



Coupling Corporation of America

"Solutions Beyond a Catalog"

Service Factor vs Factor of Safety

Service Factor (S.F.)

The Service Factor is a torque multiplier applied to the normal operating torque to account for recurring loads beyond standard operating conditions. Couplings are selected by comparing the Selection Torque (Service Factor × Operating Torque) to the coupling's Maximum Continuous Torque rating.

$$\text{Service Factor} = \frac{\text{Selection Torque}}{\text{Operating Torque}}$$

EXAMPLE

$$\text{Service Factor} = \frac{2,484,000}{1,578,981} = 1.57$$

Safety Factor (Factor of Safety, F.S.)

The Factor of Safety accounts for uncertainties in coupling design, including analysis assumptions, material variability, and manufacturing tolerances. It is defined as the ratio of a component's strength (or stress capacity) to the actual operating stress, which is influenced by torque, speed, misalignment, and axial displacement.

$$\text{Factor of Safety} = \frac{\text{Momentary Stress Capacity of Component}}{\text{Stress at Maximum Continuous Torque}}$$

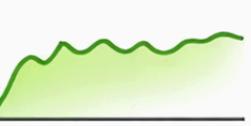
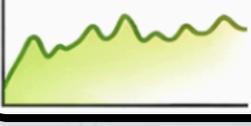
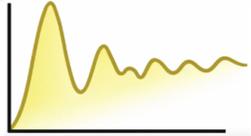
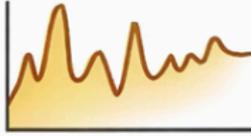
Application Factor of Safety (A.F.S.)

The most relevant safety metric is the Application Factor of Safety, which reflects the margin at the actual continuous operating load.

$$\text{Application Factor of Safety} = \frac{\text{Momentary Torque Capacity of Component}}{\text{Operating Torque}}$$

EXAMPLE

$$\text{A.F.S.} = \frac{7,452,000}{1,578,981} = 4.71$$

GRAPH	LOAD CLASSIFICATION	SERVICE FACTOR	EXAMPLE
	Continuous operation with minimal load variation	1.0	Motor Driven Centrifugal Compressor
	Torque load fluctuates under normal operating conditions	1.5	Motor Driven Slurry Pump
	Variable torque during operation with frequent start-stop cycling	2.0	Motor Driven Recip Compressor (3+ cyl)
	Involving shock loads and significant torque fluctuations	2.5	Motor Driven Recip Compressor (1-2 cyl)
	Shock loading is severe or light reversing drives	3.0	Engine Driven Dredge Pump

To find the right coupling for your application, contact us today!

www.couplingcorp.com | 800-394-3466 | 717-428-0570
250 N. Main St., Jacobus, PA 17407

**STAY CONNECTED TO COUPLING CORP:
SCAN FOR OUR SOCIALS!**

