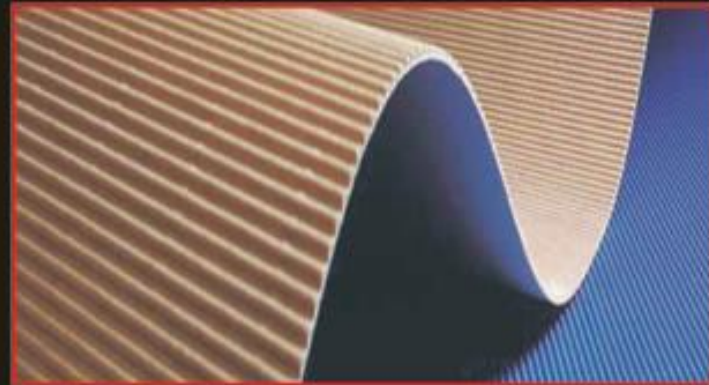


BETACORR CORRUGATED ANALYZER



 **BETA INDUSTRIES**
The Quality Control Company

BETACORR CORRUGATED ANALYZER

The BetaCorr Corrugated Analyzer optical analysis method offers the corrugated packaging industry a compact, rugged, and highly repeatable tool to measure all the critical corrugating production parameters; flute profile, creasing, & washboard effect.

The BetaCorr Corrugated Analyzer brings these defects under control to help you produce a better, more profitable product.

Structured illumination, anamorphic imaging, and automatic image stitching and analysis combine what have always been mutually exclusive properties; vertical resolution better than 0.0005 inch and a field of view wider than 1.5 inches, offering extremely high sensitivity to height variations and the ability to measure the coarsest fluting. Operation is simple and intuitive for the production worker, the data and images are automatically collected and analyzed to satisfy the most critical QC manager.

The success of any packaging is critically linked to its appearance. The appearance of your packaging is the only possibility to make your product stand out from all the others. The many advantages of corrugated in strength, weight, and environmental friendliness are immediately lost when washboard effect, cockling, and fluting defects spoil its appearance.

WHAT IS WASHBOARD EFFECT?

**It is the Undulating Surface of the
Corrugated Cardboard**



**And the Undesired Effect
of the Corrugated Manufacturing Process**

QUESTION: Check Material before printing



Can I use this corrugated board to print this high end job and meet the quality requirements regarding washboard effect?

If this is not possible – can I use this material for a less sensitive job and use a different (better) corrugated board for the current high end job?

Sorting the raw material into quality classes before printing will save money by minimizing waste, machine hours and time.

A measurement device is required to measure the washboard effect on corrugated board before printing.

QUESTION: Specify material when purchasing



If I could specify the quality requirements in terms of mechanical washboard effect to my corrugated supplier, then I could order high end corrugated board for high end jobs and cheaper corrugated board for less sensitive jobs.

Having a measurement device that enables me to specify references and tolerances to my suppliers will support me in telling my customers what I will deliver for the quoted price.

Using the quality required will help me save money!

CORRUGATED MANUFACTURING:



My customer complains they cannot print the desired result he needs in terms of low washboard effect.

Do I know how to quantify the washboard on my corrugated board before shipment?

Can I prove to have supplied the quality I promised in terms of washboard effect?

Having a measurement device that enables me to specify references and tolerances will make sure my customer gets what he expects to get.

This will help to avoid complaints and re-work and increases my market position improving my reputation as a high end supplier.

CORRUGATED SUPPLIER

CORRUGATED MANUFACTURING STANDARDS?



What are my internal standards in terms of washboard effect?

Which changes of my process parameters (starch, temperature, moisture, speeds...) will have an impact on washboard and how serious will this impact be?

A measurement device that enables me to define an in-house standard will make my production process more consistent and predictable.

A consistent and predictable production process is more cost effective.

The Importance of Controlling Washboarding

Increasing Box Performance Under Load

- Edge crush test (ECT) performance is strongly correlated to Washboarding depth and paper grammage. *

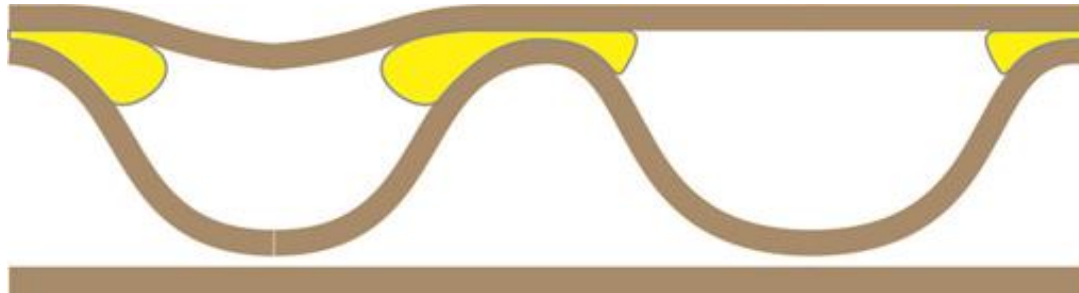


Improving Graphic Surface Printability

- Stripyness (fluting) is a summary result of print density and gloss deviations, of surface structure and **Washboarding**

* Washboarding of Corrugated Board', Sven D. Wendler, RMIT March 2006

Washboarding of Corrugated Cardboard



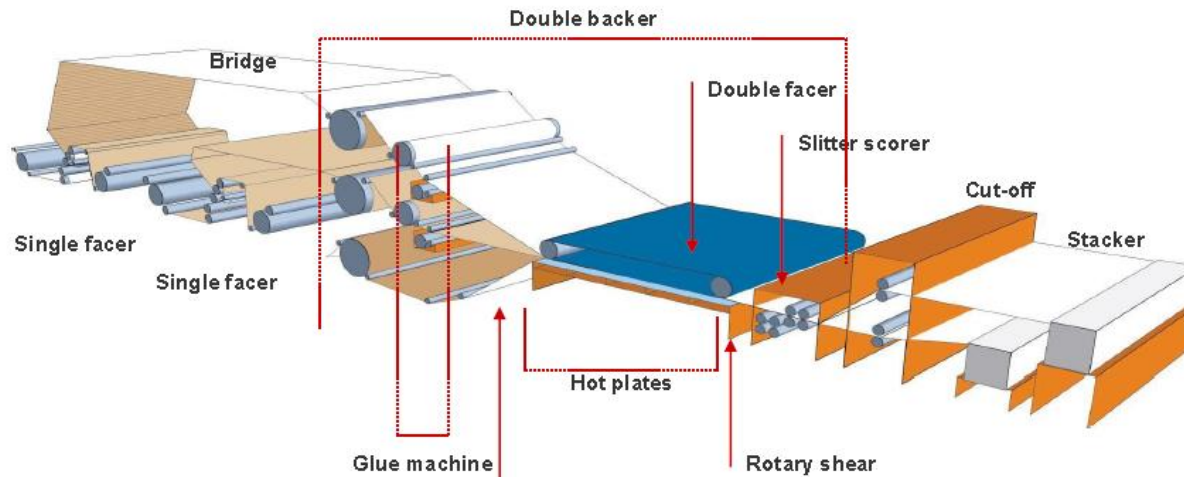
- Washboarding is formed by the shrinkage of the glue in between the liner and the fluting of the corrugated board during drying
- Washboarding depth is linearly related to the amount of glue applied*)

Washboarding of Corrugated Cardboard



- Washboarding depth is highly dependent on the relative humidity of the environment
- Higher relative humidity leads to higher moisture content, more elastic and thicker paper. As a consequence less glue is applied
- Washboarding decreases linearly with increase of relative humidity*)

Measure the WBE to improve the process

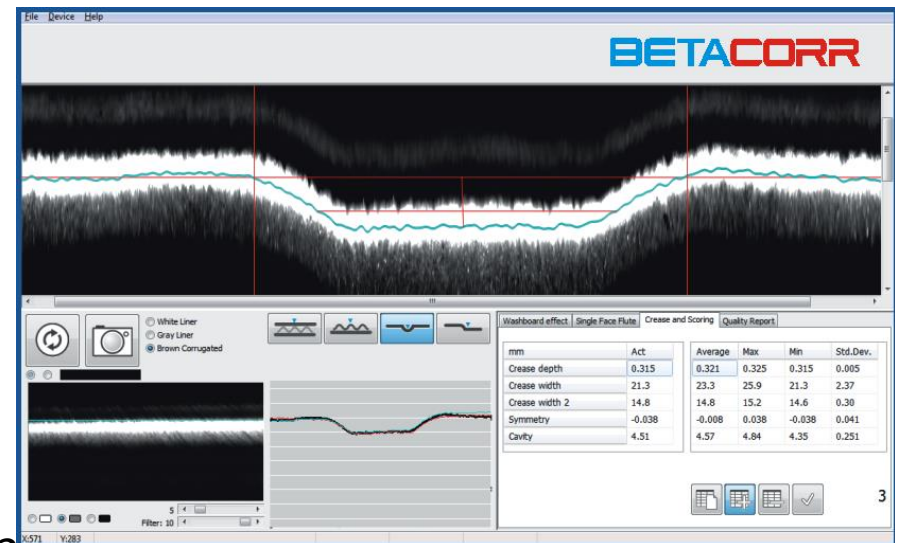
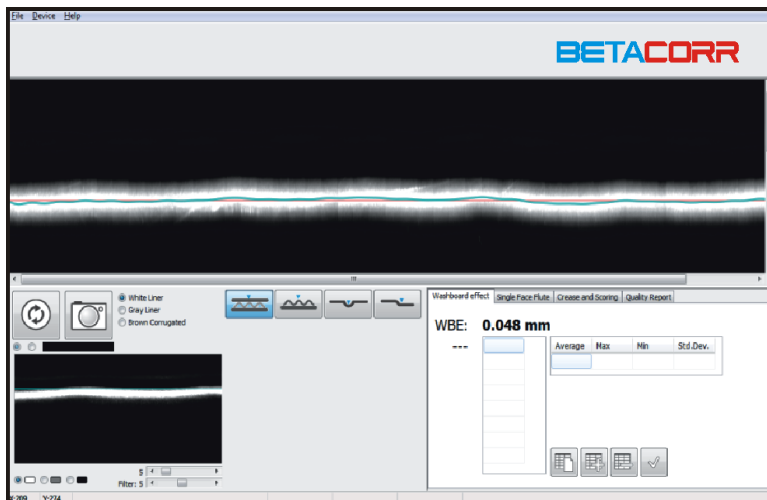
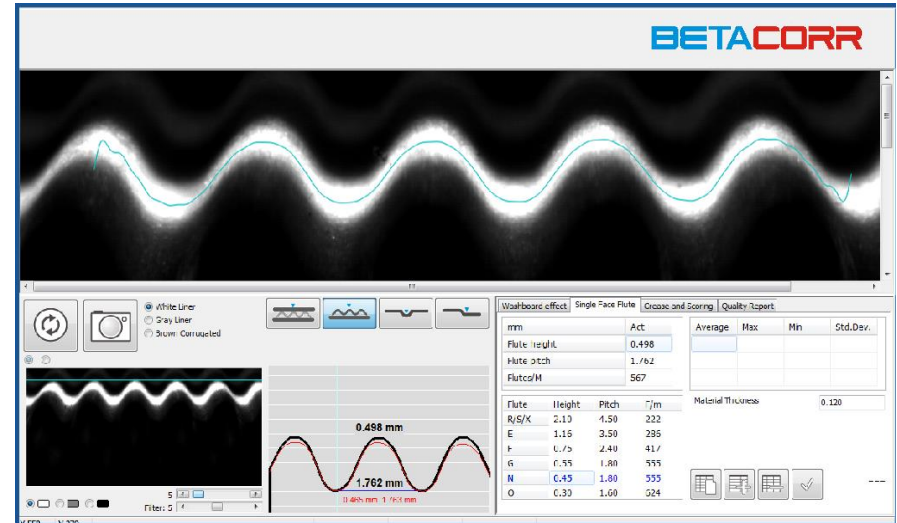


Reduce Washboard effect by applying

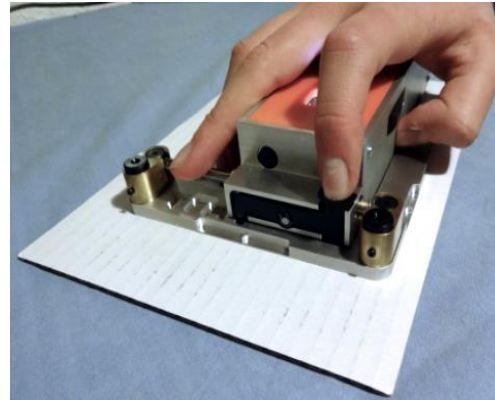
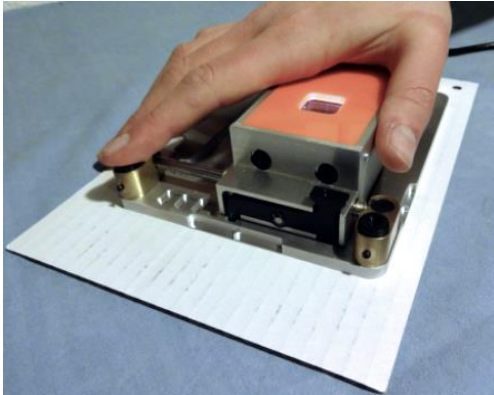
- Correct Moisture
- Correct glue amount
- Correct Hot plate temperatures on Double facer
- Correct speed difference between single faced web and glue roll

It is not cost efficient to use the Liner as the one and only variable to reduce the washboard effect!

Measuring Washboard Effect (WBE) BetaCorr Corrugated Analyzer



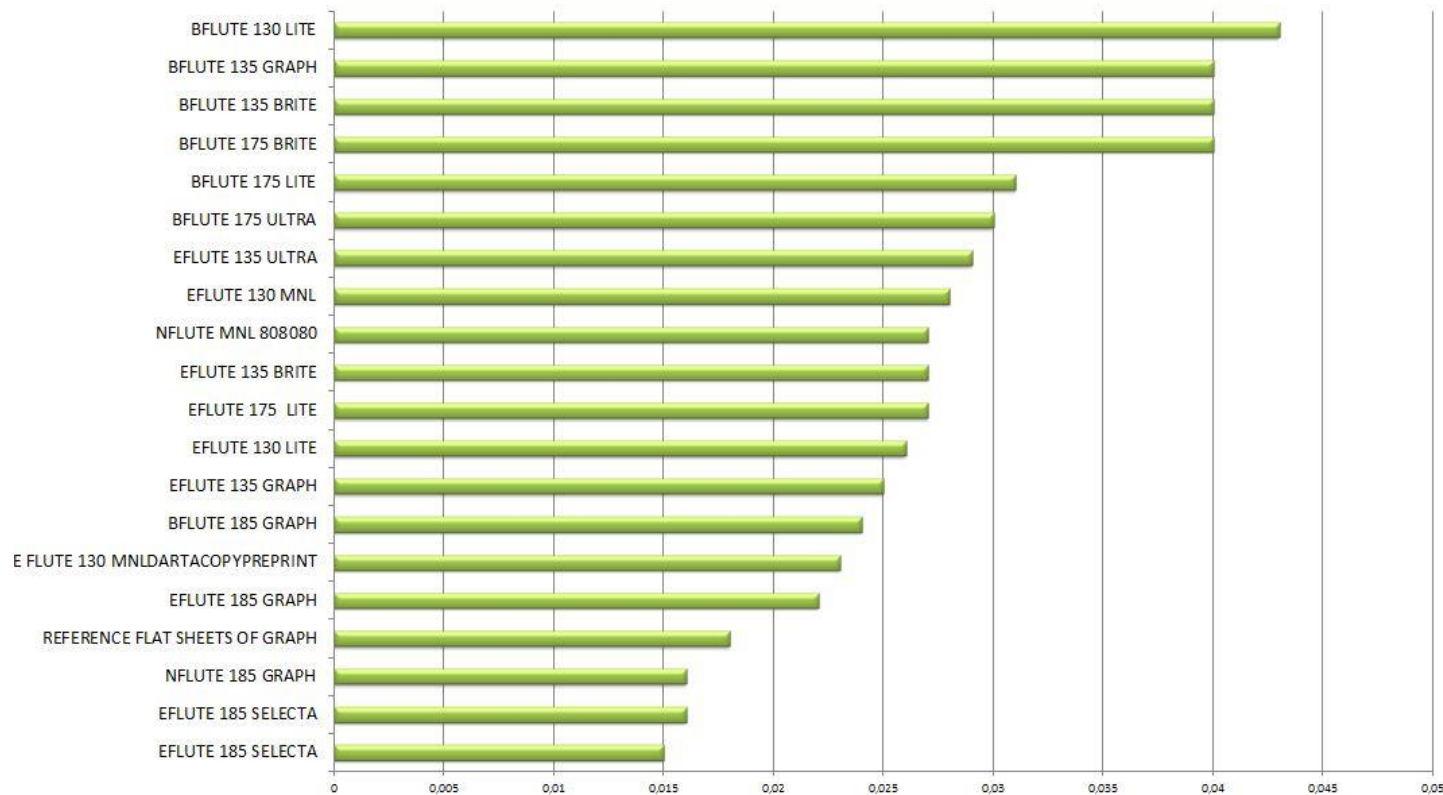
Measuring WBE (Washboard Effect)



Calculating WBE requires *extremely* sensitive height measurements while accurate measurements of flatness and flute pitch require large areas to be measured.

These conflicting requirements are solved by the use of sequential image capture and stitching. BetaCorr captures 5 high resolution images and creates a compound image over 1.5 inches (3.81 centimeters) wide.

CORRCHECK WBE Testimonial



“The measurements reflect nicely the amount of wash boarding that is visible. The results are very logical and are confirming our thoughts: E flute is better than B flute, the higher the grammage the lower the wash boarding, ...”

The FLUTE Profile

**What you do wrong at the single facer
you need to balance out on the double backer.**

*



CORRUGATED MANUFACTURING

- The corrugated rollers give the corrugated structure to the fluting
- Paper is a very abrasive material
- Corrugated roller usage might differ between left, right and middle due to setup and usage



Are my corrugated rollers still good enough for the next production shift?

CORRUGATED MANUFACTURING



Today's practice of using carbon paper to check the condition of the corrugated rollers is not precise and can not be used to estimate how much corrugated can still be produced before the rollers have to be replaced.

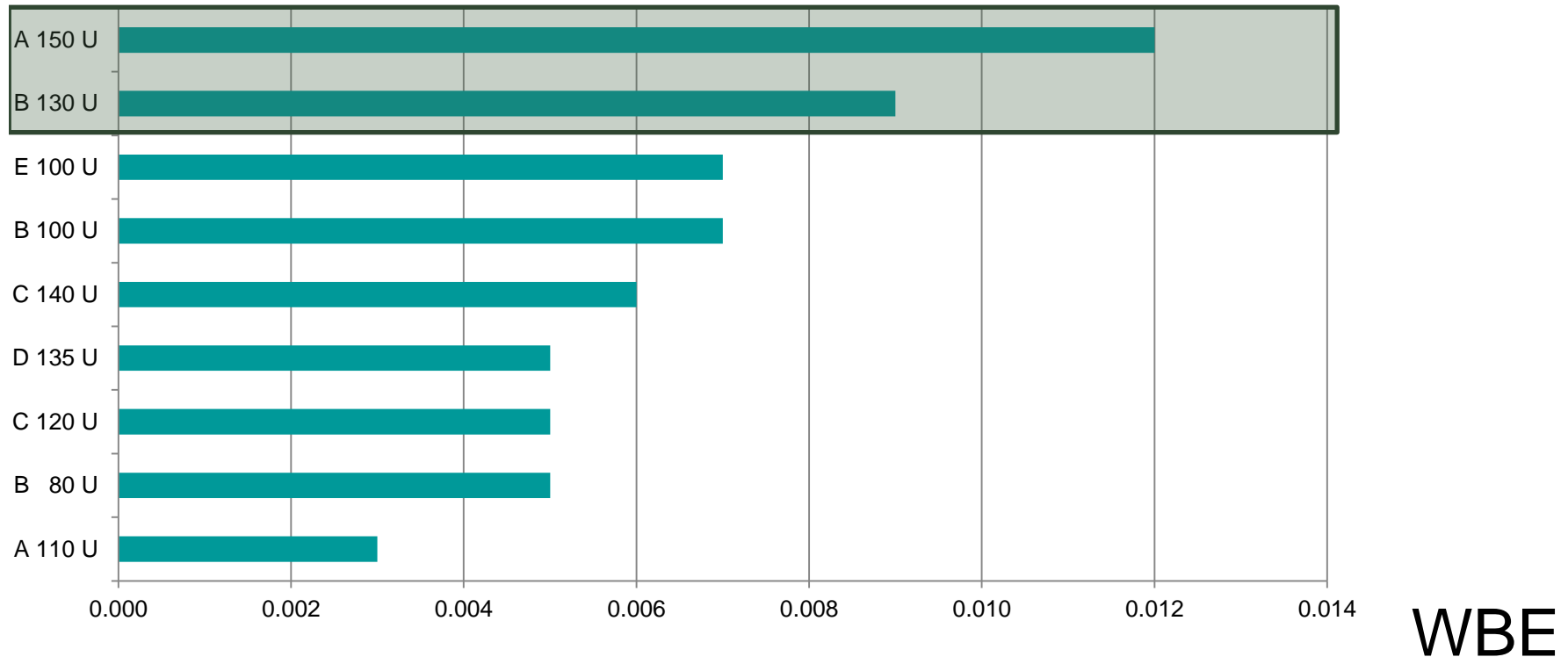
Having a measuring tool will help you setup corrugated rollers properly, verify their change in performance, and schedule the replacement of the rollers in time.

Corrugating rollers are very expensive and most shops can't afford to keep a spare set in stock. The lead time for new rollers is rather long.

You can better plan when to order new rollers.

WBE Benchmark for Uncoated E Flute

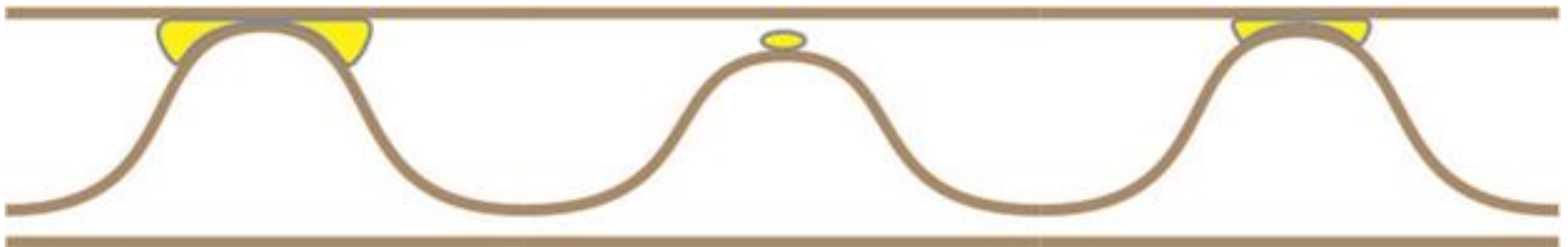
material WASHBOARDING UNCOATED E FLUTE



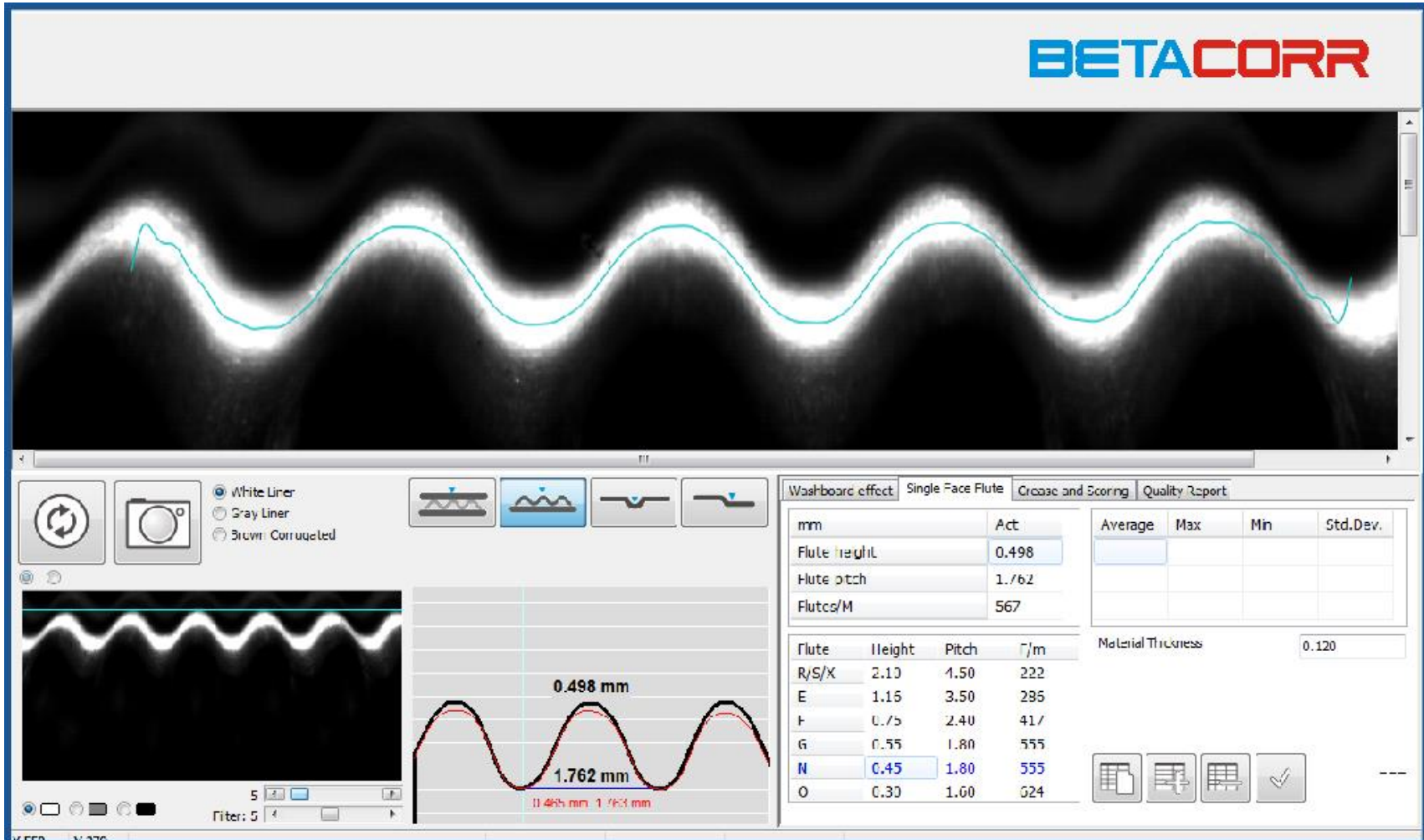
WBE above 0.007 is not acceptable for uncoated E flute corrugated card board

FLUTE Profiles

- Measure the FLUTE PROFILE on single faced material
- to check the mechanical wear of the corrugating rolls ,
- comparing Operator side (OS), Distant side (DS) and middle
- and the correct formation of the flutes.
- It does not require a carbon print, the result is immediate
- as you measure the end result.

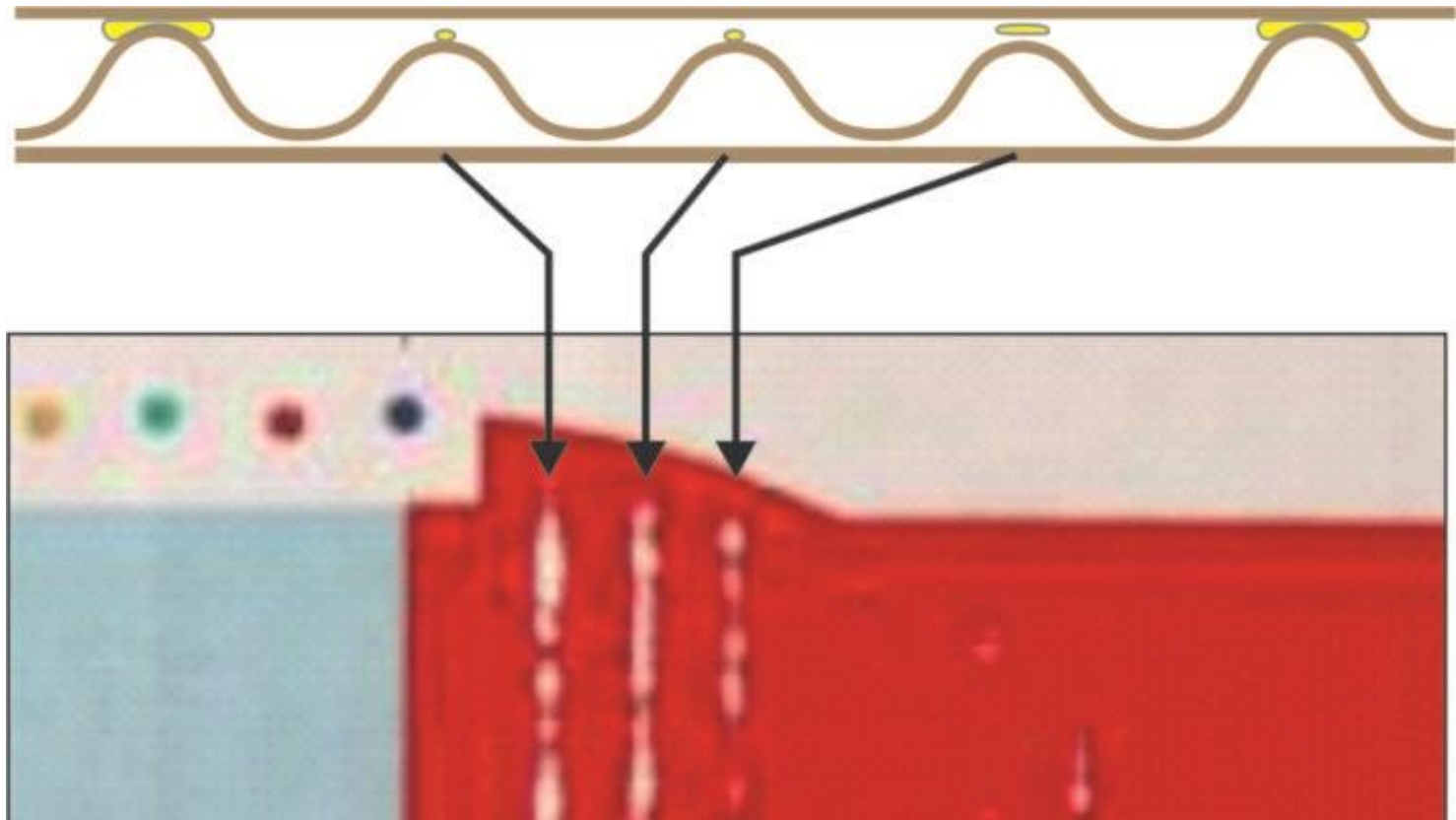


Measuring the FLUTE Profile

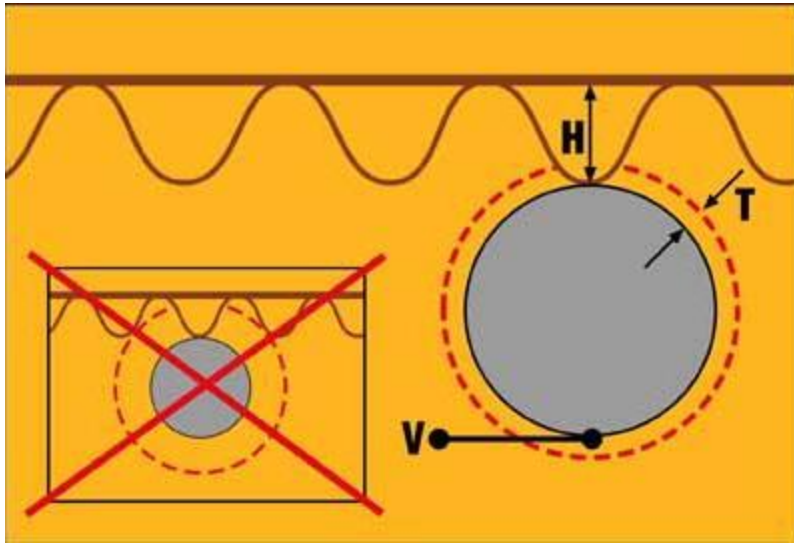


FLUTE Profiles

Incorrect flute profiles are one of the key parameters for fluting defect in flexo post print.



The FLUTE Profile

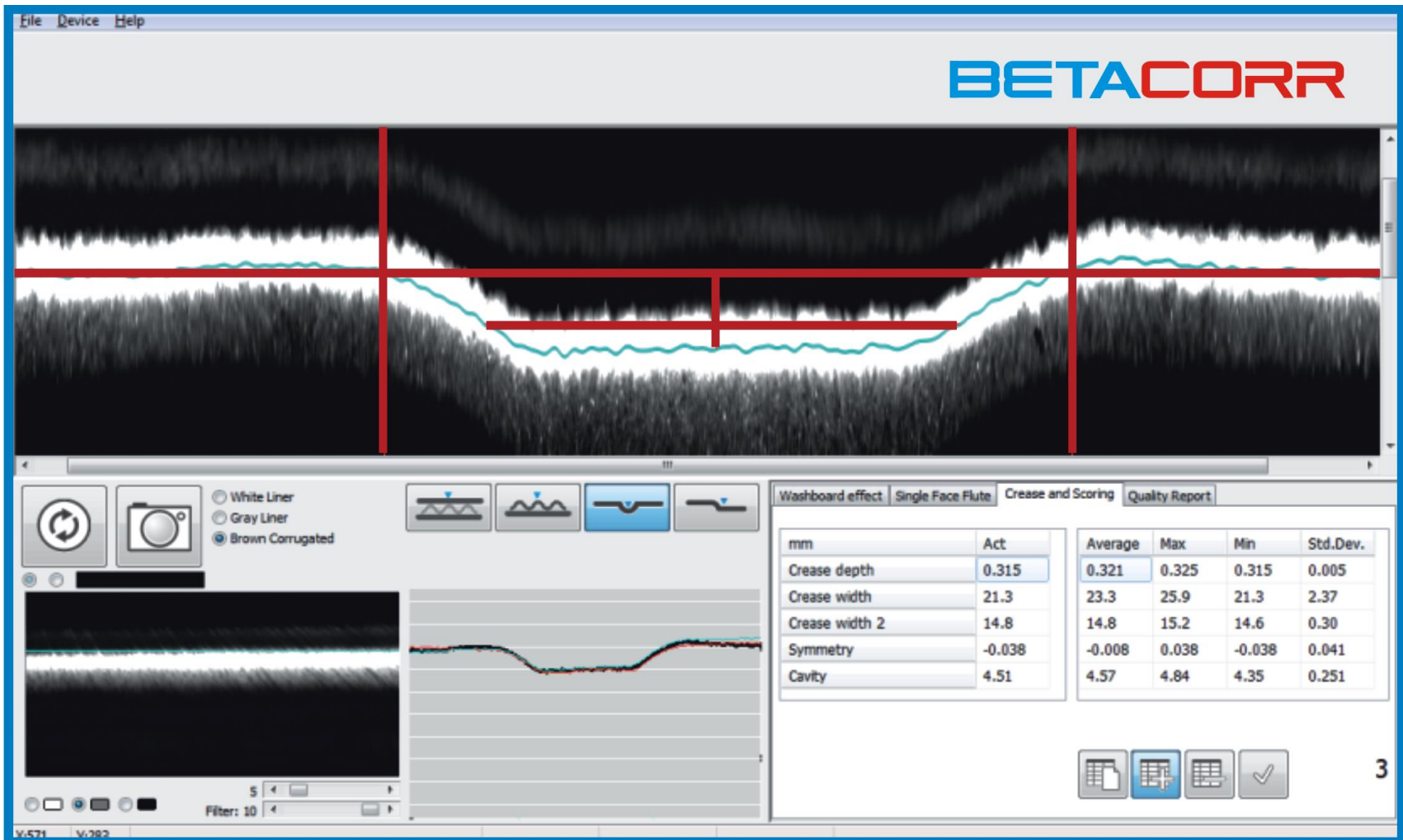


H – Flute Height
T – Thickness of Glue Film
V – Viscosity of Glue

- The correct flute height is a prerequisite to minimize the glue applied
- A uniform flute height from left to right is a prerequisite to guarantee perfect bonding
- Minimize glue consumption and reduce washboard effect and costs

Creasing and Scoring

Critical Steps in the Box Forming Process



Creasing and Scoring

- Creasing and scoring are critical steps in the box forming process.
- Measure the CREASING and SCORING on corrugated board to predict the performance in folding and box stability
- Creasing and scoring lines are stressed due to 180° folding for transportation and storage.
- Creasing and scoring lines define the symmetry and size of the box





The Quality Control Company

707 Commercial Avenue, Carlstadt, NJ 07072 USA

Phone: 800-272-7336 (Toll Free)

201-939-2400 (Outside U.S. & Canada)

Fax: 201-939-7656

Sales & Marketing: stuart@betascreen.com

Stuart Serchuk: Director, Sales / Marketing

Technical Contact: larry@betascreen.com

Larry Goldberg: Technical Director

[BetaCorr Corrugated Analyzer, www.betascreen.net,](http://www.betascreen.net)