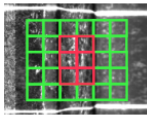# *5 - S41 CALC Surface*

- **Description**

The found seam area can be divided in boxes/tiles. In each box/tile the surface characteristics will be calculated and classified.

- **Icon**

5 S41 CALC Surface
Calculate and classify the surface characteristics of each box

- **Parameters**

Filters of
5 S41 CALC Surface

01 Surface Calculator

02 Surface Classifier

Parameter	Comment
Tiles Width	Width of a box/tile inside the seam for detailed analysis. [Pixel]
Horizontal Jump	Horizontal distance from tile to tile. [Pixel]
Tiles Height	Height of a box/tile inside the ROI for detailed analysis. [Pixel]
Vertical Jump	Vertical distance from tile to tile. [Pixel]
Calculate Mean?	Calculates the mean intensity (grey level) in a box/tile. [Active / inactive]
Calculate rel. Brightness?	Calculates the percentage value compared with the mean value of all boxes/tiles inside the ROI. [Active / inactive]
Calculate Variation?	Calculates the average intensity differences inside the box/tile. [Active / inactive]
Calculate MinMaxDistance?	Calculates the intensity difference between the highest and lowest intensity point in the box/tile. [Active / inactive]
Calculate Texture?	Parameter for detecting the weld seam structure. In order to calculate the characteristics, the analysis window is binarized with a dynamic threshold and

	filtered (removing the noise in the binary image). The texture characteristics is calculated over the sum of the differences over the lines in the binary image. [Active / inactive]
Calculate Structure?	Parameter for detecting the fine structure of the weld seam. In order to calculate the characteristics, the difference between original image and eroded image is calculated, and then dynamically binarized. Over the binary image, the area in x direction is calculated again = number of change-overs. [Active / inactive]

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

Minimal Mean	Lower limit for the average grey scale value in the box/tile. Everything below is declared to be faulty. [Greylevel]
Maximal Mean	Upper limit for the average grey scale value in the box/tile. Everything above is declared to be faulty. [Greylevel]
Min. rel. Brightness	Parameter for hole detection in the box/tile. This is a threshold relative to the total seam brighness. 0% signifies that only complete black areas are detected as a hole. 100% signifies that everything being darker than the average seam brightness is detected as a hole. [Percent]
Max. rel. Brightness	This is a threshold value for the box/tile relative to the total seam brightness. 300% signifies that bright surfaces with more than triple average seam brightness are judged to be bad. 100% signifies that everything being brighter than the average seam brightness is judged to be bad. [Percent]
Min. Variation	Minimum necessary brightness value variation in the box/tile. [Greylevel]
Max. Variation	Maximum allowed brightness value variation in the box. [Greylevel]
Min. MinMaxDistance	Minimum necessary difference between highest and lowest intensity value in the box/tile. [Greylevel]
Max. MinMaxDistance	Maximum allowed difference between highest and lowest intensity value in the box/tile. [Greylevel]
Min. Texture	Minimum necessary value for the weld seam structure in the box/tile.
Max. Texture	Maximum allowed value for the weld seam structure in the box/tile.
Min. Structure	Minimum necessary value for the weld seam fine structure in the box/tile.
Max. Structure	Maximum allowed value for the weld seam fine structure in the box/tile.

- **Measured values for plotter**

716	0 … xxx	Surface defect Size
717	0 … xxx	Surface defect Height
718	0 … xxx	Surface defect Width

- **Subgraphs interface**

IN bridges

OUT bridges

◤ **image**	Img	◤ **value**	Surface size
	ROI seam		
◤ **value**	ROI grey valid		

- **Graph block diagram**