

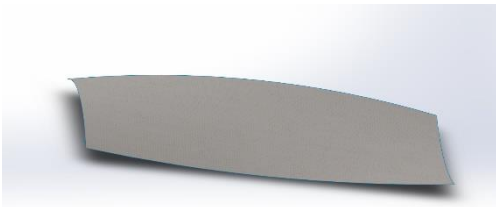
Application Note Embossing Depth

CREASY Software Version v5.x

Embossing Depth measurement on folding cartons

Depth measurement is the distance between a processed surface and the unaffected surrounding area.

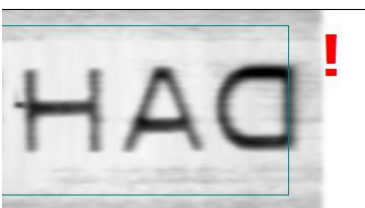
The basic prerequisite for embossing depth measurement is a reference card board surface. The larger the reference surface, the more accurate the depth measurement can be. The card board itself is never a perfect plain surface. Fibers, warp, crease lines and embossed areas are distorting the surface. This makes the analysis of several areas necessary to make sure the depth measurement is referenced to the correct surface.



A single point-to-point depth measurement is not a representative value for embossing depth. It will not be possible to repeat or compare measurements from one carton sample to the next.

The CREASY software implements several algorithms to automatically detect the current surface situation and condition. The distorted surface will be mathematically adjusted such that accurate depth measurements become possible.

A plausibility check will be performed to make sure the starting area and the ending area are plain or unprocessed card board surfaces. If the check fails, a red exclamation mark will be displayed. The measured value accuracy could be affected in this case.



Generic embossing objects

1. All around surface area

The scanning aperture of the CREASY is approximately 1mm x 70mm. Any embossing that stays well within this area leaving 1mm to 1.5mm card board surface all around it makes it possible to

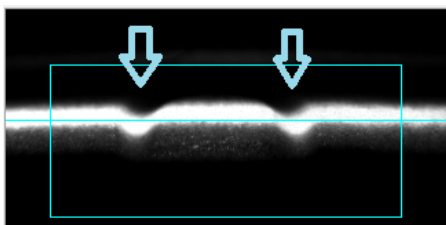
detect any distortion of the card board. The software can calculate the real card board surface based on this frame around the embossing.



The actual measured sample can be perfectly aligned flat and depth measurements can be made with the highest possible accuracy.



Use the preview Window of the CREASY Software to align the sample properly by dragging the CREASY carriage manually over the embossed subject. All embossing needs to stay perfectly within the blue frame. In order to obtain an accurate and repeatable measurement the left and right side of the blue frame needs to have a plain, unprocessed card board surface along the entire scanning distance.



EGUIDE-PRO

At the beginning and at the end of the scanning path there needs to be plain surface for at least 1mm. Limit the path using the mechanical end blocks.

Scanning distance mm

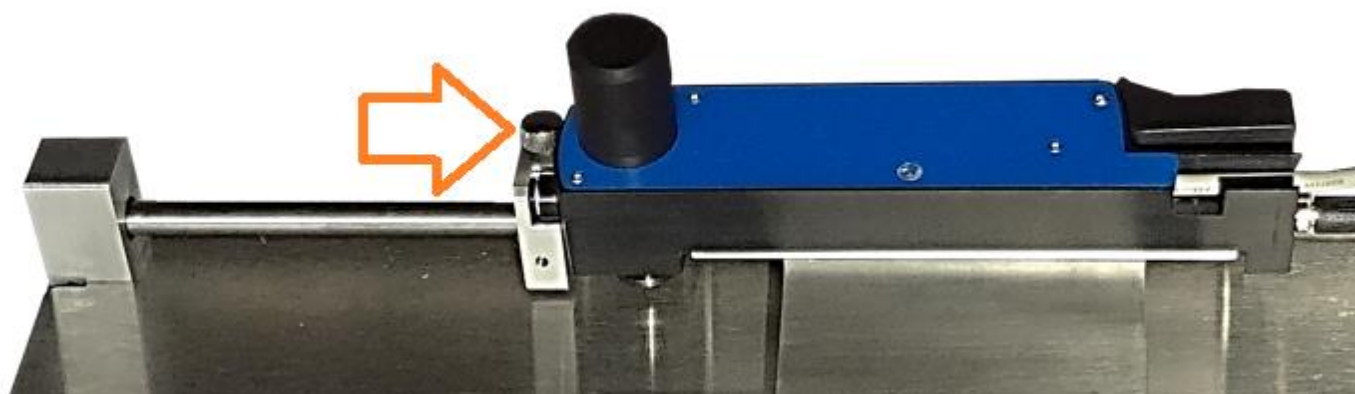
Enter a Scanning distance value on the main screen, that is larger or equal the mechanically configured distance making sure that the CREASY will travel over the entire path until reaching the end block. If the CREASY scan ends before reaching the block, calibrate the the EGUIDE-PRO motion parameters as described in the manual or simply increase the distance value.



Move the CREASY carriage manually to the starting position.

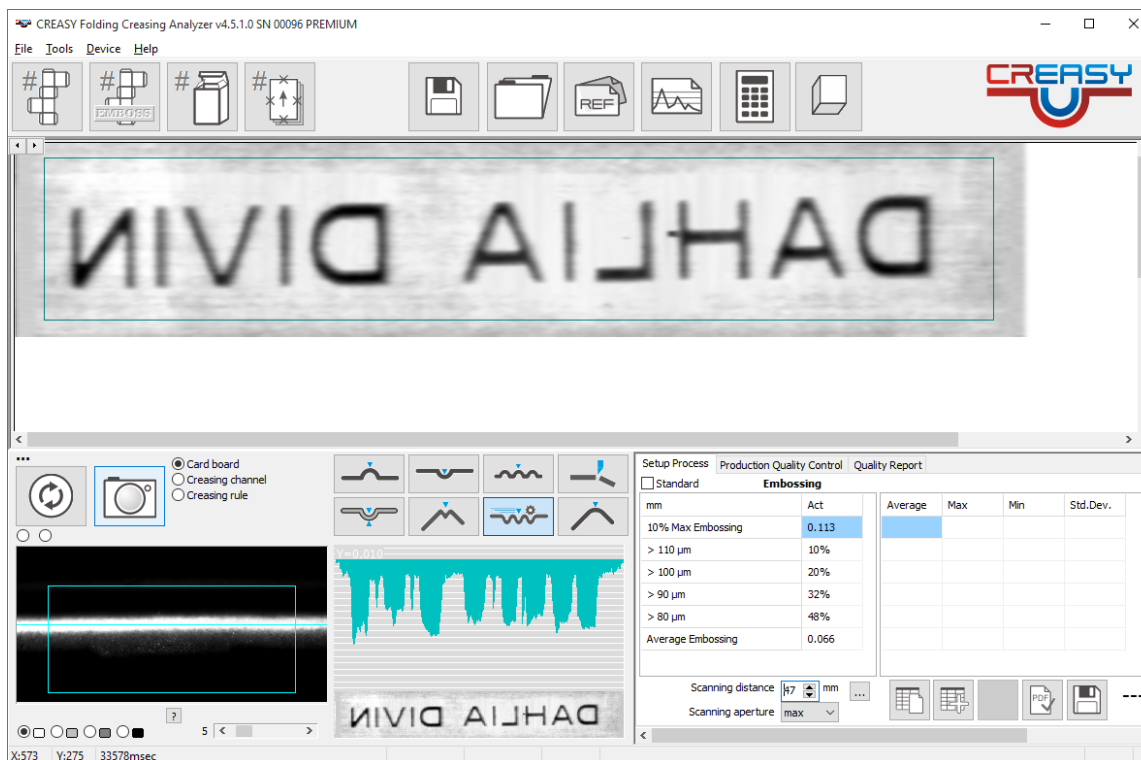
EGUIDE-PRO2

Move the EGUIDE-PRO2 carrier to the starting position for scanning. Move the stopper such as it will get in contact with the carrier and fix the position with the screw.



Please be aware, that scanning will start approx. 0.1mm distant from the stopper. The EGUIDE-PRO2 is factory calibrated and will move the configured distance with high precision. No distance calibration process needs to be performed at all.

Start the embossing measurement by pressing the measurement button of the CREASY. The device will perform a scan and display the result.



The Scan Window at the top shows that the embossing stays well within the blue rectangle of the scan aperture.

2. Left, right, and bottom surface area

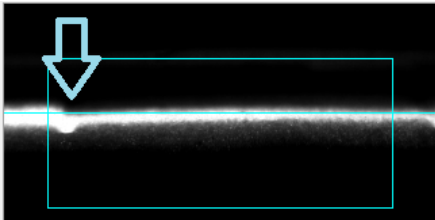
Many embossed subjects will not fit into the aperture of the CREAMY EGUIDE-PRO. If the embossed subject is aligned on a base line such as text, surface information on the left, the right, and the bottom side of the embossed subject can be retrieved.



In this case the measurement sample can be aligned on three sides, still resulting in highly accurate and repeatable embossing depth measurement values.



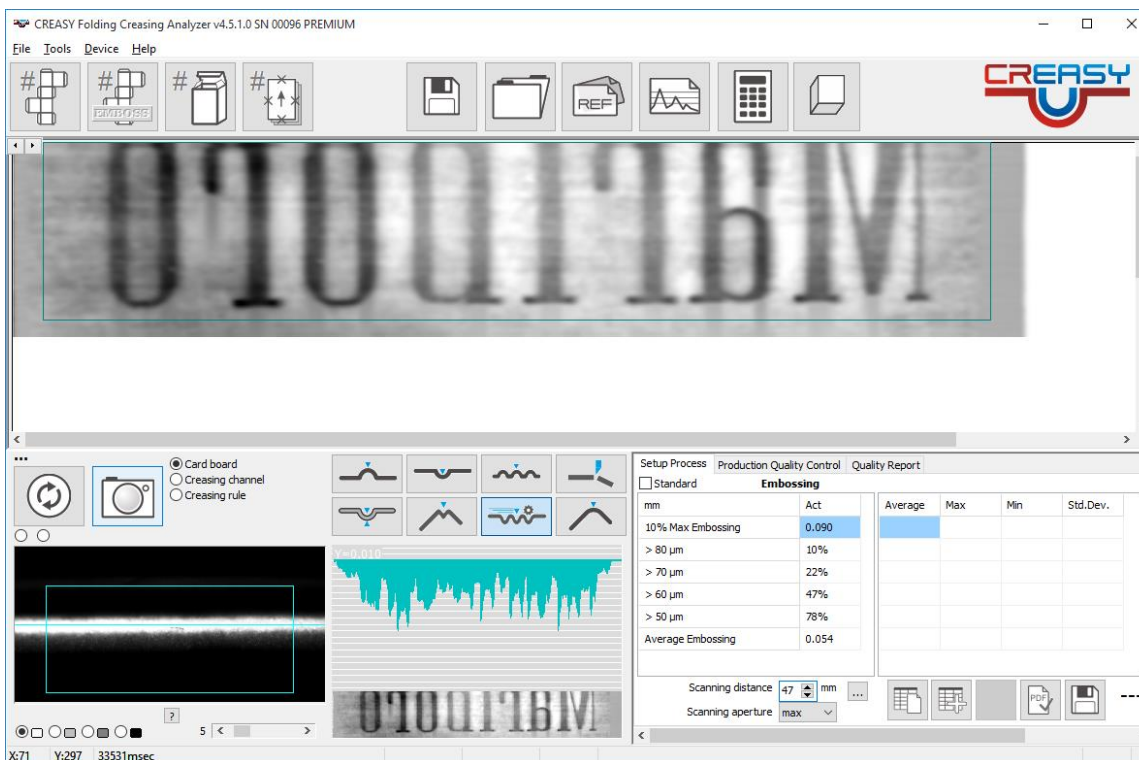
Use the preview Window of the CREASY Software to align the sample properly by dragging the CREASY carriage manually over the embossed subject. Make sure the bottom line of the embossed subject stays within the blue rectangle on the left side over the entire scanning distance. On the right side the embossing subject may go beyond the blue frame. On the left side of the blue frame there must be plain or unprocessed card board surface over the entire scanning distance.



At the beginning and at the end of the scanning path there must be plain or unprocessed surface for at least 1.5mm. Limit the scanning path using the mechanical end blocks.

Enter a distance number that is larger or equal to the length of the sample, making sure that the CREASY will be moved over the entire path until reaching the end block. If the CREASY scan ends before reaching the block, calibrate the EGUIDE-PRO motion parameters as described in the manual or simply increase the distance value.

Move the CREASY carriage manually to the starting position. Start the embossing measurement by pressing the measurement button of the CREASY. The device will perform a scan and display the result.



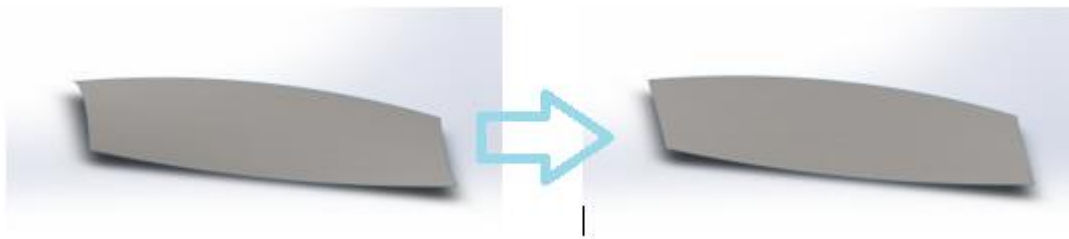
Make sure all of the embossed area stays above the blue line.

3. Left and right surface area

Large embossing subjects or non-uniform embossing subjects without a straight, unprocessed surface area at the bottom can still use the plain surface reference at the starting point and the ending point of the scanning path. They can be measured with high accuracy. In this case the plain surface at the starting point of the scanning path and the plain surface at the end point of the path is very important.



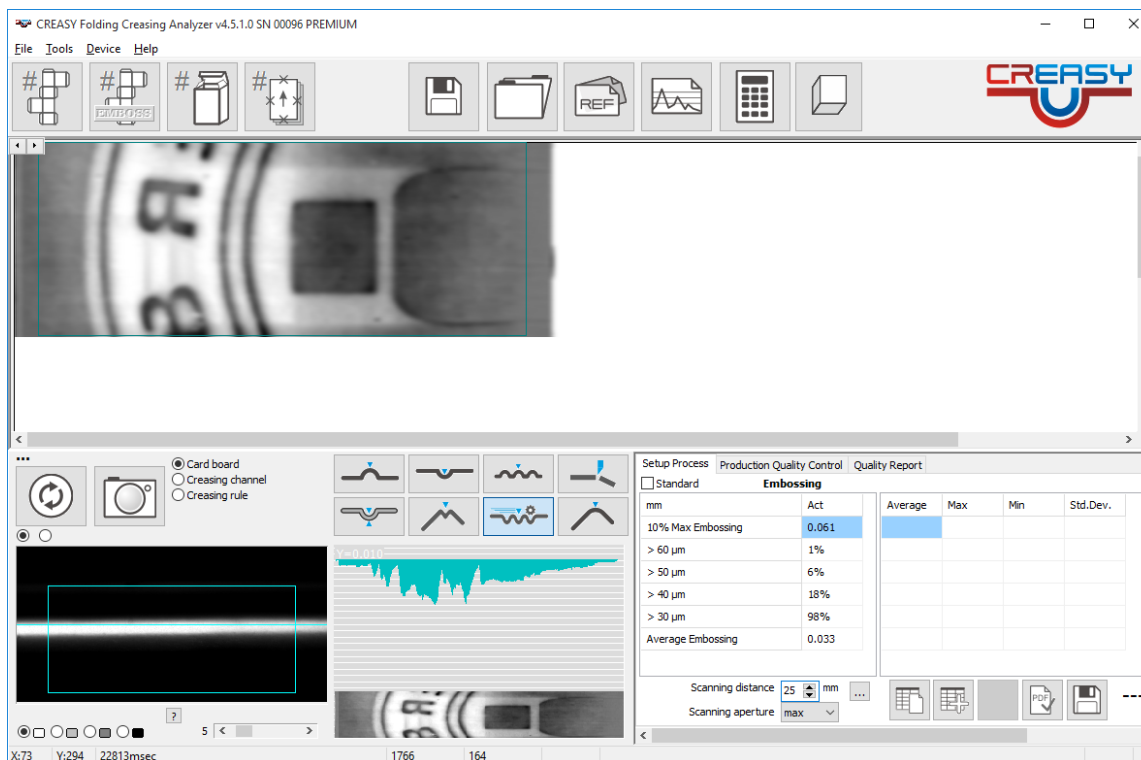
The real measurement sample can be aligned between start point and end point. The algorithm will still deliver in high accurate embossing depth measurement values. The feedback grayscale image could show artifacts that will have only minor impact on the depth measurement.



At the beginning and at the end of the scanning path there needs to be plain or unprocessed surface for at least 1.5mm. Limit the path using the mechanical end blocks.

Enter a distance number that is larger or equal the length of the sample to be scanned, making sure that the CREASY will be moved over the entire path until reaching the end block. If the CREASY scan ends before reaching the block, calibrate the the EGUIDE-PRO motion parameters as described in the manual or simply increase the distance value

Move the CREASY carriage manually to the starting position. Start the embossing measurement by pressing the measurement button of the CREASY. The device will perform a scan and display the result.



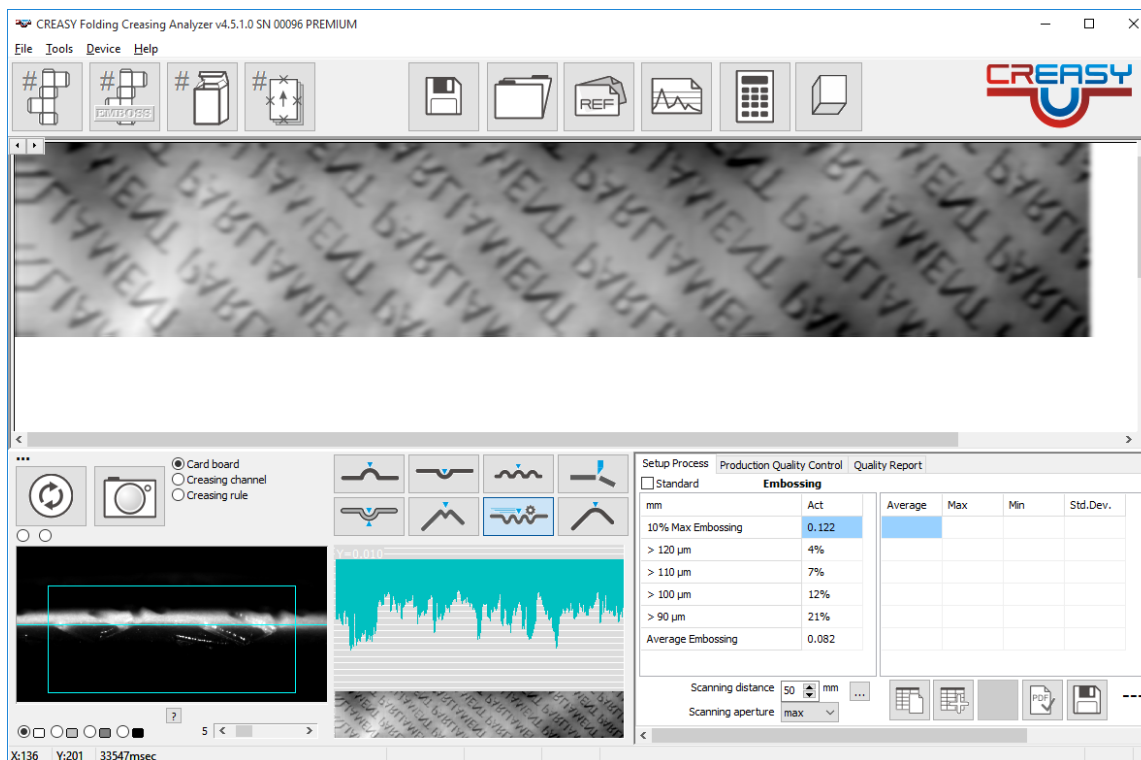
4. Location with surface area unknown

Samples without any area of plain, unprocessed surface of a certain size can be measured with the measurement function that does not apply cardboard surface correction. The card board surface location has to be extracted locally.

This function can only be used for structured surfaces with tiny embossing objects and lots of surface within between. One application is embossed micro text or embossed micro lines.



Scan the longest path possible (40mm to 70mm) to capture as much embossed area and surface area as possible.



Embossing Patch

Generic embossing subjects require attention in positioning and alignment of the measurement sample below the CREASY aperture. Any subject can require a different scanning path length and a different selection of analysis function. The more effective control of embossing depth is the use of a defined embossing patch as a process control target.

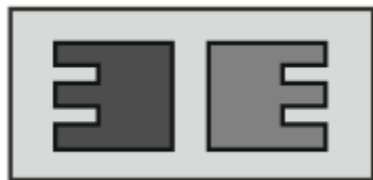
The identical patch can be used for any card board type, for any job, for any box layout. It can easily be positioned inside the adhesive lap of the box or other non-critical area. This makes the process control comparable between jobs, between card board materials, embossing tools and embossing technologies.

The CREASY-EGUIDE-PRO supports three different types of embossing patches.

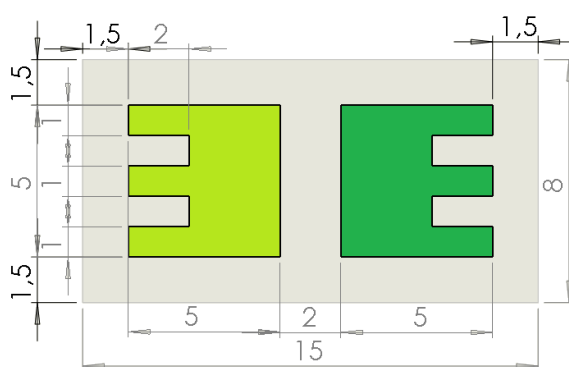
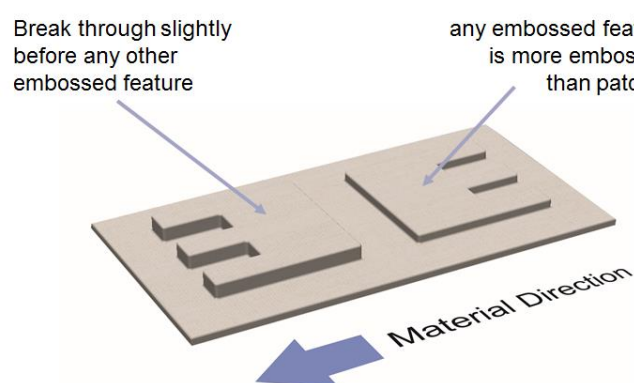


1. Embossing with two depths

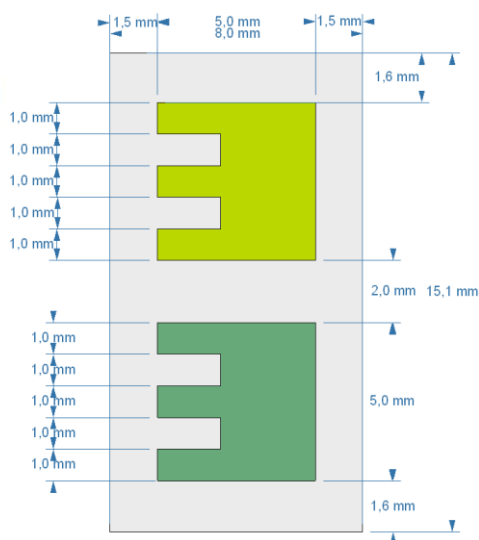
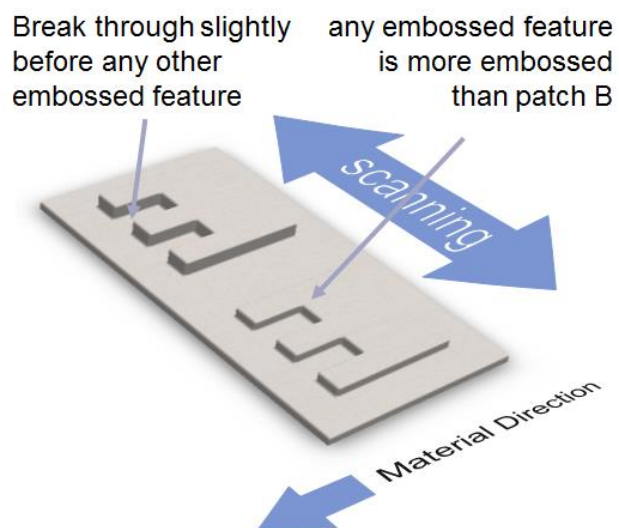
The Embossing patch with two different embossing depths has been designed to simulate embossing subjects with small lines, but still supported by a larger background to prevent the embossing tool from breaking through the card board.

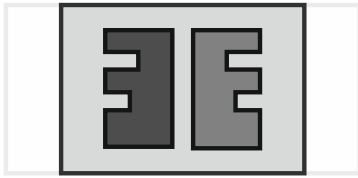


The patch can be measured as embossing or de-bossing.

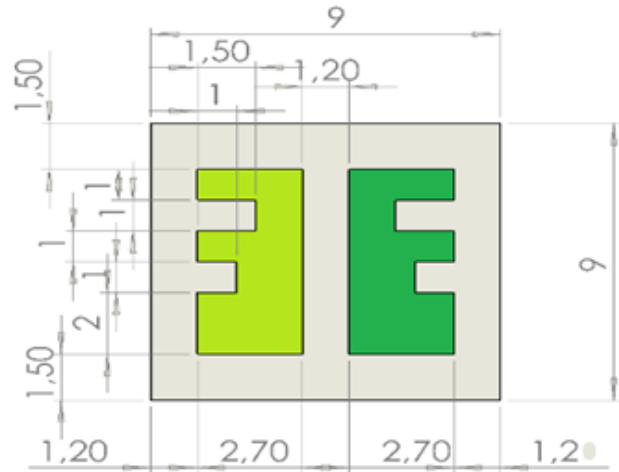
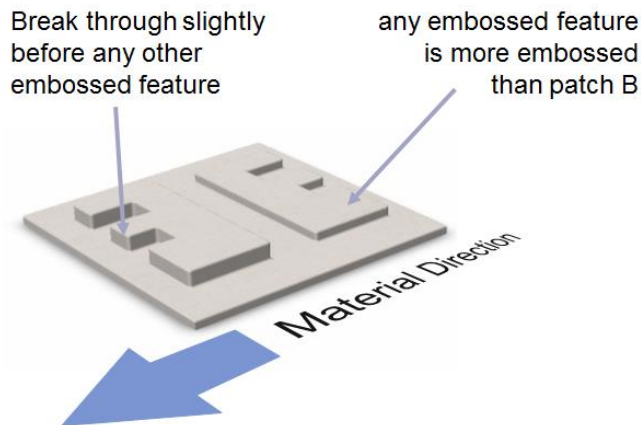


Depending on the space on the gluing lap of the box blank and the material motion direction the orthogonal patch can be used.





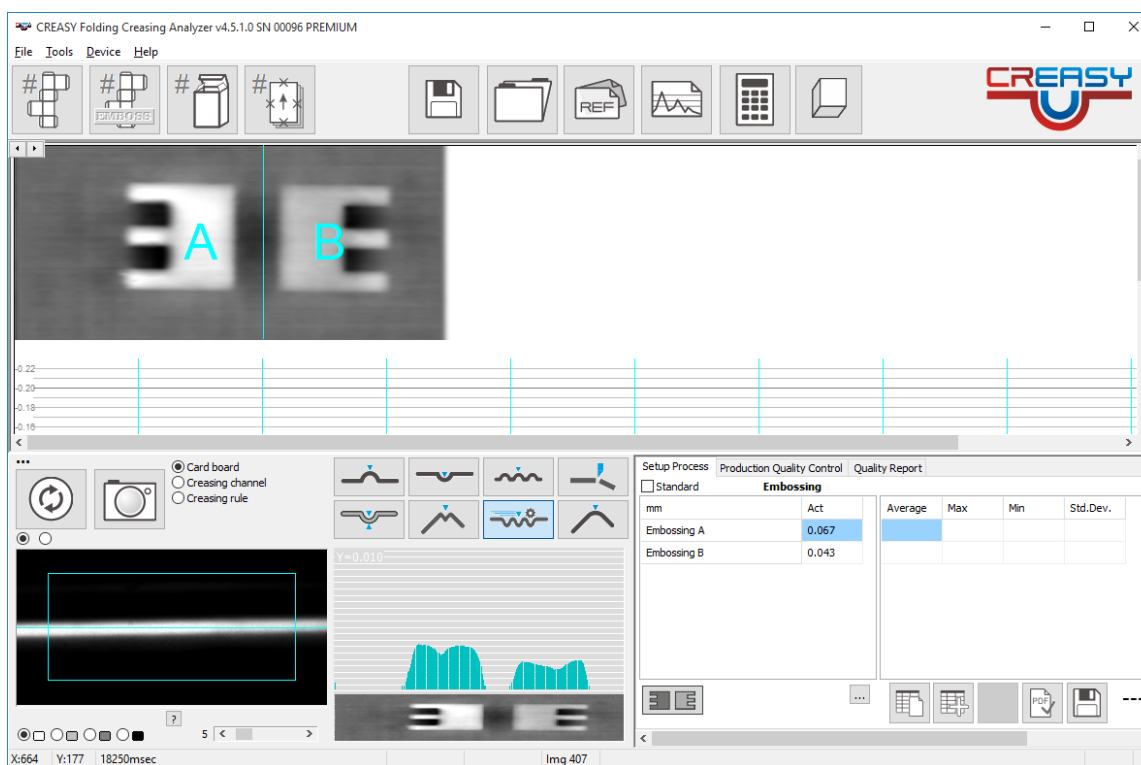
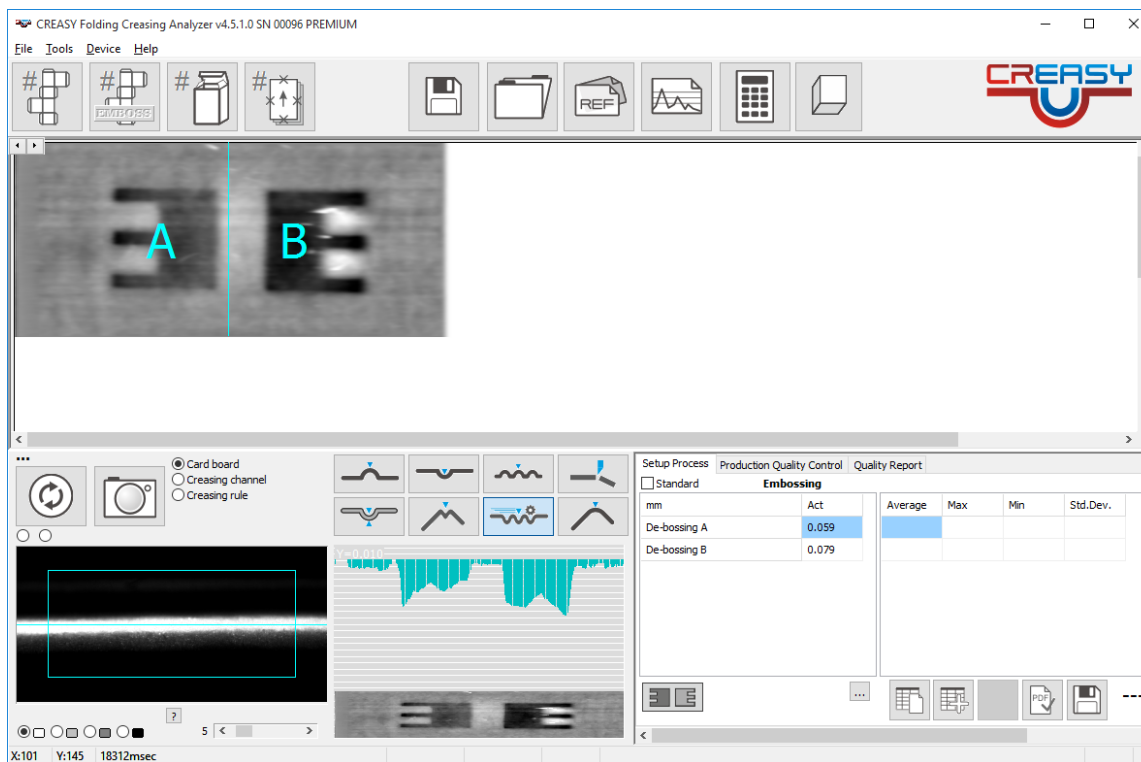
For small space there can be used the micro Patch as an alternative



Select the Embossing/Embossing Tool from the settings window. The larger Patch function measures both version of the larger patch.

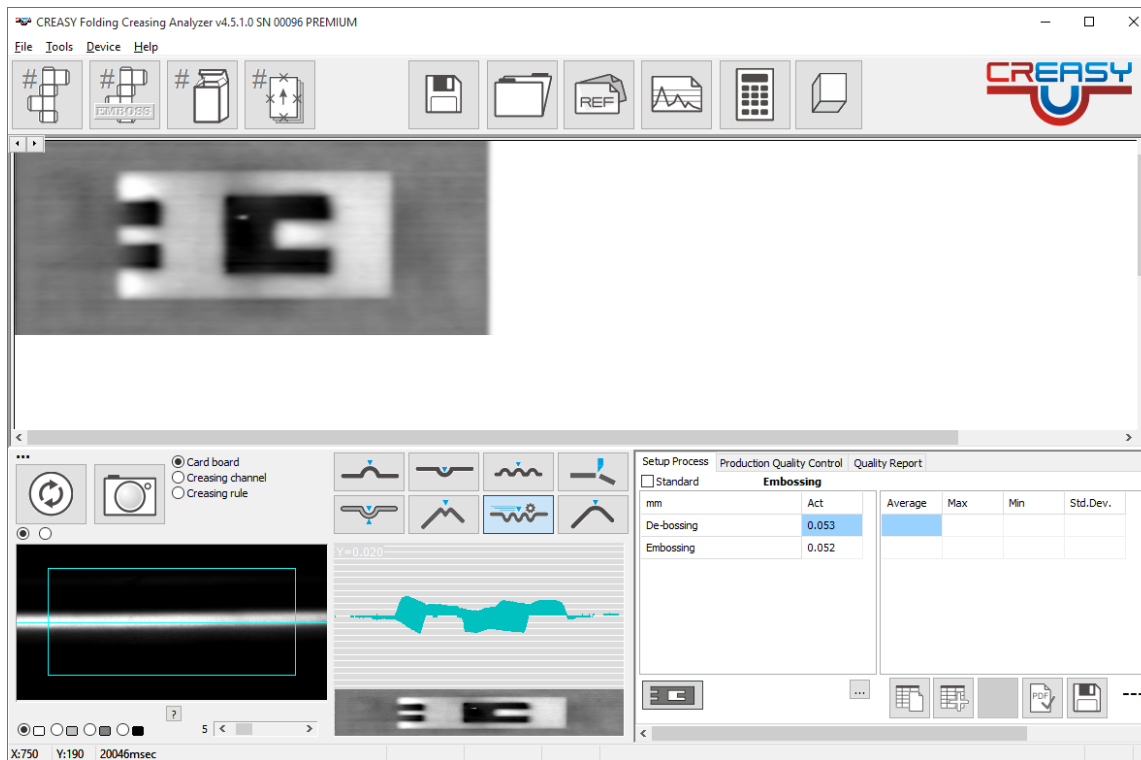
The scanning distance and all other settings are pre-defined. The operator does not need to make any parameter selections. Position the patch inside the scanning area and press the button on the CREASY device. No mechanical blocking on the right side is required.

The CREASY will move over the patch capturing cross-section images. The software automatically will detect the two patches and measure the embossing depth or embossing height. Two measurement values will be displayed.



2. Embossing De-bossing combination

In some applications there will be an embossing subject inside a debossing subject. This again can be efficiently controlled using the embossing/debossing test patch.



Summary

It is recommended to use embossing and debossing control patches whenever possible. Test patch measurement is highly independent of operator technique. Precise positioning is not required, as the target is not sensitive as it is for generic embossing measurement. Moreover, the process is much faster and the measurement data can be compared between material, embossing technologies, box blank layouts etc.