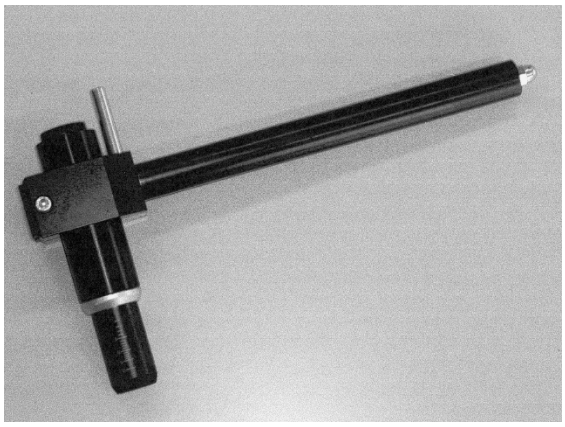
Schweizer Messkeule®
Swiss Door Force Measuring Tool

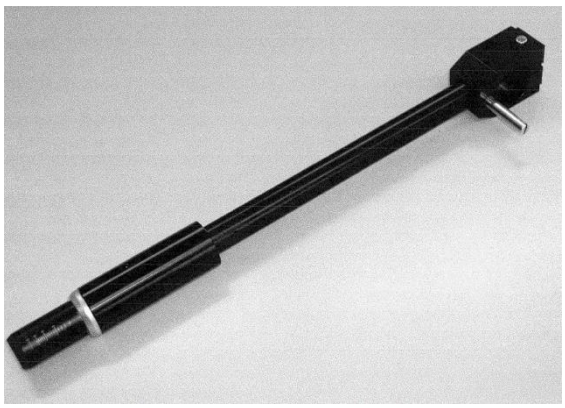
Product description

Measuring device for determining:

- *Closing force and kinetic energy of automatic power-operated doors*
- *Mechanical strength of different components*
- ***You can find comprehensive operating instructions on our homepage***

Developed in Switzerland, in cooperation with the Swiss National Accident Insurance Institution (SUVA), this measuring device, used for determining the closing force and kinetic energy of automatic power-operated doors, can also be used to measure the mechanical strength of elevator cars and landing doors, as well as car walls and aprons.
It can be converted by means of simple handgrips, so that measurements can be made within ranges < 250 mm (185 mm) and > 250 mm (500 mm).
The measurement is purely mechanical, and the value can be read via the drag pointer.
Uniquely, with this measuring device, the kinetic energy can be read directly.
The measuring accuracy of around ± 5 % is sufficient for this area of application.
This measuring device is impressive with its simplicity and robustness.





- Scale for force [N] and scale for kinetic energy [J]

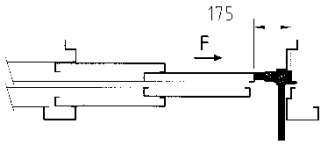
- F **max**	1000 N
- E_{KIN} **max**	20 J
- Spring constant c	25 N/mm
- Scale graduations	50 N / 1 J
- Measuring accuracy	± 5%
- Weight incl. holder	820 g
- Impact area	5 cm² / 100 cm²
- Measuring area	185 mm / 500 mm

Product contents
Measuring device
Holder
Impact area **100 cm²**
Carrying case (w x h x l 165 x 72 x 420 mm)
Allen Key
Calibration protocol
Open-end spanner

The area of application for the measuring device is explained in more detail below with reference to **EN 81-20**. This documentation not comprehensive. These are some examples. Accordingly, these applications are also applicable to other standards.

Closing Force

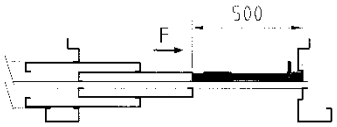
EN-81-20, 5.3.6.2.2.1 c)
the effort needed to prevent the door closing shall not exceed 150 N excluding the first third of the travel of the door;



EN-81-20, 5.3.6.2.2.1 e)
the effort needed to prevent a folding door from opening shall not exceed 150 N. This measurement shall be made with the door collapsed such that the adjacent outer edges of the folded panels or equivalent, e.g. door frame, are at a distance of 100 mm;

Kinetic Energy

EN-81-20, 5.3.6.2.2.1 a)
the kinetic energy of the landing and/or car door and the mechanical elements which are rigidly connected to it, calculated or measured at the average closing speed shall not exceed 10 J. The average closing speed of a sliding door is calculated over its whole travel, less:

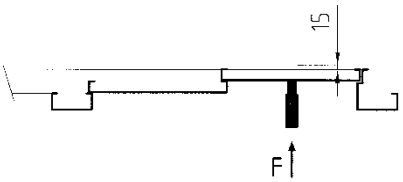


1) 25 mm at each end of the travel in the case of centrally closing doors;
2) 50 mm at each end of the travel in the case of side closing doors;

EN-81-20, 5.3.6.2.2.1 b) 4)
in case of failure, or deactivation of the protective device, the kinetic energy of the doors shall be limited to 4J, if the lift is kept in operation, and an acoustic signal shall operate at any time the door(s) is (are) closing.

Mechanical Strength

EN-81-20, 5.3.5.3.1
Complete landing doors, with their locks, and car doors shall have a mechanical strength such that in the locked position of landing doors and closed position of car doors:



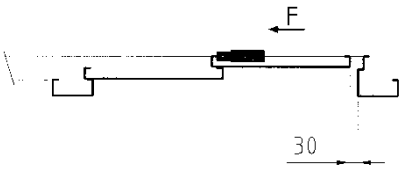
a) when a static force of 300 N, being evenly distributed over an area of 5 cm² in round or square section, is applied at right angles to the panel/frame at any point on either face they shall resist without:

   1) permanent deformation greater than 1 mm;
   2) elastic deformation greater than 15 mm;

After such a test the safety function of the door shall not be affected.

b) when a static force of 1000 N, being evenly distributed over an area of 100 cm² in round or square section, is applied at right angles at any point of the panel or frame from the landing side for landing doors or from the inside of the car for car doors they shall resist without significant permanent deformation affecting functionality and safety (See 5.3.1.4 [max. clearance 10 mm] and 5.3.9.1).

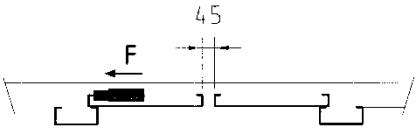
EN-81-20, 5.4.3.2.2
Each wall of the car shall have a mechanical strength such that:



a) when a force of 300 N, being evenly distributed over an area of 5 cm² in round or square section, is applied at right angles to the wall at any point from the inside of the car towards the outside, it shall resist without:
   - any permanent deformation greater than 1 mm;
   - elastic deformation greater than 15 mm.

b) when a force of 1000 N, being evenly distributed over an area of 100 cm² in round or square section, is applied at right angles to the wall at any point from the inside of the car towards the outside it shall resist without permanent deformation greater than 1 mm.

EN-81-20, 5.3.5.3.3
Under the application of a manual force of 150 N in the direction of the opening of the leading landing door panel(s) of horizontally sliding doors and folding doors, at the most unfavourable point, the clearances defined in 5.3.1 may exceed 6 mm, but they shall not exceed:



a) 30 mm for side opening doors;
b) 5 mm in total for centre opening doors.

Example

Testing the car wall with an effective force of 1000 N
on an area of 100 cm²

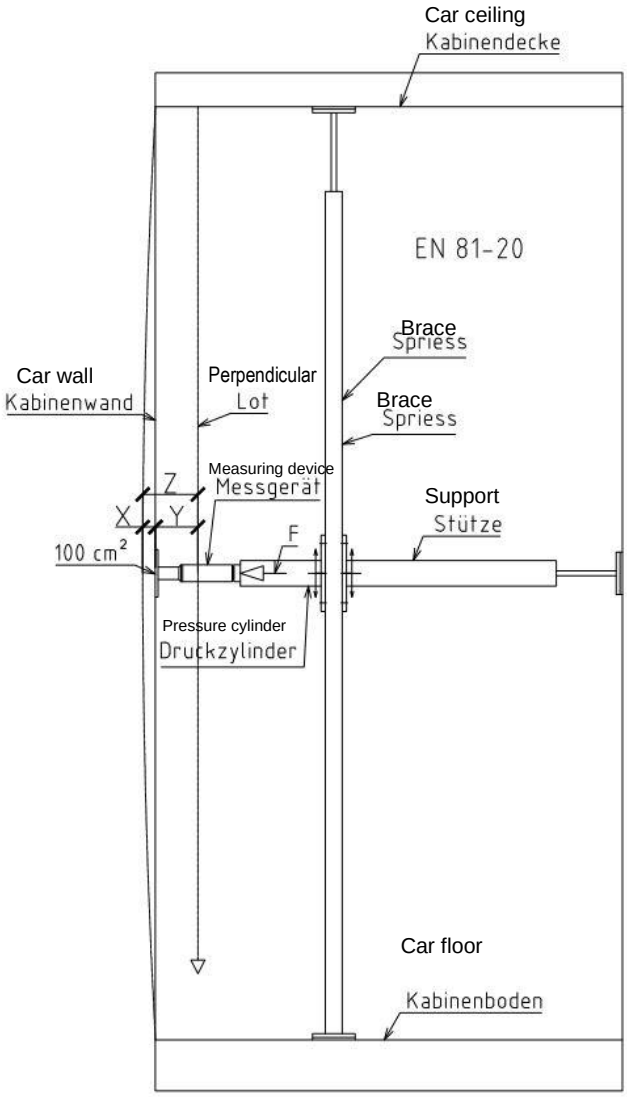
5.4.3.2.2 Each wall of the car shall have a mechanical strength such that:

a) when a force of 300 N, being evenly distributed over an area of 5 cm² in round or square section, is applied at right angles to the wall at any point from the inside of the car towards the outside, it shall resist without:

- any permanent deformation greater than 1 mm;
- elastic deformation greater than 15 mm.

b) when a force of 1000 N, being evenly distributed over an area of 100 cm² in round or square section, is applied at right angles to the wall at any point from the inside of the car towards the outside it shall resist without permanent deformation greater than 1 mm.

NOTE These forces could be applied on the "structural" wall, excluding mirrors, decorative panels, car operating panel(s), etc.



F = 1000 N, without permanent deformation
X Deflection, X = Z - Y, max. 15 mm and without permanent deformation
Y Perpendicular to the car wall unloaded
Z Perpendicular to the car wall loaded

F = 1000 N, ohne bleibende Verformung
X Durchbiegung, X = Z - Y, max. 15 mm und ohne bleibende Verformung
Y Lot zur Kabinenwand unbelastet
Z Lot zu Kabinenwand belastet

Accordingly, this application can also be applied to landing and car doors!