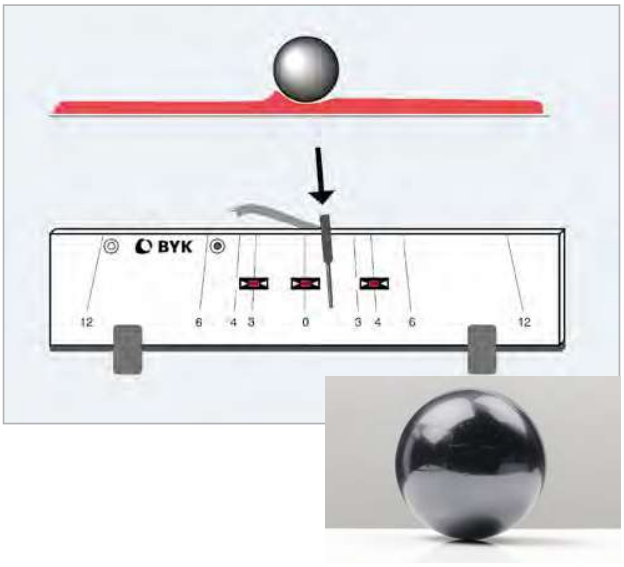
Pendulum Hardness

This method evaluates hardness by measuring the damping time of an oscillating pendulum. The pendulum rests with 2 stainless steel balls on the coating surface. A physical relationship exists between oscillation time, amplitude and the geometric dimensions of the pendulum. The viscoelastic behavior of the coating determines its hardness.

When the pendulum is set into motion, the balls roll on the surface and put pressure on the coating. Depending on the elasticity, the damping will be stronger or weaker. If there are no elastic forces, the pendulum will damp stronger. High elasticity will cause weak damping.

Two types of pendulums were standardized for this test method:

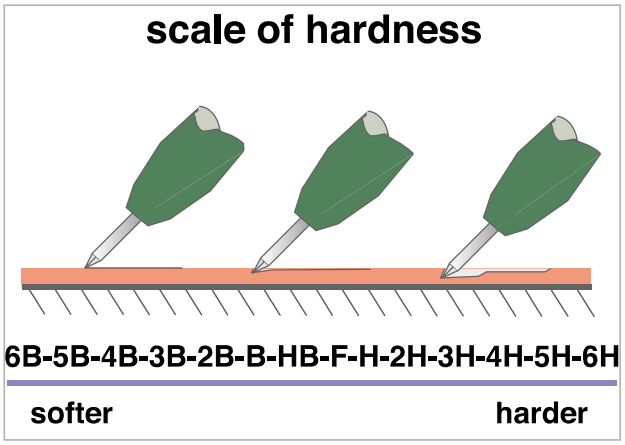
	König	Persoz
Weight	200 g ± 0.2	500 g ± 0.1
Diameter	0.2 in (5 mm)	0.3 in (8 mm)
Deflection Start	6°	12°
Deflection End	3°	4°
Period of Oscillation	1.4 s	1 s
Damping Time on Glass	250 ± 10 s	430 ± 10 s



Scratch Hardness

An ideal test for the quick evaluation of finished products. The results do not correlate with any of the other methods of hardness measurement.

The scratch can be performed with either a metal pin (Dur-O-Test) or pencils. Pencils of various degrees of hardness are drawn over the coating surface to determine which pencil causes indentation. This method is only applicable for smooth surfaces.

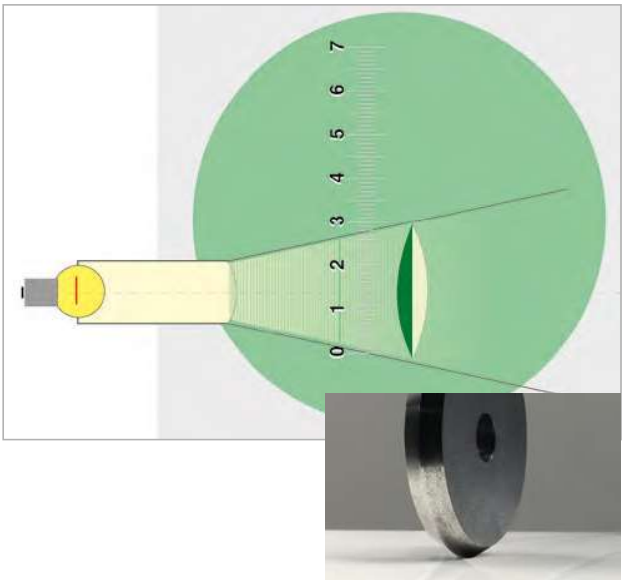


"Buchholz" Indentation Hardness

This test method is suitable for coatings with plastic deformation behavior. Coatings with elastic deformation behavior should not be evaluated with this test method, because after removal of the instrument an elastic coating will show no or very little indentation.

The instrument consists of a double cone block, which is placed on the coating for 30 seconds. Indentation is measured with the help of a precision microscope and is then calculated according to the following equation:

$$\text{Indentation Resistance (Buchholz)} = \frac{100\ \text{mm}}{\text{Indentation Length}}$$



Pendulum Hardness Tester

Simple laboratory measuring instrument for hardness measurements in accordance with the König and Persoz methods described on the previous page.

- Automatic counter with acoustic signal when the deflection is below 3° (König) or 4° (Persoz) respectively
- Registration of pendulum deflection by means of 2 light barriers
- Digital counter
- Changeable from König to Persoz by means of a third light barrier
- Selector switch for display in seconds or number of oscillations

König Pendulum

Persoz Pendulum

Standards

ASTM	D 4366
ISO	1522

Ordering Information

Cat. No.	Description
5858	Pendulum Hardness Test König
5859	Pendulum Hardness Test Persoz
5861	Pendulum Hardness Test König/Persoz

Comes complete with:
Pendulum hardness tester; Protective cover; Cable release; Tools; Pendulum (for 5861 two pendulums) Glass plate; Spirit level; Power cord; Operating manual

Technical Specifications

Weight	Ball Diameter	Deflection Start/End	Period of Oscillation	Damping Time on Glass
200 g ± 0.2	5 mm	6° / 3°	1.4 s	250 s ± 10 s
500 g ± 0.1	8 mm	12° / 4°	1 s	430 s ± 15 s according to ISO

Voltage	115 V / 60 Hz, 230 V / 50 Hz
Power Supply	0.1 A
Dimensions	320 x 710 x 300 mm (12.6 x 30 x 12 in)
Weight	17.5 kg (39 lbs)

Ordering Information

Cat. No.	Description
5860	Cable Release
5857	Persoz Pendulum
5856	König Pendulum

Accessories

Additional Description
For 5858, 5859, 5861
Additional Pendulum
Additional Pendulum