# EcoBead™ Inspect White Paper

Purpose

The purpose of this document is to demonstrate why EcoBead™ Inspect represents a genuinely new approach to hotmelt verification for the packaging industry. This simple, inexpensive device will make real-time hotmelt inspection an accessible technology in areas in which it has never been used before. In addition, the money-saving combination of inspection and glue-savings features will powerfully enhance a factory manager's continuous improvement efforts.

Concept

The EcoBead™ Inspect comes from years of information gathering. Nordson asked its customers why they were not using hotmelt inspection in their packaging machinery. The answer: It's too complicated and too expensive. With that in mind, Nordson has developed an innovative hotmelt inspection solution that is simple and cost-effective.

Design

Based on the previous EcoBead™ Pattern Generator, the EcoBead™ Inspect connects inline with an existing MiniBlue® II applicator cable. This inline connection allows the EcoBead™ Inspect to detect the applicator signal from the PLC so that it can learn the signal, break the signal into smaller beads for glue savings, and anticipate what the glue on the product should be.

Glue Input,
Error Output

Controller

Stitched
Signal
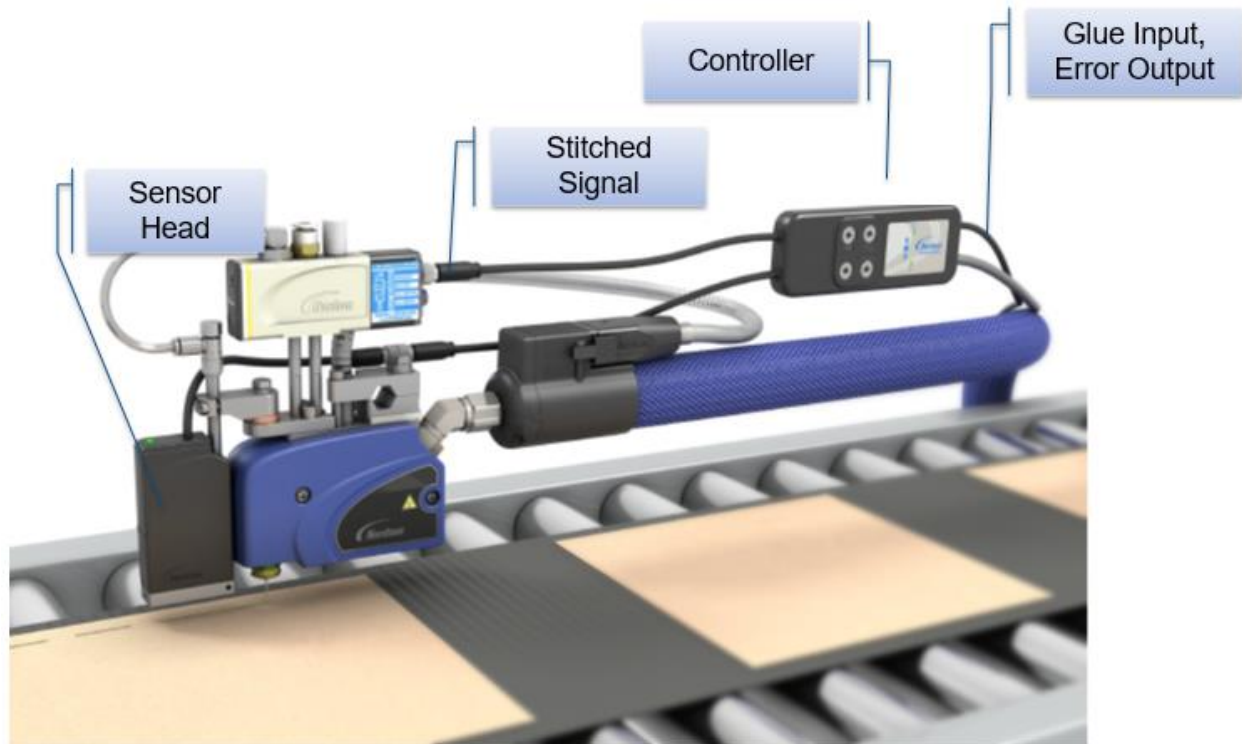
Sensor
Head

The EcoBead™ Inspect then reads the heat signal from the hotmelt through the sensor head and compares that signal against the anticipated glue based on a few simple inspection criteria. The user does not need to know how to adjust these inspection criteria; they simply need to adjust the tolerance selector to choose the tolerance level appropriate for their application.

If the user wants details about the inspection criteria or production counts, or wants to change the output settings, they can find this information and more through a wifi interface built into each EcoBead™ Inspect.

Operating Theory

For glue savings, the EcoBead™ Inspect operates on a simple and automatic principle: it samples the incoming applicator signal for the first few products until the pattern is known. It then divides the beads of that pattern into smaller signals and stores that information in a template. On the next applicator signal, the template is used to signal the applicator with the divided beads for adhesive savings.

Somewhat counterintuitively, the EcoBead™ Inspect does not need to complete sampling before it begins inspecting a product for the correct amount of adhesive. This is because as soon as it detects a signal from the PLC, EcoBead™ Inspect can use that signal to estimate the desired glue bead length. Therefore, some level of adhesive inspection can occur starting with the first product.

As several products go by, EcoBead™ Inspect can gather more information about the adhesive beads and the product to build a more complete template. This means that while the first products are being inspected, more information is being gathered so that the EcoBead™ Inspect can quickly move from a relatively tolerant inspection to a stricter verification.

Error tolerance is based on the following three inspection criteria:

Cumulative Bead Length
Actual adhesive length is totaled and compared to expected length, considering tolerance. This inspection criterion can be used beginning with the first product. It is useful for detecting a clogged nozzle, lost adhesive or air pressure, etc.

Start/Stop Zones

Adhesive must be present somewhere in these zones to assure adequate coverage on the flap.
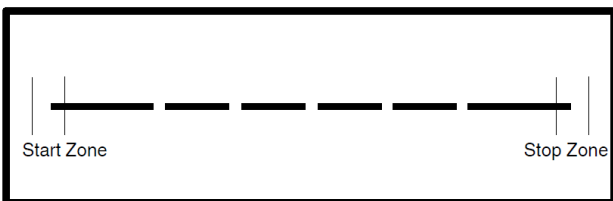
Product Length

This criterion can be used to detect torn flaps and product skew.

The tolerance selector is used to adjust to tighten or loosen these three criteria. They work together to create a flexible yet very effective set of boundaries that will function well in the vast majority of packaging applications and defect scenarios.

Results

The EcoBead™ Inspect helps the user meet continuous improvement goals through:

- Glue savings through stitched glue pattern
- Lost time savings through reduced product rework
- Lost product savings through reduced line cleanout
- Returned shipment savings through assured package integrity