

electrostatics



Frictional materials for electrostatics experiments:

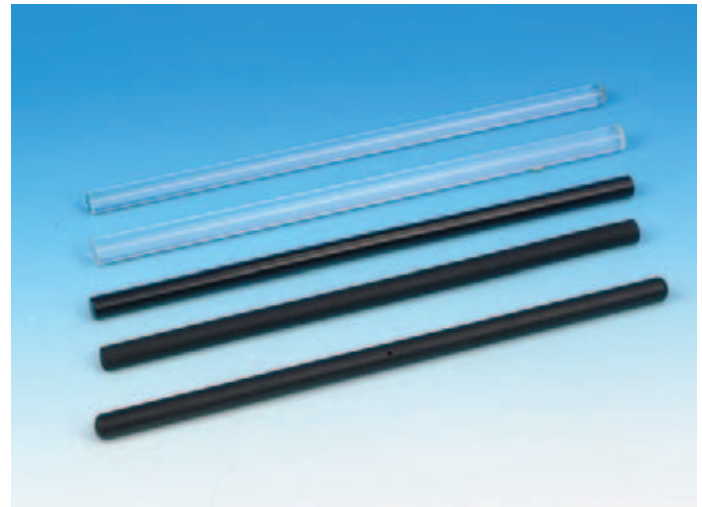
- DE511-1K Cat fur
- DE511-1L Leather cloth
- DE511-1S Silk cloth
- DE540-2S Styrofoam beads in a plastic box



Experiment: Separating electrical charges by means of friction

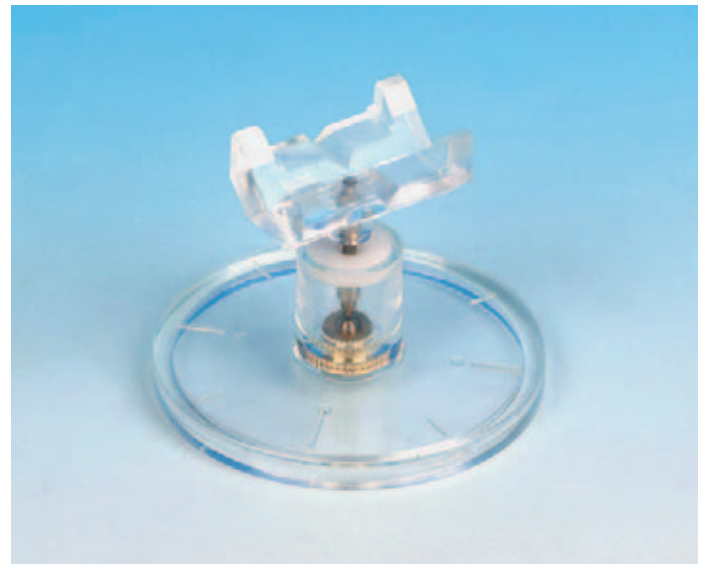


Experiment: Two kinds of electrical charges - hard rubber rod pivoting on needle bearing with base



Rods for demonstrating frictional electricity; length: 300 mm; Diameter: 12 mm

- DE510-1H Hard rubber rod, demo
- DE510-2L Hard rubber rod for pivot, demo
Axial hole allows pivoting on a needle bearing with a plug pin
- DE510-3K Rubber rod, black, demo
- DE510-4A Acrylic rod, demo
- DE510-1G Glass rod, demo

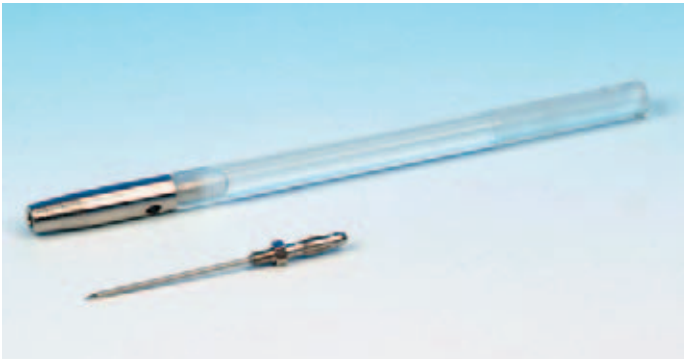


DE300-1D Pivot bearing on base

For rotatable mounting of friction rods and bar magnets;
plastic base with support mounted on low-friction needle bearing;
Base diameter: 60 mm



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DE521-4S Insulating support

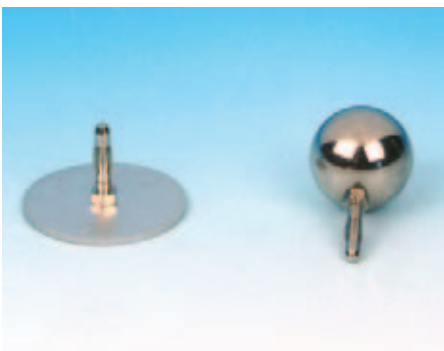
Supports and insulates apparatus with a 4-mm plug (conducting sphere, Faraday cup etc.); metal rod, with an axial and a lateral hole for a 4-mm plug, mounted on an acrylic support, D=10 mm; Length: 180 mm

DE520-1N Needle on plug pin

May be used as a needle bearing; length: 78 mm



Experiment: Two kinds of electrical charges - hard rubber rod pivoting on needle bearing with plug



DE535-1K Capacitor plate on plug

Aluminium disc mounted on 4-mm plug, D=40 mm



Use: The capacitor plate and the conducting sphere, each mounted on the insulating support, used to "spoon up" charges



DE520-2I Conducting sphere

Metal sphere, D=25 mm, mounted on 4-mm plug



MB550-2P Polarity tester, magnetic

The polarity of a charge is displayed by one of the LEDs lighting up; a conducting sphere (D=25 mm) and a 9-V battery for supplying

power are included; four strong neodymium magnets inset in the base for mounting the device magnetically
Dimensions: 84x84x39 mm



Experiment: The negative charge of the static electricity from hard rubber is displayed - magnetic panel assembly

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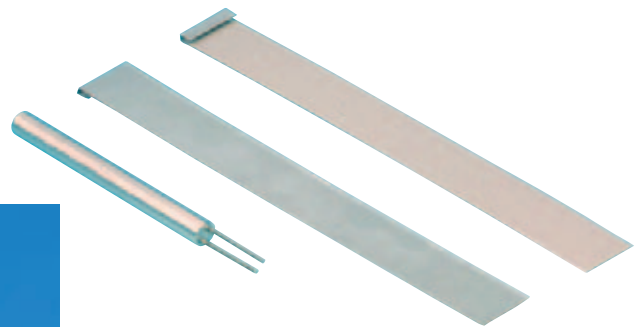


Experiment:
Effect of a ground connection on a leaf electroscope



DE520-9B Tubular fluorescent lamp, demo

For demonstrating electrostatic charges; ignition voltage of approx. 90 V
D=15 mm, L=approx. 90 mm



DE500-1A Fork support

For parallel suspension of DE500-1P electroscope leaves; fork mounted on a support with a 4-mm socket, may be mounted on a crocodile clip with plug; L=76 mm, D=6 mm

DE500-1P Electroscope leaves, pair

Used in combination with fork support DE500-1A in the assembly of a simple electroscope
Length: 124 mm; width: 15 mm



DS406-2N Screw post

For insulated mounting of wires and rods up to 6 mm in diameter; plastic insulating capsule (D=18 mm) on a plastic support (D=10 mm); with a nickel-plated brass screw (including a 6-mm through hole) and a screw-on bushing of nickel-plated brass with a threaded pin accepting a 4-mm safety plug
Total length: approx. 125 mm

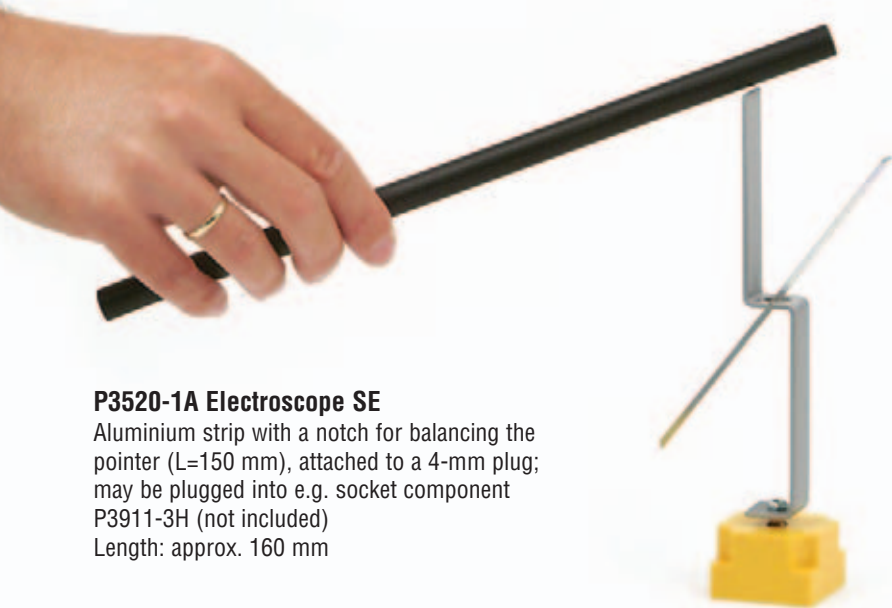
P3911-3D Crocodile clip with plug



Experiment: Model of a leaf electroscope



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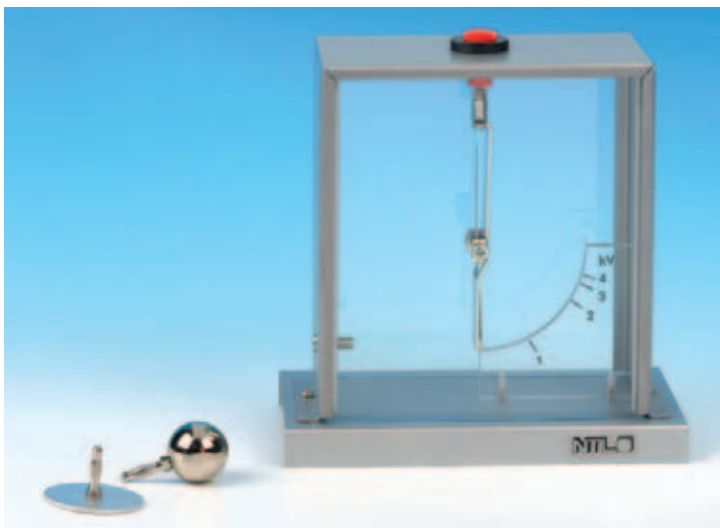


P3520-1A Electroscope SE

Aluminium strip with a notch for balancing the pointer (L=150 mm), attached to a 4-mm plug; may be plugged into e.g. socket component P3911-3H (not included)
Length: approx. 160 mm



Experiment: Displaying an electrical charge using the Kolbe-type electrostatic demonstrator



DE500-1E Electrostatic demonstrator (Kolbe type)

For electrostatics experiments and for displaying potential; metal case with grounding socket; transparent glass sides make it suitable for projection; case dimensions: 170x100x210 mm



Experiment: Neutralization of an electrical charge



DE500-2E Discharger

Aluminium rod mounted on and insulated from an acrylic rod; length of the aluminium rod: 300 mm



MB550-1E Electrometer amplifier, magnetic

Measurement accessory for detecting very small charges; used, in combination with a measuring instrument having a range of 3V or 3 mA, as an electrometer; "IN" safety jack for connecting a plug-in conducting sphere (included) to collect charges, grounding jack, reset button, ON-OFF switch, two safety jacks for connecting a measuring instrument, LED displaying operating mode
Input voltage: 12 V DC through hollow jack, supplied by mains transformer P3130-1P (12V/2A)
Dimensions: 84x84x39 mm

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DE722-1C Coulombmeter "inno"

Demonstration meter used in electrostatics for measuring charges; this instrument is easy to transport and can be mounted magnetically; the 26-mm LED display allows readings to be taken even from a distance
 Display: 3 1/2-digit LED display; digit height 26 mm; 4-mm safety jacks: measurement input (IN) and common ground (COM)

Measuring range: +/-1999 nC; Reset button for resetting instrument to zero

Accuracy: better than 1 %; droop rate: better than 5 digits/min

Toggle switch: ON/OFF

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 380 g

DE722-1H Static voltmeter "inno"

Demonstration meter for measuring high electrostatic voltages; unlike mechanical electroscopes, this instrument delivers exact and clear quantitative readings as well as the polarity of the charge; the value measured can be frozen using the hold switch; this instrument is easy to transport and can be mounted magnetically; the 26-mm LED display allows readings to be taken even from a distance

Technical data:

Display 2 1/2-digit LED display; digit height 26 mm

Measurement input provided by means of specially insulated 4-mm safety jacks

4-mm safety jack for ground connection

Measuring range: 0 ... 18.0 kV; reset button for resetting instrument to zero

Accuracy: better than 2 % for 0 ... 10 kV; toggle switch: ON/OFF

Toggle switch: measure sample - freeze measured value (hold)

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 483 g



Experiment: The negative charge of the static electricity from hard rubber is displayed - magnetic panel assembly



Experiment: Demonstrating voltage using the "inno" static voltmeter



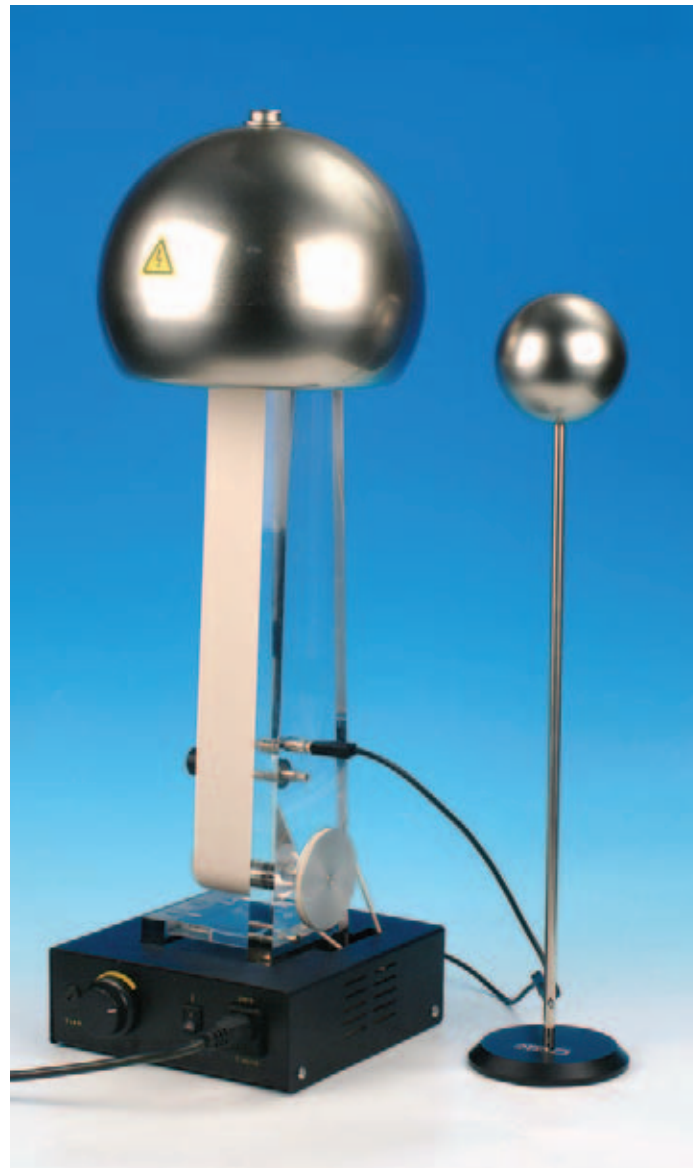
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**DE523-1A
Wimshurst machine**
Electrical influence
machine for generating
very high DC voltages
Spark length:
max. 70 mm
Voltage: max. 160 kV
Disc diameter: 300 mm
Dimensions:
350x200x390 mm



Use: Wimshurst machine powering a glow lamp



DE525-1B Van de Graaff generator

Used for generating very high DC voltages in electrostatics experiments; removable conducting sphere with 4-mm jack; belt speed is continuously variable and set by means of the motor speed control dial
Diameter of conducting sphere: 220 mm

Output voltage: max. 200 kV

Voltage source: 230 V AC/50 ...60 Hz

Dimensions: 220x220x630 mm; weight: approx. 5.2 kg

DE524-1K Sphere on support

Used in experiments with Van de Graaff generator DE525-1B; conducting sphere mounted on a support rod with a 4-mm hole and insulated base

Diameter of sphere: 90 mm; height: 520 mm

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P3171-1A High-voltage power supply, 10 kV, with digital display, "demo"

Continuously variable high-voltage power supply for powering electron diffraction tubes or for electrostatics experiments

Output: 0 ... +10 kV, continuously variable, max. 3 mA, short-circuit protection

Galvanic separation from mains source;
output voltage take from 4-mm safety jacks
Voltage indicator: 7 segment LED display; digit height 26 mm
ABS plastic case with 2 recessed handles
Voltage source: 230 V AC/50 ... 60 Hz
Dimensions: 260x150x210 mm
Weight: approx. 3.3 kg

P3170-1B High voltage power supply 25 kV, with digital display "demo"

Variable high voltage power source, designed for experiments in electrostatics;

Digital display of the Voltage: LED display, height: 26 mm

Output: 0...25 kV, variable, max. 0.5 mA, short-circuit proof

Plastic case with two handles
Powered by: 230 V AC/50...60 Hz
Dimensions: 260x150x210 mm, Weight: approx. 3,2 kg



P3127-1V High-voltage power supply, 18 kV, "inno"

Continuously variable high-voltage power supply for experiments in electrostatics

Output: 0 ... +18 kV, continuously variable, max. 3 mA

Voltage indicator: 7-segment LED display; digit height 20 mm

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

The green ABS plastic case is labelled in yellow, and 10 strong neodymium magnets are inset in the rear panel for mounting the device magnetically.

Dimensions: approx. 160x120x45 mm; weight: approx. 970 g

Recommended accessories:

P3120-6N Mains transformer 6V/500 mA

P3120-5B S-shaped assembly platform



Experiment: Location of a charge - Faraday cup

Voltage supply:

"inno" 18 kV high-voltage power supply, battery-powered

Digital measuring instrument: "inno" static voltmeter, battery-powered

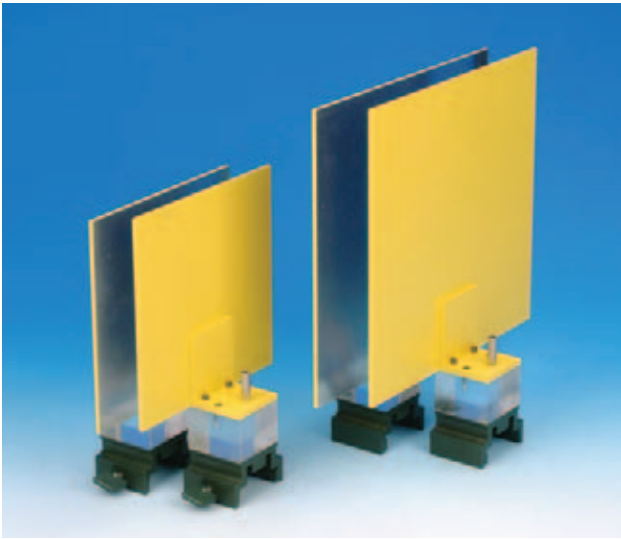


DG505-1H Connecting lead for high voltage

Extremely flexible connecting lead with a double insulating jacket and two specially insulated 4-mm plugs
Cross-section: 1mm²,
Jacket thickness: approx. 8 mm
Length: 100 cm



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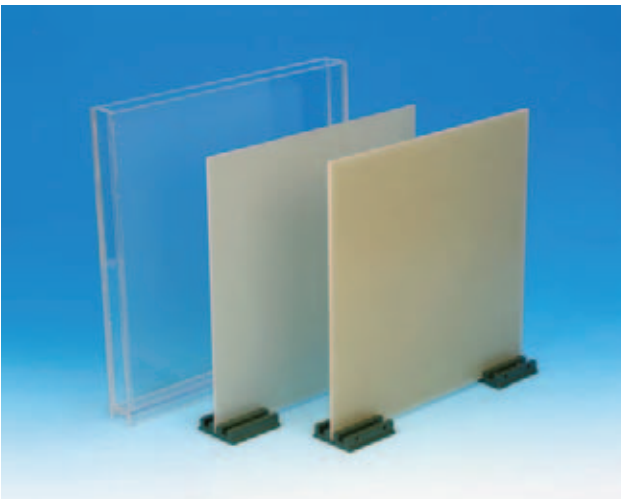


DE531-1P Plate capacitor, large

Used as a capacitor in apparatus assemblies in order to investigate the relationship between charge, voltage and capacitance, as well as to measure dielectric constants; two square aluminium plates with two 4-mm jacks, mounted on and insulated from their respective sliders; for mounting on support stand bases using NTL universal profile rails
Plate size: 200x200 mm (surface area = 400 cm²)

DE531-2P Plate capacitor, small

Design as in DE531-1P, but with plate size 141.5x141.5 mm (surface area = 200 cm²)

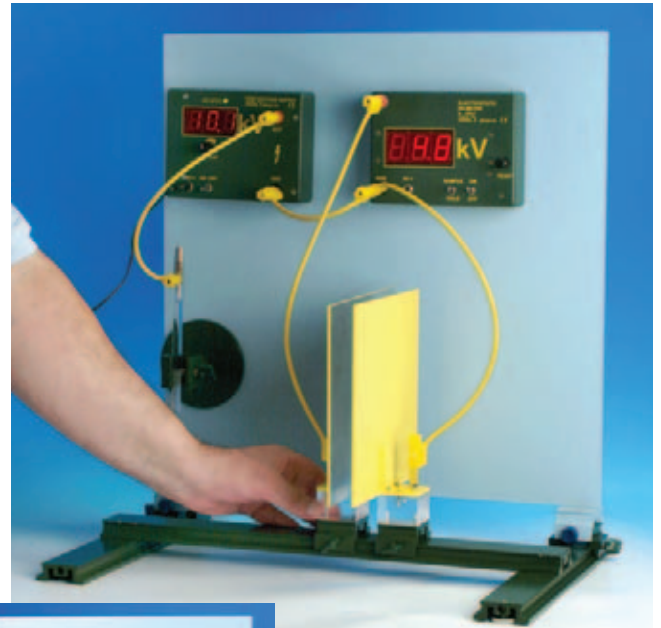


DE531-1D Dielectric plate

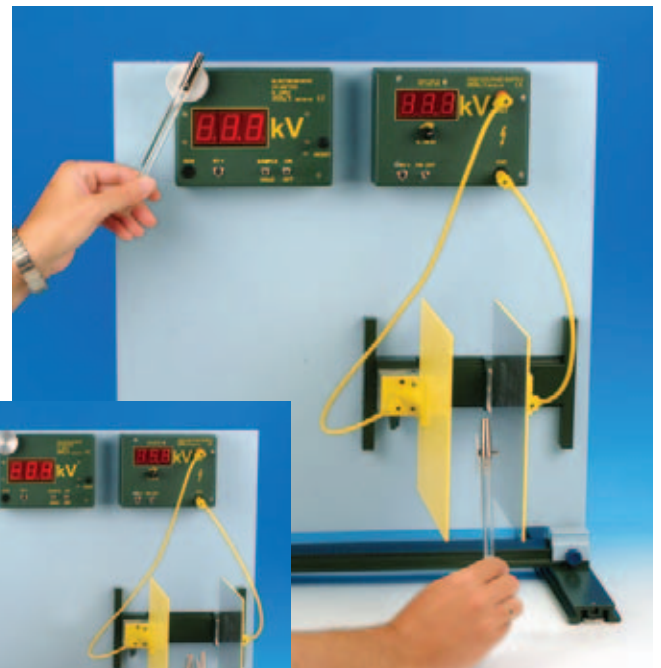
Plastic plates of different thicknesses for use as dielectrics in plate capacitors, set of 2
Dimensions: 200x200 mm

DE531-2K Dielectric cell

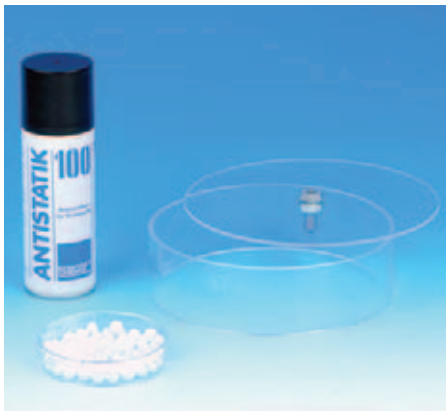
Cell for using water as a dielectric in plate capacitors
Dimensions: 240x240x28 mm



Experiment: Investigating the relationship between capacitance and distance from the plate capacitor - magnetic panel assembly



Experiment: Separation of charges by means of electrostatic induction - magnetic panel assembly



DE536-1D Electrostatics cylinder

For demonstrating, with the aid of styrofoam beads, how charges are transported as well as how an air cleaner works; acrylic cylinder with removable lid, 4-mm jack and point electrode; may be mounted on the capacitor plate of DE530-1K or between the plates of capacitor DE531-1P

Diameter: 200 mm; height: 60 mm

DE540-1A Styrofoam beads, set

Used with electrostatics cylinder DE536-1D for demonstrating "dancing beads".

Diameter: 6 ... 10 mm

DE540-2A Anti-static spray, tin

Used on the surface of materials to prevent interference caused by electrostatic charges

Volume: 200 ml



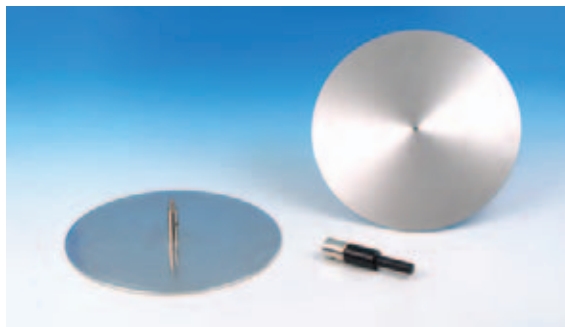
DE532-2S Round metal grid on support

Two round metal grids may be used with a high-voltage power source (see page 264) in order to create a homogeneous electrical field; round wire grid mounted on an insulated support (D=10 mm), including 4-mm jack; D=approx. 295 mm



DE530-2K Hollow plastic sphere with cord

For demonstrating electrostatic induction as well as the forces acting in an electrical field; very low-weight plastic ball with a metallic surface; D=50 mm



DE530-1K Capacitor plate on threaded rod, pair

Used as a capacitor in apparatus assemblies and in order to investigate the relationship between charge, voltage and capacitance; aluminium discs (D=200 mm), each mounted on a threaded rod and with a 4-mm jack; may be mounted on screw post DS406-2N (not included)

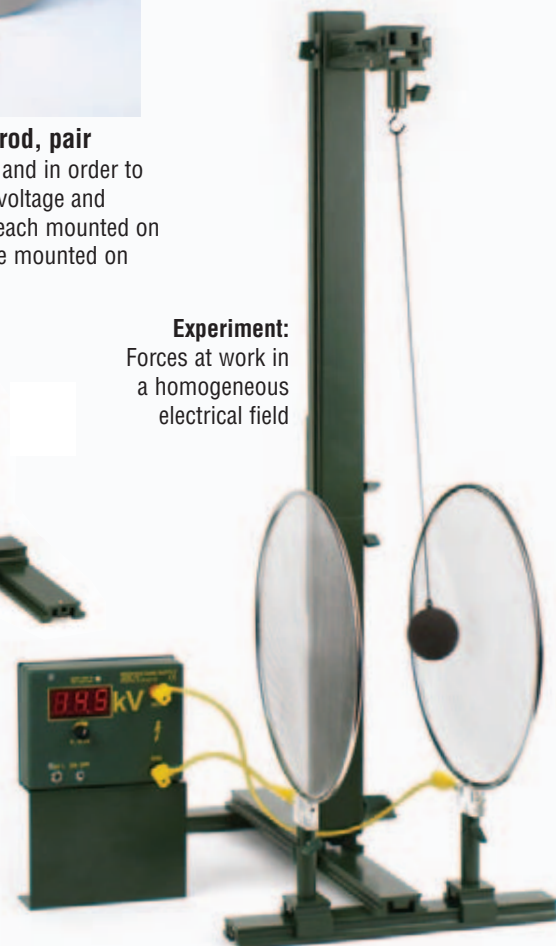


Experiment: "Dancing beads"



Set up: DE530-1K capacitor plates mounted on a large support base, used as a plate capacitor assembly

Experiment:
Forces at work in a homogeneous electrical field





electrostatics



Conducting spheres

For electrostatics experiments: plastic spheres galvanically coated with a metallic surface; with 4-mm plugs for attaching to insulating support DE521-4S

DE520-2I Metal sphere, D=25 mm

DE520-4K Conducting sphere, D=50 mm

DE520-2K Conducting sphere, D=80 mm



Experiment: Transport and measurement of charges - magnetic panel assembly

Voltage supply: "inno" 18 kV high-voltage power supply, battery-powered

Digital measuring instrument: "inno" static voltmeter, battery-powered or Coulombmeter "inno", driven by battery



DE520-1B Faraday cup

For investigating the distribution of charge around a hollow metal body; hollow aluminium cylinder; with 4-mm plugs for attaching to insulating support DE521-4S or to Kolbe-type electroscopes DE500-1E
Height: 135mm; diameter: 72 mm



Experiment: Electrical conductors and the distribution of charge - Faraday cup



electrostatics

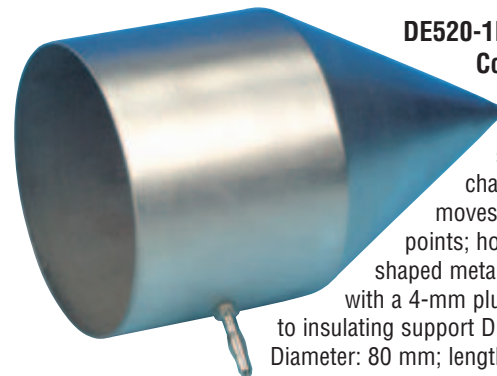


Experiment: Electrical conductors and the distribution of charge - "Cavendish" hemispheres



DE521-4C "Cavendish" hemispheres

For use in setting up a spherical capacitor and, together with the 50-mm conducting sphere DE520-4K, for investigating the effect of electrostatic induction two plastic hemispheres galvanically coated with a metallic surface; with 4-mm plugs for attaching to insulating support DE521-4S
Diameter: 80 mm



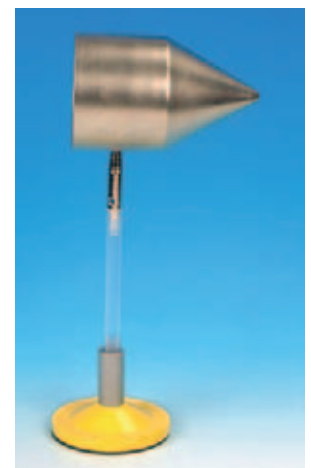
DE520-1K

Cone-shaped conductor

For demonstrating how the charge of a body moves toward its points; hollow, cone-shaped metal body; with a 4-mm plug for attaching to insulating support DE521-4S
Diameter: 80 mm; length: 130 mm



Experiment: "electrostatic wind" - movement of charge to the point



Use: Cone-shaped conductor DE520-1K attached to insulating support DE521-4S and mounted on round base with clamp socket DS100-1R



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DE522-1F Paper bush

For demonstrating how charges of the same polarity repel each other; bush consisting of strips of paper (L=210 mm, B=10 mm), mounted on a 4-mm plug

DE522-2B Line of streamers

For displaying an electrical field; a number of strips of paper (L=200 mm, B=10 mm) attached to a rubber band (L=200 mm); clasp at the ends of the band; may be mounted on conducting sphere (D=80 mm) DE520-2K

DE520-1W Pointed wheel

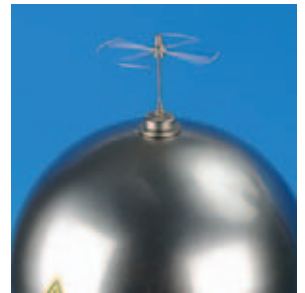
For demonstrating discharge from points; four bent points on a bearing cup and a needle on a 4-mm plug; Diameter: 85 mm



Experiment detail: Line of streamers on conducting sphere, mounted on Van de Graaff generator



Experiment detail: Paper bush



Experiment detail: Pointed wheel mounted on Van de Graaff generator



DE523-1M Electrostatic motor

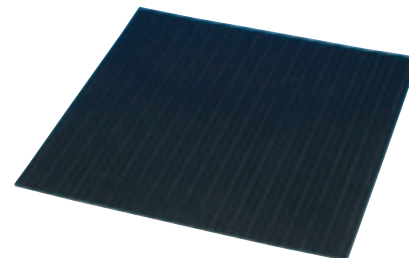
consisting of:

DE523-1Z Acrylic tube with bearing cup

Acrylic tube, closed at one end, with graduation markings
Diameter: 60 mm; height: 160 mm

DE523-2S Point electrodes on brackets, pair

Metal electrodes for mounting on screw post DS406-2N
Diameter: 10 mm; length: 30 mm

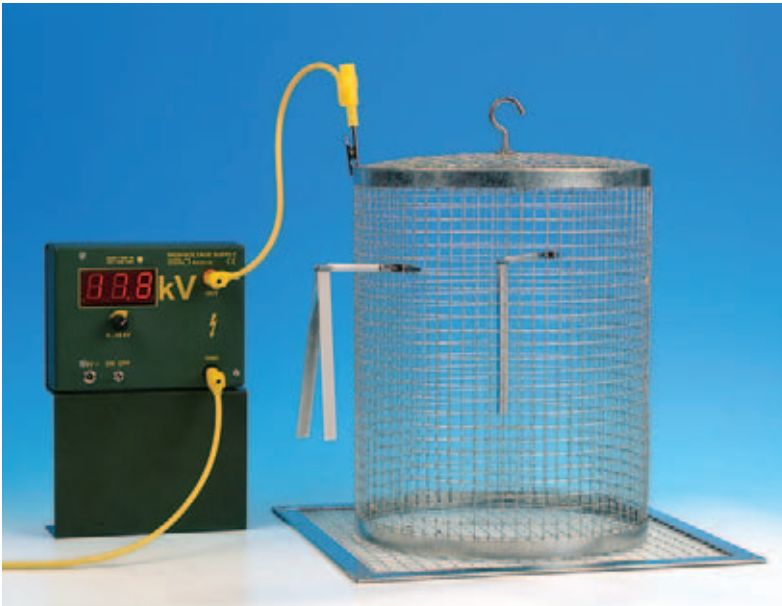


DE519-1I Insulating mat

Rubber mat for insulating persons and apparatus from the ground
Dimensions: 400x400 mm



Experiment: Operation of the electrostatic motor
Acrylic tube with cup bearing pivots on a needle with plug (DE520-1N), and the assembly is mounted on insulating support DE521-4S



Experiment: Faraday cage at work

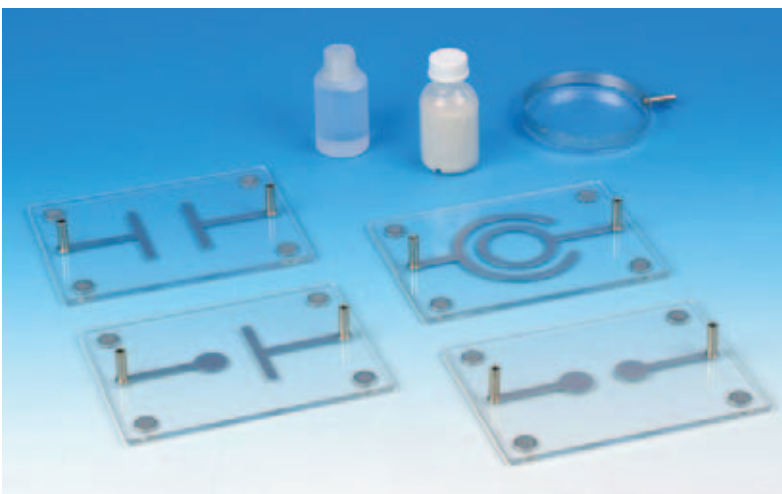


DE520-1F Faraday cage

Metal mesh cage with a hook, used to shield objects from electrical fields
Diameter: 242 mm; height: 320 mm

DE520-1U Wire grid mat

Used as an additional shield with the Faraday cage; wire grid mat on a frame
Dimensions: 320x320 mm



DE524-1F Field line apparatus set

For displaying electrical field lines using an overhead projector
Set consisting of:

Four acrylic plates with scratch-resistant electrode strips of various shapes, two 4-mm sockets on each plate;
Dimensions: 120x160 mm

One dish surrounded by a metal electrode, with a 4-mm socket, D=90 mm

DE524-2R 1x Castor oil, 100 ml, in a plastic bottle

DE524-2G 1x Semolina grains, 100 ml, in a plastic bottle

Recommended power supply:

P3127-1V High-voltage power supply, 18 kV, "inno"
P3120-5B S-shaped assembly platform, for making a table set-up

Experiment topics Electrostatics:

- ESD 001 Separating electrical charges by means of friction
- ESD 002 Two kinds of electrical charges
- ESD 003 Displaying types of electrical charges
- ESD 004 Displaying an electrical charge using an electroscope
- ESD 005 Neutralization of an electrical charge
- ESD 006 Transfer of electrical charge
- ESD 007 Model of an electroscope - function of the housing
- ESD 008 Electrostatic induction
- ESD 009 Separation of charges by means of electrostatic induction
- ESD 010 Wimshurst machine
- ESD 011 Van de Graaff generator - paper bush
- ESD 012 Van de Graaff generator - line of streamers
- ESD 013 Van de Graaff generator - producing sparks
- ESD 014 Cone-shaped conductor

- ESD 015 Van de Graaff generator - movement of charge to the point
- ESD 016 Electrostatic wind - movement of charge to the point
- ESD 017 Electrical conductors and the distribution of charge
- ESD 018 Location of a charge - Faraday cup
- ESD 019 Location of a charge - Cavendish hemispheres
- ESD 020 Faraday cage
- ESD 021 Forces in the homogenous magnetic field
- ESD 022 Mechanical conductivity in metals
- ESD 023 Dependence of the transfer of the charge on the voltage and number of charge carriers
- ESD 024 Plate capacitor - investigating the relationship between capacitance and distance of the plates
- ESD 025 Plate capacitor - investigating the relationship between capacitance and surface area of the plates
- ESD 026 Plate capacitor - influence of a dielectric unit