



PULL TEST KIT - OPERATION MANUAL

PTK2000, PTK3002 & PTKDGT02

MAGNETIC PULL TEST

Why test Magnetic Strength?

A magnetic pull test is a reliable method of determining the magnetic strength of a magnet. A magnetic pull test can be used in comparing two magnetic devices that look very similar on the outside. When testing magnet(s) for changes in performance, consistency must be maintained through thorough documentation. On some equipment, it is necessary to use a polarity indicator to determine the location and the midpoint of the internal magnetic poles so that the exact test location can be documented and replicated. Magnetic strength testing can be performed on magnets with round or flat surfaces and either permanent or electromagnetic circuits.

Principle

Pull strength is determined by using a calibrated scale and a ferrous test piece. A metal plate is used for plate magnets and conveying rail, and a metal sphere is used for magnetic tubes. The ferrous object is attached to the snap swivel hook on the scale and drawn away 90 degrees from the magnet until it is released. The pull strength or pounds of pull is read off the scale using the breakaway readout indicator. It is important that each pull test be conducted with consistency to ensure that an accurate reading is achieved.

Test Surface Preparation

Clean the magnet surface of all tramp metal by using a rag to wipe the metal fines to a non-magnetic area or to one end of the magnet. The surface area to be used for the pull test must be free of any fine metal particles. Fine particles, whether ferrous or non-ferrous, will cause an air gap between the pull test piece and the magnet. Air gaps will reduce the value of the pull test. If suspended, move the magnet to a position of accessibility so that the test sphere or plate can be pulled away from the magnet at a 90° (degree) angle.

TEST KIT EQUIPMENT

PTK2000	PTK3002	PTK3002NIST	PTKDGT02	PTKDGT02NIST	CONTENTS	WHERE TO USE IT.
✓					1 pc. Chatillon, Model IN-25MRPSVR	0-25 lbs. pull scale
	✓		✓		1 pc. Mecmesin, Model # CFG+ 200.	0-44 lbs. Digital pull scale
		✓		✓	1 pc. Mecmesin, Model # CFG+ 200. NIST traceable	0-44 lbs. Digital pull scale
✓	✓	✓			1 Set of four Spacers (1/8" thick, 1" wide, 4" long stainless steel bar stock pieces)	Use for testing air gap in 1/8" increments on magnetic tubes, plates and rail.
✓	✓	✓			1 pc. Ball* on ring, 1/4" diameter	Move to the next size up test ball if results average 7 lbs or less on surface.
✓	✓	✓			1 pc. Ball* on ring, 1/2" diameter	
✓	✓	✓			1 pc. Ball* on ring, 1" diameter	
✓	✓	✓			1 pc. MP1321 UHMW Tube/Spacer	Used to test second row of tubes by preventing test ball from attaching to first row of tubes
✓	✓	✓			1 pc. Round Test Plate (16 ga. x 3" dia.)	Ceramic or electromagnetic flat surfaces with air gap.
✓	✓	✓			1 pc. Polarity Tester - Green Light (South) - Red Light (North)	Used to determine if magnets are properly aligned. Magnetic rail should be N to N and S to S. Magnetic tubes should alternate NSNS.
✓	✓	✓			1 pc. Magna View (3" x 3" green sheet)	Used to show gap between magnets, either air or pole pieces.
✓	✓	✓			1 pc. General 6" rule	Used to measure magnet thickness and application areas.

*Test balls are made from 1010-1020 (low) carbon steel. Hardness: Very Hard Rockwell C60. Tolerance: +/- 0.005". Meets ASTM A29 Standard.

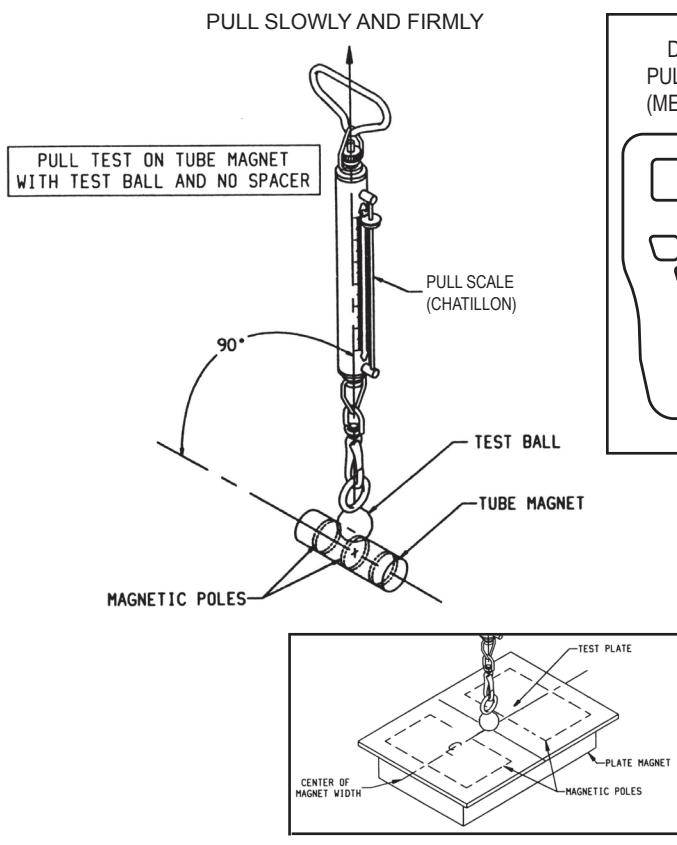


TESTING PROCEDURES

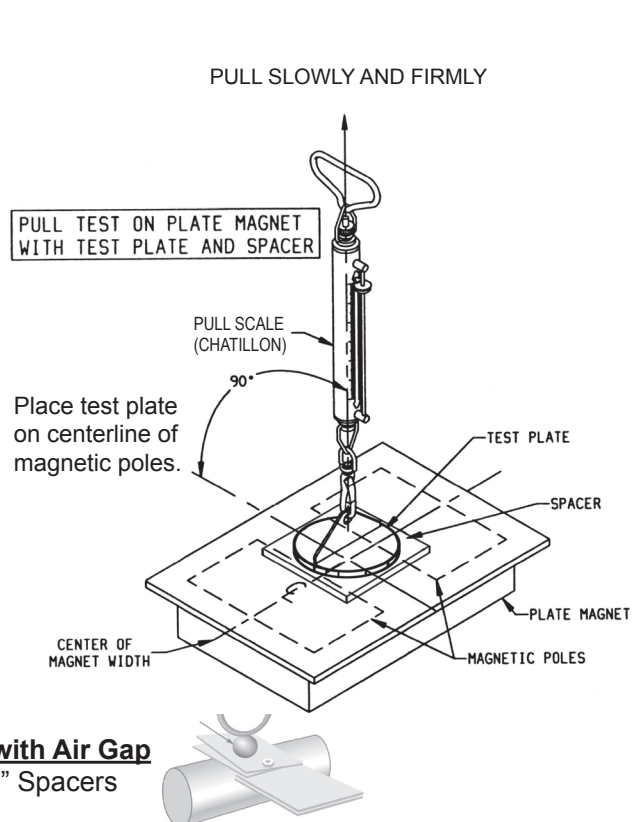
1. Record the testers name, date, time, and ambient temperature on the pull test data sheet provided.
2. Select and record the proper scale, test piece and air gap (if needed). Test balls should be used whenever possible to measure the strength of the magnetic field on the magnetic surfaces. Test balls will migrate to the closest magnetic pole. Test plates are better suited for measuring magnetic strength at greater distances (air gap) from the magnetic face. Test plates should always be centered, bridging from North to South Pole.
3. **PTK2000 ONLY**) Attach the test device to the scale. Calibrate the scale by holding the scale vertically, then pulling the test device to the 3 to 4 pound range and release. Then reset the maximum readout pointer (red slide piece) to ensure it is at the zero mark. Adjust the pointer to the zero mark using the knurled calibrated screw as required. This procedure "clears" the scales and should be done prior to each magnet pull test.
4. **(PTK3002 & PTKDGT02 ONLY - Mecmesin Scale)** Attach the test device to the digital scale. Read the Mecmesin manual to setup the digital scale. Push the RED button to turn the scale on. A set of numbers will appear and slowly count down to zero. Press the ZERO button to zero out the scale with the test device attached. The scale should indicate "Lbs" below the zeros. Proceed to step 4.
5. Carefully position the spacer (if required) and the test device in the designated position on the magnetic face. **USE CAUTION:** do not allow hands or fingers to be pinched or trapped by the test piece.
6. Pull the scale slowly and firmly in a direction perpendicular (90°) to the magnetic face until the test device breaks away from the magnetic field. **USE CAUTION:** keep the direction of the pull away from head, body or other persons.
7. Record the peak reading measured by the scale.
8. Perform four more additional tests (for a total of 5) in the same location on the magnet. Throw out the highest pull and the lowest pull. Find the average of the remaining (3) pulls and record it on the Pull Test Data Sheet. This value (average) is your baseline for pounds of pull for this magnet.

MAGNET TESTING

SURFACE TEST (Preferred Test Method)



AIR GAP TEST - 1/8" Spacers





**INDUSTRIAL
MAGNETICS®**

Magnet location: _____

TOLL FREE 1.800.662.4638
imi@magnetics.com

Line Name or Number: _____

PULL TEST KIT - DATA SHEET

File Name or Number: _____

MAKE COPIES OF BLANK FORM FOR FUTURE USE.

Instructions: Record five (5) pulls. Throw out the highest and the lowest pulls. Find the average of the remaining three (3) pulls and enter it in the "AVERAGE" column.

TEST	PRODUCT DESCRIPTION OR PART NO.	TESTED BY	TEST SCALE USED		DATE & TIME	AMBIENT TEMP.	TEST PIECE OR PLATE SIZE & THICKNESS	AIRGAP	PULL TEST RESULTS						
			TYPE	RANGE					1	2	3	4	5	AVERAGE	
Example	GT1000R Rare Earth Tube	TB	Digital	0 - 800 Lbs.	00/00/00 12:00 AM	68° F 20° C	Test Ball Diameter	None	5.25	6.50	5.50	5.75	6.00	5.75	Pass <input checked="" type="checkbox"/> FAIL <input type="checkbox"/>
A															Pass <input type="checkbox"/> FAIL <input type="checkbox"/>
B															Pass <input type="checkbox"/> FAIL <input type="checkbox"/>
C															Pass <input type="checkbox"/> FAIL <input type="checkbox"/>
D															Pass <input type="checkbox"/> FAIL <input type="checkbox"/>
E															Pass <input type="checkbox"/> FAIL <input type="checkbox"/>
F															Pass <input type="checkbox"/> FAIL <input type="checkbox"/>

COMMENTS / NOTES / OBSERVATIONS: _____