

## MAGNETIC TEST KIT INSTRUCTIONS FOR USE

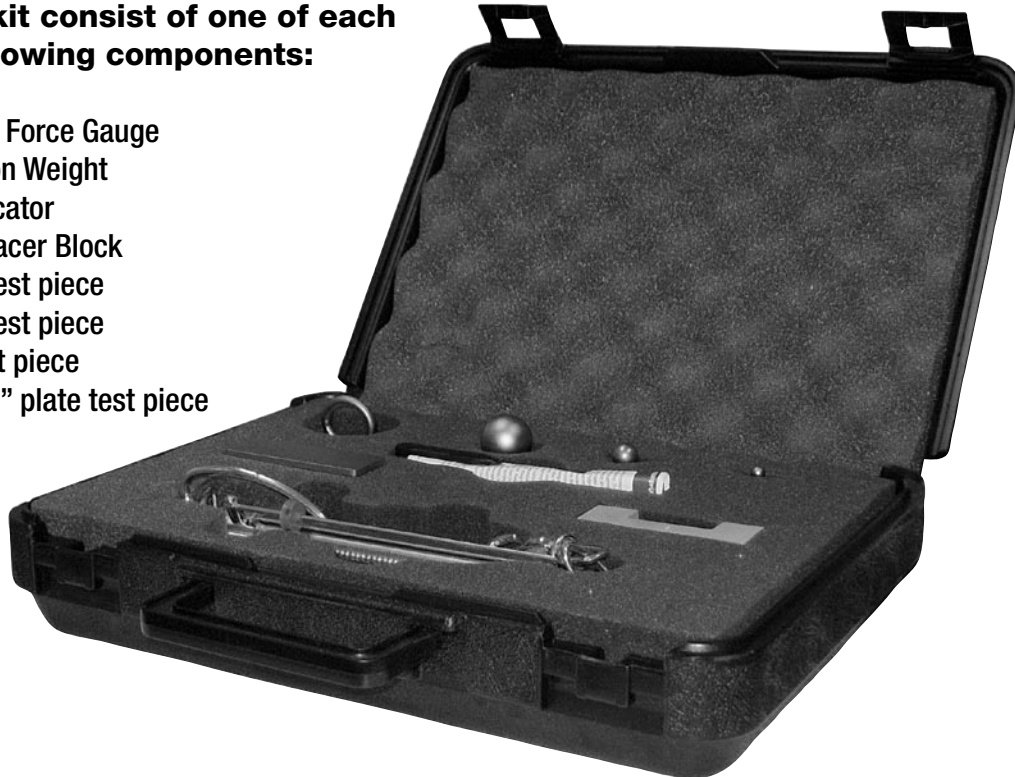
This test kit has been developed for the purpose of field inspection, measurement and performance analysis of permanent magnetic separation equipment to guard against a lapse in magnetic protection. Field tests on magnetic equipment are most accurately done by measuring the relative magnetic attraction of a separator on a ferrous test piece. This test kit includes test pieces and tools which have been selected to offer maximum flexibility for testing a broad range of magnetic separator styles.

As with any analytical procedure, consistency and repeatability are key to producing usable test data. In the following instructions you will find test procedures which when combined with the proper test pieces and tools, offer the user a means of achieving accurate test results.

Bunting Magnetics Co. extends a lifetime guarantee of its products against magnetic loss. However, external factors such as excessive heat, impact or modification can damage magnets in the field.

### The test kit consist of one of each of the following components:

- 0-50lb x 8oz Force Gauge
- 1# Calibration Weight
- Polarity Indicator
- Multigap Spacer Block
- 1/4" Ø ball test piece
- 1/2" Ø ball test piece
- 1" Ø ball test piece
- 1/8" x 1" x 3" plate test piece



## **TESTING FUNDAMENTALS**

It is essential that the test kit user understand the function of the magnetic equipment in question so that appropriate testing procedures may be applied. Magnetic separators must accomplish two separate tasks to effectively remove ferrous tramp from the product stream. The first task, CAPTURE, requires the separator to retrieve ferrous particles from its maximum rated reachout distance and deposit it on the collection area of the magnetic face. The second task, RETENTION requires the separator to magnetically hold the ferrous object against the wiping effect of product flow over the magnet face.

### **CAPTURE**

Measurement of a separator's ability to capture ferrous objects involves performing a pull test at a given distance away from the magnet face. The test kit provides a spacer with gaps of 1/8" and 1/4" to measure attractive force in the typical 1/2" or less separation zone around cylindrical magnetic cartridges. To represent a plate magnet's capturing ability beyond 1/2" away from the magnetic face, the test kit spacer provides gaps of 1/2" and 1" above the magnet.

### **RETENTION**

A pull test using a metal ball test piece in contact with the separator face represents the magnet's ability to retain ferrous objects. The test ball size does not necessarily represent the expected tramp metal size because a minimum ball size is required to produce a measurable pull force value on the force gauge. For ceramic separators a 1/2" and 1" ball is provided while the 1/4" and 1/2" balls provided produce sufficient force for rare earth magnetic equipment.

### **GENERAL PULL TEST PROCEDURE**

For the sake of personnel safety, test pieces have been selected which will produce pull forces within the range of the 0-12lb. force gauge provided.

The following illustrations show combinations of test pieces and spacer block orientations which produce repeatable values for ceramic and rare earth magnetic cartridges and plates. Actual values measured may differ between similar equipment due to a wide range of variables such as environment, testing technique and equipment options. The primary objective of an in-field testing program is to establish a base line for a given magnet and, through repeated tests, confirm its continued performance.

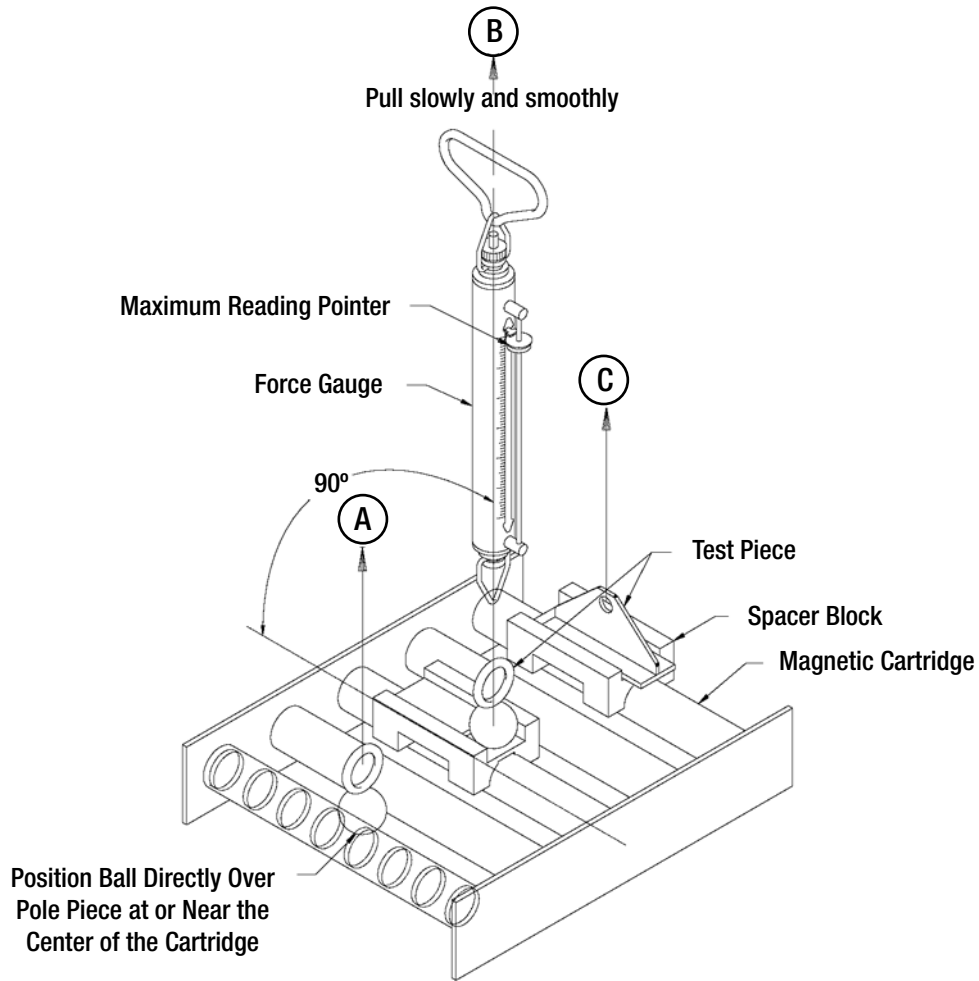
Consistency in testing is critical to achieve repeatable results-follow the prescribed guidelines and make note of any deviations. Documenting your test results with the included Magnetic Inspection Log will provide a record of how the test was performed as well as a comparison with future tests.

### **Test Steps**

1. Clean and remove any steel objects or dirt from the face of the magnet.
2. Where possible, position the magnet facing up in a horizontal position. In cases where the magnet cannot be removed from the process line, attempt to position it such that the force gauge and test piece can be pulled away from the magnet in a perpendicular (right angle) direction.
3. Calibrate the force gauge. Holding the gauge vertically, pull the latch hook down to the 3# reading and allow it to snap back. Adjust the knurled knob so that the maximum reading pointer is set at zero. Use the 1# test weight to check the accuracy of the scale under load and readjust the force gauge if necessary.
4. Select the appropriate test piece and spacer block orientation for the test to be performed. Attach the test piece to the force gauge and position the spacer block firmly against the magnet face as shown in the following diagrams. Then, firmly holding the test piece, position the test piece on the spacer block (use caution as the magnetic attraction will tend to snap it down).
5. Pull the force gauge SLOWLY and SMOOTHLY in a perpendicular (right angle) direction until the test piece breaks away from the magnet.
6. Read the force measurement as indicated by the "maximum reading pointer". Repeat the test twice and if the same value is achieved, record it in the Magnetic Inspection Log. If the values are different, an additional test should be performed to achieve two agreeing values, or an average can be developed from the two nearest values.
7. A polarity indicating wand has been included in this test kit which has "N" and "S" marked on opposite ends. It can be useful for identifying the north and south pole positions on a magnet and for locating the strongest zone of a particular pole. Since like poles repel and opposites attract, the polarity of a pole can be identified easily.

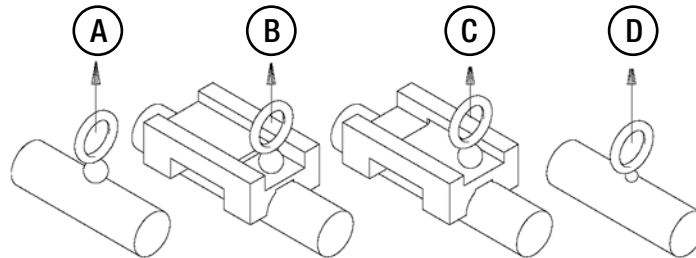
# MAGNETIC CARTRIDGE PULL TEST PROCEDURE

For magnetic cartridge testing, use the test pieces shown below with the proper spacer orientation. Testing procedures for neodymium cartridges are identical to ceramic except for the selection of test pieces.



## CERAMIC CARTRIDGE TESTING

| TEST | AIR GAP | TEST PIECE       |
|------|---------|------------------|
| A    | NONE    | 1" Ø BALL        |
| B    | 1/8"    | 1" Ø BALL        |
| C    | 1/4"    | 1/8"x1"x3" PLATE |



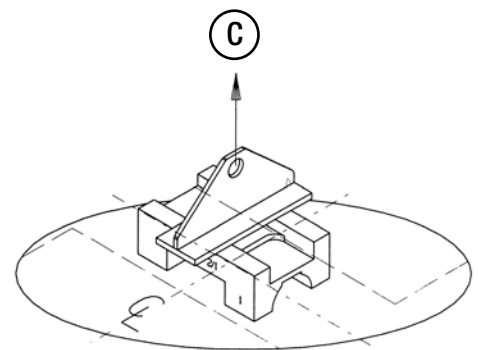
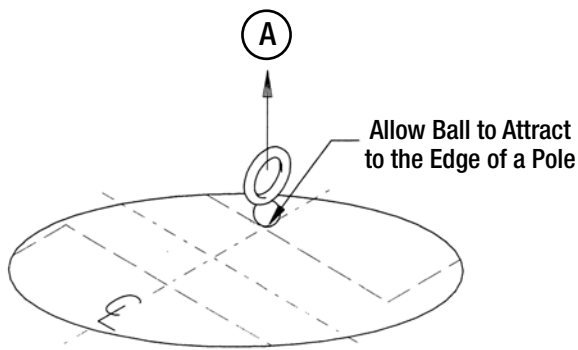
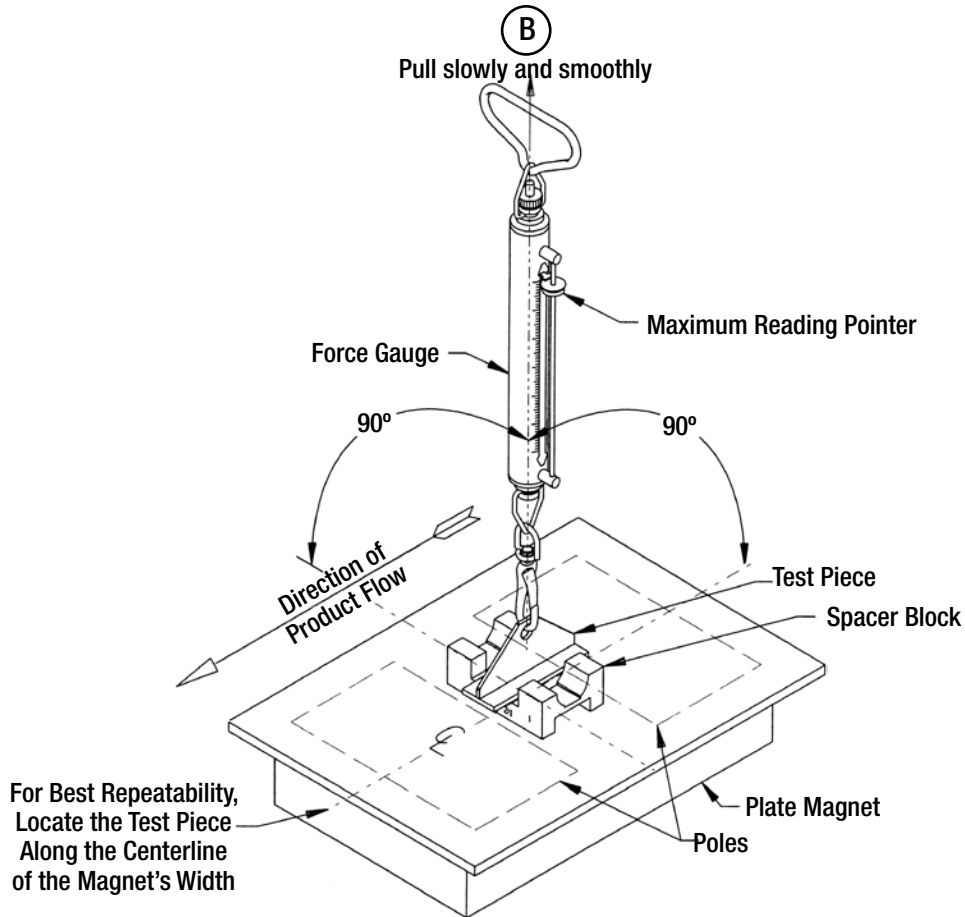
## NEODYMIUM CARTRIDGE TESTING

| TEST | AIR GAP | TEST PIECE  |
|------|---------|-------------|
| A    | NONE    | 1/2" Ø BALL |
| B    | 1/8"    | 1/2" Ø BALL |
| C    | 1/4"    | 1/2" Ø BALL |
| D*   | NONE"   | 1/4" Ø BALL |

\* Test "D" more closely measures the cartridge's ability to retain small particles than test "A".

# PLATE MAGNET PULL TEST PROCEDURE FOR CERAMIC AND NEODYMIUM PLATE MAGNETS

For plate magnet testing, the 1/8"x1"x3" test plate and the 1/2" Ø ball is recommended as shown below. When using the 1/8"x1"x3" test plate, it should be oriented parallel to the direction of product flow such that it bridges between the north and south poles.



## PLATE MAGNET TESTING

| <u>TEST</u> | <u>AIR GAP</u> | <u>TEST PIECE</u> |
|-------------|----------------|-------------------|
| A           | NONE           | 1/2" Ø BALL       |
| B           | 1/2"           | 1/8"x1"x3" PLATE  |
| C           | 1"             | 1/8"x1"x3" PLATE  |