motors may not provide adequate [starting and pull-out torques](#), and incorrect starter/overload sizing is possible. This in turn affects the overall life span of the motor.
3. Do not rely on the service factor capability to carry the load on a continuous basis.
4. The service factor was established for operation at rated voltage, frequency, ambient and sea level conditions.

Most motors have a **duty factor** of 1.15 for open motors and 1.0 for totally closed motors.

Traditionally, **totally enclosed fan cooled (TEFC)** motors had an SF of 1.0, but most manufacturers now offer TEFC motors with service factors of 1.15, the same as on ODP motors. Most [hazardous location motors](#) are made with an SF of 1.0, but some specialized units are available for Class I applications with a service factor of 1.15.

The service factor is required to appear on the nameplate only if it is higher than 1.0.

Reference: Understanding Motor Nameplate Information: NEMA vs. IEC Standards – Continuing Education and Development, Inc.

Source:

<http://electrical-engineering-portal.com/motor-service-factor-sf-defined-by-nema>