Heavy Duty Lifting Magnet Operator's Manual

Important safety information and instructions for the operation of Heavy Duty Neodymium Lifting Magnets

HDNLM220, HDNLM660, HDNLM1300, HDNLM2200, and HDNLM4400

MASTER MAGNETICS, INC.
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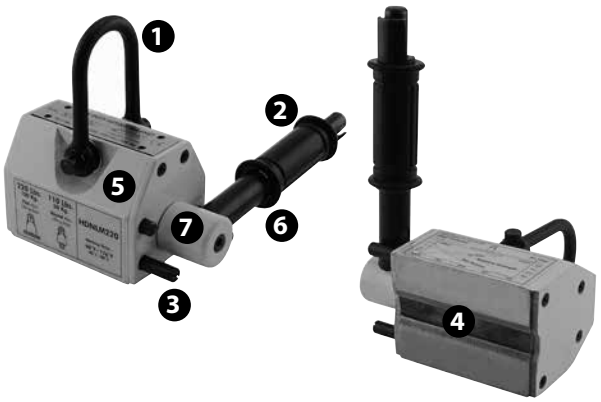
FEATURES



Master Magnetics' Heavy Duty Neodymium Lifting Magnets are ideal for handling steel plate, forgings, die castings, and similar items in machine shops, warehouses and industrial processing plants. Designed to lift flat or round non-flexing, ferrous metal items. Not for lifting sheet metal. No electricity required for operation of magnet.

1. Lifting ring
2. ON/OFF release lever
3. Magnet "ON" lock
4. Magnetic pole surface
5. Magnet body housing
6. Magnet "OFF" position
7. Magnet ON/OFF cam

OPERATION and GENERAL INSTRUCTIONS

READ AND UNDERSTAND ALL INSTRUCTIONS AND CAUTIONS IN THIS MANUAL BEFORE USE.

WARNING: **DO NOT** use near heart pacemakers, insulin pumps, communication equipment, electronic machine controls, or computers.

1. Inspect the magnet for missing parts or loose bolts. Tighten if needed or contact Master Magnetics, Inc. if parts appear to be missing.
2. Be sure that the magnetic pole surface, and material to be lifted that is in contact with the magnet, are clean and free of debris.
3. Confirm that the load to be lifted is within the magnet's load lift rating.
4. Use appropriate hook system with hoist or crane to lower magnet onto material to be lifted. Center magnet on load ensuring full contact of magnetic poles with load.
5. To engage magnet to load, press and hold down the button on top of the release lever (2) and rotate the magnet release lever toward the "ON" position. Lock it into place by releasing the button. Be sure that the locking mechanism is completely engaged.
6. Lift and move the load slowly to desired location. Observe all standard procedures for safe handling of a suspended load. Never hurry.
7. Set the load in desired location – on floor, support or work station, etc. Be sure that the load is stable and the location is strong enough to support the weight of the load before releasing magnet.
8. To disengage the magnet, press and hold down the button on top of the release lever (2) and rotate the magnet release lever toward the "OFF" position. Be sure to have a firm grip and use caution as kickback by the release lever may occur when releasing the magnet.

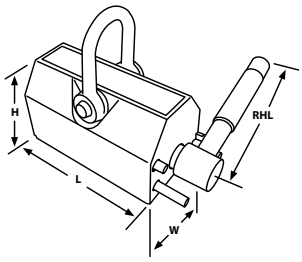
CAUTIONS

BE SURE TO READ AND UNDERSTAND ALL WARNING AND CAUTIONS BEFORE OPERATING THIS POWERFUL NEODYMIUM LIFTING MAGNET.

- Be sure both lift and load surfaces are clean and clear of impediments. Magnet pole surfaces **MUST** make full contact with load.
- **Never lift** more than the maximum rated load of the Lifting Magnet. *(See HDNLM Lift Ratings and Dimensions Table, Page 3)*
- Be sure handle is securely locked in "ON" position before lifting. **DO NOT** engage the magnetic lift to the "ON" position before placement on the steel to be lifted.
- Center lift on load. **Never** hoist if load is unbalanced.
- Use only on ferrous metal material that does not flex or bend. Magnet peel-off may occur and the load may fall if it is too thin and flexible.
- **DO NOT** hoist a load before testing for a safe magnetic attraction. Always make a test lift of two or three inches *(10cm)*.
- **DO NOT** disengage the magnet before firmly setting down the load on the floor or work station and making sure the load is stable.
- **DO NOT** weld in close proximity to the magnet.
- **DO NOT** use the magnet as a part of the ground circuit during a welding operation.
- **DO NOT** place the magnet directly onto a grounded floor. Use a non-conductive spacer.
- **DO NOT** lift people or loads with people on them.
- **DO NOT** leave suspended loads unattended.
- **DO NOT** operate the magnet with missing, damaged or malfunctioning parts.
- **DO NOT** remove or obscure product labeling.
- **DO NOT** lift loads higher than necessary.
- **DO NOT** stand under load being lifted. Be sure operating area is clear of personnel.
- **DO NOT** use in vertical material handling applications (material perpendicular to the ground) without a properly fitting vertical lifting adapter tool.

DO NOT EXCEED DESIGNATED LOAD LIMITS OF LIFTING MAGNETS. SEE TABLE BELOW:

Part No.	Flat Max Lift Rate*		Round Max Lift Rate*		Dimensions in Inches				Weight (lbs.)
	(lbs.)	(kg.)	(lbs.)	(kg.)	L	W	H	RHL	
HDNLM220	220	100	110	50	3.62	2.52	2.64	5.67	6.61
HDNLM660	660	300	330	150	6.38	3.62	3.58	8.86	20.94
HDNLM1300	1,320	600	660	300	9.17	4.80	4.65	9.06	49.60
HDNLM2200	2,200	1,000	1,100	500	10.55	7.05	6.47	12.60	119.10
HDNLM4400	4,400	2,000	2,200	1,000	14.92	9.13	8.39	17.56	282.20



Key: L = Length, **W** = Width, **H** = Height, **RHL** = Release Handle Length.

*** For safety, the actual breakaway force is 3.5 times greater than the maximum lift ratings.**

Lifting strength varies depending on thickness and composition of ferrous metal object being lifted. The item to be lifted must cover the entire length and width of the magnetic poles to properly engage and release the part.

Round item holding values are based on ideal conditions. Pipe length, wall thickness, diameter and surface condition can all affect the magnet's performance. Please consult Master Magnetics, Inc. before specifying these magnets for use on round materials.

Working Loads - Material Thickness - Surface Condition *(Not recommended for painted or finish coated surfaces)*

Any air gap between the magnet and load to be lifted will diminish the rated lifting strength of the magnet. The chart below can help in determining the approximate lifting strengths of HDNLM models when considering the unique air gap characteristics of each load:

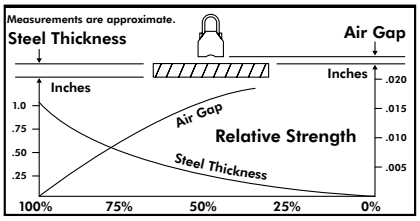
	Lifting Power By Material	0% 50% 100%
Carbon Content	Low Carbon *(.05% - 0.29%)*	100%
	Moderate Carbon *(0.30% - 0.59%)*	85%
	High Carbon *(0.60% - 0.99%)*	75%
	Higher Carbon = Lower % of lifting power	

	Lifting Power By Surface Finish	0% 50% 100%
Surface Finish	Ground Surface	100%
	Rough Machined	100%
	Foundry Finish	90%
	Rough Cast	65%

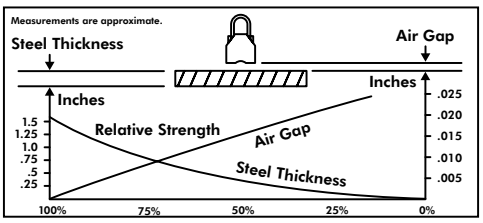
Holding Force

Refer to the charts below to determine the percentage of relative magnetic strength with air gap and steel thickness for each model.

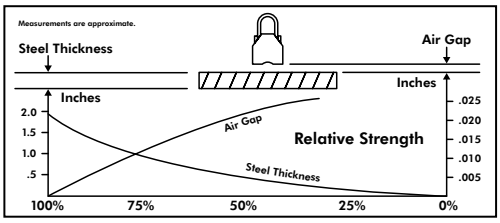
HDNLM220



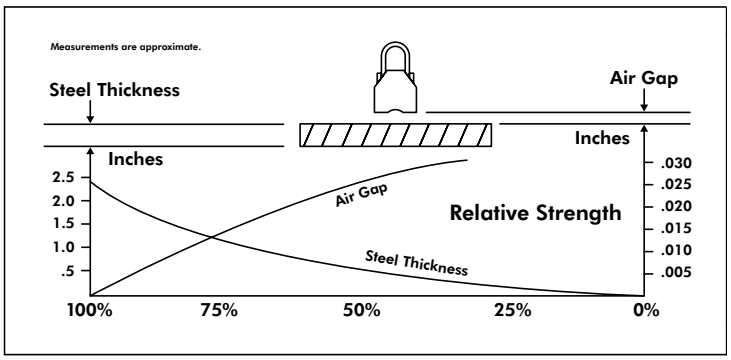
HDNLM660



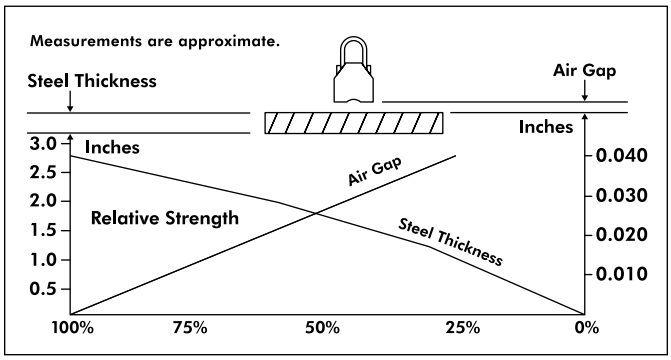
HDNLM1300



HDNLM2200



HDNLM4400



FACTORS and CONDITIONS THAT AFFECT THE SELECTION and OPERATION OF LIFTING MAGNETS

• Properties of load materials
Magnetic lifting is not appropriate for all steels. For example, some stainless steels are not magnetic and other types are only partially magnetic. Lifting strength of a magnet varies depending on thickness and composition of the ferrous metal object being lifted.

• Load weight, thickness, shape, and area in contact with magnet
The surface area of the load and the proportion of the magnet face in contact with it, will dictate the number and size of magnets required for safe handling almost as much as the weight and thickness of the load. For example, a thick bar of steel may only require a single two-pole magnet, whereas a thin plate section of equal weight may require a multiple arrangement of magnets *(See diagram "A" below)*.

Where the surface of materials is non-uniform *(e.g., corrugated or perforated sheet)*, flat lifting magnets can be used but must be rated according to the percentage of the load which actually contacts the magnet face, as well as the kind of path that the material offers to the magnetic flux from pole to pole. *(See Holding Force/Air Gap, Page 3)*

CAUTION! Neodymium Lifting Magnets are not designed for lifting multiple pieces at the same time, for example when handling scrap. These magnets are intended to lift single flat or round pieces that are in full contact with the magnetic pole surface.

• Stiffness or flexibility of the load
Droop or overhang at the ends of a flexible load *(e.g., long bar, flat or thin sheet)*, may cause it to peel off the magnet under its own weight during handling operations. A number of magnets may be selected to give greater coverage over the load area rather than reliance being placed on weight-lifting ability alone. Proper configuration/positioning of the magnets should minimize the sag or droop of the overhanging portions of a load.

• Range of sizes to be lifted and frequency of operations
If multiple lifting magnets are required to handle a range of load shapes and sizes, it is essential that the equipment supplier and/or the person carrying out the risk assessment are provided with sufficient information as to the likely demands on equipment. This should help them determine if magnetic lifting is feasible and safe and, if so, how the system should be configured to ensure safety. *(See diagram "A" below)*

• Surface conditions of magnet and load
The effectiveness of a magnet falls rapidly as the distance between its face and the load i.e., the air gap, is increased. Good contact between the surfaces of the magnet and the load is essential for the magnet to achieve optimum and safe performance. To maximize contact, both the magnet face and the load surface must be as smooth and clean as possible and the air gap kept to a minimum. The surface texture or finish of the load and the presence of paint, rust, oxide scale, oil, ice and snow, etc., and nonmagnetic material on either surface will increase the air gap, thus reducing the contact and, possibly, the magnetic effectiveness. *(See Holding Force/Air Gap, Page 3)*

• Temperature of magnet and load
- Minimum **cold** operating temperature: – 40° F, -40°C
- Maximum **hot** operating temperature: 176 ° F, 80°C

MAINTENANCE

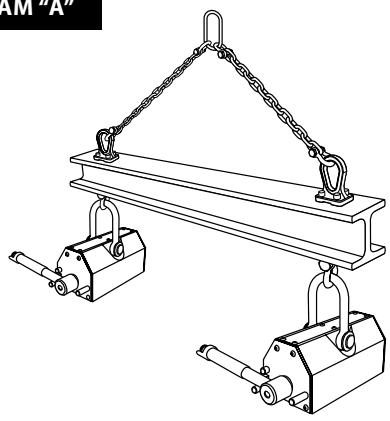
• Clean off components

• Place on clean, dry surface.
Do not set on ground, *(to avoid attraction of fine iron particles)*.

• Keep magnet in a dry environment.
After use, protect the pole surfaces with oil to prevent rusting.
(Clean oil off surface before use.)

• Examine magnetic pole faces for any particles or debris before each use.

DIAGRAM "A"



Proper lifting method with Spreader Bar when using two or more magnets.

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