

The Pendulum Tester Purchasing Guide



The Portable Skid Resistance Tester – also known as the British Pendulum Tester – was originally 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.



Rubber Sliders

Rubber Sliders are fitted onto the end of the Pendulum foot.

There are three types of rubber slider. Each has specific properties and must be carefully selected depending on the type of surface that you are testing:

- TRL(55) Rubber Sliders have a hardness of 55 ± 5 IRHD. They should be used in 'barefoot' pedestrian areas (e.g. bathrooms, changing rooms, swimming pools). They are also used on vehicular surfaces such as roads and runways. Product Code: 881032/1
- 4S(96) Rubber Sliders have a hardness of 96 ± 2 IRHD. They should be used in 'shod' pedestrian areas (indoor/outdoor public spaces, pavements etc.). Product Code: 881032/2
- CEN Rubber Sliders have a hardness of 53-65 IRHD. CEN sliders are required for testing in accordance with some industry specific European standards. Product Code: 881032/3

Large rubber sliders are required for most applications (dimensions: 76.2 x 25.4 x 6.35 mm).

Small rubber sliders are used for Polished Stone Value (PSV) testing (dimensions: 31.75 x 25.4 x 6.35 mm). Readings must be taken from the Detachable Scale (F Scale) when using small rubber sliders.

Please Note: Each rubber slider is supplied with a date stamp and a certificate stating the hardness (IRHD), resilience and date of expiry. Sliders should be disposed off according to your testing standard's criteria for age and wear.

Product Code	Item Description
881032/1	Large Mounted #55/TRL/Barefoot Rubber Slider
881032/2	Large Mounted #96/4S/Shod Rubber Slider
881032/3	Large Mounted CEN Rubber Slider
881035/1	Small Mounted #55/TRL/Barefoot Rubber Slider (2 Units)
881035/2	Small Mounted #96/4S/Shod Rubber Slider (2 Units)
881035/3	Small Mounted CEN Rubber Slider (2 Units)



Conditioning & Verification Surfaces

Conditioning

The following items are used to prepare (condition) the rubber slider before use:

Product Code	Item Description
SX2278	Float Glass with Bevelled & Polished Edges
SX2282	P400 Conditioning Paper
SX2277	Green Lapping Film (For Slider #55/TRL) (Pack of 10)
SX2276	Pink Lapping Film (For Slider #96/4S) (Pack of 10)

Rubber slider preparation is critical for good reproducibility. It ensures that each rubber slider begins the test in the same condition. Failure to follow this procedure may affect the validity for your results.

In line with UKSRG Guidelines sliders should be prepared as follows:

- For a new edge
 - 10x swings on P400, reset the footprint, 10x further swings on P400
 - Check for burring on the slider edge and gently remove
 - 20x swings on lapping film (green for #55/TRL, pink for #96/4S)
- For a working edge
 - 3x swings on P400
 - Check for burring on the slider edge and gently remove
 - 20x swings on lapping film (green for #55/TRL, pink for #96/4S)

Conditioning materials should be mounted on top of the float glass, a sample holder (product code SX2280) can help with this. P400 should always be used dry, whilst lapping films should always be used wet.

Sliders with prepared edges in excess of 4mm should be discarded.

Verification

The Pendulum Tester must be verified at the start of each day of testing and after re-assembly or transportation. The verification procedure is an extremely important part of the test. It demonstrates to you, and all those making use of your results, that the instrument has been set up correctly and is functioning properly. The verification process is a key strength of the Pendulum test method when compared to other slip testing methods.

Pendulum verification is achieved by testing a number of well-defined surfaces with a known Pendulum Tester Value (PTV). These are given in the table below:

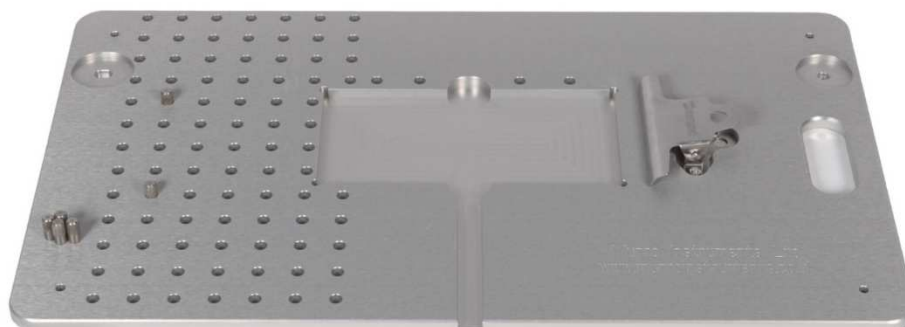
Surface	Accepted PTV Range	
	Slider #96/4S	Slider #55/TRL *
Pink Lapping Film	59 - 64	n/a
Green Lapping Film	n/a	60 - 66
Float Glass	5 - 10	5 - 10
Pavigrés Tile	32 - 36	13 - 19

**Verification using the #55/TRL is no longer recommended by the UKSRG. Verification should be carried out with slider #96/4S even when subsequent testing is to be conducted with slider #55/TRL.*

If these values are not obtained, you must not proceed with testing. The pendulum set-up procedure (including slider conditioning) should be re-performed, and the rubber slider should be checked for defects. If you continue to experience difficulties verifying your instrument, please contact Munro Instruments for further assistance.

The Aluminium Sample Holder (see overleaf) provides fast and secure mounting for conditioning, verification and testing surfaces and is a recommended addition to maximise repeatability of results.

Product Code	Item Description
SX2276	Pink Lapping Film (For Slider #96/4S) (Pack of 10)
SX2277	Green Lapping Film (For Slider #55/TRL) (Pack of 10)
SX2278	Float Glass with Bevelled & Polished Edges
SX2279/A	Conditioned and Certified Pavigrés Tile (For Slider #55/TRL)
SX2279/B	Conditioned and Certified Pavigrés Tile (For Slider #96/4S)
SX2282	P400 Conditioning Paper
SX2280	Aluminium Sample Holder



Aluminium Sample Holder

Conditioning

The Aluminium Sample Holder is used when conditioning the rubber sliders, verifying the Pendulum and for holding floor/tile/road samples. It helps to maintain stability and prevent unwanted movement. The Sample Holder is made of brushed aluminium.

- Recess to fit the Float Glass and Pavigrés Tile.
- Clip to hold P400 paper and lapping films in position on top of the Float Glass.
- Peg set to allow flexible bracing of test samples of almost any size.
- Foot holes which match the Pendulum feet, allowing secure placement and preventing movement.

The Aluminium Sample Holder also contains a built-in channel for water drainage and a handle to aid use when out in the field.

Product Code	Item Description
SX2280	Aluminium Sample Holder

Miscellaneous



Pendulum Feet

We can provide traditional Spreader Feet (left) which sit under the sharp points of the Pendulum or upgraded Adjuster Screws with Rubber Pads (right) which replace the older pointed feet. Both feature firm rubber bottoms to ensure a secure footing, minimum movement of the Pendulum frame and maximum reliability of results.



Tools Kit

Essential for operation of the Pendulum, and beneficial to keep as a spare when conducting field works.

Includes 15mm Spanner, C Spanner, Thermometer, Perspex Setting Gauge and Spray Water Bottle in a handy tool pouch



Detachable Scale (F Scale)

The scale is clipped onto the Pendulum dial. It is used for Polished Stone Value testing (see BS EN 1097-8). It is clearly engraved from 0 to 100 with intervals every two units. The scale is designed to be used with small rubber sliders (see "Rubber Sliders" above).



Base Plate

The Base Plate is used to hold curved specimens from an accelerated polishing machine. It is used for Polished Stone Value (PSV) testing and is designed to be used with small rubber sliders (see "Rubber Sliders" above).

Product Code	Item Description
SX2281	Spreader Feet (Set of 3)
881332	Adjuster Screw Complete with Rubber Pad (Set of 3)
SX1704	Tool Kit for Pendulum Tester
881103	Detachable Scale for Polished Stone Value Testing