



## 4-POINT BENDING STIFFNESS TESTER Model 4PF-50

With the Single Column Testing Framework, designed to quickly and accurately determine 4-Point Flexural Stiffness of standard corrugated cardboard samples according to ISO 5628.



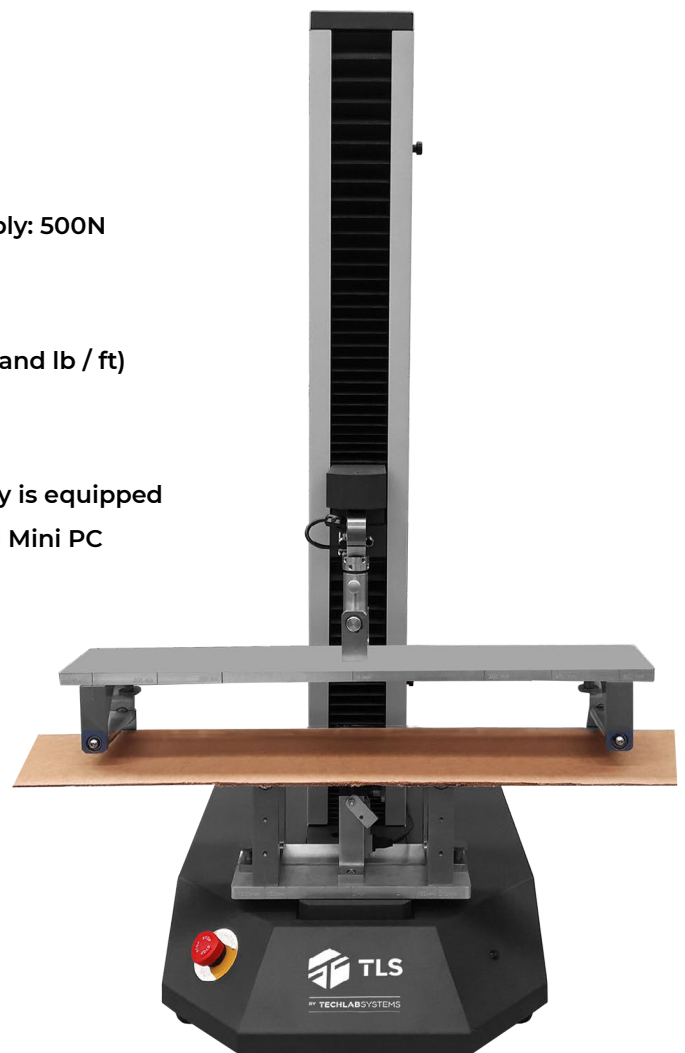
Flexural Stiffness is the relationship between the Flexural moment applied to a normalized sample according to ISO 5628 and the Deflection within the elastic zone.

The Flexural Stiffness of Corrugated Cardboard is of great importance to achieve great resistance to Stacking, BCT, in the corrugated cardboard box.

What primarily determines this flexural stiffness of corrugated cardboard is the mixture of the thickness of corrugated cardboard and the tensile strength of Liner Papers.

## Model 4PF-50

- **Maximum force capacity: 1 kN**
- **Load cell included in the standard supply: 500N**
- **Accuracy  $\pm 0.5\%$  (Class 0.5)**
- **Selectable units:**
- **(N / m, N / mm, Kg / m, Kg / mm, lb / in and lb / ft)**
- **Precise electromechanical drive**
- **High stiffness test frame**
- **The Testing Machine in standard supply is equipped with METROTEST Testing Software and Mini PC**
- **Large workspace in test area**
- **Ergonomic and precise**



## General Information

The 4PF-50 4 Point Corrugated Cardboard Flexural Stiffness Meter has the most advanced and reliable structure in the framework of electromechanical tests with ball circulation spindle. The computerized control system allows for closed-loop control of parameters such as test force, specimen deformation and crosshead travel, etc. The system realizes in real time on the PC screen test diagrams, test curves and creation of test reports. Closed-loop control through the **METROTEST** testing program makes it possible to carry out tests quickly and accurately to suit your needs in quality control and research of Corrugated Paper and Cardboard used in modern packaging.

In the International Standards compliance section, it meets or exceeds the requirements of the following standards: ISO 7500-1, ASTM-E4, EN10002-2, BS 1610, DIN 51221, ISO 6892.

**The 4PF-50 Corrugated Cardboard 4-Point Flexural Stiffness Meter** is made up of a robust frame in which the test frame is located. The test frame is made up of a low friction coefficient drive and re-circulation ball screw with protectors and a rectified and chromed steel guide column.

Force measurement is carried out through a compression-tension load cell housed in the mobile crosshead. The bending device is directly coupled to this load cell at 4 points.

The test framework admits overloads of 120% of the nominal force without affecting its measurement or operating precision, which gives the frame a great robustness and safety of correct operation under intensive work.

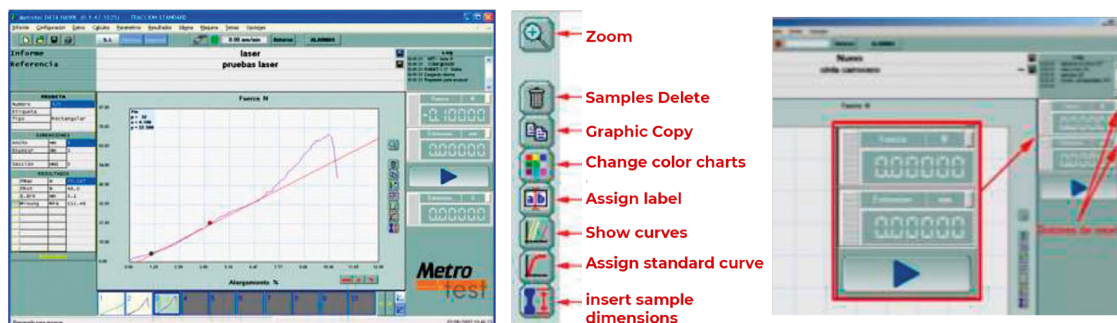
It has a system of upper and lower travel limiters adjustable independently by the user. Inside the base box are included the transmission elements, the transformer, regulation electronics, servomotor, etc.

## Features

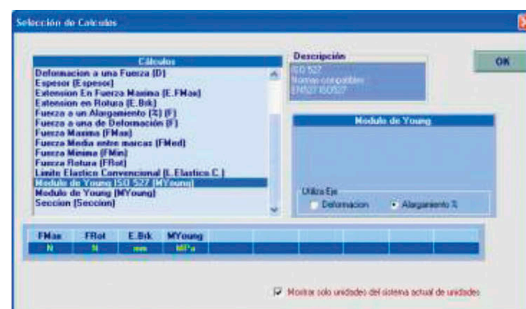
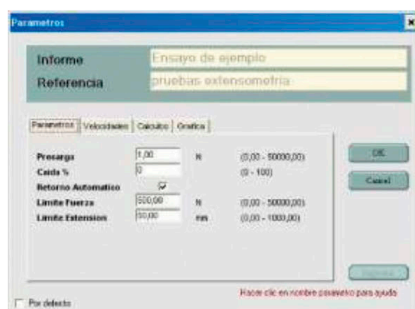
- **Fully computerized:** The control and measurement system with a specific electronic card used for testing machines, performing the tare to zero and adding a setting which is very reliable.
- It has a Database manager for the test results which stores according to a standard format which facilitates analysis and transfer to other programs.
- Compliance with testing requirements for all types of materials with all international testing standards.
- With a wide range of graph functions, curve color changes, magnifications (zoom), reductions, curve auto-scaling can be performed (making it easier and shorter to run a test with a new material), displacement of the curves in the deformation axis, designate standard curve, association of labels to each graph, indication of the values digitally on the screen and printing of all kinds of test curves.
- Modular design makes it easier to upgrade software in the future.

## METROTEST material testing software

METROTEST testing program based on WINDOWS MS is easy and fast to use to achieve different functions, adaptable to most operator habits. With all the integrated functions such as test sample information, sample choice, data display, data processing, data analysis, test operations ... easy to use.



- Very clear, intuitive, attractive interface design with information on the screen.
- Choice of different units for each of the results.
- Route of all the points of the graph, point by point.
- Association of labels to each graph.
- Creation and management of standard curves.
- Context sensitive help
- Customizable report
- Reports in PDF format directly without the need for additional software
- Automatic auto scaling on charts
- Test limits independent of graph limits
- Auto-save of results, specimen by specimen
- Single or multiple curve display
- Customizable interface
- Option to request sample dimensions at the beginning of each trial.
- On-screen information of the tasks being carried out by the program (log)
- Visual parameterization of results



## Functional Technical Specifications

### Control unit

- PC Control and **METROTEST** Testing Software
- Level of breakage of the sample (% of force drop at the end of the test)
- Maintenance of Peak Force / Extension in Tension or Compression
- Selection of force and deformation units
- External control mode by Mini PC
- RS-232 serial port

### Force measurement

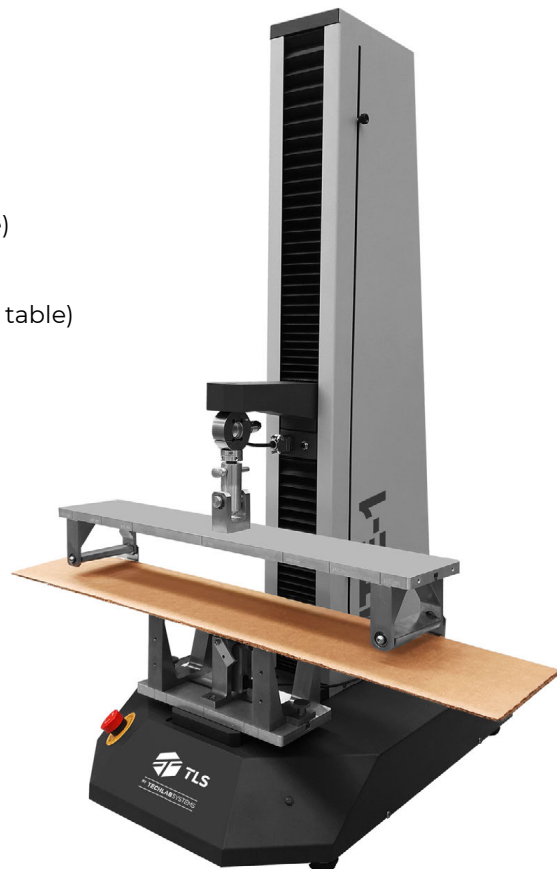
- Range: 2% to 100% - Accuracy 0.5% of applied force
- Precision in Forces: Class 0.5 (accuracy  $\pm 0.5\%$ )
- Load reading resolution: 1 / 200,000 points:
  - 1 / 100,000 in Tension
  - 1 / 100,000 in Compression
- Force Data Sampling Rate (internal): 30,000 S / second
- Digital load tare 20% with the Load Cell at its maximum capacity
- Selectable units: kN, N, cN, kgf, gf, lbf.
- Protection system of the Load Cell
- Programmable preload
- 18 bit high speed A / D converter

### Measurement of travel (mobile crosshead)

- Direct measurement from the drive spindles
- Single measurement range (1 scale)
- Reading resolution: 0.001 mm
- Auto-return precision, better than 0.05mm
- Selectable units: Millimeters and Inches
- Programmable extension limits

### Speed control

- Servo motor drive
- Variable speed range (see table)
- Variable return speed within range (see table)
- Default speed resolution:  $<0.02\text{mm} / \text{minute}$
- Speed accuracy:  $\leq \pm 0.5\%$
- Variable Preload speed within the range (see table)
- Current protection system



MODEL	4PF-50
Force capacity of the Testing Machine	1 kN
Capacity of load cell standard supply	500 N
Force resolution with 500 N Load Cell	0.005 N
Measured force accuracy	$\leq \pm 0.5 \%$
Displacement resolution	0.001 mm
Travel accuracy	$\leq \pm 1 \%$
Mobile crosshead travel	500 mm
Separation between column and grips adapter	150 mm
Range Standard Test Speeds	0.5 – 1000 mm /min.
Accuracy of test speed	$\leq \pm 1 \%$
Maximum return speed	1000 mm/min
Spacing between fixings (adapters)	500 mm
Electric supply	220V / 50Hz - 110V/60Hz Single-phase.
Approximate power	400 W
Working Ambient Temperature and Relative Humidity Condition	10 °C ~ 35 °C   20% -80%
Dimensions Test Frame approx.	420x670x950 mm (Width x Depth x Height)
Net Weight approx.	76 Kg
Dimensions Wooden packaging approx.	600x870x1250 mm (Width x Depth x Height)
Gross Weight approx.	130 Kg

#### STANDARD SUPPLY CONTENT:

- \* 4 Point Flexure Stiffness Meter 4PF-50 + Load Cell 500 N
- \* METROTEST Multilingüe Software
- \* Management Module with Basic Statistics Packs:  
Bar Charts - Gaussian Bells and Reference Comparison
- \* Mini PC – Windows O.S.