

Hardness

Background: Hardness Testing

Together with friability, hardness (or breaking force) is a defining physical characteristic for a tablet. High hardness values may indicate for example, longer disintegration and dissolution times, compromising the speed of drug delivery.

On the other hand, if hardness is too low, then friability may be also high, giving rise to poor product stability and compromised dose uniformity.

By examining correlations between hardness, disintegration, dissolution and friability, a dosage form with optimum characteristics can be produced.

Chapters Ph. Eur. 2.9.8 **Resistance to Crushing of Tablets** and USP Chapter <1217> **Tablet Breaking Force** describe standardised methods for the assessment of tablet hardness.



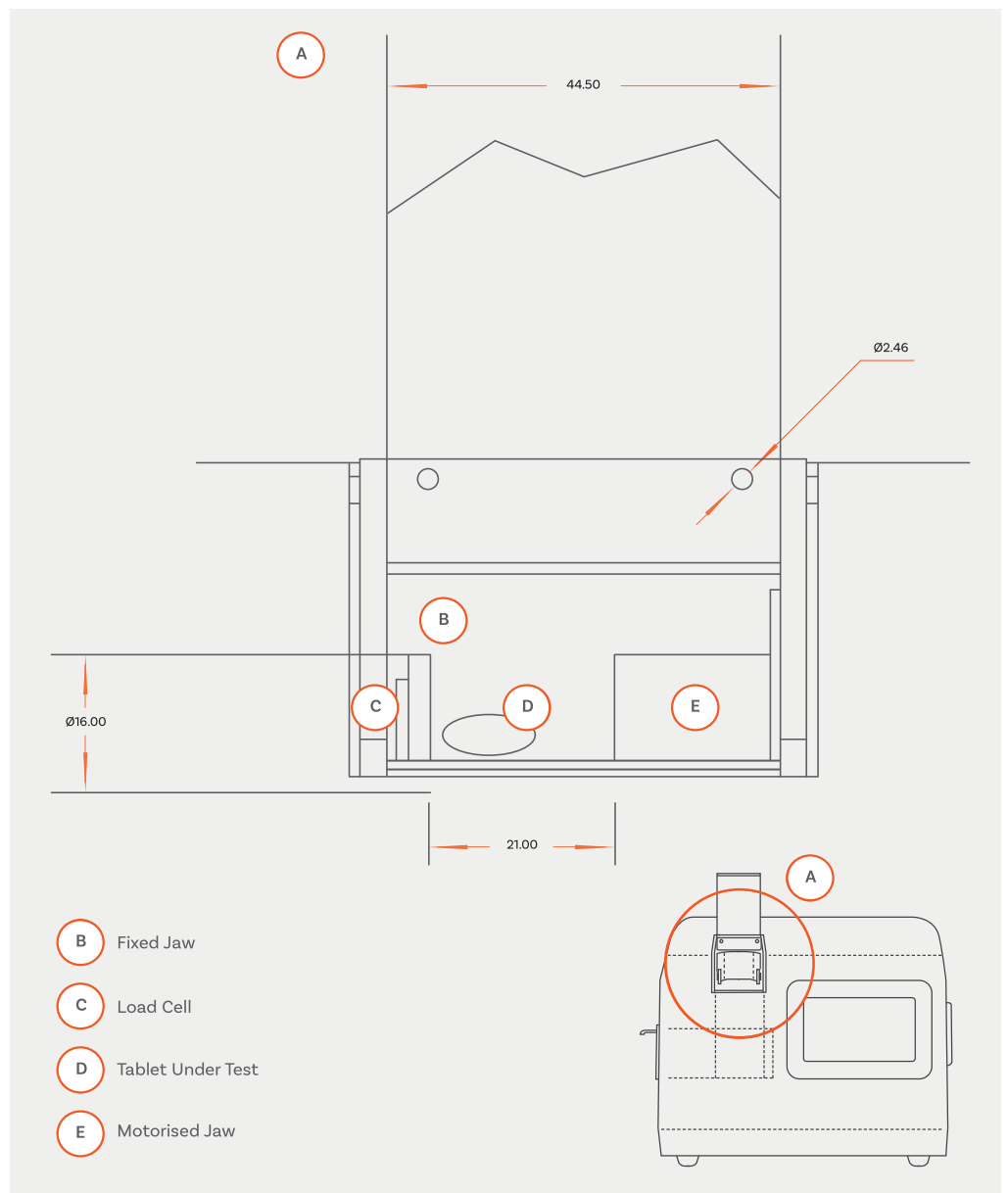
Hardness

Test Apparatus & Method

A tablet is placed between two platens (jaws), one of which is attached to a force gauge with load cell and the other to a motor which provides the mechanical drive.

The motorised jaw drives forward pressing the tablet against the fixed jaw until the tablet breaks. The motorised jaw then retracts and the load force required to break the tablet is recorded.

The units of force normally employed to quantify breaking force are Kiloponds (Kilogram-Force) or Newtons.



Hardness: TBF 100i

Rapid, no-fuss tablet hardness testers

Combining the economy of a simple, easy to use hardness tester with the accuracy of microprocessor-controlled data collection, the compact TBF 100i hardness tester delivers precise tablet hardness and diameter measurements. Tablet thickness and weight can also be recorded (optional).

Offering high tablet throughput, the intuitive touchscreen user interface of the TBF 100i streamlines test set-up procedures for users, whilst the built-in data processor provides analysts with tablet breaking force statistical analyses at the touch of a button.



Ph. Eur. and USP
Compliant



Choice of breaking force
measurement units



Intuitive touchscreen
control to simplify
operation



Force application:
constant speed



Option: Manual or
automated entry of tablet
weight & thickness data



Extensive data
reporting output
options



TBF 100i: Key Features



In-built guard for safe operation



Robust metal case with advanced corrosion protective coating



Intuitive touchscreen control with icon-based menu structure simplifies operation and clearly displays test parameters throughout run



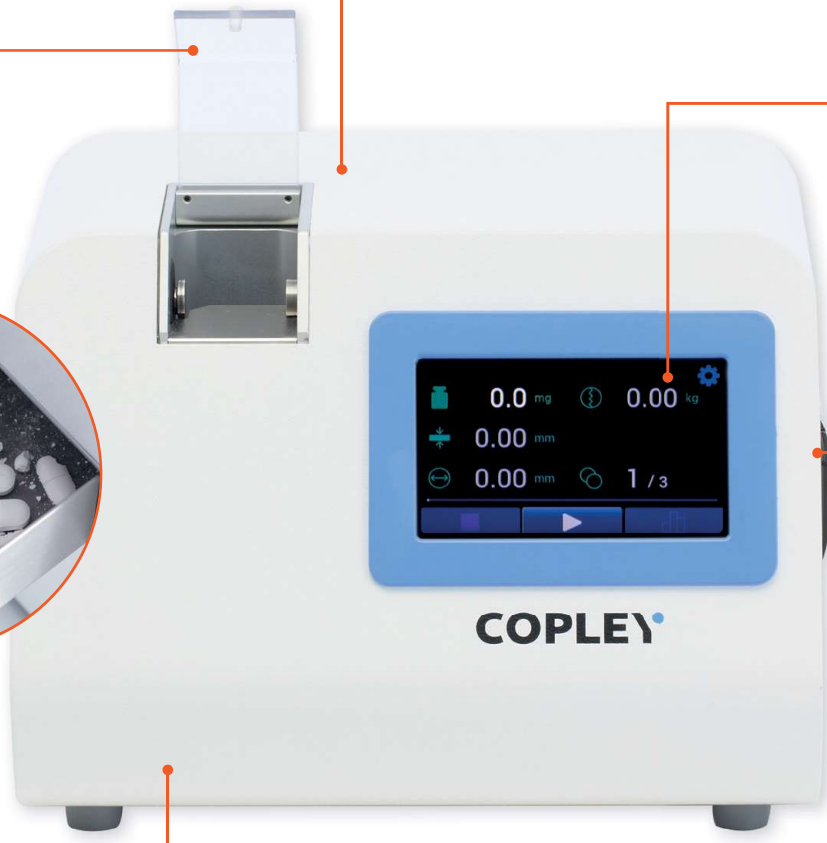
In-built thermal printer for quick checks of test results and calibration data



Convenient tablet waste drawer for dust-free tablet disposal



Small unit footprint saves precious benchtop space



COPLEY

TBF 100i: Touchscreen User Interface



Key Features:

- **Intuitive menu structure** enables users to locate features quickly and easily
- **Easy-set** user-configurable **test parameters**:
 - Rate of force application (mm/min)
 - Force measurement unit (N, kp, kgf, or lbs)
 - Tablet Batch size
- **Key tablet measurements clearly displayed on-screen to user**
 - Tablet weight (if applicable)
 - Tablet thickness (if applicable)
 - Tablet diameter (if enabled)
 - Tablet hardness
- **Batch progress displayed during batch testing run** provides clear indication on throughput status
- Resistive touchscreen interface can be **operated with gloves on**
- Hygienic **wipe-clean** screen
- High productivity - **easy system set-up and operation** minimises training burden

- A** Before testing (batch mode enabled)
- B** After test completion (batch mode enabled). Progress bar indicates test run complete.
- C** Tablet hardness statistics
- D** Settings menu (I)
- E** Settings menu (II)
- F** Test speed setting screen
- G** TBFi interface settings menu
- H** Calibration menu



TBF 100i with calibration rig

Reporting

Extensive data output options are available as standard, including direct printing from the TBF 100i and direct reporting to a PC.

Reported parameters

- **Individual Tablet Results**

Diameter (if enabled)
Hardness
Weight (if applicable)
Thickness (if applicable)



- **Tablet Batch Statistics**

Batch minimum, maximum, mean and standard deviation of:
Diameter
Hardness
Weight
Thickness



- **Calibration Data**

Calibration date
Temperature calibrated at (°C)

Compliance & Maintenance



- ✓ Certificate of compliance to Ph. Eur./USP provided as standard
- ✓ Comprehensive IQ/OQ/PQ documentation packages and toolkits available
- ✓ Passcode-protected static calibration routine
- ✓ Optional calibration rig available
- ✓ Latest calibration information stored and available to export/print

Choose your Tablet Hardness Tester



TBF 100i

Cat. Number
2532

Pharmacopoeial Compliance

Ph. Eur. 2.9.8
USP <1217>

Tablet Measurements

Breaking force • Diameter
Weight* • Thickness*

Statistics Reporting

Yes

Max. Tablet Diameter

36 mm

Force Range

0-490 N

Batch Testing

Yes

Portable

No

Unit Dimensions (w x d x h)

283 x 237 x 208 mm



TH3/200

Cat. Number
7801

Pharmacopoeial Compliance

Ph. Eur. 2.9.8
USP <1217>

Tablet Measurements

Breaking force

Statistics Reporting

No

Max. Tablet Diameter

30 mm

Force Range

0-200 N (+/- 0.04 N)

Batch Testing

No

Portable

Yes

Unit Dimensions (w x d x h)

82 x 380 x 90 mm



TH3/500

Cat. Number
7802

Pharmacopoeial Compliance

Ph. Eur. 2.9.8
USP <1217>

Tablet Measurements

Breaking force

Statistics Reporting

No

Max. Tablet Diameter

30 mm

Force Range

0-500 N (+/- 0.1N)

Batch Testing

No

Portable

Yes

Unit Dimensions (w x d x h)

82 x 380 x 90 mm

*Optional with balance and/or thickness gauge

TBF 100i: Technical Specifications

User Interface	Resistive touchscreen
Max. Tablet Diameter	36 mm
Force Range	0 - 490 N
Force Application	Constant speed 1 - 50 mm/min
Hardness Units	N, kp, kgf, lbs
Testing Throughput	~ 5-8 tablets per minute* <i>*depending on hardness/diameter of tablet under test</i>
Fracture Detect Percentage	Adjustable between 30% - 90%
Data Output	RS 232 USB type B (for communications with a PC) In-built thermal printer
Waste Drawer	Integrated

TBF 100i

Cat. No.	Description	Cat. No.	Description
2532	Tablet Hardness Tester Model TBF 100i	2505	IQ/OQ/PQ Documentation Pack
2503	Calibration Rig	2511	Re-Calibration Certificate
2504	Set of Calibration Weights for TBF 100i (4 x 10 kg, 2 x 5 Kg)	2506	Pack of 10 Paper Rolls
2510	Other Qualification tools		
2512	Re-calibration of Qualification Tools		



TBF 100i with open guard

Choose your TBF 100i Accessories

Tablet Weight & Thickness

With the addition of a balance and/or Mitutoyo micrometer for measuring thickness, the TBF 100i becomes a complete system for measuring the hardness, diameter, weight and thickness of tablets. This configuration is a highly efficient, cost-effective alternative to more sophisticated commercial systems for measuring these critical tablet parameters.

Alternatively, tablet weight and thickness can be entered into the TBF 100i system manually.



Mitutoyo Measuring Gauge



Sartorius Balance Model Quintix 224-1 CEU



TBF 100i Accessories

Cat. No.	Description
2507	Sartorius Balance Model Quintix 224-1 CEU (including cable)
2508	Mitutoyo Thickness Measuring Gauge