

# Application Data

## Evaluating sandwich bread quality

### Description

Sandwich bread is manufactured to meet specific requirements of the sandwich-making industry which differ from other types of pan breads. Particular emphasis is placed on the uniformity of shape for loaves with a square or rectangular cross-section. The size of the cells in the crumb can affect the cost control in spreads and the large holes may result in significant quality issues.

### Data

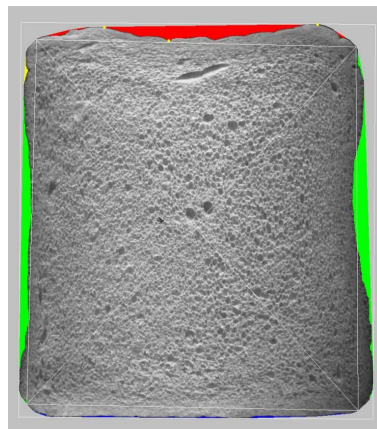
C-Cell measures up to 48 different parameters and different combinations of these will provide the data required for the assessment of bread quality. Depending on bread product specifications 5-8 parameters may be used in the quality evaluation. For example possible key parameters may be;

<b>Slice height (maximum)</b>	<b>Slice height (average)</b>
<b>Concavity – top, left, right</b>	<b>Area of holes</b>
<b>Number of cells</b>	<b>Average cell wall thickness</b>
<b>Average cell diameter</b>	<b>Coarse/Fine clustering</b>

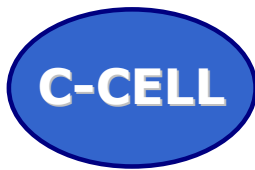
### Images

The processed images provide valuable visual information about the quality parameters

**Shape:** This type of image shows a view with particular feature shown in colour and can be used to assess the uniformity of the product shape. The points used to measure height are marked as yellow dots on the top edge. Concavity of the top is shown in red and green for the sides.

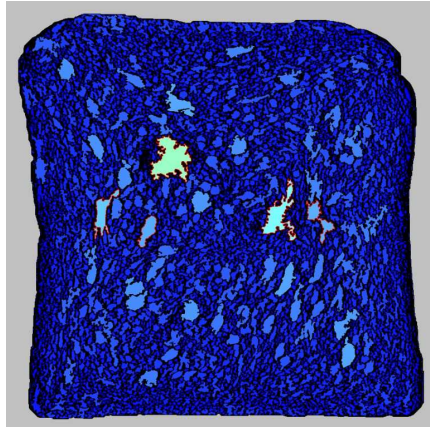


<b>Slice height (maximum) (mm)</b>	<b>135.7</b>
<b>Slice height (average) (mm)</b>	<b>133.3</b>
<b>Top concavity (%)</b>	<b>1.41</b>
<b>Left concavity (%)</b>	<b>1.36</b>
<b>Right concavity (%)</b>	<b>1.61</b>



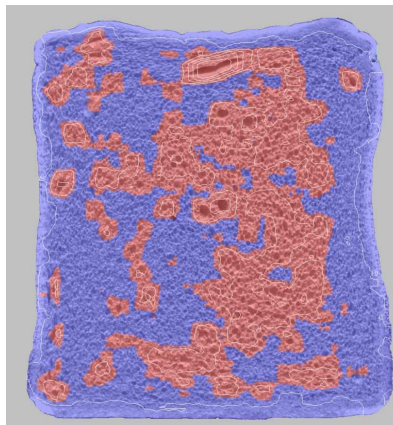
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**Cell Image:** This image provides an excellent overview of cells and other features in the crumb. The variation in cell sizes is visualised and features which are considered to be large enough to be described as holes identified. Small cells are coloured dark blue and larger ones in lighter shades of blue, green and yellow; features considered to be holes are outlined in red.



<b>Number of cells</b>	<b>8717</b>
<b>Average cell diameter (mm)</b>	<b>1.835</b>
<b>Area of holes (% of slice area)</b>	<b>2.02</b>

**Uniformity of cell distribution:** C-Cell provides a number of measures of the uniformity of cell distributions across the slice cross-section. Areas which are dominated by larger cells and holes in the crumb are coloured in pink while areas which are dominated by smaller cells are coloured blue.



<b>Coarse/fine clustering</b>	<b>0.028</b>
<b>Non-uniformity</b>	<b>0.986</b>

Low numbers (as above) are indicators of a uniform distribution of cells; such information makes comparison between slices very easy.

**More information is available from:**

## **CALIBRE CONTROL INTERNATIONAL LTD**

**5/6 ASHER COURT, LYNCastle WAY, APPLETON, WARRINGTON WA4 4ST, UK**

**T: +44 1925 860401 F: +44 1925 860402 E-mail: [info@calibrecontrol.com](mailto:info@calibrecontrol.com)**

[www.calibrecontrol.com](http://www.calibrecontrol.com)

[www.c-cell.info](http://www.c-cell.info)

