MONTROSE TECHNOLOGIES INC.

Automated Inspection & Intelligent Material Handling for Toaster Pastries

Montrose inspection and handling systems provide a complete inspection, and rejection solution, created just for toaster pastry 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	Chipped corner/edge Too long or short Too wide or thin Small jam deposit Broken	Product rejection Customer complaints Handling problems, such as jamming at packaging	0 - 100% fully under plant control	Worst Fault Pareto Reporting Dashboard
Color Analysis (Top and Bottom)	Jam filling leaker Poor icing coverage Under- or over-baked Visible debris Foreign material Too little topping Cracked	Consumer complaints and safety Product rejection Topping giveaway	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. Montrose software also has the capability to perform 100% rejection for individual lanes, for those temporary situations where marginal toaster pastries need to be removed from the production line.

The **Montrose color analysis software** is programmed for the necessary detailed examination of the various colored components of a toaster pastry, so that all attributes and defects are accurately quantified.

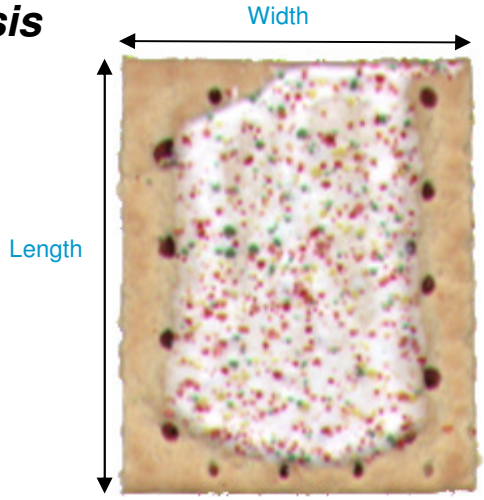
MONTROSE TECHNOLOGIES INC.

Automated Inspection & Intelligent Material Handling for Toaster Pastries

> *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 toaster pastries.

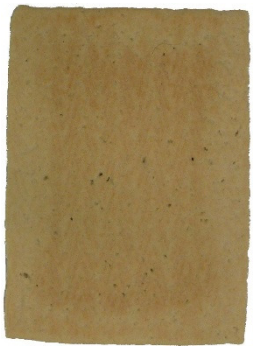
> *Common 2-D Analysis*



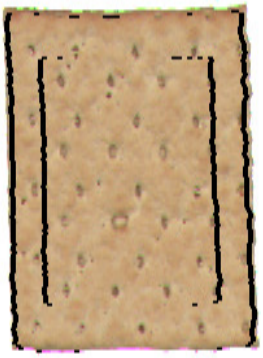
Two dimensional calculations are based on an accurately defined perimeter, which is imaged by both overhead cameras. 2-D measurement accuracy is ±0.5mm. Surface Area, and Volume are other common measurements applied to toaster pastries.

> *Common Color Analysis*

Bottom Bake Color
(average of all pixels)

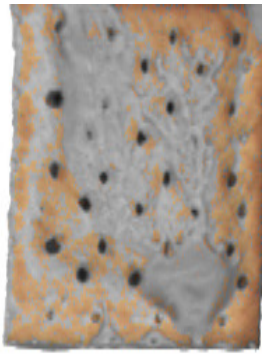


Top Bake Color
(average of all pixels)

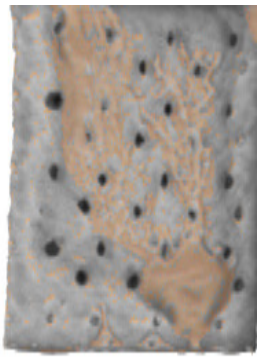


Even though the coloured pastry components can be very similar, Color Analysis allows for the ***distinction*** between the frosting, crust, additional topping, and filling.

Original Image



Filtered Image for the Crust Only (frosting converted to gray scale)



Filtered Image for the Frosting Only (crust converted to gray scale)

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.

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

MONTROSE
TECHNOLOGIES INC.

Automated Inspection & Intelligent Material Handling for Toaster Pastries

> *Common Fault Analysis*

Broken
(white area within perimeter)

Misshaped
(width or length too large)

Chipped Corner or Edge
(missing perimeter area as compared to a rectangular template)

Cracked
(filtered color blob analysis)

Poor Frost Coverage
(within central region, small surface area of frosting color, or large surface area of exposed crust color)

Poor Deposit
(within central region, large surface area of a reduced height - blob analysis)

Too Thick
(large peak height; usually due to extra dough or dough fold)

Bottom Leaker
(surface area of exposed filling color)

Top Leaker
(surface area of exposed filling color, excluding breather holes)

Only some common examples have been pictured. Carbon on bottom, too much frosting, too little/too much additional topping, and excessive wicking 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