MONTROSE TECHNOLOGIES INC.

Automated Inspection & Intelligent Material Handling for Frozen Dough Products

Montrose inspection and handling systems provide the only complete inspection, rejection, and handling solution created just for frozen dough and par-bake manufacturing lines. Receive comprehensive statistical analysis of variability while removing human involvement from inspection, rejection, counting, and packing.

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. Accurately count, group, and fill cartons or bags with in-spec product.
5. Rapidly recognize a positive ROI by improving quality, reducing waste, and automating production - in previously labor-intensive areas.
6. Report accurate production and package volume to management and customers.

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

> *Isolate and Eliminate Sources of Waste*

Automated inspection provides real-time and historical information on packaged, fault, and out-of-spec conditions, allowing you to isolate the issues causing the most waste by 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	Broken Too large Too small Poor shape Doubles Poor symmetry	Product giveaway Product rejection Food-service customer complaints and shorting through "doubles count"	0 - 100% fully under plant control	Worst Fault Pareto Reporting Dashboard
Color Analysis (Top and Bottom)	Under- or over-baked Visible debris Too light Too dark Foreign material Too much/little topping	Consumer complaints Food-service customer complaints Topping giveaway	0 - 100% fully under plant control	Worst Fault Pareto Reporting Dashboard

> *Measure, Reject, Count, Group, Pack*

The MT Series inspection system uses 3D and color vision to count and identify individual in-spec product suitable for the grouper chute, that buffers product while the packing container is indexed. Measurement accuracy and count accuracy are extremely high.

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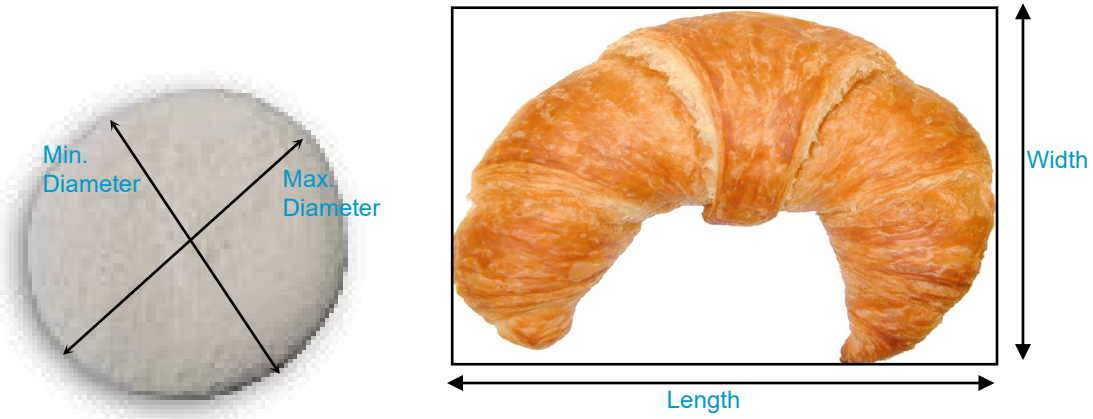
Biscuits, Bagels, Croissants, Donuts....Any Frozen Product

> *Common Height Analysis*

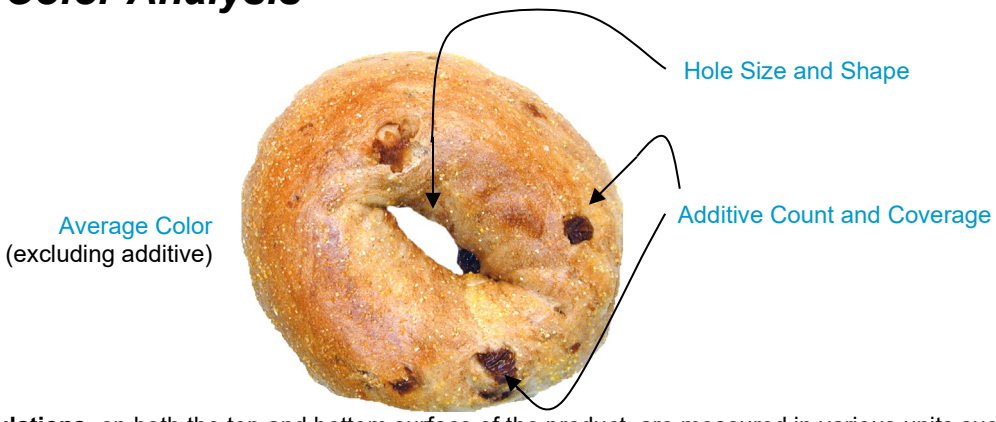
Profile height calculations are based on hundreds of individual height values gathered on every product, which leads to a measurement accuracy of ±0.5mm. Mean Height is another common measurement applied to frozen product.

> *Common 2-D Analysis*



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

> *Common Color Analysis*



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.

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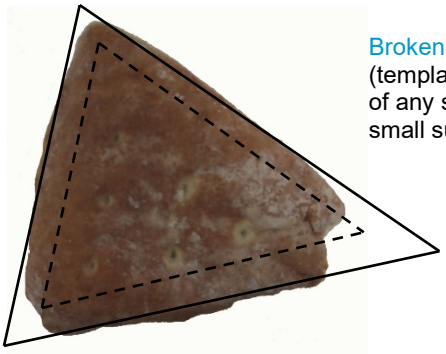
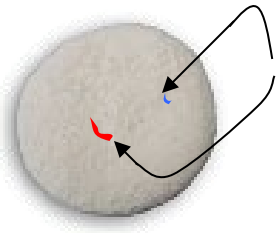
> *Common Fault Analysis*

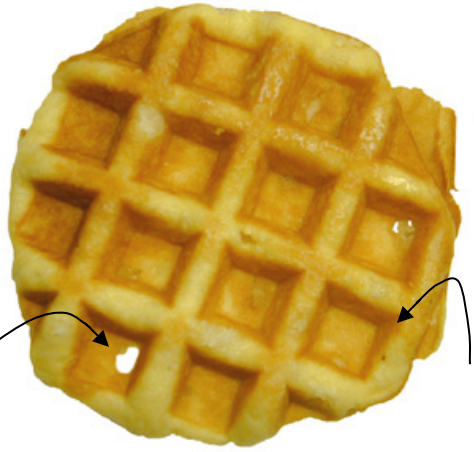
Doubles
(large peak height, volume, and/or surface area)



Broken
(template matching of any shape, or small surface area)



Foreign Material
(color blob analysis)



Unwanted Holes
(color blob analysis - count or total surface area)

Carbon, Oil Stain
(color blob analysis)

Misshaped Hole
(color blob analysis length vs. width)

Uncooked Area/Side
(light colored area)

Only common examples have been pictured. 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.**