



# Creating a Verification Process, not an Inspection Process

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## Abstract

In today's healthcare industry the expectations are for zero defects. West, as a provider of pharmaceutical packaging components, is constantly challenged to meet extremely high quality standards. Pharmaceutical manufacturing requires physical inspection of filled containers to reject those showing evidence of contamination with visible foreign material. Biopharmaceutical drug products in particular are scrutinized for particles.

Packaging components are an important subset of this process. Component manufacturers can contribute to reducing particulate matter in finished drug products by supplying closures with reduced embedded and adhered particles. Vision inspecting components leads to improved upstream quality in the closure manufacturing process; verification of this improvement provides a lower risk of rejecting the final drug product for particulate and foreign material.

## Introduction

Vision inspection of rubber components brings an understanding of the manufacturing processes creating a verification process and not an inspection process. Component suppliers should not place emphasis on the end of line product sorting. Helping to reduce customers' end-of-line rejects is a major benefit of 100% vision inspection of rubber components. When vision inspection is utilized, it leads to improved patient safety.

The trend in aseptic processing of parenteral drug products is to employ automated 100% vision inspection of the finished container closure system. This final inspection helps to ensure the patient receives an injectable drug free from particulate per the requirements of the US,<sup>(1)</sup> European<sup>(2)</sup> and Japanese<sup>(3)</sup> standards. The largest contributors of contamination are human and environmental factors present during the component manufacturing processes.<sup>(4)</sup>

## Case Study #1

Figure 1 shows that the trend for detection of foreign matter (FM) defects has increased. These most commonly identified defects were submitted as complaints for investigations. West identifies complaints as product concerns, which meet the specification, and product discrepancies, which do not meet the specification. To address the foreign matter discrepancies, West has implemented various process improvements to reduce the contribution of foreign matter during the elastomer production process; examples include gowning, cleanroom best practices and ISO 8 manufacturing area.

Have you chosen the correct component to align with the drug product and critical quality attributes? It is typical that customers provide a component specification that evaluates the elastomer at incoming for specific attributes including but not limited to foreign matter defects.

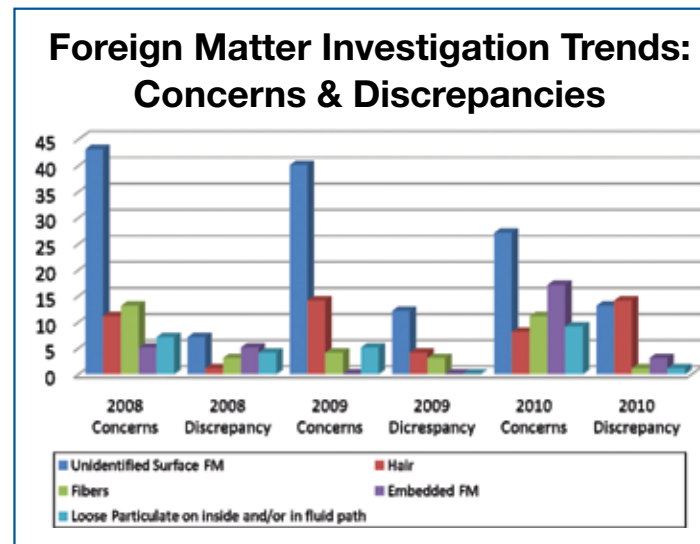


Figure 1

The attributes are commonly evaluated per ISO 2859 or ANSI/ASQ Z1.4: American National Standard: Sampling Procedures and Tables for Inspection by Attributes. It is important to align the component specification with the final intended use and finished release specification. When the components are

evaluated at incoming via manual inspection based on an ANSI population, the probability to have defective parts exists. When 100% vision inspected components are used, it reduces the risk for upstream issues. Each stopper or component has been inspected, which is aligned with the 100% vision inspection of the finished product. Figure 2 represents the above complaint data and illustrates the impact of foreign matter when it goes undetected at incoming only to be found during the manufacturing process, final inspection or from the field. When this occurs it can lead to hours of investigation/resources, loss of product, delays to market and compromised brand promise.

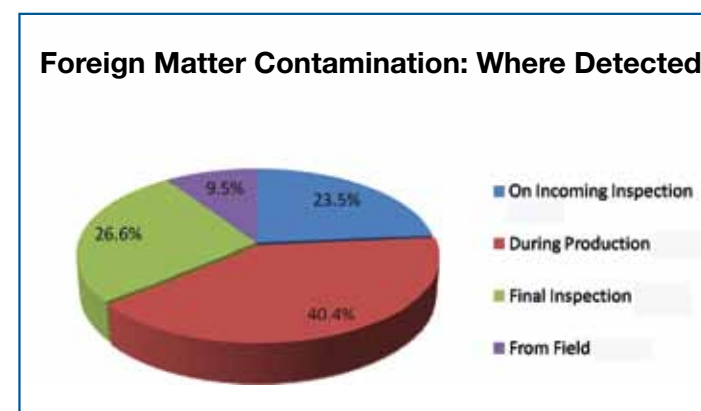


Figure 2

## Case Study #2

Examples of the direct impact that automated vision inspected components have had on the acceptance of incoming release and final reject rates are shown below. In both examples (Figures 3 and 4) the plungers and stoppers had been supplied in a ready-to-sterilize configuration per agreed specifications and had previously met the quality expectations. Due to shifts in customer quality expectations, notifications were issued for investigation. Several production improvements were made. In addition, the customer upgraded the product to include automated vision inspection.

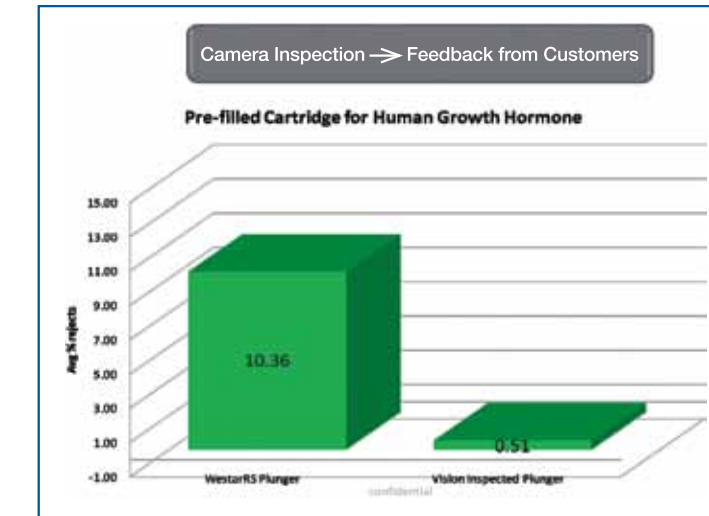


Figure 3

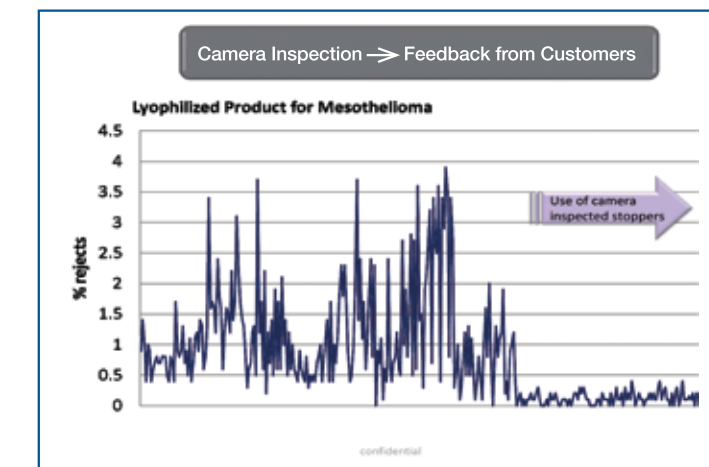


Figure 4

## Case Study #3

Automated vision inspection of components was used to gain product and process understanding, and resulted in improvements to the upstream process. The vision inspection process ultimately is used for verification of assuring patient safety by using the highest quality components. Figures 5 and 6 are examples of defects seen during vision inspection that are further evaluated in the upstream manufacturing process as described in Figure 7.

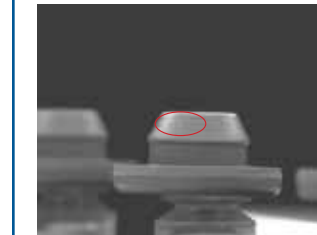


Figure 5 Particle or inclusion



Figure 6 Flow mark, but may appear as hair-like



Figure 7

## Conclusion:

Driving quality and product understanding upstream to the component manufacturer may improve the finished goods production process. Helping to reduce customers' end-of-line rejects is a major benefit of 100% vision inspection of rubber components.

## Citations:

- (1) U.S. Pharmacopeia USP32/NF27, General Chapter <1>
- (2) European Commission EU Guidelines to Good Manufacturing Practice Medicinal Products for Human and Veterinary Use Volume 4, Annex 1, 2008
- (3) The Japanese Pharmacopoeia Fifteenth Edition, 6.06 Foreign Insoluble Matter Test for Injections. March 31, 2006
- (4) Product Complaint Trends, Foreign Matter Defects, Years 2005-2010, West Pharmaceutical Services, Inc.