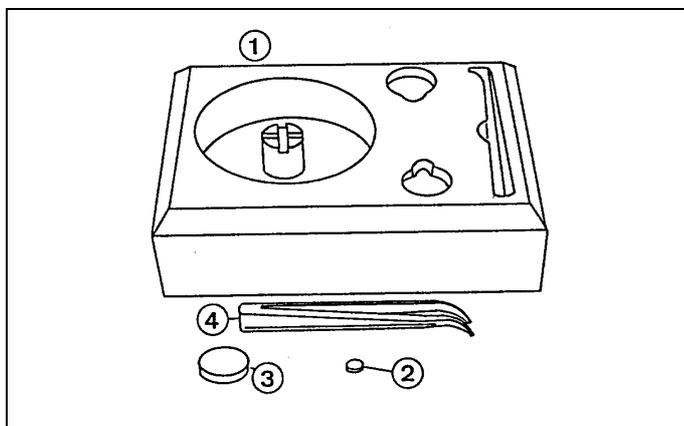


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## 1 Contents

- ① 1 dish for liquid nitrogen
- ② 1 permanent magnet, 8 mm diam.
- ③ 1 superconductor pellet, 26 mm diam.
- ④ 1 plastic forceps, 145 mm long

## 2 The Meissner-Ochsenfeld effect

The Meissner-Ochsenfeld effect is the classical phenomenon used to demonstrate superconductivity.

The effect is caused by the fact that a magnetic flux field cannot penetrate a superconductor. Thus a permanent magnet and a superconductor will repel each other. If a permanent magnet is placed above the superconductor, it will levitate due to the repellency, in a balanced state, above the surface of the magnet - presuming that the magnet is sufficiently lightweight and that its field strength is sufficient.

The superconductor pellet will exhibit superconductive properties even above the temperature of liquid nitrogen.

## 3 Conducting the demonstration

The superconductor pellet is placed in the center of the dish. The dish is then filled with liquid nitrogen so that the pellet is just barely covered.

### **Note:**

Protective goggles and gloves must be worn when working with liquid nitrogen.

The requirements of all safety codes and regulations governing the handling of hazardous materials shall be observed.

The nitrogen will boil violently at first. Once boiling has subsided, use the plastic forceps to position the permanent magnet above the superconductor pellet. It will float about 7 mm above the superconductor.

## Instruction Sheet

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## Meissner-Ochsenfeld effect kit

## 4 Liquid nitrogen - a problem?

Liquid nitrogen has today become a commonly used cooling medium in many technical and industrial applications. You will require 1 to 2 litres of nitrogen for a series of experiments in a classroom hour. Liquid nitrogen is used in many and varied fields so that it can almost always be obtained from a nearby source at minimal effort. The following list of users, which is by no way complete, will illustrate this fact: university and hospital laboratories; agricultural cold-storage plants and insemination stations; manufacturers and processors of plastics; rubber processing operations; plastic film manufacturers and surface coatings companies; the tire industry; blood banks; manufacturers of serums, plasma or pharmaceutical products; deep-frozen foods manufacturers; shipping companies which transport perishable products; manufacturers of powders - regardless of whether powder-coat paints or instant soups.

