

1

Dimensioning helps braking

BRAKES – Industrial disc brakes are highly compact and capable of performing holding, stopping and control functions reliably. The correct configuration creates numerous applications.

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Seldom noticed components in many industrial applications are disc brakes. Whilst common in the various automotive fields, they allow a mastery of holding, stopping and control tasks in the smallest space. Important application fields in industrial environments are for example, in the production of PET-bottles, steel processing, paper production, cable and wire manufacturing, textile and printing machines, in elevators and escalators as well as conveyor systems.

Disc brakes are used in three basic types of application. When used as a holding brake, the disc brake serves only to connect two static components in such a way that relative movement is prevented. This is in contrast to its use as a stopping brake –

the most common automotive function. In this case, a moving mass is brought to a standstill within an appropriate period of time.

The brake must be capable of controlling the friction heat that is generated during the braking process. The brake

The safe use of Disc brakes requires target-oriented design.

must therefore master, the resulting frictional heat. This also applies to the third possible use, as a control brake: in this case the brake is used to control the force and velocity of an application. Since this can occur over a long period, it is of particular importance to consider the heat

balance.

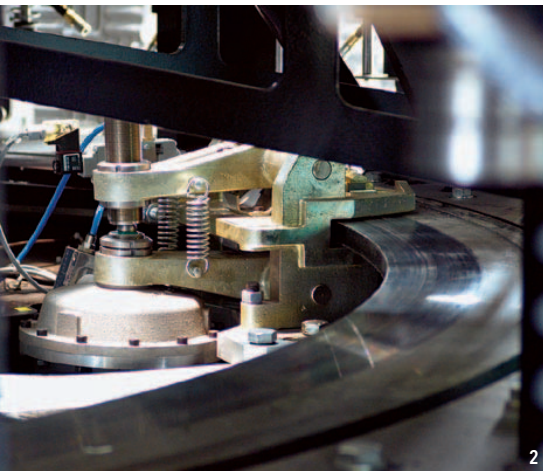
A characteristic feature of all brakes is the manner in which a brake is activated or released. In the industrial environment this is mainly by pneumatics or hydraulics, electromagnetically, by spring force or manually. Crucial for the function are also the brake linings, these require very careful selection of a suitable material, relevant experience and in some cases special testing is required to find the best option.

In applications such as elevators a friction-wear indicator is an essential requirement because in most cases the brake is used for stopping or control where wear of the brake pads will take place. Sophisticated design details such as automatic wear adjustment is very helpful. Another small detail that con-

tributes to the reliable function of the brake, is a spring-action contact or lift-off between the brake pad and the brake disc, it will also reduce wear and improve efficiency.

Intelligent dimensioning

The safe use of disc brakes in different applications requires target-oriented design and perfect technical selection according to the desired application. Since the braking torque of disc brakes is calculated on the basis of generated clamping force and the diameter of the disc, the resulting braking torque can be tuned to the application within certain limits by varying the disc diameter. When used as a holding brake, holding torque is calculated on the basis of available clamping force, the mean friction



1 In a stranding machine allows the arrangement of several calipers at one brake disk a particularly high power density.

2 In a PET bottle blowing machine ensures the disc brake safe production.

Source: Ringspann

radius and the friction coefficient. The friction coefficient depends on the material of the brake disc, the condition of the brake (run-in or not) and above all from the friction linings. In addition, special friction linings may be required for holding brakes, as many standard friction linings are designed for a specific braking speed.

Major heat dissipation

In all dynamic braking applications the most important selection criteria is heat dissipation. Finally, when braking, the entire kinetic energy is converted into heat.

Especially for demanding applications the brake should be selected together with the manufacturer, RINGSPANN GmbH Bad Homburg offers a broad product programm of disc brakes.

For dynamic braking were a rotating mass with a defined inertia and a specific speed stops to standstill, in addition to selecting the appropriate size of brake to handle the braking torque, one must ensure that the resulting heat can be absorbed by the brake disc. Heat disipation information & advice is available from the manufacturer.

For control operations or frequent braking operations where the capacity of the brake disc to absorb heat is no longer sufficient to maintain control of the braking operation, heat must be dissipated from the brake continuously. Potential brake heat dissipation depends on several different factors. These include brake disc dimensions, the connection between the brake disc, the shaft and the size of the brake pad friction surface. The heat dissipation behaviour of a brake cannot be described in terms of simple characteristic values. Different temperature progressions occur during braking, depending on changes in rotational speed. In such cases, it is best to check the brake for suitability for the application in question, in direct consultation with the manufacturer.

AT A GLANCE

- RINGSPANN GmbH in Bad Homburg is a leading company in the field power transmission and workholding technology.
- The portfolio includes freewheels, brakes, shaft-hub-connections, torque and force limiters, couplings and precision clamping fixtures.

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