# General notes

Materials

High-quality carbon or corrosion-resistant spring steel strip (austenitic).

### **Temperature stability**

## Tolerance rings made of carbon steel

Up to 200 °C continuous temperature; briefly ... up to 250 °C (Does not affect the spring characteristics).

#### Corrosion-resistant steel tolerance rings

Up to 250 °C continuous temperature; briefly ... up to 300 °C (Does not affect the spring characteristics).



The table shows the installation of  $\sigma$  200 mm rolling bearing at a temperature of 20 °C with and without a tolerance ring. In both cases a seating force of 6500 N is present. As the temperature rises, the seating force drops: in the case of a rolling bearing installation without a tolerance ring, this drop to a value of 0 is at 80 °C; whereas, in the case of an installation with a tolerance ring, a seating force of approximately 2000 N is still present at 170 °C.

# Tolerance ring connections for transmitting torques

Axial or circumferential forces must very frequently be transferred that are defined in their order of magnitude.

Fastening of belt pulleys, flywheels and fan blades are just a few of the multitude of possible applications that we can quote.



This illustration shows a V-belt drive that is fastened to a shaft using an R0820 030 08 tolerance ring.

This connection transmits a minimum torque M of 88 Nm.

This corresponds to: Electric motor output of P = 4.3 kW

- At a rotary speed of Safety factor
- P = 4.3 kWn = 1400 rpm and S = 3 for the start-up torque

## **Transmission of torques**

Polar moment of resistance

The illustrations below show a comparison of **free** and **centered installation** tolerance ring connections, versus a **positive-locking connection** with the same shaft dimensions.



The positive-locking connections that have been in common use up to now require you to machine appropriate grooves into the shafts and bores of the parts that are to be connected. Machining grooves in the shafts weakens them and reduces the polar moment of resistance W<sub>p</sub>. Making connections using tolerance rings obviates this disadvantage. With free installation, the polar moment of resistance  $W_p$  is retained completely and only reduces slightly in the case of centered installation.



Shaft diameter = 30 mm Moment of resistance  $W_p = 4.3 \text{ cm}^3$ 



