



### What are donuts?

Donuts are a type of sweet made with fried dough that are fluffy and ring-shaped, but they can come in various shapes and sizes. They can be plain or filled with various creams, jams, or other sweet fillings, and are commonly topped with glazes, sprinkles, or powdered sugar. Donuts are enjoyed as a popular treat around the world, often served as a snack or dessert.

## Application overview

# + DONUTS

With SENSURE SYNAPSE, it is possible to **measure numerous product features** (a wide set is included in the system), such as shape, size, and colour, using **2D technologies** (industrial cameras) and perform a full 3D product profile using **3D technology** (laser profilometer). SENSURE solutions also allow for the inspection of the bottom part of products.

Thanks to the flexibility of the solutions, it is possible to **integrate the vision systems into existing production lines and to customize rejection mechanisms** (traps, individual/multiple retractable belts, robots, etc.) based on the size and shape of the products, and the speed of the line.

Vision system can be installed in **different position of the line** (before/after fryer, before/after topping deposition, etc.).

Using **SENSURE SYNAPSE ensures reliable, repeatable, and accurate measurements**, even at high line speed, with the added benefit of all data being saved in a SQL database. It is also possible to **automatically adjust the parameters of individual processing stages** based on the analysis of their outputs and product information.

## Upper Surface analysis

### Product color/Spots

Average color (excluding or not toppings) and edge/contour defects.  
Area calculation for spots. Values can also be provided in L\*a\*b and BCU.

### Topping conformity

Percentage of the surface coverage, distribution and color.

### Shape/Size

Min/Max/Average diameter, Min/Max axis, roundness, perimeter, distance between centers.  
Overall area calculation (to identify double or broken products, etc.), cracks detection and bubbles on sides.

## Bottom Surface analysis

### Product color/Spots

Average color (excluding or not any anomalies like spots and area calculation for spots). Area calculation for spots. Values can also be provided in L\*a\*b and BCU.

## Three-dimensional analysis

### Slope

Curvature of the top surface of the products (Measured by calculating the difference in height between the center of the product and a user-defined ring near the product's edge), flatness, planarity and bubbles.

### Height/Volume

Min/Max peaks, average height, volume, etc.

## Defects detection capabilities

