

DUTY CLASSIFICATION**2**

According to FEM classification, two fundamental criteria must be taken into account:

- Type of duty (load spectrum)(k)
- Average daily operated time (T_m)

I) Type of Duty (load spectrum)**I.a) Approximate determination**

- Light duty (k < or = at 0.5)

Hoist only exceptionally lifts maximum load and regularly lifts considerably lighter loads.

- Medium duty (0.5 < k < or = at 0.63)

Hoist lifts for equal periods, light, medium and maximum loads.

- Heavy duty (0.63 < k < or = at 0.8)

Hoist subjected equally frequently to maximum and medium loads.

- Very heavy duty (0.8 < k < or = at 1)

Hoist lifts loads mainly approaching maximum.

I.b) Strict determination

For an exact classification into groups the cubic mean value k referred to the load to be lifted is required. It is calculated by using the following formula:

$$k = \sqrt[3]{\left(\left(\frac{C1}{Cm}\right)^3 \cdot \left(\frac{T1}{Tm}\right) + \left(\frac{C2}{Cm}\right)^3 \cdot \left(\frac{T2}{Tm}\right) + \left(\frac{C3}{Cm}\right)^3 \cdot \left(\frac{T3}{Tm}\right) + \dots\right)}$$

Since the life of the mechanism is inversely proportional to the third power of the load.

Symbols:

- C1, C2, C3, ... useful or partial load
- T1, T2, T3, ... daily operating time under useful or partial load
- T_m = T1+T2+T3+... average daily operated time

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II) Daily Operated Time (Tm)

Tm is the daily operated time with load and without load

III) Determination of the FEM Classification

Class of duty (load spectrum)		Average daily operating time in hours					
service	k	< 0,5 h	< 1 h	< 2 h	< 4 h	< 8 h	< 16 h
light	k < 0.5	-	1 Cm	1 Bm	1 Am	2m	3m
medium	0.5 < k < 0.63	1 Cm	1 Bm	1 Am	2m	3m	4m
heavy	0.63 < k < 0.8	1 Bm	1 Am	2m	3m	4m	5m
very heavy	0.8 < k < 1	1 Am	2m	3m	4m	5m	-
		Life of the mechanisms under full load 250 hours/year					
		800	1600	3200	6300	12500	25000

IV) FEM Classification Checking

It is necessary to check the Duty factor and the Number of starts per hour.

$$\text{Duty factor} = \frac{\text{(lifting time + lowering time)}}{\text{(lifting time + idle time + lowering time + idle time)}}$$

GROUP	1 Bm	1 Am	2m	3m
Duty factor	25%	30%	40%	50%
Number of starts per hour	150	180	240	300

V) FEM / ISO

Group FEM	1Bm	1Am	2m	3m	4m
Group ISO	M3	M4	M5	M6	M7