



# Portable Skid Resistance Tester

## Description

The Portable Skid Resistance Tester – also known as the British Pendulum– was designed in the 1940s by Percy Sigler to measure the slip resistance of floors in government buildings. During the late 1950s the instrument was adopted and redesigned by the Road Research Laboratory (now known as the Transport Research Laboratory, TRL). Although basically unchanged, W F Stanley, now part of Munro Instruments Limited and known today as Munro Stanley London, has continually refined and improved the original design. The instrument is used to study problems in the design and maintenance of public highways, and to test the frictional resistance of new roads, road markings and iron works.

The Portable Skid Resistance Tester is also used to measure slip potential on pedestrian surfaces. Research by the Health and Safety Executive (HSE) has identified that in excess of 90% of slipping accidents in the UK occur on smooth, wet floors. The Portable Skid Resistance Tester is regularly used to test the slip resistance of pedestrian walkways in offices, shopping malls, factories, airports and sports facilities – both at the design stage and in the investigation of accidents.

The Portable Skid Resistance Tester is based on the Izod principle. In operation, a pendulum of a known mass rotates about a vertical spindle. The head of the pendulum is fitted with a Rubber Slider, which has a specific hardness and resilience. When released from a horizontal position, the pendulum head strikes the sample surface with a constant velocity. The distance travelled by the pendulum after striking the sample is determined by the friction resistance of the sample surface. The Pendulum Test Value (PTV) is read directly from the clearly engraved scale.

The Munro Stanley Portable Skid Resistance Tester is manufactured at our premises in the United Kingdom. We use high-grade metal castings to ensure that the instrument is strong, durable and not susceptible to de-calibration. Under normal service and use, a Munro Stanley Pendulum will last several decades.

## Applications

- Flooring and tiles
- Materials testing
- Construction, architecture and civil engineering
- Floor cleaning
- Facilities management
- Expert witness and forensic engineering
- Insurance
- Road safety
- Tyres

## Standards

- BS 7976-2002: Method of Operation and Calibration of the Pendulum Tester
- BS EN 13036-4-2003/11: Road and Airfield Surface Characteristics. Method for measurement of slip/skid resistance of a surface. The Pendulum Test
- BS EN 1097-8:2009: Tests for mechanical and physical properties of aggregates. Determination of the polished stone value
- BS 812 pt. 114 [see BS 1097-8:2009]
- BS EN 1436:2007: Road Marking Materials. Road Marking Performance for Road Users
- BS 7188:1998: Impact Absorbing Playground Surfacing. Performance Requirements and Test Method
- ASTM E303 – 93 (2013): Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
- AS 4586:2013: Slip Resistance Classifications for New Pedestrian Surface Materials
- AS 4663:2013: Slip Resistance Measurement of Existing Pedestrian Surfaces



## Technical Specifications

The Munro Stanley Portable Skid Resistance Tester has the following features:

- A spring-loaded slider assembly mounted on the end of a pendulum arm, such that the sliding edge is  $514 \pm 6$  mm from the axis of rotation;
- A means of setting the column of the instrument vertical (three levelling screws with bubble spirit level);
- A means of raising and lowering the axis of rotation of the pendulum, such that the slider can swing clear of the test surface and be set to slide over a fixed length of the test surface of  $126 \pm 1$  mm;
- A means of holding and releasing the pendulum arm, such that it falls freely from the horizontal position;
- A pointer, balanced about the axis of suspension, indicating the position of the pendulum arm throughout its forward swing and moving over the circular scale;
- A main scale (C scale), calibrated for a sliding length of 126 mm, marked from 0 to 150 in intervals of five;

The combined mass of the pendulum arm and slider assembly is  $1.50 \pm 0.03$  kg. The centre of gravity lies on the axis of the arm  $410 \pm 5$  mm from the centre of suspension.

The mass of the pointer is not greater than 85 g. The friction in the pointer mechanism is adjustable such that, with the pendulum arm swinging freely from a horizontal position, the outward tip of a nominal 300 mm long pointer can be brought to rest on the forward swing of the arm at a point 10 mm below the horizontal (the 'zero' mark).

The pointer is carried with the pendulum on the forward swing only.

## Rubber Sliders

The Rubber Slider – either 4S(96), TRL(55) or CEN – has dimensions  $(76.0 \pm 1.0)$  mm x  $(25.4 \pm 1.0)$  mm x  $(6.35 \pm 0.5)$  mm.

The rubber slider is fixed to a rigid backing plate with a central pivoting axis.

The mass of the slider assembly is  $35 \pm 5$ g.

The slider assembly shall be mounted on the end of the swinging arm so that, when the arm is at the lowest point of its swing, with the trailing edge of the rubber slider in contact with the test surface, the plane of the slider is angled at  $26 \pm 3^\circ$  to the horizontal. In this configuration, the slider can turn about its axis without obstruction to follow unevenness of the test surface as the pendulum swings.

The slider assembly shall be spring-loaded against the test surface. The nominal static force of the slider assembly in operation is  $22.5 \pm 5$  N in its median position.

**TRL(55) Rubber Slider:** This rubber slider has a hardness of  $55 \pm 5$  IRHD. It is specially designed to replicate the tyre of a car. It is normally used to test rough surfaces used by vehicles (roads, motorways, runways etc.).

The TRL(55) Rubber Slider is also used in areas used by barefoot pedestrians such as swimming pools, bathrooms and changing rooms.

Temperature	0°C	10°C	20°C	30°C	40°C
Lüpke Resilience	43-49	58-65	66-73	71-77	74-79
IRHD	$55 \pm 5$				

**CEN Rubber Slider:** This rubber slider has a hardness of 53 to 65 IRHD and is used to test rough surfaces.

**4S(96) Rubber Slider:** This rubber slider has a hardness of  $96 \pm 2$  IRHD. It is most commonly used to test smooth surfaces such as internal flooring, wooden flooring, ceramic tiles, as well as other walkways used by shod pedestrians.

Temperature	5°C	23°C	40°C
Lüpke Resilience	$21 \pm 2$	$24 \pm 2$	$28 \pm 2$
IRHD	$96 \pm 2$		