

ILLUSTRATION OF THE PRESSURE UNITS “BAR & PA”

MED 14.01



Material

Item-no.	Qty.	Description
DM375-1G	1	Weight, 1 kg
DS090-1K	1	Claw base simple, L=200 mm
DS201-10	1	Support rod, round, L=100 mm, D=10 mm
DS400-3K	1	Bosshead cross-pattern, Demo, green
DM725-ND	1	Newtonmeter "inno" 20 N / 2000 g
P3120-5B	1	S-shaped assembly platform

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Purpose

Illustration of the pressure unit 1 bar (the force of 10 N acts on an area of 1 cm²).

Preparation

Insert the 100 mm support rod into the sliding saddle of the claw base; afterwards mount the bosshead at the top end of the support rod.

Place the Newtonmeter on the S-shaped assembly platform for better visibility; the weighing bar is mounted in the bosshead with the plate facing upwards.

Experiment 1

Set the measuring range of the Newtonmeter to „g“ (grams); afterwards turn it on and tare if required (set to 0).

Place the weight on the plate as shown on the image to the right.

The weight has a mass of g



Remove the weight from the plate, set the measuring range on the Newtonmeter to “N” (Newton) and tare again (set to 0; afterwards repeat the measurement.

The weight exerts a force of N on the weighing bar.

Experiment 2

Position the weight with its large area on your hand; the force that the weight exerts on your hand can be felt.

Afterwards place the weight with the cm² area on your hand now. Compare the force that the body exerts on our hand now.



Note

The unit in the SI-system is **1 N/m² = 1 Pa.** (Pascal)

1 m² = 100 cm x 100 cm = 10.000 cm²

If a force of 10 N acts on an area of 1 cm² it is equal to a force of 100.000 N acting on an area of 10.000 cm²

$$\Rightarrow \boxed{1 \text{ Bar} = 10 \text{ N/cm}^2 = 100.000 \text{ Pa}}$$



To compare

Copy paper has about 80 g / m²; a little thicker paper has 100 g / m².

1 cm² of this therefore has 1/100 g or 10 mg (weight 1 / 10,000 N).

If you cut off such a piece and place it on your finger or hand you can feel a pressure of 1 Pa.