

## ***Transport with Lifting Magnets***



### ***Electro Permanent Lifting Magnets***

### ***Electro Lifting Magnets***

### ***Permanent Lifting Magnets***

#### ***for the transport of:***

- pipes, shafts
- plates, slabs
- thin plates
- profiles, beams, molded parts
- other parts

For the transport and handling technology, we have the electropermanent and electromagnetic systems in our program for various applications. We deliver from the smallest robot gripper magnet to heavy duty magnets for docks and steel works. They can be equipped with fixed or removable suspension brackets and chains. In addition, we offer complete units such as cross heads with lifting magnets, magnetic systems, backup batteries and control systems.

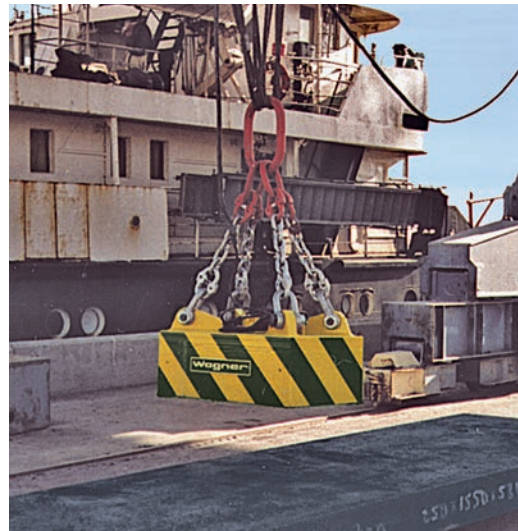
## ***Electro Lifting Magnets***

The magnetic field is created by the DC-coil in the magnet system, as every current carrying wire is surrounded by a magnetic field. The coil encloses an iron core which is connected with both yoke and arm. By this, north and south pole are generated. Depending on the type, very high holding forces with high magnetic fields can be obtained.

Electro magnets hold parts only as long as DC current is supplied to the magnet. After switching off or in case of power failure, the parts fall off.

If the lifting magnet is not only used in secured areas, a backup battery and an automatic warning device to signal any power failure are required acc. to EN13155.

Types 518, 535



## ***Electro Permanent Lifting Magnets***

The iron core in electropermanent magnets is replaced by permanent magnetic material. This material can be magnetized by means of a short current pulse from the ambient excitation winding. Here, a permanent magnetic (continuous) holding force is generated which holds the component also without further current supply. Thus, these systems are absolutely safe load handling devices in handling technology with very little power consumption. Even in case of power failure or cable break, the full holding force is maintained.

The magnet is switched off by triggering an opposite demagnetizing pulse. To operate the electropermanent lifting magnet, a pole-reversal control unit is required.

Types 5180N, 5190N



## ***Permanent Lifting Magnets***

Due to the installed permanent magnet system, the permanent lifting magnets can be used without electric control and complex wiring.

In addition the permanent magnet design provides sufficient magnetic force at any time. The magnet system can be easily switched on/off using the control lever. If the magnet is switched on this status is secured by a locking system.

Types 0519



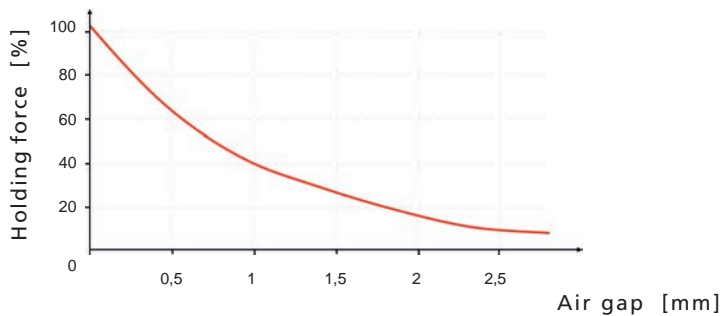
## Lifting capacity of load Lifting Magnets

The air gap between magnet pole and workpiece surface, as well as shape, surface quality and type of material of the goods to be transported have substantial effects on the load bearing capacity of the magnet.

Special tests have been carried out for the Wagner load lifting magnets during which the pull-off strength (measured according to EN 13155) depending on air gap, material thickness and material type is determined.

### Air gap effects

The distance between pole face of the lifting magnet and the surface of the good to be transported is called air gap. The size of the air gap is decisive for the lifting capacity of the load lifting magnet. The larger the air gap the smaller the lifting capacity of the magnet. Air gaps can be created inter alia by uneven surfaces, coatings, packing material, dirt as well as snow and ice.



### Effects of the workpiece dimensions

The cross section of the transport material through which the electric flux lines flow determine the strength by which the material is stuck to the magnet. The magnetic flux of the lifting magnet requires an appropriate cross section, which is mainly defined by its height (thickness).

If length and width of the transport material larger than the dimensions of the lifting magnet, thin materials may sag, and an air gap is created between lifting magnet and load. This reduces the load bearing capacity of the lifting magnet. Excessively long parts must therefore be picked by multiple magnets.

To obtain full magnetic force, the magnet has to have full direct contact over the complete pole surface. Only partial contact of the pole surface is not permitted.

### Effects of the surface quality

The load bearing capacity is also reduced if the transport material is either coated, shows signs of rust, scales or dirt, or has any other coating. All this will have the effect of an air gap.

The same applies to the surface quality of the magnet. Rough or uneven surfaces will create air gaps that will reduce the load bearing capacity of the magnets.

### Effects of the material composition

The smaller the carbon content in the steel, the higher its magnetizability. Alloyed steel or steel with high carbon content offer poor magnetizability, which means, that the holding force of the magnet is reduced.

| Magnetizability | Material                                    |
|-----------------|---|
| 100%            | technically pure iron                       |
| approx. 95%     | 1.0037 (St 37-2) unalloyed structural steel |
| approx. 80%     | 1.0050 (St 50-2) unalloyed structural steel |
| approx. 60%     | 1.2379 (X155CrVMo12-1) cold work tool steel |
| approx. 30%     | EN-JL (GG) lamellar graphite cast iron      |

Additionally, the magnetization of work pieces is influenced by heat treatment as this changes the physical structure of the material. Hardened work pieces are less effective magnetic flux conductors.

### Electro Lifting Magnet

Operation only in secured area or with backup battery (hold period > 10 Min.)

### Electro Permanent Lifting Magnets

Requires only current pulse for clamping and unclamping

#### Types 518, 535

- Use
- Handling systems and robots in secured area
  - Crane systems with backup battery

- Special features
- Universal handling
  - Variable magnet dimensions
  - High load capacities despite air gap
  - Variable depth effect (sheet-metal transport)
  - Very short cycle times possible
  - Demagnetizing of parts possible
  - Magnet heats up

#### Types 5180N, 5180

- Crane systems
- Safe transport without backup battery
- High load capacities
- Max. material temperature 60°C

#### Type 5190N

- Crane systems and manipulators
- Handling systems and robots
- Compact dimensions
- Slender design (for rod-shaped parts)
- Transport of cylindrical parts on the circumference possible by using pole shoes
- Max. material temperature 80°C

