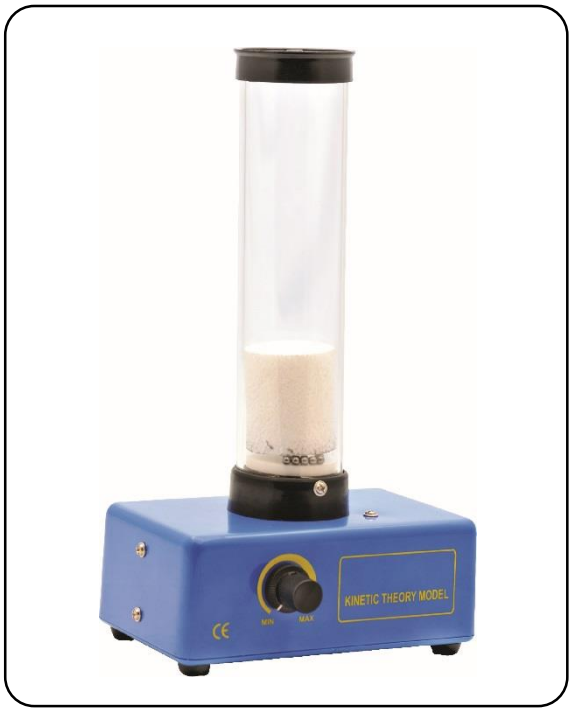
H25365 **Kinetic Theory Apparatus** **NFU384**



Purpose

The apparatus is designed to illustrate qualitatively the various aspects of the kinetic theory of gases.

Apparatus details

The apparatus comprises a clear perspex tube mounted on a base unit. The tube is provided with a cap and a freely sliding expanded polystyrene piston. The base unit contains an agitator piston driven by a low voltage D.C. motor and is fitted with 4mm terminals. The base is designed so that it may be clamped to a bench.

A supply of 3mm diameter phosphor-bronze balls is provided, to act as particles, and a Styrofoam float with which pressure can be increased.

Assembly

Locate the plastic tube firmly into the cup on top of the base unit. Rotate the motor manually by inserting fingers through the large hole in the base of the box to ensure the agitator piston can move freely.

Clamp the base to the side of a bench using two small G clamps and connect the motor terminals to a continuously variable low voltage D.C. supply unit.
NB: Check the maximum voltage marked on the apparatus.

The apparatus is now ready for use.

version H25365.16.12

Operating procedure

1. Place enough metal balls in the tube to cover half to two-thirds of the area of the agitator piston, and fit the metal cap on the top of the tube. The cap prevents the balls from jumping out, and reduces the noise.

2. Switch on the d.c. supply and gradually increase the voltage. As the agitator piston vibrates, the balls are set into random motion, illustrating three-dimensional kinetic motion in a gas.

   Insert the piston inside the tube. It will be supported due to the balls striking it, showing that pressure is being exerted on it.

3. As the voltage ("temperature") is increased, the piston moves up the tube, showing an increase in volume (proportional to height), i.e. Charles' Law. The position of the piston may be marked on the tube, using a chinagraph pencil, at various voltages.

4. To demonstrate Boyle's Law, keep the motor supply constant and load the piston with cardboard discs to show the decrease in height with increase in pressure.

5. To demonstrate the Pressure Law, mark the height of the piston on the tube, then add the Styrofoam float. Increase the supply voltage to show that increased "temperature" restores the piston to its original height.

   The number of balls in the tube can be changed to show the variation of pressure with number of particles.

6. Place a 10-15mm diameter expanded polystyrene ball in the tube. The irregular motion of the large ball due to bombardment by the smaller balls shows a large-scale model of Brownian motion.

Periodic testing

Check the mains lead and plugs at both ends for any damage.

Periodically check the earth bonding and insulation, by performing a Portable Appliance Test (**PAT**). Most schools and local authorities have a regular schedule for such testing.

Check the action of the electronic cutout, by short circuiting the power supply output (check dc and ac outputs separately) using a short 4mm plug lead.

Check that the fuse in the mains plug (5A recommended) and the two fuses (active and spare) in the IEC socket on the back panel are all of the correct rating.

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Disposal of Waste Electrical and Electronic Equipment (WEEE)

Do not dispose of this product with household waste

- For the proper treatment , recovery and recycling please take this product to an appropriate collection point.
- If you are unsure where this is, contact your Local Authority
- By disposing of this product correctly you will be providing positive help to the environment.

Warranty, repairs and spare parts

The Kinetic Theory Apparatus is guaranteed for a period of one year from the date of delivery to the customer. This warranty does not apply to defects resulting from the action of a user such as misuse, improper wiring, any operations outside of its specification, improper maintenance or repair, or unauthorized modification.

Our liability is limited to repair or replacement of the product. Any failure during the warranty period should be referred to Customer Services.

Please contact Customer Services or techsupport@philipharris.co.uk for advice.

Supplier details

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version H25365.16.12