

EXPLANATION & USE OF RATINGS & SERVICE FACTORS

0403

Gear unit selection is made by comparing actual loads with catalogue ratings. Catalogue ratings are based on a standard set of loading conditions, whereas actual load conditions vary according to type of application. Service Factors are therefore used to calculate an equivalent load to compare with catalogue ratings.

i.e. Equivalent Load = Actual Load x Service Factor

Mechanical ratings and service factor Fm

Mechanical ratings measure capacity in terms of life and/or strength, assuming 10 hr/day continuous running under uniform load conditions.

Catalogue ratings allow 100% overload at starting, braking or momentarily during operation up to 10 hours per day.

The unit selected must therefore have a catalogue rating at least equal to half maximum overload.

Mechanical Service Factor Fm (Table 1) is used to modify the actual load according to daily operating time, and type of loading.

Load characteristics for a wide range of applications are detailed in Table 3 opposite, which are used in deciding the appropriate Service Factor Fm from Table 1.

If overloads can be calculated, or accurately assessed, actual loads should be used instead of Fm.

For units subjected to frequent start/stop overloads in excess of 10 times/day multiply factor Fm x Factor Fs (table 2).

For applications where units are to operate in extremely dusty or moist/humid atmospheres unit selection should be referred to Textron Power Transmission application engineers.

Table 1. Mechanical Service Factor (Fm)

Prime mover	Duration of service-hrs per day	Load classification-driven machine		
		Uniform mass acceleration factor ≤ 0.2	Moderate mass acceleration factor ≤ 3	Heavy mass acceleration factor ≤ 10
Electric motor, steam turbine or hydraulic motor	Under 3	0.80	1.00	1.50
	3 to 10	1.00	1.25	1.75
	Over 10	1.25	1.50	2.00
Multi-cylinder internal combustion engine	Under 3	1.00	1.25	1.75
	3 to 10	1.25	1.50	2.00
	Over 10	1.50	1.75	2.25
Single cylinder internal combustion engine	Under 3	1.25	1.50	2.00
	3 to 10	1.50	1.75	2.25
	Over 10	1.75	2.00	2.50

$$\text{Mass acceleration factor} = \frac{\text{all external moments of inertia}^*}{\text{moment of inertia of driving motor}}$$

* calculated with reference to the motor speed

Table 2. Number of Starts Factor (Fs)

Start / Stops per hour (1)	Up to 1	5	10	40	60	≥ 200
Factor Fs	1.00	1.03	1.06	1.10	1.15	1.20

Note: (1) Intermediate values are obtained by linear interpolation