Centrifugal brakes

Besides centrifugal clutches, centrifugal brakes are becoming increasingly important.

A decisive advantage of centrifugal brakes over conventional brakes is that they operate without an external power supply.

The brake, mounted on a shaft, starts to brake a drive shaft at a defined speed. Centrifugal force causes the flyweights to lift from the hub so that their linings contact the inside diameter of the brake drum. This action creates a braking torque.

As soon as the speed of rotation of the system falls, the tension springs return the flyweights to their initial positions.

For special designs that deviate from this principle, see page 34 et seq.

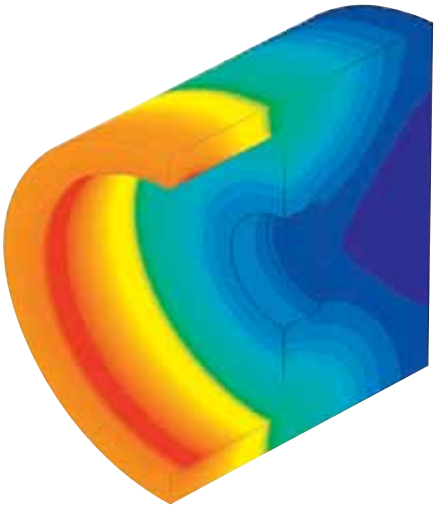
It is a fundamental principle of centrifugal brakes that they cannot brake a system to a standstill, i.e. the system speed searches for an equilibrium condition between the speeds determined by load torque and braking torque.

Although centrifugal brakes are governed by the same technical principles as centrifugal clutches and also use similar components, brakes call for additional investigation of their conditions of use.

The most important principle governing the use of centrifugal brakes is:

FRICTION PRODUCES HEAT

Centrifugal brakes convert mechanical energy into heat, which is generated between the lining and the brake drum, and mostly heats up the latter.



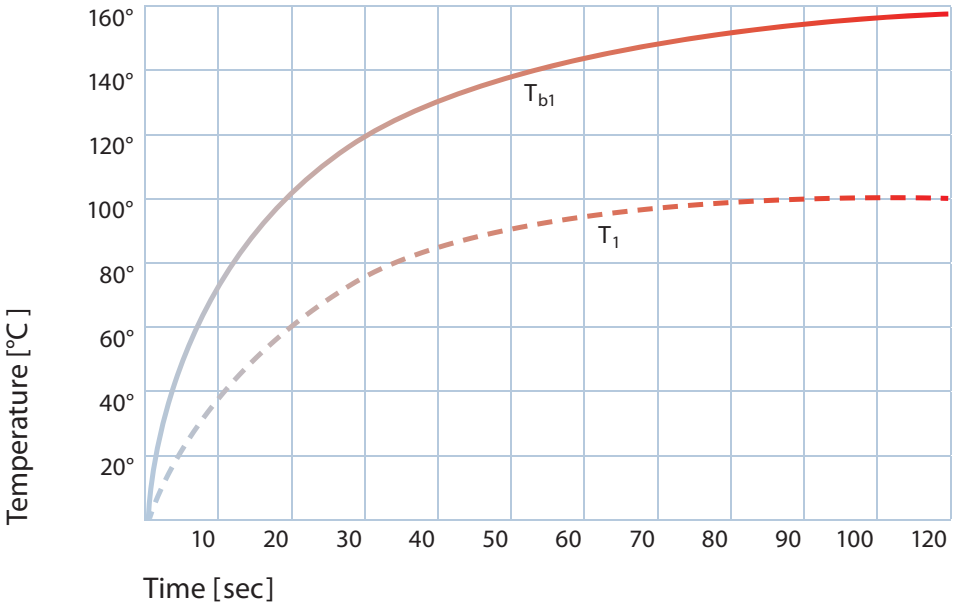
The temperature distribution illustrated above on a sectioned brake drum clearly shows the higher heating of the drum in the region over the flyweights.

The amount of heat generated depends on various factors:

- Transmitted brake torque
- Brake speed
- Duration of the braking operation
- Size of the friction surface
- The mass of the brake drum that has to be heated

For further technical advice and explanations, see page 6 et seq.

Over the braking time, the temperature curve rises very steeply at the start and then gradually approaches a maximum. The temperature at the friction surface (Tb1) is substantially higher than the temperature (T1) at the outer surface of the brake drum. Nevertheless, the brake drum can become very hot during operation and is a source of danger. The authority responsible for operation of the machine is solely responsible for ensuring that suitable protective measures are taken.



The maximum temperature must not exceed the manufacturer's maximum permitted temperature for the friction material, otherwise the linings may be damaged. This can lead to a loss of effectiveness of the brake and, in the worst case, destruction of the brake.

To prevent this, detailed data about the application are required when laying out a centrifugal brake, among others:

- Operating speed of the system to be braked
- Engagement speed of the centrifugal brake
- Braking torque required at the braking speed
- Changes in the braking torque
- Braking times and frequency
- Field of application

Centrifugal brakes are speed limiting devices and are finding increased use in lowering equipment. In such cases, the speed of lowering corresponds to the equilibrium condition between the speed governed by load torque and the speed governed by braking torque.

Types of centrifugal brake

F-Type
see page 8 et. seq.

S-Type
see page 10 et. seq.

W-Type
see page 12 et. seq.

P-Type
see page 14 et. seq.