IAOM WESTERN DISTRICT CONFERENCE 2017

Industrial Magnetics, Inc. - Celebrating 56 years in business!
Who We Are

- Founded in Ferndale, MI 1961 (Detroit area).
- If it’s magnetic, we do it.
- 70 employee company located in Boyne City, MI (pop. 3,500).
- Average employee tenure = 15 years.
- Recently expanded 16,000ft$^2$ which created 20 new jobs.

- Increased capacity for large Heavy Duty Magnets, more light duty production and new 1,400ft$^2$ R&D Lab.
- Acquired Prater Industries and Sterling Systems and Controls 4 years ago.
IMI Facility Expansion
Industries Related to IAOM

Free Flow Products

- Aspirin Powder
- Barley
- Bone Meal
- Carbon Black
- Coffee Beans
- Coffee Grounds
- Corn Gluten
- Crumb Rubber
- Cullet
- Flour
- Fertilizers
- Garlic Powder
- Graphite
- Ground Pepper
- Ice Crystals
- Lime, Hydrated
- METHOCEL®
- Nylon Pellets
- Oats
- Oxide, Magnesium
- Oxide, Zinc
- Paper Pulp
- Plastic Pellets
- Resins
- Rice
- Roofing Granules
- Salt
- Sand, Silica
- Seeds, Bird
- Seeds, Celery
- Seeds, Mustard
- Seeds, Popcorn
- Seeds, Sunflower
- Sugar, Granular
- Tobacco Grounds
- Wheat Hulls
- Whey Powder
- Whole Grains

Difficult Flow Products

- Calcium Carbonate
- Calcium Phosphate
- Cheese Powder
- Clay
- Cocoa
- Cornstarch
- Dextrose
- Gypsum
- Hard Flour
- Meal Bone
- Meal Corn
- Meal Fish
- Meal, Poultry
- Meal, Soybean
- Pet Food
- Plastic Regrind
- Powdered Sugar
- Spice (some)
- Stucco
- Tabular Alumina
- Talcum Powder
- TiO2
- Vinyl Powder

Liquid Products

- Chocolate
- Coolants
- Fruits
- Fuels
- Jellies
- Oil
- Oil, Vegetable
- Paper Slurry
- Peanut Butter
- Pudding
- Soups
- Syrup
- Water
The Purpose of Our Products

- Equipment protection/Downtime prevention
- Product purification
- Injury prevention/Safety
- Energy savings – Most of our magnets do not require outside power.
  - Permanent magnets lose strength at a rate of $\frac{1}{2}$ of 1% every 100 years.
Western District Coverage

- Kyle Fritz for AZ
What We’ll Discuss

• Please feel free to comment or ask questions as we go.
• IMI staying ahead of the curve.
• Magnet terminology.
• How magnetic circuits work
• Not going to bore you with magnetic separation principals. That’s old news.
• Where magnets have come in the last 10 years.
• The future of magnets in the industry.
• HACCP, FSMA, SQF, FDA & USDA Compliance.
• Magnets and plant audits.
• Preventative Maintenance.
• Solutions.
Magnet Terminology

**Gauss**: Flux density. A measurement of the amount of magnetic flux in one square centimeter.

**MgOe – Mega Gauss Oersteds**: Magnetic capacity number. Unit of measure typically used in stating the maximum magnetic energy a piece of material can hold.

**Magnetic Circuit (not electric)**: A certain combination of magnet material and ferromagnetic pole pieces.

**Reach Out**: The distance a magnet can effectively pull a given piece of steel to its face (measured in distance from magnetic poles).

**Air Gap**: Any non-ferrous material or space between the magnetic pole surface(s) and the steel which it needs to attract or hold. An increase in air gap results in a decrease in the holding value of the magnetic circuit.

**Burden Depth**: The depth of product the magnet has to pull through to extract metal contaminants.
Permanent Magnet Strength - MgOe

- MgOe stands for Mega Gauss Oersteds and indicates how much energy a piece of magnet material can supply to a circuit.
- The higher the MgOe the stronger the magnet material.
- IMI standard is 52 MgOe. This is the highest available for production purposes. 55 MgOe on the way.
- High heat options are available as well, up to 572°F; however high heat material is not quite as strong.
Magnetic Circuits

- Permanent magnet circuit.
Magnetic Circuits

- Magnetic Grate Tube. What’s inside?
Grate Tube Guts
Magnetic Strength
Gauss vs. Pull Test - GAME OVER

• Gauss (flux density) – Difficult to measure accurately outside of a lab.

• Pull Test (lbs.) – Simple, accurate and repeatable field test.

• High surface gauss does not necessarily make a more effective magnetic tube.

• ø1” - 12,000 and 14lbs vs. 10,600 and 17lbs pull.

• Ø3” – 11,500-12,000 and 23-24lb pull.
Compliance

• HACCP, FSMA, SQF, FDA & USDA.
  • Compliance.
  • Fitting the magnets into your plan and documenting.
  • Magnets can be CCP’s, but CP is preferred.
  • New IMI designs approved by USDA.

• New Compliance Engineer.
  • Main focus in the food industry.

• Partnered with HACCP International
  • Redefining the standards.
On Site Audits, PM and Service

- Independent 3rd party auditing keeps your facility in compliance with regulatory requirements.

- Visual inspection of magnet(s). Check for excessive wear.

- Onsite repairs, upgrades and more all performed by a qualified Technician.

- Cycle through mechanical steps to ensure motors, belting, cylinders, guide rods, etc. are in proper working order.

- Technician performs and documents pull tests.

- Technician can train your maintenance staff to ensure maximum effectiveness and longevity of magnet.
IMI Service Tech

- 30 hour OSHA General Industry Standards Certificate.
- 20+ years experience fabricating, welding and building magnetic assemblies at IMI.
- Certified Occupational Health and Safety Officer.
- Certified Michigan Fire Instructor.
- Certified Fire Officer III.
- Certified Michigan Fire Fighter II.
- Certified Michigan EMT.
- Variety of Certification via State of Michigan DELAG and FEMA.
Regional Coverage
Audits & Inspections

• Magnet Health
Is it the right equipment for the application?
PM, Cleaning Schedule & Circuit Analysis
PM and Cleaning Schedule
Magnet Location & Selection
R&D Lab & Test Facility
Test Facility – Simulation

- Pneumatic conveying with magnets vertical or horizontal. Hopper for material, filter receiver to convey, and air lock for continuous test loops.

- Gravity feed using the pneumatic convey system for loading material from ground level to upper hopper.

- Air lock for metered flow, slide gate for flood loading, glass sided housing for 1" and 3" tube testing, various tube layout drawers.
Custom Solutions

• 95% of the magnets we build in this industry are customized in some way.
Fully Automated 8 Row Housing

- In service since 2002.
- 4 Drawer with 8 rows of magnets.
- PLC Integration.
- Has been upgrade to OX™ drawers.
- Semiannual drawer audits/repair by our in-house tech. All pull testing is on file at and IMI.
What does this all lead to?

• Compliance, compliance, compliance!

• We can help!
Questions?
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