MONTROSE TECHNOLOGIES INC.

Automated Inspection & Intelligent Material Handling for Flatbread, Pizza Crust

Montrose inspection and handling systems provide a complete inspection, and rejection solution, created just for flatbread, thins, pancakes, and pizza crust manufacturing lines. Receive comprehensive statistical analysis of variability while removing human involvement from inspection and rejection.

A high speed, turnkey system that allows you to:

1. Assure quality on a 100% monitoring basis.
2. Remove individual defective and non-conforming product from the line.
3. Monitor process statistics to pinpoint causes of waste.
4. Rapidly recognize a positive ROI by improving quality, reducing waste, and automating production - in previously labor-intensive areas.

Solution Components	SnapQC	FocalPoint	MT Series
3D & True Color Inspection	✓	✓	✓
Bottom Color Inspection			✓
Automated Rejection			✓
Weight	✓		
Statistical Analysis and Reporting	✓	✓	✓
NEMA 4X		✓	✓
Sanitary Design	✓	✓	✓

> *Isolate and Eliminate Sources of Waste*

Automated inspection provides real-time and historical information on fault, and out-of-spec conditions, allowing you to isolate the issues causing the most waste by lane, shift, product, line, and plant. The measurement results will also make it easier to reach consistent quality when developing new products or when formulation changes are made.

Analysis Type	Example Faults	Impact on Customer or Plant	Rejection Capability	Statistical Analysis
Geometrical Analysis	Diameter Too Large Diameter Too Small Damaged Edge Fold Broken Too Thick/Thin Oval	Product rejection Customer complaints Handling problems, such as jamming at packaging Less Topping Waste	0 - 100% fully under plant control	Worst Fault Pareto Reporting Dashboard
Color Analysis (Top and Bottom)	Under- or over-baked Hole/Tear Visible Debris Foreign Material	Consumer complaints and safety Product rejection	0 - 100% fully under plant control	Worst Fault Pareto Reporting Dashboard

> *Measure, Analyze, Reject - by Lane*

The **MT Series inspection system** software displays real-time measurement data in graphic formats that make it easy to identify what fault relates to the largest cause of rejection, and in what across belt lane(s) position those same faults occur.
Pizza crusts are eventually topped with expensive toppings, packaged, and weighed. Crusts that are too large may cause packaging problem and be overweight. Crusts that are too small may be underweight. Avoid these scenarios by grading the diameter of the plain crusts before topping with an **MT Series vision system**.

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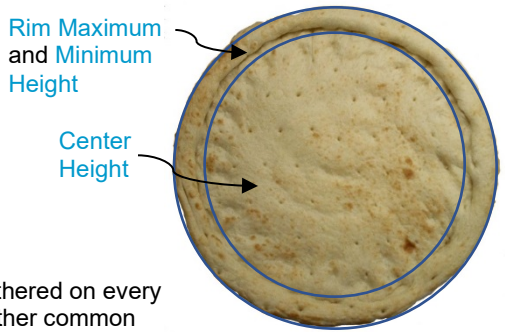
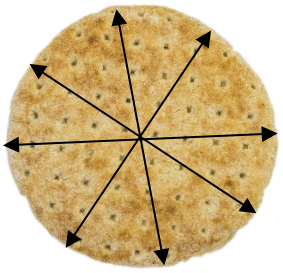
> Common Height Analysis



Profile height calculations are based on hundreds of individual height values gathered on every product, which leads to a measurement accuracy of ±0.5mm. Mean Height is another common measurement applied to pizza crust, flatbread, and other similar products.

> Common 2-D Analysis



Mean Diameter

Two dimensional calculations are based on an accurately defined perimeter, which is imaged by both overhead cameras. 2-D measurement accuracy is ±0.5mm. Length, Width, Maximum Diameter, Minimum Diameter, Diameter Range, and Surface Area are other common measurements applied to pancakes, thins, and other similar products.

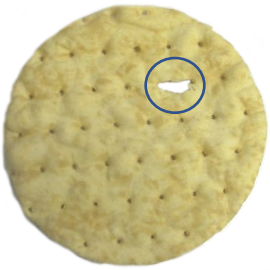
> Common Color Analysis

Top Bake Color and Bottom Bake Color (an average of all pixels, an average of a certain region, or an average of the baked area only)

True color calculations, on both the top and bottom surface of the product, are measured in various units such as L*a*b* and BCU.

> Common Fault Analysis

Insufficient Toast Marks or Too Much Toast Area



Hole / Tear

Fold / Edge Defect

Misshapen and Carbon on bottom are other common defects that can be quantified. There are many standard measurements that can be used, individually or combined within formulae, to qualify your product. **All visible product characteristics and faults can be quantified.**

Montrose Technologies Inc. 1051 Baxter Road, Ottawa, Ontario, Canada K2C 3P2 Tel: +1-613-562-1113 www.montrose-tech.com