

# product specification

## Taber® Bending Stiffness Tester



### Description

The Taber® Stiffness Tester is used to evaluate material stiffness and resilience. This precision instrument provides accurate test measurements to  $\pm 1.0\%$  for specimens of between 0.1 and 5.56 mm thickness.

### Defining stiffness and resilience

One Taber unit is the bending moment of 1/5 of a gram applied to a specimen 3.8 x 5 cm (W x L) while flexing it to a 15° angle.

A stiffness unit is the equivalent of one gram centimetre. Resilience is the elastic quality of a material expressed as the ratio of basic stiffness to initial stiffness calculated by the following formula:

$$\text{Percentage of resilience} = \text{basic stiffness} \times 100 / \text{initial stiffness}$$

Initial stiffness is the first reading obtained immediately after flexing the specimen to the end point of deflection and is generally used for comparing relative stiffness qualities.

Basic stiffness is the loss of stiffness caused by realignment of the molecules in the material when the specimen is held at the end point of deflection.

### Model 150-E

An integral computer automatically calculates, records and displays stiffness testing data. Stiffness readings are automatically converted into the appropriate user-selected stiffness range, eliminating the need to manually multiply results by a scaling factor. The unit also calculates average, standard deviation and high/low readings.

Via the accessory ports, data can be either printed or downloaded to a PC. Up to 1000 readings can be stored and identified with a date and time reference and an optional user-defined label. Through the 16-button keypad, the direction, deflection and number of cycles can be selected and the instrument also offers the option for automatic or manual testing.

### Model 150-B

This is a manual instrument offering the same accurate, precision test results as Model 150-E. The stiffness test data are read from a scale on the stationary disc and subsequent calculations have to be performed manually. Model 150-B is lightweight, portable and mounted on telescopic tripod legs.

# Taber® Bending Stiffness Tester



## Instrument operation

Taber® Stiffness Testers include three major components:

- a constant speed motor
- a weighted, free-swinging pendulum with a clamping block to hold the specimen at the face
- a powered, gear-driven rotating disc

The clamping block is precisely aligned with the centre of rotation of the gear-driven disc. The specimen to be tested is held on the top end in the jaws of the clamping block and at the lower end between two adjustable rollers attached to the rotating disc. In this way, 5 cm of the specimen are flexed in the standard 10- to 100-unit test range. When power is applied to the gear-driven disc, a resulting torque is placed on the specimen, causing angular deflection in the pendulum. This deflection is indicated directly on the scale or on the digital display.

## Options

- Step down transformer – for Model 150-B when using 230 V
- Triple cut specimen shear – for the preparation of precise samples for testing. Interchangeable dies enable sample sizes of 3.8 x 3.8 or 3.8 x 7 cm
- Sensitivity range attachment – for testing stiffness of extremely lightweight materials, including cellophane, natural fibres, synthetic filaments, metallic foils. Requires the compensator range weight
- Wire/tube testing apparatus – for testing cylindrical specimen materials
- Range weights – for testing specimens  $\leftarrow$  10 stiffness units and  $\rightarrow$  100 stiffness units
- Calibration specimens
- 6 mm clamp jaw upgrade – for use with older stiffness tester models

## Physical specifications

Dimensions (W x L x H)	Net weight
150-E 38 x 25.5 x 39 cm	150-E 11.4 kg
150-B 42 x 22 x 25.5 cm	150-B 5.9 kg

## Performance data

**Specimen thickness** With the ratchet stop roller, the stiffness tester will accommodate specimen thickness up to 12.7 mm.

**Testing range** A set-up chart is provided with each instrument to help determine which test range should be used for the type of material being tested. When determining a range for the first time, test a sample in range 3. If the sample deflects immediately and results in a stiffness reading of  $\leq 10$  stiffness units, change to range 2. If the results are  $\geq 100$  stiffness units, use ranges 4–9. Values of test ranges overlap. For the greatest accuracy, test should be performed in the lowest range.

Operation	Power supply
Electrical and mechanical	115/230 V, 50/60 Hz

## Standards

ASTM D5342, D5650, JIS P8125, ISO 2493, TAPPI T-489 os-92, T-566 om-97

