

PULP AND PAPER

L&W Bending Tester

Lorentzen & Wettre Products | Paper Testing



L&W Bending Tester measures a material's resistance to bending. This can be done either by measuring the force needed to bend a test piece to a predetermined angle, or by measuring and determining the bending stiffness, which is an elastic property of the material. Bending resistance and stiffness affects the product performance in many converting operations and is important in handling and protection purposes of packaging products.

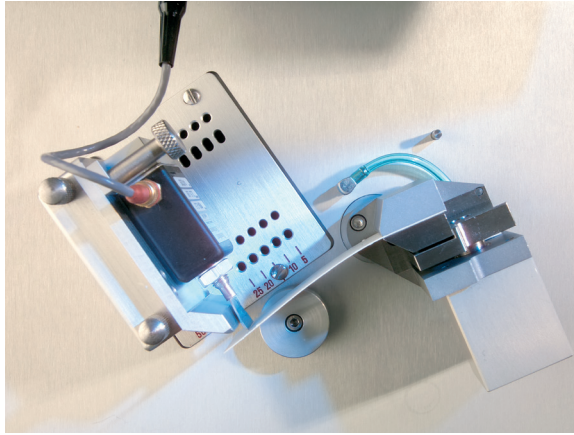
L&W Bending Tester is quick and easy to use. A test piece is placed in a clamp, and when the operator presses the start button, the clamp closes about one end of the test piece. A support holds the test piece in place before the measurement. This helps the operator and leads to a repeatable measurement process. When measuring, the support is automatically lowered and does not hinder the movement of the test piece.

If the auto-touch function is selected, the clamp turns slowly to move the free end of the test piece in contact with the load cell. The test piece is bent to the selected angle. The instrument records the force throughout the measurement process.

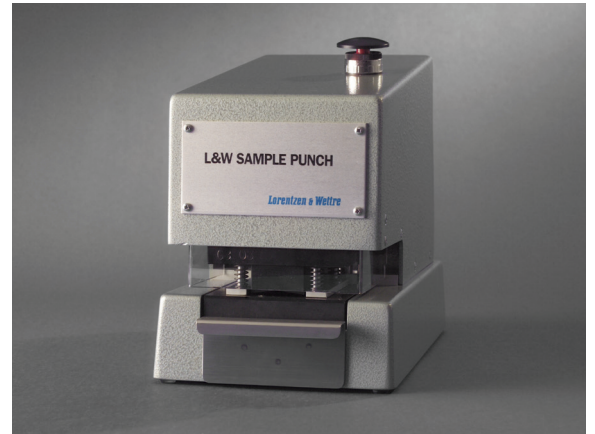
The clamp then returns to the start position and the test piece is released. The chosen measurements are automatically shown in the display and printed on the built-in printer.

Features/Benefits

- Designed for correct and relaxed testing:
 - Pneumatic clamping of the test piece for repeatable measurements
 - Test piece support for correct clamping
 - Auto-touch function of the load cell against the test piece gives relaxed and operator independent test results
- Predict converting performance:
 - Creaseability evaluation used for prediction of converting performance included



The circular support for test pieces and the pneumatic clamp create the perfect conditions for measurements.



L&W Sample Punch can be used for precise test pieces.

Measures creaseability

Creasing is performed when converting board and makes the material easy to fold in the right places. A large number of properties are calculated from the measurement curve's bending moment relative to the angle (bending moment = force x length of bend), which facilitates the assessment of how the board should be creased when converted.

When measuring creaseability, two sample groups are prepared and tested: one group with uncreased test pieces and one group with creased test pieces. The measurements are carried out as normal, but often with a bending angle of 90°.

For good measurements, it is crucial that the test piece is firmly held in place. This is achieved with pneumatic clamps that secure the test pieces with 200 kPa between level, parallel jaws.

Load cell with auto-touch function

Auto-touch means that the test piece is brought into contact with the load cell with a small, predetermined force. From this position the test piece is bent through the predetermined angle. The benefit of the auto-touch function is that no manual intervention is required to place the test piece in contact with the load cell; without this function, it can be difficult and time consuming to ensure that the same force is used each time.

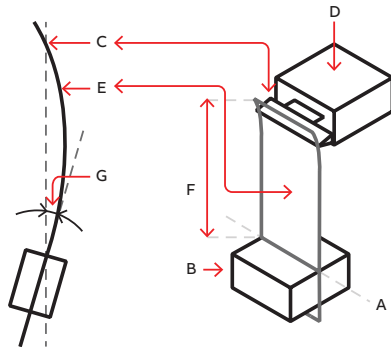
Easy to get started

All configuration and programming is done only once via a computer. Thereafter, the computer is disconnected from the instrument. The instrument is then controlled through pushing one or two buttons on the instrument panel. The most common configurations are pre-set at the factory.

If requested, the instrument can be configured so that the operator is given guidance on the order of measurement within the measurement series. Checks and calibration are easily and rapidly performed, with the aid of the weight platform included (calibration weights are not included).

Technical specifications – L&W Bending Tester, code 160			
Inclusive	Weight support, PC software for instrument setup. Serial cable. Printer rolls.		
Measurement range	0–5000 mN (standard) or 0–10000 mN		
Instrument			
Bending angle	Standard measurement 5°, 7.5°, 15°, and 30° Creaseability 90°		
Bending length	5, 10, 15, 20, 25 and 50 mm		
Bending velocity	Standard measurement 5°/s. Creaseability 45°/s		
Test piece	Width 38 mm, max thickness 3 mm		
Results			
Standard measurement	<ul style="list-style-type: none"> Measurement values on the printer - bending resistance at selected angle (several angles possible for same measurement) - calculated bending stiffness at 5°, 38 mm sample width, 50 mm bending length - taber value 		
Creaseability	<ul style="list-style-type: none"> bending stiffness, slope - max bending moment - angle at max. bending moment - angle at zero-moment on return movement - bending work (area under the curve) <p>Measurement values on data output:</p> <ul style="list-style-type: none"> - bending stiffness, slope - max bending moment - bending moment at 90° - bending moment on relaxation - angle at max bending moment - angle at zero-moment on return movement - bending work (area under the curve) - complete test graph <p>Statistics:</p> <ul style="list-style-type: none"> - mean value - standard deviation - coefficient of variation - maximum and minimum values of the series 		
Connections			
Data	RS232C - connectable to L&W Autoline Data Acquisition Workstation		
Printer	Parallel		
Installation requirements			
Power	40 W		
Instrument air	0.4–1.0 MPa (60–150 psi), 0.1 m ³ /h (3.5 ft ³ /h) NTP		
Option	Calibration weights 1–500 g Bending length 1 mm		
Dimensions	0.3 × 0.4 × 0.4 m/12 × 16 × 16 in	Volume	0.1m ² /3.5ft ³
Net weight	9 kg / 20 lb	Gross weight	19 kg / 42 lb
Applicable standards			
Bending resistance (15°):	APPITA/AS 1301.453s, ISO 2493-1, NF Q 03048, SCAN P 29, TAPPI T 556		
Bending stiffness (5°):	DIN 53121, ISO 5628		

Bending resistance and bending stiffness



- A - pivoting axis
- B - clamp device
- C - measuring device
- D - load cell
- E - test piece
- F - bending length
- G - bending angle

DEFINITION

The force (in Newton) that is required to bend a rectangular test piece to a specified angle, when the test piece is fixed at one end and the force is applied to its free end.

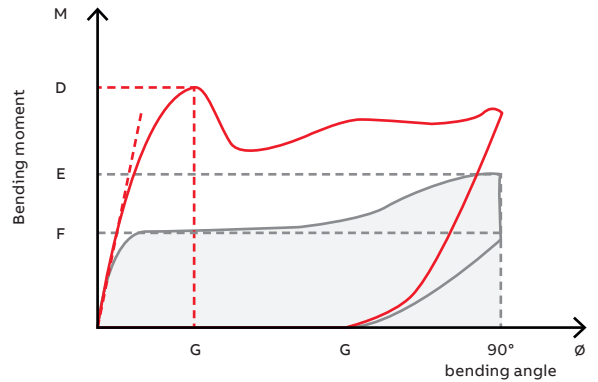
Bending stiffness (DIN)

S_{DIN}^b The result of the following equation when the bending angle is 5°.

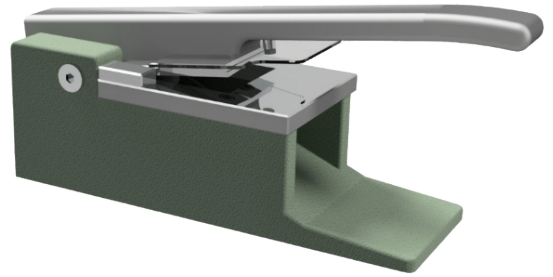
$$S_{DIN}^b = \frac{60 \times F \times l^2}{\pi \times \phi \times b}$$

- S_{DIN}^b = bending stiffness [mNm]
- F = force [N]
- l = length [mm]
- b = width [mm]
- ϕ = bending angle [°]

Measurement of creaseability



- A - uncreased test piece
- B - creased test piece
- C - bending stiffness (slope)
- D - max. bending moment (uncreased)
- E - bending moment at 90° (creased)
- F - bending moment on relaxation (creased)
- G - angle at max. bending moment (uncreased)
- H - angle at zero-moment on return movement (creased)
- I - bending work (area under the curve) creased



ABB's L&W Sample Cutter can be used for easy and quick preparation of accurate and precise test pieces for use in the L&W Bending Tester. It is manually operated and ergonomically designed with safety features for easy and secure operation, while ensuring precision cutting over across a wide range of paper grades and grammages.