Muffin - Color

Bake Color (Mean Color)
The overall bake color of a muffin top. This measurement is best for muffins with no distinct added flavor pieces, such as chocolate chips or blueberries.
Defect: Over baked = too dark. Under baked = too light. Incorrect muffin type.

Two color thresholds define three color ranges by absolute or relative values. These three color ranges apply to Color Between, Area Above (light), and Area Below (dark).

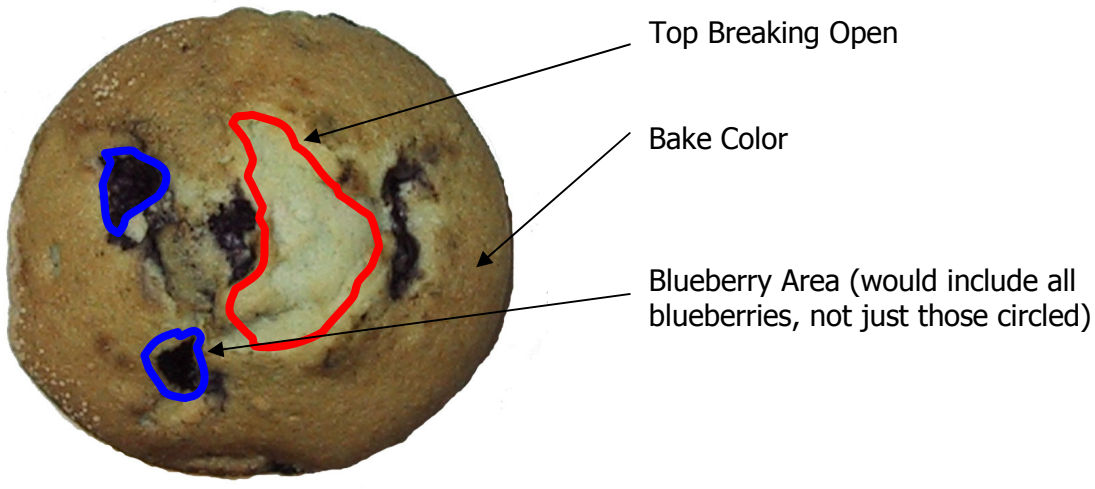
Bake Color (Color Between)
The average bake color of a muffin top, not including dark or light colored areas (areas such as chocolate chips or white nuts).
Defect: Over baked = too dark. Under baked = too light. Incorrect muffin type.

Top Breaking Open (Area Above)
All area lighter in color than the typical bake color.
Defect: Foreign light colored debris or muffin top breaking open or missing (additive) white nuts.

Blueberry Area (Area Below)
All area darker in color than the typical bake color.
Defect: Foreign dark colored debris or muffin top burnt or too little/many of dark additive (i.e. blueberries).

Note: Color parameters for *Percent Area* are also available.

Sample Blueberry Muffin



Muffin - Height / Slope

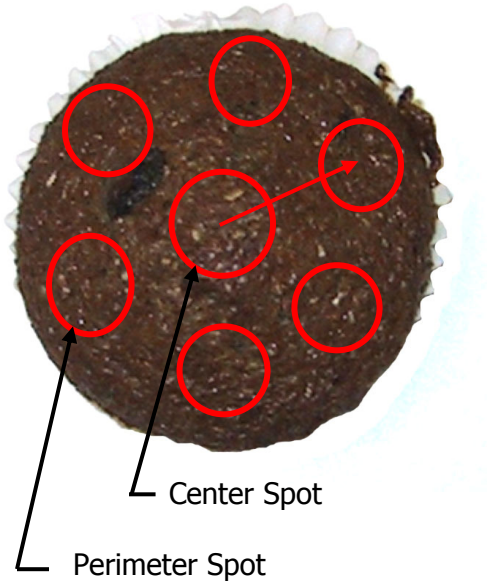
Muffin Peak (Peak Height)
The average of the 50 highest height points.
Defect: Muffins resting on side, possible packaging problem (below limit); Smashed/dented muffin (below limit); Undercooked – low rise muffin (below limit). Muffin risen too much (above limit).

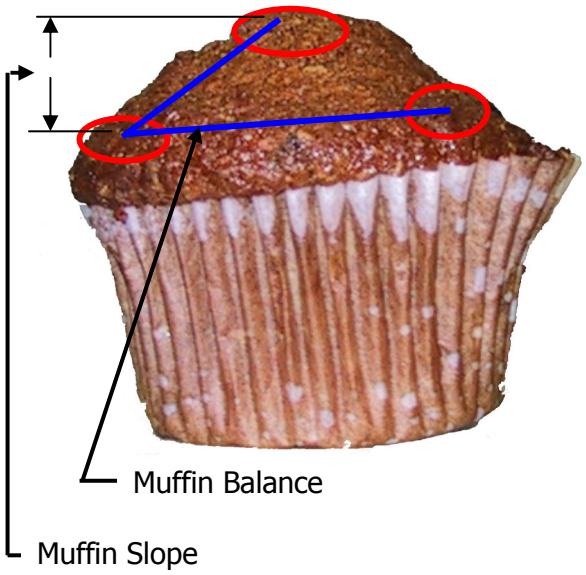
To measure slope, the height within a center circular area and numerous circular areas (spots) around the product's perimeter are used.

Muffin Symmetry (Slope Symmetry)
A typical muffin profile has a natural downward slope on all sides. This measurement focuses on the height variation near the muffin perimeter.
Defect: Non-symmetric muffin top – peak of muffin is off to one side (above limit).

Muffin Slope (Mean Slope)
A typical muffin profile has a center peak and a natural down slope to all sides. This measurement focuses on the slope between the center and the perimeter.
Defect: Flat muffin (below limit), Squished muffin (below limit); Muffin peak broken off (below limit).

Sample Bran Raisin Muffin





Muffin – Diameter/Shape

The length of each radii may be as measured or may averaged with the radii on each side. If radii are averaged, then small pieces along the product perimeter are "smoothed" out.

Muffin Diameter (Mean Diameter)
The average diameter based on the measurement of 180 radii.
Defect: Diameter too large - possible packaging problem, ingredients "given away".

Muffin Roundness (Roundness)
The difference between the largest diameter and the smallest diameter.
Defect: Oval. Bite on side or side broken off.

Muffin Volume (Volume)
The standard measurement is the product of top surface area and mean height. For muffins, a formula would be implemented to account for the muffin base volume that fits in the pan "cup" and add that to the muffin top volume.
Defect: Volume too large – possible packaging problem, ingredients "given away". Possibly correlate to weight.

Sample Blueberry Muffin