Hazard Analysis and Critical Control Points, or HACCP, is a systematic preventive approach to food safety and pharmaceutical safety that identifies physical, allergenic, chemical, and biological hazards in production processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to a safe level. In this manner, HACCP is referred to as the prevention of hazards rather than finished product inspection. The HACCP system can be used at all stages of product processing and packaging. It has become the universally recognized and accepted method for food safety assurance.

HACCP is internationally recognized as the primary means for enhancing food safety in plants. Depending upon the industry, in the United States HACCP is regulated by the FDA or USDA. The system is unique since it focuses on preventing problems before they occur, rather than relying on end-product testing.

The detection and elimination of contaminants is a vital part of the food safety process. In consumer packaged goods metal represents a major and often unavoidable physical hazard, as most food processing and packaging systems rely on machinery with a myriad of moving mechanical parts.

If metal contamination is identified as a risk on a production line, then a metal detector must be present to address this risk as a “Critical Control Point” or CCP – the step at which the hazard can be prevented. However, the use of a metal detector alone is not sufficient to satisfy HACCP requirements. It needs to be managed as Critical Control Point according to HACCP principles.

Critical Control Point (CCP)

Is a point, step or procedure at which controls can be applied and a safety hazard can be prevented, eliminated or reduced to acceptable (critical) levels.

Furthermore, HACCP requires the maintenance of records and reports generated during the monitoring of the Critical Control Point. And finally, the effectiveness of the CCP monitoring process needs to be verified periodically.
HAACP Principles
There are seven (7) HACCP principles:

**Principle 1:** Conduct a hazard analysis. – Plans determine the food safety hazards and identify the preventive measures the plan can apply to control these hazards. A food safety hazard is any biological, chemical, or physical property that may cause a food to be unsafe for human consumption.

**Principle 2:** Identify critical control points. – A critical control point (CCP) is a point, step, or procedure in a food manufacturing process at which control can be applied and, as a result, a food safety hazard can be prevented, eliminated, or reduced to an acceptable level.

**Principle 3:** Establish critical limits for each critical control point. – A critical limit is the maximum or minimum value to which a physical, biological, or chemical hazard must be controlled at a critical control point to prevent, eliminate, or reduce to an acceptable level.

**Principle 4:** Establish critical control point monitoring requirements. – Monitoring activities are necessary to ensure that the process is under control at each critical control point. In the United States, the FSIS (Food Safety and Inspection Service) is requiring that each monitoring procedure and its frequency be listed in the HACCP plan.

**Principle 5:** Establish corrective actions. – These are actions to be taken when monitoring indicates a deviation from an established critical limit. The final rule requires a plant’s HACCP plan to identify the corrective actions to be taken if a critical limit is not met. Corrective actions are intended to ensure that no product injurious to health or otherwise adulterated as a result of the deviation enters commerce.

**Principle 6:** Establish procedures for ensuring the HACCP system is working as intended. – Validation ensures that the plants do what they were designed to do; that is, they are successful in ensuring the production of a safe product. Plants will be required to validate their own HACCP plans. FSIS will not approve HACCP plans in advance, but will review them for conformance with the final rule.

**Principle 7:** Establish record keeping procedures. – The HACCP regulation requires that all plants maintain certain documents, including its hazard analysis and written HACCP plan, and records documenting the monitoring of critical control points, critical limits, verification activities, and the handling of processing deviations.

The seven (7) HACCP principles are included in the international standard ISO 22000 FSMS 2005. This standard is a complete food safety and quality management system incorporating the elements of prerequisite programs (GMP & SSOP), HACCP and the quality management system, which together form an organization’s Total Quality Management system.

**CombiCheckers are a CCP**
If it is sold into any form of food processing/packaging application it is very likely that, since a major component of the system is a Safeline Metal Detector, the Hi-Speed CombiChecker is a CCP. In this case there are Production Monitoring and Control features available within the CombiChecker control system that when applied, will help end users meet the requirements set forth in the seven (7) principles of HACCP. When an end user has identified the CombiChecker as a CCP, we recommend the following CombiChecker (CCP) Monitoring Package:
- Metal Detector Serial Interface
- Metal Monitoring
- Metal Detector Reject Verify
- Infeed Countercheck
- Checkweigher Reject Verify
- Checkweigher Countercheck
- Pressure Monitoring
To make CCP compliance and monitoring simple for the end user these features will be offered together in a single option for all CombiCheckers that are identified by the end user as a CCP. This can be noted in the Request for Quotation so that we are aware the system has been identified by the customer as a CCP and can provide the appropriate combination of CCP CombiChecker features in our quotation.

For convenience and ease ordering, these features are offered together as a single CCP Monitoring Option Package. Each of these monitoring and control options perform a distinct and important function in ensuring that CCP is performing within the critical limits established for the control point and will provide continuous monitoring of the CCP to ensure that metal contaminated product does not pass the CCP. A brief explanation of each monitoring and control feature is provided below.

### Metal Detector Serial Interface – 610F
An RS232 serial interface between the XE or XS checkweigher control and a Safeline metal detector (v4 or newer). This interface allows configuration of MD through checkweigher HMI. Metal detector rejecter settings and conveyor speed is managed at the checkweigher and new settings activated upon package changeover at the checkweigher control. Once configured this provides a single point of control for checkweigher and metal detector settings thus eliminating the need for multiple SOP for package changeover and the need for operator interaction with two (2) devices to manage a package changeover.

### Metal Monitoring – 522A
Metal Monitoring tracks packages between the metal detector and the weigh conveyor and will signal when a package passes the weigh light barrier (WLB) that has not been previously detected by the metal detector photoeye. This ensures that every package passes through the CCP. In addition, packages detected at the metal detector, but not seen at the WLB, are also monitored. The default checkweigher function when a Metal Monitoring fault is detected is to provide an internal Process Fault Output and display one of the following messages:

- Metal Monitoring: Item Missing
- Metal Monitoring: Too Many Packages on the control main screen

### Metal Detector Reject Verify – 507B
The feature Metal Detector Reject Verify uses a sensor placed across the metal detector reject path to determine whether a package containing metal that should have been rejected actually did cross the metals reject path. This sensor is placed before the scale and monitors the operation and successful rejection of packages containing metal contaminants. Depending upon the SOP the system can be configured to provide an internal Machine Fault Output and the message Metal Detector Reject Verify Fault on the control main screen. One potential free contact (PFC) for customer use is included in the base system on the Machine Fault Output.

### Infeed Countercheck – 508A
Infeed Countercheck is used in systems where fault detection and rejection occurs upstream of the weigh conveyor – such as a metal detector in a CombiChecker. This feature uses the upstream fault detection synchronization photo eye to determine whether a package that should have been rejected has actually been rejected. Infeed Countercheck inspection can detect faults in one of three different ways:

1. **Reject Countercheck** - Checking for the presence of an item that should have been rejected.
2. **Good & Bad Product Check** - In addition to Reject Countercheck, checking for the absence of an item that should have been accepted.
3. **Total Flow Check** - which includes both variants listed above (1 & 2) and also includes inspection for the presence of an unexpected package.

This ensures that every package is accounted for and nothing passes the CCP without being inspected.
Checkweigher Reject Verify – 507C

Similar to Metal Detector Reject Verify this feature ensures that the off weight reject function of the CCP is also monitored. Checkweigher Reject Verify uses a sensor (photoeye) placed across the reject path to determine whether a package that should have been rejected actually did cross the reject path. The default checkweigher function for a Checkweigher Reject Verify fault is to provide an internal Machine Fault Output and the message Reject Verify Fault on the control main screen.

Checkweigher Countercheck – 508A

Checkweigher Countercheck uses a photo eye located in the normal flow of packages downstream of the reject mechanism to determine whether a package that should have been rejected has actually been rejected. This provides monitoring of the checkweigher component of the CCP.

Pressure Monitoring – 521

Pressure Monitoring monitors the air pressure to the reject mechanism(s) to signal whenever air pressure drops below a preset threshold. The threshold value is set at the monitoring device. If a low pressure fault is detected, the default checkweigher function is to provide an internal Machine Fault Output and the message Lack of Compressed Air on the control main screen. Without adequate air pressure the reject mechanism(s) of the CCP will not function.

Enhanced System Supervision – Metal Detector LS SW Package “D”

PVR Performance Validation Routine

Safeline metal detectors offer integral Performance Validation Routines (PVR) to alert you when performance testing is due and walk QA personnel through the step-by-step process. The metal detector can be configured to signal a PVR be executed based upon a package changeover, a change in a critical metal detector parameter like frequency, or upon power up. As an added measure of security, the metal detector can be configured to signal a PVR be executed when a new PVR test is configured.

When a Performance Validation Routine has been signaled by one of the above conditions, the metal detector enters the PVR Due state. The Running Mode’s traffic light system display alternates between Due and Overdue to indicate that the metal detector has generated the condition. Once the PVR has been executed the MD returns to the normal state and test is recorded in the MD test log. The log shows the date and time of each test, the result, and the user name of the operator who ran the test.

CombiChecker Critical Control Point Monitoring will enable end users to address the seven (7) HACCP principles with reliable, robust, and effective CCP monitoring and reporting capabilities from a single inspection system. Integrating the increased CCP monitoring capabilities into an existing HACCP plan will enhance any organizations’ Total Quality Management System.