

# LIFT MAGNET BASICS & SAFETY INFORMATION

## Material Surface & Safe Lifting Conditions

Lifting ferrous items using a magnet requires a good look at the length, width and thickness of the item. Thin metals do not absorb as many of the magnetic flux lines (magnetic energy) as thicker metals. Thin metals also flex, causing the steel to peel-off the magnet. Equally important is the physical size, flatness, surface conditions and type of steel. The charts below illustrate how surface finish and Carbon content affect lifting value.

PERCENTAGE OF STATED LIFTING POWER BY MATERIAL

CARBON CONTENT	LOW CARBON 0.05 - 0.29%	100%
	MODERATE CARBON 0.30 - 0.59%	85%
	HIGH CARBON 0.60 - 0.99%	75%
	HIGHER CARBON = HIGHER RESIDUAL*	

PERCENTAGE OF STATED LIFTING POWER BY SURFACE FINISH

SURFACE FINISH	GROUND SURFACE	100%
	ROUGH MACHINED	100%
	FOUNDRY FINISH	85%
	ROUGH CAST	65%

\* HIGH CARBON STEEL (TOOL STEEL) WILL ABSORB MAGNETISM & MAY MAGNETICALLY STICK TO STEEL SURFACES, SUCH AS THE MAGNET, OR ATTRACT FERROUS PARTICLES.

## Design Factor

**Design Factor is the relation of the magnet's labeled Working Load Limit (WLL) compared to the magnet's maximum lifting value under ideal conditions.** Ideal conditions are when a magnet is new and pulled off a newly machined, thick, low carbon steel plate. **The pounds of pull it takes to break the magnet away from the steel surface is the "maximum" lifting value.**



Unless otherwise noted, magnet working load limits are stated up to 50% of the actual value. These magnets may reach substantially higher holding values, but the surface condition of the part may affect the magnet's performance capabilities.

Working Load Limit (de-rating) values are then determined by taking this maximum lifting value and dividing it by the manufacturer's design factor. Design factors are minimum 2:1 and most cases 3:1. This means a magnet with a 3:1 design factor and labeled with a working load limit of 1,000 lbs will have a break-a-way force minimum of 3,000 lbs. The labeled WLL is stated for the benefit and safety of the user, due to the fact that ideal conditions rarely exist in the field. The steel that you are lifting may have scale, rust, dirt, or coatings on its surface; or the surface of the magnet itself may be worn. Any of these conditions will cause lower lifting values. Pick a lift magnet that has a WLL value slightly higher than the weight of your part.

**DO NOT ADD** additional weight to your lifting requirements. If you have a 1,000 lb part and you buy a higher labeled 2,000 lb lift magnet, it will result in a magnet that is much heavier, harder to handle and cost more than needed since the 2,000 lb magnet should have a Design Factor of 2:1 or 3:1. **Under no circumstances should you lift ferrous objects that weigh more than the stated Working Load Limit value.**

## ASME B30.20 Lifting Standards & ASME BTH-1 Design Standard

The American Society of Mechanical Engineers (ASME) has established standards for Below-the-Hook Lifting Devices. These standards apply to the marking, construction, installation, inspection, testing, maintenance, and operation of all lifting magnets when used for single or multiple steel piece handling operations in which the operator of the lifting magnet is required to manually position the lifting magnet on the load and manually guide the load during its movement, or in close proximity to people.

Lifting devices designed to these Standards shall comply with ASME B30.20, Below-the-Hook Lifting Devices. Designed and manufactured to ASME BTH-1 Standard.

**Industrial Magnetics, Inc. offers several lift magnet options that conform to the ASME B30.20 Standards**

## Compliance Initiatives

**RoHS Compliance:** directive – Restriction of use of Hazardous Substances – limits or bans the use of ten hazardous substances in electrical and electronic equipment sold in the European Union (EU). All IMI products are manufactured in compliance with the RoHS directive.

**REACH:** Registration, Evaluation, Authorization and Restriction of Chemicals – is a regulation of the European Union (EU) that requires companies to identify and manage the risks linked to the substances they manufacture and market in the EU. All articles as supplied by IMI do not contain chemical content that requires EU authorization.

**Conflict Minerals:** Titanium, tin, tungsten and gold are conflict minerals as defined by the Dodd-Frank Act, section 1502: Democratic Republic of the Congo (DRC) Conflict Mineral Rule. All products as supplied by IMI do not contain these restricted minerals sourced from the DRC region.

**California Proposition 65:** The Safe Drinking Water and Toxic Enforcement Act, commonly known as Prop 65, requires businesses to provide a "clear and reasonable" warning before knowingly and intentionally exposing anyone in California to a listed chemical. Any IMI products that contain listed chemicals are appropriately labeled.

**NAFTA:** IMI complies with all commercial rules and regulations associated with import and export activity under the North American Free Trade Agreement.