PULP AND PAPER

L&W S-Tester

Lorentzen & Wettre Products | Paper testing

L&W S-Tester offers a better and easier method for strength classification of medium fluting, than the CMT measurement. The method will help paper producers to save time, improve quality and reduce costs.

The method is developed by a group of fluting producers (CCB-CEPI) and the main idea is to overcome the tedious sample preparation needed in producing the test pieces and performing the CMT test in a crush tester. But also to introduce a more relevant test for describing the usability of fluting, as well as find a method that can be fully automated. L&W S-Tester measures the failure strength of a test piece loaded in compression when the initial span length is 4 mm and the offset is fixed to 1 mm. This will simulate the initial failure in a CMT test when the fluted test piece will leave the symmetrical sinusoidal shape.

Difficulties in performing CMT measurements

There are several drawbacks when performing CMT measurements. It is time consuming in all the different steps in creating the test piece in correct shape for testing and run it in the crush tester. When using the CMT30 procedure were the test piece need to be "cooled" for 30 minutes then the feedback to production is very long. There can also be quality and maintenance related problems such as the condition of the laboratory fluter, the tape used etc. A consequence of poor sample preparation could also be "leaning flutes" which will result in under estimation of the paper strength or no reading at all. Leaning flutes can also be seen at high basis weights and high performance papers, due to high bending stiffness. The flutes are then not compressed but "pressed "away. Besides the technical factors, the delamination of the fluting makes this measurement difficult to interpret.

A standard CMT test is probably not relevant to predict box performance. As when the CMT_{max} is recorded the flutes are destroyed since long.

Benefits

- Quicker and easier method (s-test) for strength classification of fluting medium (than standard CMT measurements)
- No need of corrugating and taping of test pieces
- Reports test results within some seconds
- Designed and produced using long experience of manufacturing measuring units for L&W Compressive Strength Tester STFI
- Ease of use:
  - Auto-start, a photocell detects the presence of a sample and automatically initiates a measurement sequence, thus allowing hands-free operation measurements
  - Large touch screen for good overview
  - Intuitive user interface

Understand S-test in two steps

Step 1: By measuring crushing resistance at initial damage of the specimen in a CMT test one can get an indication of the strength potential of the fluting medium, hence the ability to keep the liners apart without lose its own strength. CMT first plateau has been used to define initial damage in this case (Fig. 1).

Step 2: Use S-test as a predictor of the CMT first plateau to overcome the manual operations in CMT tests (Fig. 2).

Easy to use

L&W S-Tester is easy to use, the operator only needs to place the test piece in the measuring gap, press start, and measurements are performed automatically. The capacitive colour touchscreen has intuitive menus, large accessible buttons, and has a protective surface for easy cleaning.

Measurement results

The values are presented on the touchscreen, either in tabular or graphic form. Results can also be printed on the built-in printer, on a network printer or exported via Ether net. The instrument acts as an FTP-server and test results can be retrieved by an FTP-client.

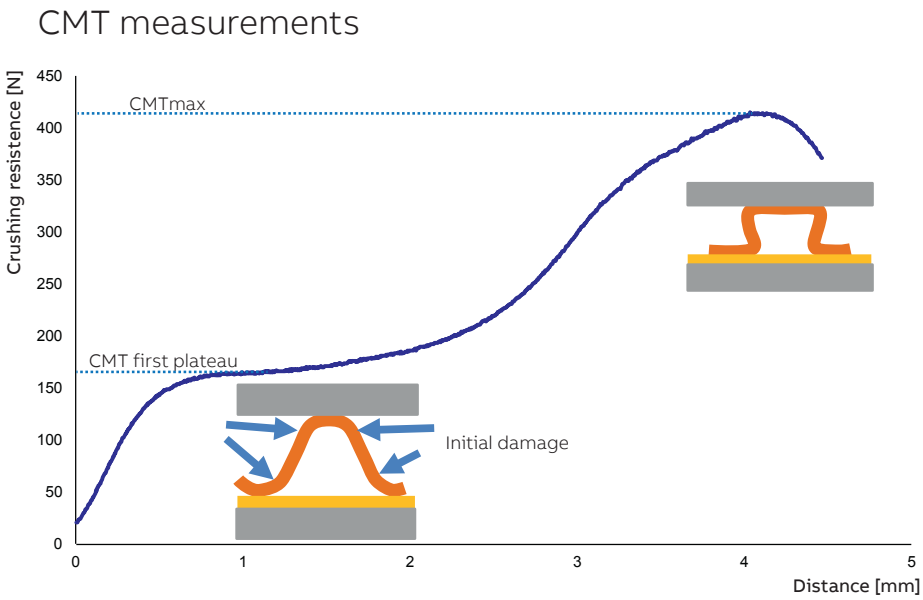


Fig.1: CMT compression curve showing standard CMT_{max} and CMT first plateau FP.

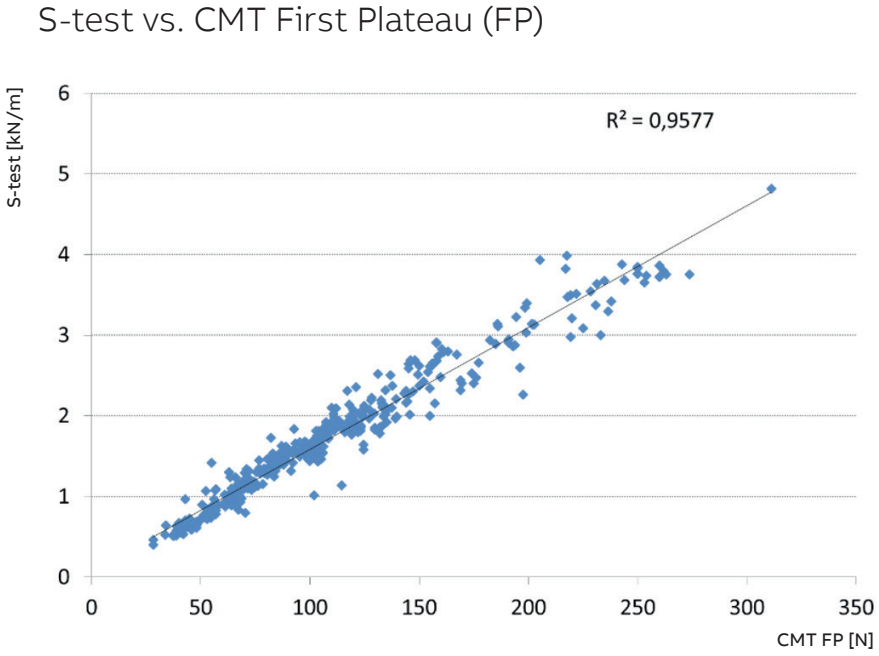
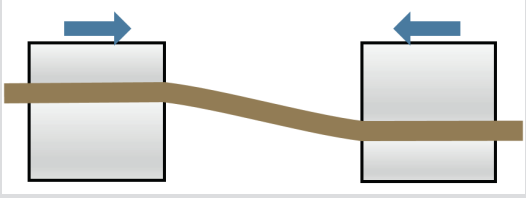


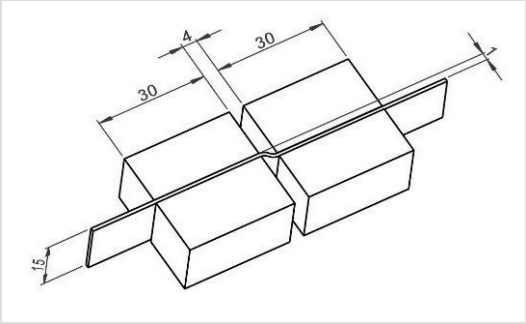
Fig. 2: Correlation graph between various medium paper grades.

MEASUREMENT METHOD

In an S-test a 15 mm wide test piece is clamped and compressed. The initial span length is 4 mm and there is a 1 mm offset between the clamping lines.

It is as simple to measure as a SCT test. Cut a sample into test pieces. Put the test piece in the measuring gap. Push the start button. The clamps are moved in the direction of the arrows. The force at test piece failure is recorded and presented in kN/m.





Technical specifications – L&W S-Tester, code 284	
Measurement	
Unit	kN/m or lbf/in
Range	up to 20 kN/m (115 lbf/in)
Instrument	
Max force	300N (67 lbf)
Free span	4 mm
Offset	1 mm
Test piece	Width 15 mm (0.6 in)
Printer	Built-in thermo printer
Results	
Measurement values	S-test values
Statistics	- individual measurement values - standard deviation - coefficient of variation - maximum and minimum values in the measurement series
Connections	
Data	Ethernet The instrument acts as an FTP-server. Test results can be retrieved by an FTP-client.
Installation requirements	
Power	90 W
Instrument air	0.6–1 MPa
Dimensions	0.4 × 0.5 × 0.4 m 16 × 20 × 16 in
Volume	0.34 m^3 12 ft^3
Net weight	29 kg 46 lb
Gross weight	43 kg 95 lb
Applicable standards	
N/A	

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