

Magnetic Pull Test Kits



Pull Test Kits

MECHANICAL AND DIGITAL

Eriez offers Pull Test Kits with either a mechanical scale or a digital scale. The digital scale is recommended for industries that require calibrated scale certification for auditor purposes.

WHY TEST MAGNETS FOR STRENGTH?

Eriez has pioneered the adoption of standard test equipment for determining the relative strength of magnetic separation equipment. While flux density (Gauss) is the standard measure for evaluating a magnetic design, it is not a practical measurement for assessing the relative effectiveness of a magnetic separator. Eriez' kits, when properly used will help you monitor the efficiency of your separator by measuring the holding force of the magnet. We list typical pull test values below to guide you in your inspection. Pull test values can and will vary among separators due to a variety of magnet options. We suggest you use the kit not to verify the values listed but to monitor your separator's performance over time. Record the pull test results of your periodic inspections to evaluate any changes in magnetic performance.

STARTING THE PULL TEST PROCEDURE

- Clean the magnet surface. Even a small gap between the pull test piece and the magnet will adversely affect the test results.
- Select the appropriate pull test piece and spacer for your separator based on the guidelines, and attach it to the scale (if you are using the Mechanical Scale).
- Zero the scale with the appropriate pull test piece by rotating the adjustment knob on top until the scale line measures zero.
- Allow the piece to attract to the magnet and position the scale perpendicular to the magnet surface.
- Secure or hold the magnet and pull the scale directly away from the magnet smoothly and evenly. Be careful as the piece may snap unexpectedly from the magnet surface. Note the measurement by reading the metal slide as it moves down along the side barrel of the scale.
- Repeat the test to verify the results and the method of testing.

Pull Test Measurement Guidelines

| MAGNET | PULL TEST PIECE | SPACER | MEASUREMENT |
|--------------------------|------------------------------------|--------------------------|------------------|
| RE7HP Tube | 1/4" ball (6mm) | None | 100 oz. (2835 g) |
| RE7HT250 Tube | 1/4" ball (6mm) | None | 90 oz. (2551 g) |
| RE6HP Tube | 1/4" ball (6mm) | None | 90 oz. (2551 g) |
| RE6HT250 Tube | 1/4" ball (6mm) | None | 84 oz. (2381 g) |
| RE5HP Tube | 1/4" ball (6mm) | None | 80 oz. (2268 g) |
| RE5HT250 Tube | 1/4" ball (6mm) | None | 75 oz. (2126 g) |
| RE4HP Tube* | 1/4" ball (6mm) | None | 70 oz. (1984 g) |
| RE3HP Tube* | 1/4" ball (6mm) | None | 56 oz. (1588 g) |
| CR2 Ceramic Tube | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 1/4" radius (6mm radius) | 20 oz. (566 g) |
| SuperPower Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 3/4" (19mm) | 70 oz. (1984 g) |
| MaxiPower Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 1" (25mm) | 66 oz. (1871 g) |
| Brute Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 3" (76mm) | 23 oz. (652 g) |
| SuperBrute Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 3" (76mm) | 28 oz. (794 g) |
| Rare Earth Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 1-1/4" (32mm) | 64 oz. (1814 g) |
| Xtreme Rare Earth Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 1-1/2" (38mm) | 80 oz. (2268 g) |
| Rare Earth+ Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 1-1/4" (32mm) | 90 oz. (2551 g) |
| Xtreme Rare Earth+ Plate | 1/8" x 1" x 3" bar (3 x 25 x 76mm) | 1-1/2" (38mm) | 105 oz. (2978 g) |

* RE3HP Tube Magnets – Obsolete (1996)

* RE4HP Tube Magnets – Obsolete (1999)

Notes:

1. Actual pull test values may vary unit to unit. Please use the values listed above as a guideline.
2. Plate Magnets narrower than 12" wide (305mm) may produce lower pull test values than the values listed above.
3. It is not uncommon for different individuals to record different results.
4. For pull test information on magnet models not listed, please contact Eriez.



Testing Eriez Tube Magnets

Rare Earth Grate Magnet Pull Testing Photos



Standard Mechanical Scale



Digital Calibrated Scale



Rare Earth Grate Magnet Pull Test using a 1/4" ball (6mm) test piece.

Ceramic Tube Magnets

Use 1/8" x 1" x 3" (3 x 25 x 76mm) bar test piece attached to the 1/4" (6mm) radius section

Ceramic Tube Magnets are designed to remove tramp metal from free flowing products. We define tramp metal as relatively large iron such as hex nuts, bolts, nails and other metallics in the size range, hence the 1/8" x 1" x 3" (3 x 25 x 76mm) bar test piece.

Rare Earth Tube Magnets

Use 1/4" ball (6mm)

No spacer is required

Rare Earth circuits are designed to remove fine metallics which are defined as iron particles typically associated with abrasion, scale or small metallic slivers such as threads stripped from a bolt. Since it would be difficult to measure the force associated with removing the metal sliver from a tube magnet, we use a 1/4" ball (6mm).

Testing Eriez Plate Magnets

Rare Earth Plate Magnet Pull Testing Photos



Standard Mechanical Scale



Digital Calibrated Scale



Rare Earth Plate Magnet Pull Test using non-magnetic spacers & 1/8" bar (3mm) test piece.

Plate Magnets

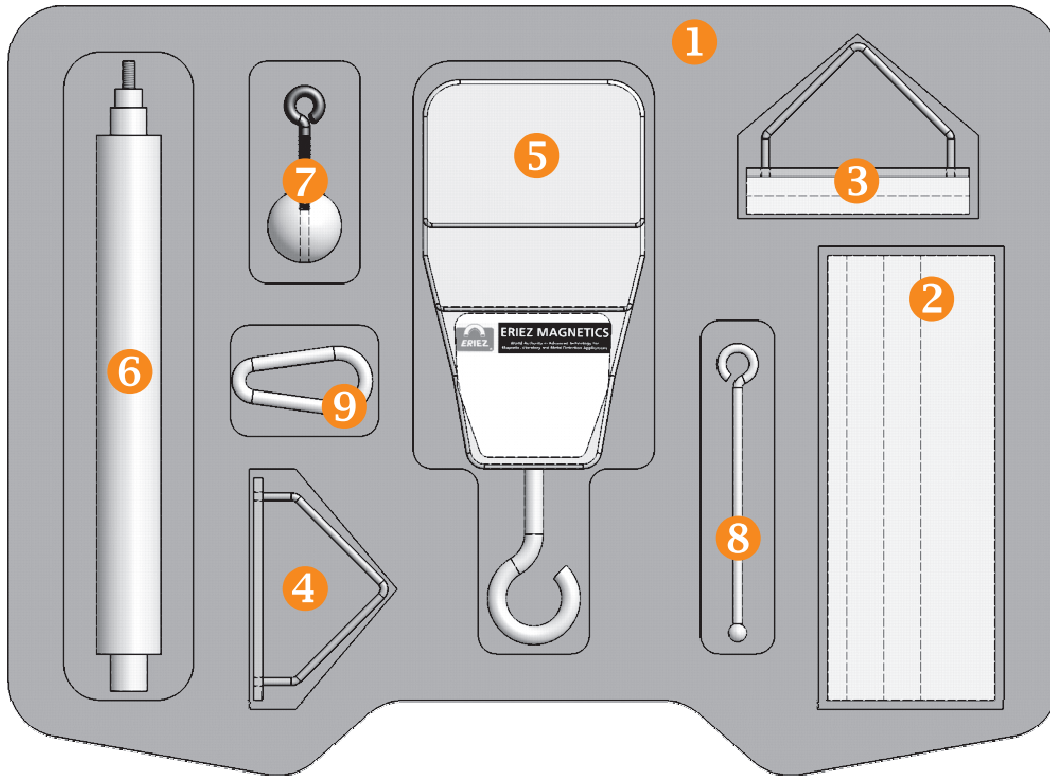
Use 1/8" x 1" x 3" (3 x 25 x 76mm) bar and non-magnetic spacers 1/4" (6mm), 1/2" (12mm) and 1" (25mm) thick

We designed Plate Magnets to reach out and grab iron from deeper flows, so we suggest a minimum 3/4" (19mm) non-magnetic spacer stack (1/4" (6mm) and 1/2" (12.5mm)) between plate surface and Pull Test piece. (We included two 1/2" (12.5mm) non-magnetic spacers for ease in testing near the triangular one-step face which is an integral part of the plate magnet.)

Test Kit Equipment

Digital/Analog Combo Kit

Includes both scales and all other components listed above
P/N 201512425G1



Pull Test Kit Options

| | PART NO. # | TEST KIT EQUIPMENT | STANDARD KIT PIN 107121E | DIGITAL CALIBRATED KIT PIN 201512425G2 |
|---|------------|--|-----------------------------|--|
| 1 | 462572 | Plastic Carry Case | ✓ | ✓ |
| | 111092 | Aluminum Spacer - 1" x 2" x 6" (25 x 50 x 150mm) | ✓ | ✓ |
| 2 | 111091 | Aluminum Spacer - (2) 1/2" x 2" x 6" (12.5 x 50 x 150mm) | ✓ | ✓ |
| | 111090 | Aluminum Spacer - 1/4" x 2" x 6" (6 x 50 x 150mm) | ✓ | ✓ |
| 3 | 107316 | Pull Test Bar - 1" x 3" x .25" (25 x 76 x 6mm) | ✓ | ✓ |
| 4 | 107317 | Pull Test Bar-Plate Type - 1" x 3" x 1/8" (25 x 76 x 3mm) | ✓ | ✓ |
| 5 | 470697 | Digital Scale | | ✓ |
| 6 | 446403 | Scale Tension Chatillion | ✓ | |
| 7 | 111093 | 1" Diameter Ball (25mm) | ✓ | ✓ |
| 8 | 124739 | 1/4" Diameter Ball (6mm) | ✓ | ✓ |
| 9 | 443822 | Link Snap - Pear Shaped | ✓ | ✓ |

• Standard Kit

Includes mechanical scale
P/N 107121E

• Digital Calibrated Kit*

Includes traceable digital scale
P/N 201512425G2

* Digital Scales are calibrated by scale manufacturer. See Calibration Label on back of device.

Pull Test Considerations



Why would my Pull Test results vary from the original values?

Given the appropriate magnet circuit was identified and the correct test procedure was followed, factors that affect magnet performance include (but are not limited to) high application temperature, direct current, moisture and physical abuse. Under normal operating conditions, magnet circuits retain their original strength indefinitely.

- Rare Earth magnetic circuits subjected to temperatures in excess of their design range may fail completely or show signs of weakening. Contact Eriez for more information.
- Direct Current refers to welding equipment used on, or in close proximity to permanent magnet circuits. The direct current can short the magnetic field and destroy the magnet. The heat also associated with welding can damage the magnet circuit.
- Moisture refers to subjecting the raw magnet material to liquids that would only result from breaching the magnet enclosure. Rare Earth magnets are typically made from Neodymium Boron Iron and will oxidize, causing the circuit to fail if it gets wet.
- Physical abuse refers to magnet handling. The actual magnet material inside the separator is brittle and when subjected to repeated abuse or heavy physical handling will break down and fail over time. This may occur with little physical damage evidence on the outside of the separator.

Tips for successful magnet inspections

- Pull Test values are a result of averages, so we recommend two or three pulls per assembly to identify the average or appropriate value.
- It is not necessary to pull test every tube of every grate assembly.
- Do not pull test near the ends or edges of any magnetic separator. The magnetic strength will measure less due to its design. Pull Test values taken from the center of a tube or plate should represent the magnet's true working strength.
- The kits contain two 1/2" (12.5mm) spacers. The gaps referenced in our table are best accomplished by stacking a 1/2" (12.5mm) spacer behind the magnet step with a second spacer stacked perpendicular to the first. This prevents the test piece from snapping to the magnet surface.
- The Pull Test specified is measured from the surface of the spacer.
- Review the magnet's physical condition with special attention to breaches in the magnet enclosure. Magnets with visible cracks or wear holes should be removed from operation immediately.



ERIEZ

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Note: Some safety warning labels or guarding may have been removed before photographing this equipment.
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