

USE OF MAGNETIC FRICTION DISCS IN CONVEYOR TECHNOLOGY

Ideas on utilisation

Due to the extremely high adhesive force, permanent magnets made of neodymium-iron-boron (NdFeB) are ideally suited for applications with limited

installation space.
Improved material

properties and the development of low-cost coating processes have helped the material to make a breakthrough worldwide. Especially in conveyor technology, its use makes it possible to innovate. In cable cars, cable cranes and elevators, ropes are driven by means of traction sheaves. The necessary driving force is transmitted by friction to the moving rope in the classic traction sheave. If the transmittable frictional force is greater than the difference in the rope forces the driving ability is guaranteed. With the innovative, also more-ridged magnetic friction disks (see Fig. 1) the driving ability is increased, because the magnetic force pulls the rope in the wrapping area additionally in an optimized, rope-preserving round groove and thus increases the frictional engagement.

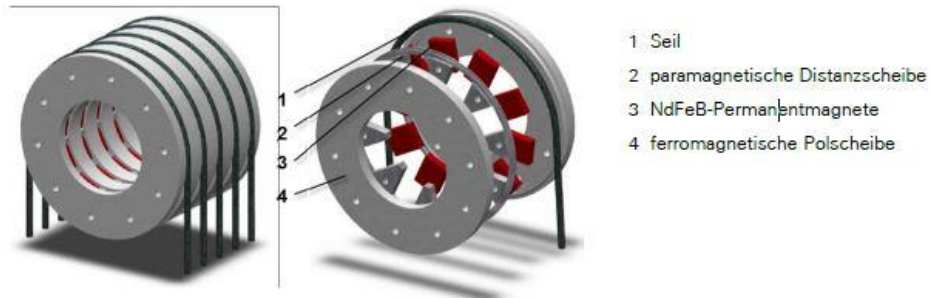


Fig. 1: Multi-groove magnetic friction disk

Potential adopters of technology

Manufacturer and operator of conveyor systems with traction sheaves for lifts, goods lifts, mine hoists and Vorschaltwinden for cranes in all branches of the economy.

Advantages of technology

Increasing the driving ability of the rope drive

- Reduction of the loads of rope and traction sheave
- Increasing the service life of the rope drive
- more compact dimensions of the rope drive
- Reduction of the mass of the rope drive
- Saving of rope strands with multi-groove traction sheaves
- Increased operational safety
- no deterioration in the efficiency of the cable drive due to the magnetic forces



Market and context of technology

In the classic traction sheave, the demands for high traction and service life are in contradiction. High driving abilities are achieved with V-grooves, which, however, too high stresses in both the rope and in the traction sheave that shorten their lives. The rope and the traction sheave - important elements of the rope drive - must be more frequent be replaced when the rope is running in a round groove. The magnetic friction disc eliminates this contradiction, because the magnets provide increased traction and the rope in the round groove is least stressed. As a result of research work are available

- Design guidelines for magnetic friction discs and instructions for their use
- Calculation programs for magnetic sizing
- mechatronic models to describe the dynamic behavior and the influence of magnetic force effects on the energy balance
- Comprehensive test results from single and long-term tests in the laboratory, which serve the validation of the calculation models and demonstrate the functionality
- a proven technology for the production of magnetic friction disks