

DETECTABLE PLASTICS AND RUBBER: A GAME-CHANGER IN CONTAMINATION PREVENTION

John Collins

PolyMag Additives Manager, Eriez

In industries such as food production, pharmaceuticals, and manufacturing, where product purity and consumer safety are paramount, even a single contamination incident can lead to costly recalls, financial losses, and damage to brand reputation. Considering these risks, the need for innovative contamination prevention solutions has never been more critical.

Detectable plastics, designed for identification by metal detectors and X-ray inspection systems, empower manufacturers to protect their production processes, meet stringent regulatory standards, and maintain consumer trust.

By recognizing the vital role of detectable plastics and rubber in minimizing contamination risks and optimizing operational efficiency, processors can make better-informed decisions to attain the highest safety and quality standards.

THE COST OF CONTAMINATION

In 2024, a wave of high-profile food recalls linked to plastic and rubber contamination swept across North America, capturing significant media attention and garnering public scrutiny. This situation underscores the ongoing risks of plastic contamination, even with advanced safety measures in place. Throughout the year, leading brands and major retailers were forced to pull a wide range of products from store shelves, spanning various food categories, including produce, meats, dairy, bakery goods, snacks, desserts, and prepared and frozen foods.

Many of the year's most notable recalls involved everyday food items commonly found in most kitchens. Produce and meat recalls that made headlines included tomatoes, kielbasa, and sausage. Dairy products from well-known manufacturers, such as cheese and ice cream, were also flagged for potential plastic contamination. Additionally, bakery staples like sourdough bread, cheese Danishes, and cinnamon rolls were on the list of items recalled for plastic contamination. Popular kid-friendly snacks and desserts, such as sandwich cookies and pizza nuggets, were also affected. Recalls involving prepared foods like potato salad and chicken dumplings, along with staple packaged items such as waffles and hummus, further illustrate the widespread contamination risks involved with producing a broad spectrum of products.

It is important to note that these instances represent just a fraction of the many recalls that occurred in 2024. The sheer volume of these incidents serves as a stark reminder of the persistent challenges in ensuring food safety and the necessity for consumers to remain vigilant when purchasing food products.

Economic Impact

1. Recall Costs – On average, a single product recall costs manufacturers around \$10 million, not including additional expenses such as legal fees and lost customer loyalty (Grocery Manufacturers Association).
2. Industry-Wide Scope – In 2023, the Food and Drug Administration (FDA) reported 328 food recalls in the U.S., many due to contaminants such as glass, metal, and plastics (FDA Enforcement Reports).
3. Long-Term Damage – According to Harris Poll Consumer Trust Index surveys, major recalls can reduce brand loyalty by up to 30%.



Navigating Regulatory Pressures

As global regulatory frameworks tighten, manufacturers must meet heightened safety standards. Key examples include:

1. Food Safety Modernization Act (FSMA) – The FSMA mandates robust Hazard Analysis and Risk-Based Preventive Controls (HARPC) to identify and mitigate potential physical contaminants in food products (FDA FSMA Resources).
2. FDA Standards – The FDA classifies any foreign object larger than 0.275 inches (7mm) as hazardous, intensifying the need for manufacturers to update quality procedures and upgrade inspection systems regularly to ensure compliance (FDA Compliance Policy Guide).
3. HACCP Principles – Detectable plastics and rubber align with HACCP protocols by preventing contamination at critical control points throughout production lines (Codex Alimentarius HACCP Guidelines).
4. Global Standards – In addition to U.S. regulations, detectable plastics and rubber help manufacturers abide by European Union food safety regulations (EFSA Food Safety Guidelines) and Canadian Food Inspection Agency (CFIA) standards (CFIA Industry Resources).

These and other regulatory demands increasingly compel manufacturers to adopt more widespread strategies, such as using only detectable plastics and rubber in food handling, packaging, and processing environments.

UNDERSTANDING DETECTABILITY

Polymers are generally invisible to food processing inspection equipment. Detectable plastics and rubber are specially engineered polymers infused with additives that enable detection by metal detectors and/or X-ray inspection systems.

Mechanisms of Detectability

1. Metal Detectable Additives – These additives contain metallic particles that allow metal detection systems to identify plastic and rubber fragments.
2. X-Ray Detectable Additives – These additives incorporate high-density materials to improve visibility during X-ray inspections.
3. Color-Coding – Distinctive coloring, such as blue, green, or red, makes plastic fragments easier to spot during visual inspections.

Common Uses

- Machine parts and packaging materials
- Pallets, bins, totes, gaskets, and tags
- Conveyor belts and cable ties
- Earplugs, safety glasses, markers, pens, scoops, scrapers, and sifter cleaning balls



ERIEZ POLYMAG® ADDITIVES: THE INDUSTRY STANDARD

Among detectable plastics, PolyMag® has emerged as a benchmark solution. Developed by Eriez®, a global leader in separation technologies, PolyMag combines unmatched detectability with flexible customization options, ensuring its versatility across various manufacturing processes.

Features and Benefits

- **Dual Detectability** – PolyMag additives are specifically engineered for detection by both metal and X-ray inspection systems, offering comprehensive contamination control. This ensures PolyMag is suitable for use at every production stage, providing manufacturers with an extra layer of security.
- **Customizable Solutions** – PolyMag is effective at loadings ranging from 5% to 30% to meet the specific demands of different production processes and applications. Parts containing PolyMag additives can be pigmented darker colors like blue, gray, green, red, and purple.
- **Enhanced X-ray Contrast** – PolyMag Beige XRD is designed for applications requiring high X-ray digital density values, enabling optimal detection capability. Molders can integrate both PolyMag HSCP and XRD masterbatch additives to achieve both metal detectability and enhanced X-ray contrast in plastic parts.
- **Regulatory Compliance** – PolyMag is FDA and EU food contact compliant and made with GMP (Good Manufacturing Practices) for contamination prevention and lot traceability.
- **Cost Efficiency** – PolyMag offers substantial cost savings compared to higher volume, custom-formulated detectable compounds, allowing selectable loadings and small-batch production with standard resins.

Applications

PolyMag supports multiple manufacturing techniques, including:

- Injection molding
- Extrusion
- Casting
- Compression molding
- Rotational molding



QUANTIFIABLE IMPACT

The use of detectable plastics infused with PolyMag delivers measurable benefits:

- **Reduced Recalls** – Food manufacturers using PolyMag greatly decrease their risks of plastic contamination-related recalls.
- **Improved Detection** – Previously invisible plastic and rubber contaminants become detectable with existing inspection equipment.
- **Operational Efficiency** – PolyMag’s compatibility with automated systems reduces downtime, inspection times, and labor costs.

Food Production

Detectable plastics are now used in over 60% of global food production facilities, with this number expected to grow as regulations increase and consumer expectations rise (IBISWorld Industry Report).

Market Outlook – Growth Projections

- The global detectable plastics market is projected to grow at a CAGR of 7.5% between 2024 and 2030, reaching a market value of \$2.1 billion (Markets and Markets Report).
- Increased adoption across sectors, driven by regulatory demands and technological advancements, is expected to continue fueling growth.

Emerging Innovations

The field of detectable plastics continues to evolve alongside advancements in inspection technology, presenting manufacturers with increasingly effective solutions for contamination control.

CONCLUSION

Detectable plastics and rubber mark a transformative progression in contamination control by meeting the rigid demands of modern manufacturing. Integrating detectable plastics and rubber into processing environments has become increasingly essential as safety standards advance and expand globally.



Headquarters

2200 Asbury Road
Erie, Pennsylvania 16506, USA

+1-814-835-6000
eriez@eriez.com
www.eriez.com