

Friability

Test Apparatus & Method

A standard friability drum has an inside diameter of 287 mm and a depth of 38 mm. Each drum is fitted with a curved baffle which subjects tablets to a drop of 156 mm during rotation.

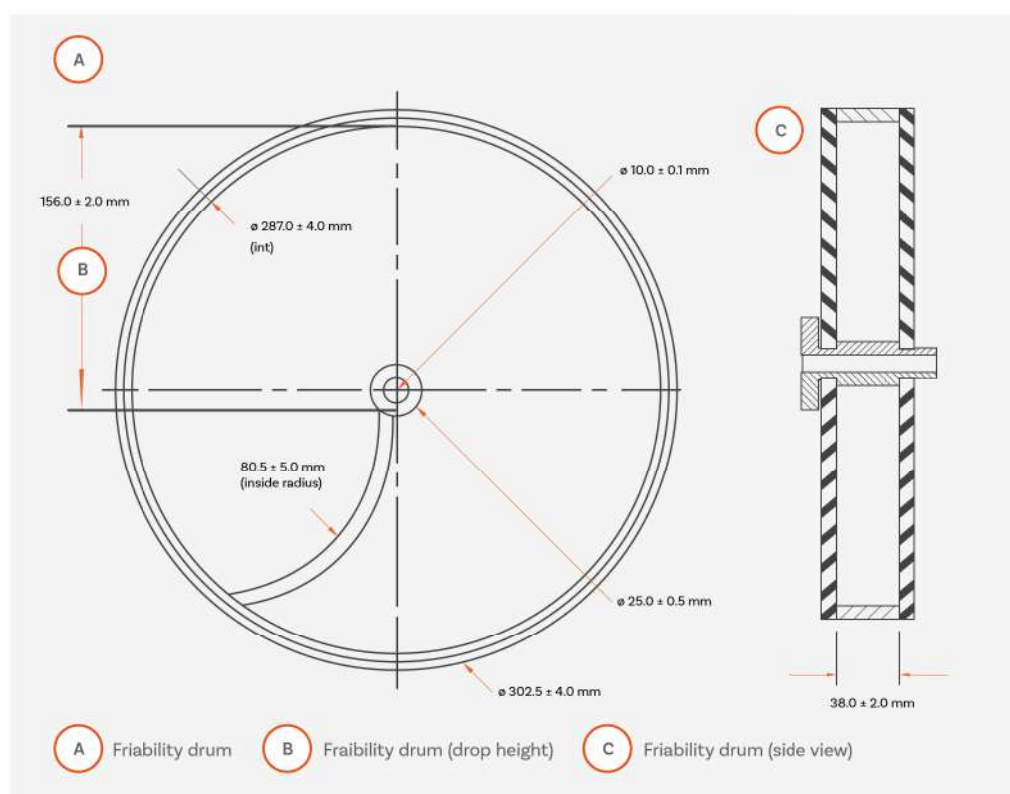
The sample (normally 10 tablets) to be tested is first weighed and then placed into the drum. The drum is then rotated 100 times at a speed of 25 rpm. Any loose dust from the sample is removed and the sample re-weighed.

Friability of a sample is defined in terms of percentage (%) weight loss (loss in weight expressed as a % of the original sample weight). A maximum weight loss of no more than 1% is considered acceptable for most tablets.

Attrition caused by tablets rubbing together can also be measured using this method with a special abrasion drum.

For coated tablets, granules and spheroids, friability cannot be determined using a conventional friability tester, as the dosage form is too hard for meaningful weight loss measurements. Alternative equipment that oscillates the sample at high frequencies is available for this purpose (see Ph. Eur. 2.9.41).

The abrasive forces generated by the horizontal shaking movement of the oscillating arm of this equipment allows users to easily optimise test conditions for each type of formulation with simple-to-use programmable controls.



Friability: FRVi Series

Advanced friability testers for all tablet types

Providing highly reproducible and cost-efficient friability testing, the FRVi series of friability testers from Copley allow analysts to easily characterise the critical tendency of tablets to chip, crumble or break.

Based on an original design by Roche, the Copley FRVi Series friability tester is an established standard within the pharmaceutical industry. Equipped with advanced design features, ranging from convenient sample loading and unloading to an integrated friability calculator, the FRVi Series streamlines the workflow associated with routine friability testing.



Ph. Eur. and USP
compliant



Extensive data
output options



Intuitive touchscreen
control to simplify
operation



Convenient drum
emptying function



Integrated calculation
of % tablet weight loss



Built-in 10° angling device
for larger tablets



FRVi Series: Touchscreen User Interface



Key Features:

- **Intuitive menu structure** enables users to locate features quickly and easily
- **Easy-set** user-configurable **test parameters**:
 - Speed (revolutions per minute)
 - Total revolutions
 - Test duration (HH:MM:SS)
- Status of '**Actual**' v '**Set**' test **parameters** clearly **displayed** throughout testing
- **Test progress bar** provides clear and constant indication on run 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
- **Calculation** of Friability Ratio

- A Setting a test parameter
- B Set v Actual test parameters (before test run)
- C Set v Actual test parameters (during test run, with test progress bar)
- D Settings menu
- E Friability calculation screen
- F Report output settings menu
- G Motor speed (RPM) verification



Built-in 10° switching leg
for testing larger tablet and
capsule types

Reporting

Extensive data output options are available as standard, including direct reporting to a printer or PC.

Reported parameters

- **Speed (revolutions per minute)**
 - Set
 - Average
 - Maximum
 - Minimum
- **Number of revolutions**
 - Set
 - Actual
- **Friability calculations**
 - Start weight (g)
 - End weight (g)
 - Friability (%)



Compliance & Maintenance



- ✓ Certificate of compliance to Ph. Eur./USP provided as standard
- ✓ Comprehensive IQ/OQ/PQ documentation packages and toolkits available

Choose your Friability System

		
FRV 100i	FRV 200i	Friabimat SA-400
Cat Number 1431	Cat Number 1432	Cat Number 1450
Pharmacopoeial Compliance Ph. Eur. 2.9.7 USP <1216>	Pharmacopoeial Compliance Ph. Eur. 2.9.7 USP <1216>	Pharmacopoeial Compliance Ph. Eur. 2.9.41-2 (Method B)
Tablet Types Uncoated tablets	Tablet Types Uncoated tablets	Tablet Types Hard tablets, Granules
Test Station Capacity 1 drum	Test Station Capacity Up to 2 drums	Test Station Capacity 1 oscillating container
Unit Dimensions (w x d x h) 316 x 343 x 325 mm	Unit Dimensions (w x d x h) 407 x 343 x 325 mm	Unit Dimensions (w x d x h) 440 x 300 x 220 mm

FRVi Series: Friability Calculator

The integrated friability calculator removes the need for manual tablet weight loss calculations, reducing the risk of analyst calculation error and improving data accuracy.

Simply inputting start and end weight allows for automatic calculation of percentage (%) friability.

Friability results together with the test report are easily output to PC and printer.

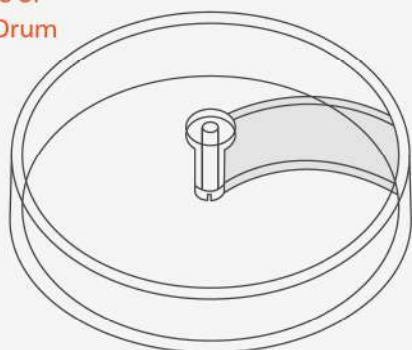


FRVi Series: Friability & Abrasion Drums

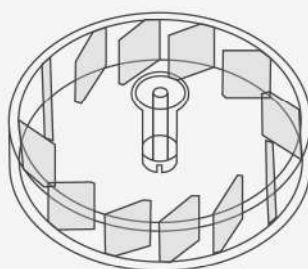
Fitted with an aperture for convenient sample loading and unloading, the FRVi Series drums automatically revolve to face the operator for easy sample loading. Upon test completion, simply tapping the 'empty drum' icon on the touchscreen empties the drum contents into the waiting collection tray(s), ready for weighing.

With a choice of either USP Friability and/or Abrasion drums, the versatile FRVi Series allows direct comparisons between the two parameters under identical test conditions.

Schematic of
Friability Drum



Schematic of
Abrasion Drum



Note:

All drums are interchangeable and can be fitted to any side of the unit

FRVi Series: Technical Specifications

Pharmacopoeial Compliance	Ph. Eur. 2.9.7 USP <1216>
User Interface	Resistive touchscreen
Test Duration Parameters	Time or Revolutions of the Drum(s)
Drum Rotational Speed Range	10 - 60 rpm (± 1 rpm)
Rotational Limit	Up to 60,000 rotations
Test Run Time	Up to 99 hours, 59 minutes, 59 seconds
Data Output	RS 232 USB A (for connection with a USB printer) USB B (for connection with a PC)
Alarm	End of testing (audible)

FRVi Series & Accessories

Cat. No.	Description	Cat. No.	Description
1431	Friability Tester FRV 100i (Variable Speed - 1 Drum)	1405	Extra for Numbering & Certification (per drum)
1432	Friability Tester FRV 200i (Variable Speed - 2 Drums)	1406	IQ/OQ/PQ Documentation Pack
1407	Abrasion Drum (Optional extra)	1410	Qualification Tools
1408	Friability Drum (Spare)	1412	Re-calibration of Qualification Tools

Friability: Friabimat SA-400

For the hardest and most robust solid dosage forms which fall outside the scope of the conventional friability tester a higher-energy input instrument is needed to generate quantifiable changes in surface mass. The Friabimat, as described in Ph. Eur. 2.9.41, has been designed to generate the necessary abrasive forces required to define the friability characteristics of these types of dosage forms.

Not only useful for determining the friability of hard pellets and granules, the Friabimat is suitable for detecting variations in mechanical properties between

different formulations and batches, making it a convenient tool for both research and development and quality control applications.



Friabimat SA-400: Key Features



Quantifiable abrasion of hard tablets, granules and pellets



Stainless steel case ideal for production environments



Clear acrylic lid with magnetic interlock to ensure safe operation



Option: Oscillation frequency verification certificate

Friabimat SA-400: Technical Specifications

Pharmacopoeial Compliance	Ph. Eur. 2.9.41-2 (Method B)
Shaking rate	0 - 400 oscillations per minute
Test Run Time	Up to 9,999 seconds
Test Station Capacity	1 Oscillating Container
Dimensions (w x d x h)	440 x 300 x 220 mm



Friabimat with safety lid open



Oscillating Container

Friabimat SA-400 Accessories

Cat. No.	Description
1450	Friabimat Model SA-400 including 1 Glass Container
1451	Oscillation Frequency Verification Chart
1452	Pack of 100 Spare Glass Containers
1453	IQ/OQ/PQ Documentation Pack
1455	Qualification Tools
1456	Re-Calibration of Qualification Tools
1454	355 Micron Sieve