Goring Kerr AuditCheck Automatic Performance Verification System

▽ DSP3 Conveyor Metal Detector shown with AuditCheck

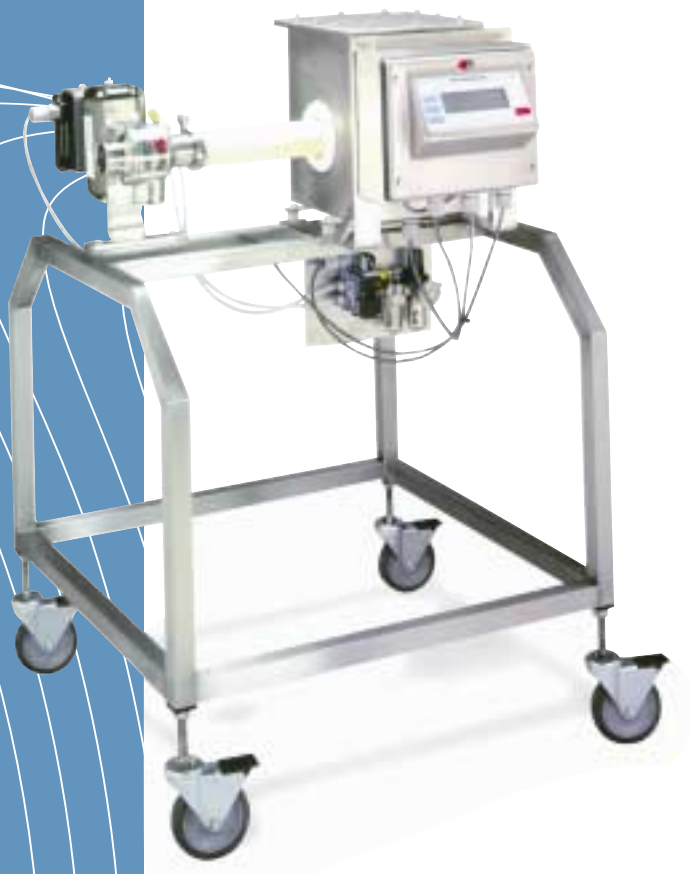
- Performance Validation
- Total Quality Solution
- Cost Savings
- Product Integrity
- Brand Protection
- Unique and Patented

Weighing and Inspection

Thermo
ELECTRON CORPORATION

AuditCheck

Continuous Monitoring of your Metal Detection System



Δ Pipeline Metal Detection System shown with AuditCheck

Δ Gravity Feed Metal Detection System shown with AuditCheck

New Total Quality Solution (TQS™)

The Goring Kerr DSP range of metal detectors incorporates, for the first time, the company's Total Quality Solution package. The concept provides a quality solution for every aspect of the system and its operation, ensuring that the benefits of a quality metal detector system are achieved and monitored regularly during the whole lifetime of the system's use. Additionally, the TQS™ package can result in considerable operational savings and improved protection of brand names. Other elements of the TQS include reject validation, quality tests, bin full, printed reports, and automatic diagnostics.

New AuditCheck™

A key element of the TQS™ package is the integration of the exceptional performance of DSP™ technology with the cost-saving and quality enhancement of AuditCheck. The world patented AuditCheck allows the sensitivity performance of the metal detector to be continuously monitored, eliminating costly recall and quarantine. This is the most significant advance in metal detector technology since our introduction of DSP™. Additionally, AuditCheck provides the only practical solution for testing pipeline, drop through, and VFFS metal detector systems.

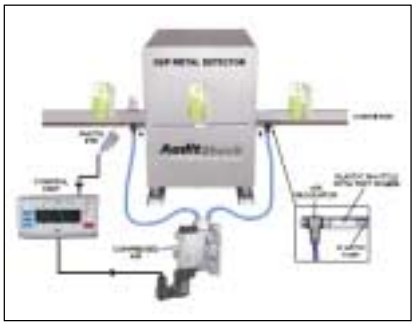


Figure 1

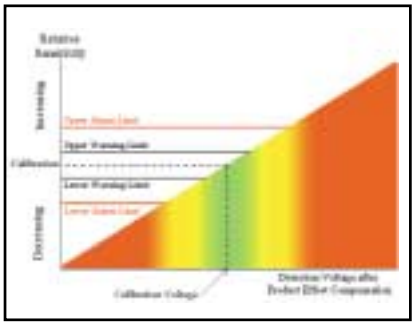


Figure 2

Metal Detector System Performance

The most significant performance criterion for any metal detector system is its sensitivity, or the size of metallic contaminant that can be detected and rejected.

The meaning of sensitivity and its measurement, however, is far more complicated than generally realized. Consider passing increasing sizes of spherical metal test pieces through a metal detector, 100 times for each size, and plotting the probability of detection against sphere size. The result would be as shown in Figure 3 below.

It will be seen that very small sphere sizes are never seen (red), but much larger sizes are always seen (green). However, there is an intermediate region (yellow) when the test sphere will be seen some of the time, but not all of the time. In other words, it is a zone of uncertainty. To test the head using the traditional manual test method, a test sphere in the green region must be selected. Now, consider the effect of a decrease in the system performance. With reference to Figure 4, if the sensitivity of the head reduces, the graph would move to the right and the 50% probability point would move from relative sphere size 1.0 to 1.2, a 20% reduction in performance. However, it can be clearly seen that the chosen manual test sphere would still be detected at least 97 times out of 100 with no indicated performance degradation. The reason for this is that manual testing, how ever well performed, is a purely qualitative (go/no-go) test and not a quantitative test. Indeed, the sensitivity could decrease further, as illustrated in Figure 5, but there is a 50% chance that the manual test would pass unless a rigorous three pass regime is employed.

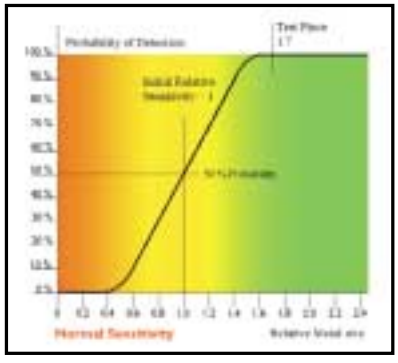
There are clear limitations to the effectiveness of manual testing, which is useful for determining detector failure or gross sensitivity reduction, but other smaller changes caused by variance in product effect, product build-up, or system drift will not be detected. This will cause sudden and unpredictable line stoppages.

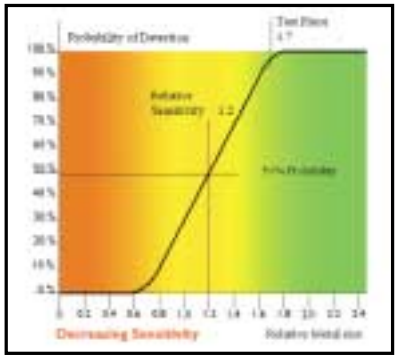
These are expensive and can cause extensive recall and quarantine procedures to be invoked. A method of measuring relative sensitivity performance is required, preferably one that is automatic, failsafe and frequent. We have developed this with the AuditCheck!

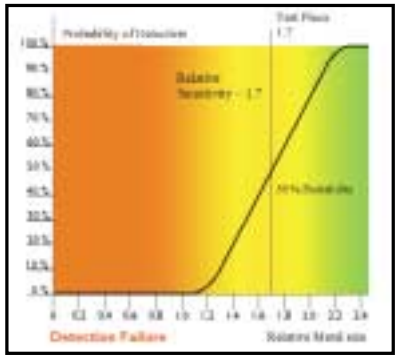
AuditCheck System Operation

The AuditCheck system consists of a plastic tube that extends through the head from side A to side B (figure 1). A plastic shuttle is contained inside the tube, and a test sphere is secured in the center of the shuttle. The two ends of the tube are connected to an air supply via two air regulators that control the speed of the shuttle in the forward and return directions. Air is normally applied to side B of the tube so that the shuttle is stationery at the infeed side of the tube. When the control unit is ready to test the head, air is switched to side A (side B being vented to atmosphere) and the shuttle will travel to the opposite side. The movement is synchronized with the product using a photoeye and the speed is controlled using the air regulators so that the test shuttle moves through the head with the product. Since the test shuttle always travels at the same speed and in the same path, the detection voltage generated should be consistent. Any variation of detection voltage indicates a relative change in system sensitivity or product effect.

During product set-up, the calibration detection signal is analyzed and used as the standard for future tests. Each time an AuditCheck test is carried out, it is compared to the calibration graph (figure 2). Small variations are permitted, but if there are changes in the system due to influences such as product build- up or parameter changes, a warning will be given. More serious deviations from normal will generate an alarm. By monitoring small changes in head performance, it is possible to recalibrate or correct abnormalities before they cause serious line stoppages and consequential loss of production.







Specifications

Features of AuditCheck

- Failsafe
- Monitors small changes in performance
- Reduces test time and manual labor for testing
- Automatic Guaranteed Test
- QA reports
- More frequent testing
- Reduces or eliminates quarantine
- Unique, worldwide patents
- DSPNet Communications
- Saves money

Reject Validation and Bin Full Detection

One of the TQS options is the reject validation and bin full system. This monitors a rejected package and ensures that it actually passes into the locked reject bin for full system security. A bin full option will monitor the amount of rejected product in the reject bin and generate an alarm before the bin becomes full and causes the rejected product to fall back onto the production line.

Printer Options

In order to automatically provide extensive quality reports, DSP metal detectors have several printer options. They include local and remote printers, and remote print buffers for reports from multiple metal detectors.

The local printer can be supplied in an IP65 enclosure with full rewind capability.

Automatic Diagnostics

Goring Kerr metal detectors have extensive automatic diagnostics. These run continuously and monitor all of the critical sub-assemblies within the metal detector. Failure of any component will generate an alarm to provide an instant warning.

	Simple Manual Test	Extensive Manual Test	Goring Kerr Quality Test	AuditCheck
Detector Failure	✓	✓	✓	✓
Poor Performance	✗	✓	✓	✓
Guaranteed Test	✗	✗	✓	✓
Automatic Records	✗	✗	✓	✓
Fully Automatic and Labor-Free	✗	✗	✗	✓
Failsafe	✗	✗	✗	✓
Monitors Small Changes in Performance	✗	✗	✗	✓
Saves Money and Improves Line Efficiency	✗	✗	✗	✓

Comparison of Test Methods for Metal Detectors

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