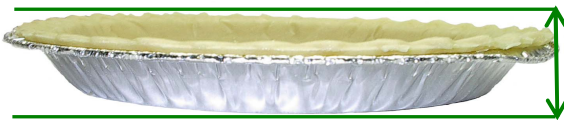
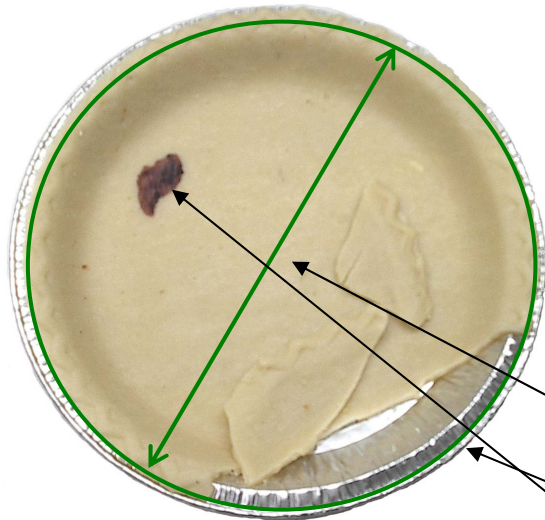


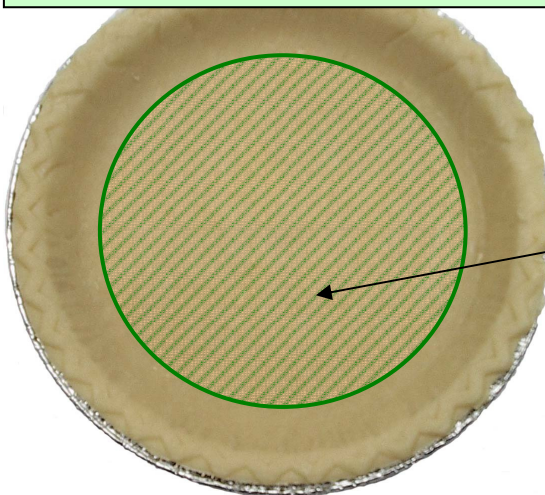
MONTROSE TECHNOLOGIES INC.

PIE SHELL INSPECTION

Shell Analysis



Rejection of Defective Shells



Key Measurements

A Dipix **over-line sensor** provides an objective, repeatable measurement of pie shell characteristics. Empty shells are measured prior to filling or packaging. Every shell is inspected for thickness, missing dough, high-contrast burnt debris and bent tins. A defective shell can be rejected without affecting its leading and trailing neighbors. Both structural flaws and 3-dimensional abnormalities can be detected.

Visible Defect Analysis

The Dipix system inspects each shell for visible defects. These include:

Minimum Diameter: The minimum diameter allows detection of crushed or mangled tins.

Visible Tin %: The percentage of the shell covered by visible tin, excluding the guard band at the shell edge. This detects areas where the dough has been torn during pressing.

Dark Defects: Large dark defects such as burnt debris can be detected. To be detected reliably, defects must be at least 5 mm in diameter and must be at least 50% darker than the surrounding area. Defect detection is most reliable in the base and less reliable in the sloped sides of the shell. Defect detection is limited to inside the guard band. Smaller defects may be detected, but the natural variation in the dough may cause false rejects if the defect detection thresholds are set too low. Note that faint stains will not be detected even if they are larger than the defect size threshold.

Height Mapping

Peak Height: This measures the highest point on the shell. The peak height will be too high if the shell rim is bent upward or if there is extra dough on the shell rim.

Center Spot Height: The average height of the dough surface in the center of the shell is a measure of dough thickness, assuming the tin is a constant thickness. Height trends can be monitored in real time to ensure consistent dough thickness.

Rejection of Defective Shells

Rejection Option: A rejection device may be added to the system as an option. This is typically an air jet that blows rejected product off the line onto a customer provided turntable or other similar device. This allows the customer to inspect rejected product and reuse the dough from the rejected product if desired.