

# OPERATING INSTRUCTIONS

## Buoyancy Balance

### 34-8100

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<p><i>In the interests of improving and updating its equipment, ELE reserves the right to alter specifications to equipment at any time</i> <b>ELE International 2003 ©</b></p>		

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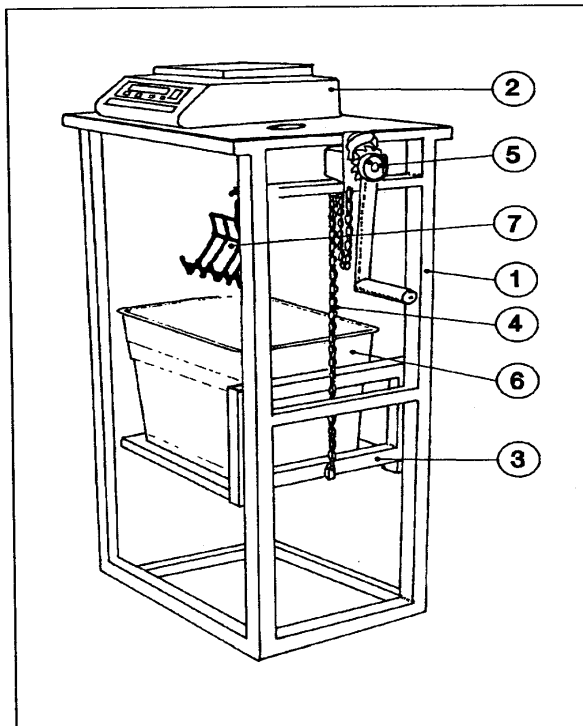
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## 1 Introduction

- 1.1 The determination of volume and weight of materials by the buoyancy method is used for several testing techniques in civil engineering and building construction.
- 1.2 This ELE buoyancy balance has been developed to encompass the following tests:
  - 1.2.1 Density of hardened concrete.
  - 1.2.2 Density of asphalt samples.
  - 1.2.3 Analysis of freshly mixed concrete (BS 1881).
  - 1.2.4 Density of aggregates.
- 1.3 The model operates with an electronic Top-pan programmed balance of 15 kg capacity readable to 0.5 g.
- 1.4 For a full description of the balance and its operation, refer to the manufacturer's handbook.
- 1.5 The unit incorporates an immersed weighing tank mounted on a platform, which can be elevated by a manual action ratchet lifting gear, to allow the test specimen to be weighed in air and weighed in water using the same balance.

## 2 Description

### 2.1 Support frame



- 2.1.1 The support frame (1) comprises a welded steel frame on top of which is mounted the top loading flat pan balance (2).
- 2.1.2 A cantilever platform (3) to support the immersion tank is elevated by a chain (4) attached to it and operated by a manually operated ratchet mechanism (5).

- 2.1.3 The tank provided (6) is suitable to accept concrete cubes up to 150 mm (6 inch). Although it is possible to conduct weight in water in air/water density tests on 150 mm diameter x 300 mm long cylinders using the equipment provided, the water tank should be replaced by one of larger capacity when regular testing is required.
- 2.1.4 A suspension hook is provided to fit under the balance to support the cradle (7) or wire basket used to weigh the various items of material.

### **3 Installation**

#### **3.1 Assembly**

- 3.1.1 Remove the balance from its packing.
- 3.1.2 Carefully invert it and remove the plastic cover and attach the suspension hook from the underside of the balance mechanism.
- 3.1.3 Position the balance on top of the immersion frame so that the hook passes through the large central hole.

#### **3.2 Positioning**

- 3.2.1 The unit can be operated on a rigid flat floor that will not be affected by any surrounding movements or vibration.
- 3.2.2 The balance is provided with adjustable feet. It is important to level the balance before use.
- 3.3 For electrical details for the scales, refer to manufacturer's handbook.

### **4 Calibration**

- 4.1 Remove the hook from the underside of the balance mechanism.
- 4.2 Switch on the balance and leave for 30 minutes.
- 4.3 Press calibrate and, while holding it down, press the tare button.
- 4.4 The display will show C5000.
- 4.5 Place a 5 kg calibration weight on the centre of the plate, wait for the stability light to glow and press calibrate and tare buttons as before. The 'C' will disappear and the display come alive.
- 4.6 Remove the calibration weight. The balance is now ready for use.

### **5 Operation**

- 5.1 Switch on the balance, then suspend the sample carrier below the balance. Its weight will show on the display. Press T/Air button, the weight will continue to be displayed and will be retained in the memory. The light beside the T/Air button will glow.
- 5.2 Immerse the carrier in water to the mark on the stirrup. Its weight in water will be displayed. Press the T/Water button and this weight will be retained in the memory. The light beside the T/Water button will glow.
- 5.3 The weight of the carrier, both in air and water, is now in the memory and provided the same carrier is used, there is no further need to repeat this procedure unless the balance is switched off. During this period, the balance can be used as a normal weighing machine and the tare button used as required.
- 5.4 Place the sample in its carrier. The gross weight is displayed. Press the W/Air button; the nett sample weight will be displayed for a short period of about 10 seconds before reverting to the gross weight. The light beside the W/Air button will glow.

- 5.5 Immerse the sample and carrier in water. The gross weight in water is displayed. Press the W/Water button; the nett weight in water of the sample will be displayed for a short period of about 10 seconds before reverting to the gross weight in water. The light beside the W/Water button will glow.
- 5.6 Press the S/G button and the particle density of the sample will be displayed and held.
- 5.7 To clear the S/G display, press the S/G button again. The display will show zero and the lights beside the W/Air and W/Water buttons will go out.
- 5.8 To carry out further tests, start again from 4.4.
- 5.9 To clear, press T/Air and T/Water and switch balance off. This removes all retained tare weights from memory.

**Note:** If the sample is weighed on the top of the balance and the hanger is immersed in water throughout the operation, it is important that the Tare in Air button is pressed while the carrier is immersed in water.

## **6 Maintenance**

### 6.1 Cleaning

- 6.1.1 The scale exterior and fitting may be wiped clean with a soft cloth moistened with water or a dilute soap or detergent solution.
- 6.1.2 Scouring cleaners, alkali cleaning solutions such as washing soda, or solvents should not be used.

### 6.2 Ratchet lift mechanism

This device should continue to operate without any attention for a considerable period of time.