

Critical whirling speed for R gearboxes

Maximum permissible screw rotational speed

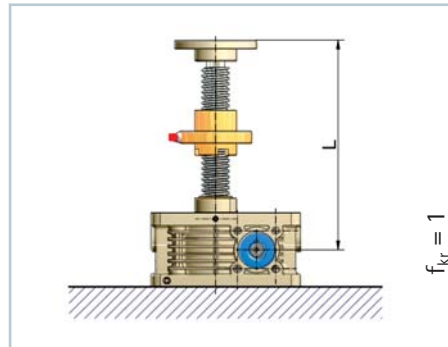
$$n_{zul} = 0.8 \times n_{kr} \times f_{kr}$$

n_{zul} Maximum permissible screw speed (rpm)

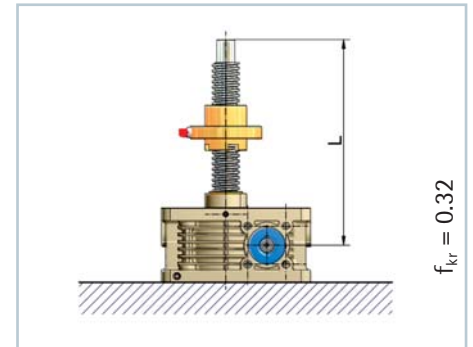
n_{kr} Theoretical critical screw speed (rpm) leading to resonant vibrations (see diagram)

f_{kr} Correction factor which makes allowance for the type of screw bearing

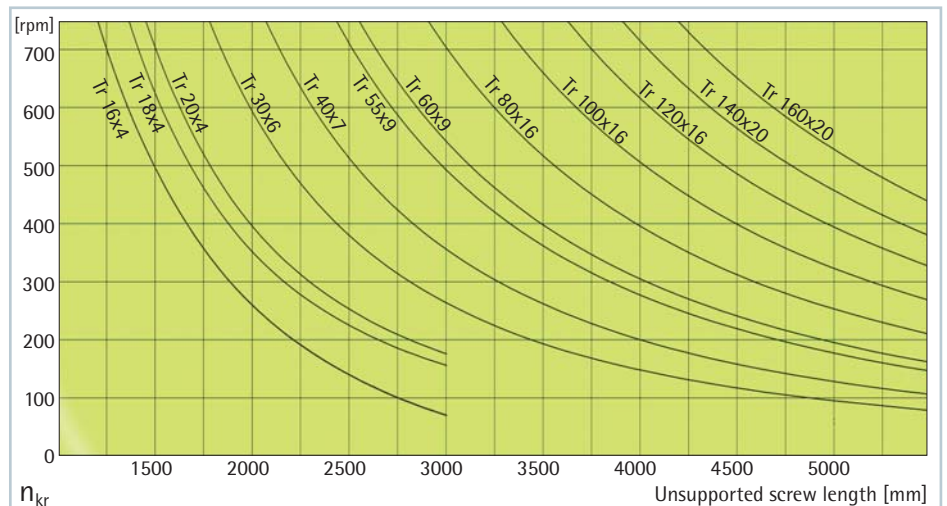
i The operating rotational speed must not exceed 80% of the maximum rotational speed



with end mounted bearings
(preferred solution)



without end mounted bearings
(avoid as far as possible)



$$\text{Screw speed} = \frac{\text{Input drive speed}}{i_{\text{gearbox}}}$$

The maximum allowable screw speed must be calculated for R version gearboxes (with rotating screws) with long thin screws. To do this, read the theoretical critical speed n_{kr} from the diagram. Take into account also the additional lengths for screw covers etc. when calculating unsupported screw lengths. Now use the formula together with the correction factor for the screw bearing arrangement to calculate the maximum allowable screw speed.

If the calculated maximum screw speed is lower than the required speed, select a larger screw or a double-pitch screw with half the speed. This must then be checked also. You have the option to use a "increased screw" for the R version (screw for the next larger gearbox).

Bear in mind that a larger pitch demands a higher drive torque.

CAUTION:

Long, thin screws can tend to squeak even though they satisfy the critical whirling speed! Therefore allow a sufficient margin of safety in the calculation.