HFBTE Solids Densimeter

HFBTE Electronic Solid Density Meter User Manual

Model: Solids Densimeter

1. Introduction

This user manual provides detailed instructions for the proper setup, operation, and maintenance of the HFBTE Electronic Solid Density Meter. This precision instrument is designed for accurate density measurement of various solid materials, including but not limited to plastics, rubber, polymers, metals, ceramics, and powders. Please read this manual thoroughly before operating the device to ensure correct usage and optimal performance.

2. Safety Information

- Always operate the densimeter on a stable, level surface to ensure accurate readings.
- Avoid exposing the instrument to extreme temperatures, humidity, or direct sunlight.
- Do not immerse the main unit in water or other liquids. Only the designated sink and test components are designed for liquid contact.
- Use only the provided power adapter. Using an incorrect power supply may damage the instrument.
- Keep the instrument clean and free from dust and debris.
- Handle samples and accessories with care to prevent damage or injury.
- In case of malfunction, do not attempt to repair the instrument yourself. Contact qualified service personnel.

3. Product Overview

The HFBTE Electronic Solid Density Meter is a high-precision gravimeter featuring a digital display and an intuitive interface for direct density readings. It is equipped with a sensitive sensor for accurate measurements and includes features like automatic zero tracking and overload warning.

Figure 3.1: Front View of the Densimeter. This image shows the main unit with the measurement platform and the transparent water sink assembly. The control panel with ON/OFF, ENTER, and ZERO buttons is visible.

Figure 3.2: Rear View of the Densimeter. This image highlights the rear panel of the instrument, showing the power input (12VDC) and the RS-232C interface for data export.

Figure 3.3: Angled View of the Densimeter. This perspective shows the overall compact design of the instrument, including the main display and the measurement setup.

Figure 3.4: Top View with Sink Lid Open. This image displays the transparent water sink with its lid open, revealing the internal structure for placing samples during measurement.

Figure 3.5: Included Accessories. This image shows the various standard accessories that come with the densimeter, such as the test board, tweezers, thermometer, power adapter, and measuring accessories for grains and floating bodies.

Standard Accessories:

- Host (Main Unit)
- Sink (Transparent Water Tank)
- Test Board
- Tweezer
- Thermometer
- Windproof and Dustproof Cover
- Set of Measuring Grain Accessories
- Set of Measuring Floating Body Accessories
- Power Transformer

4. Setup

1. **Unpacking:** Carefully remove all components from the packaging. Verify that all standard accessories listed in Section 3 are present.
2. **Placement:** Place the main densimeter unit on a stable, flat, and vibration-free surface. Ensure there is adequate space around the instrument for operation and ventilation.
3. **Assemble Sink:** Place the transparent water sink onto the designated area of the main unit's measurement platform. Ensure it is seated securely.
4. **Power Connection:** Connect the provided power transformer to the power input port on the rear of the densimeter. Plug the transformer into a suitable electrical outlet.
5. **Initial Power On:** Press the **ON/OFF** button to power on the instrument. The display should illuminate.
6. **Environmental Considerations:** For optimal accuracy, operate the densimeter in a room with stable temperature and humidity, away from direct drafts or air conditioning vents.

5. Operation

Measurement Procedure for Solid Materials:

This procedure outlines the steps for measuring the density of solid samples using the water displacement method.

1. **Prepare the Sink:** Fill the transparent water sink with distilled water up to the indicated fill line. Ensure no air bubbles are present in the water.
2. **Power On and Zero:** Press the **ON/OFF** button to turn on the densimeter. Wait for the display to stabilize. Press the **ZERO** button to set the display to zero.
3. **Measure Weight in Air:** Carefully place the sample on the test board (or appropriate accessory for the sample type) on the measurement platform. Ensure the sample is stable and not touching the sides of the sink or any other part of the instrument. Read the weight displayed on the screen. Press the **ENTER** button to record this weight (weight in air). The instrument will store this value.
4. **Measure Weight in Water:** Without removing the sample from the test board, carefully lower the test board and sample into the water-filled sink. Ensure the sample is fully submerged and no air bubbles are clinging to it. The suspension wire (if used) should be perpendicular and not touch the sink walls. Read the new weight displayed on the screen. Press the **ENTER** button again to record this weight (weight in water).
5. **Density Display:** After the second **ENTER** press, the densimeter will automatically calculate and display the density value (g/cm^3) of the sample.
6. **Repeat Measurement:** For increased accuracy, it is recommended to perform multiple measurements and average the results.

Special Functions:

- **Solution Compensation:** If using a liquid other than water as the measurement medium, refer to the specific instructions in the full manual for solution compensation settings to ensure accurate density calculations.
- **RS-232C Interface:** The instrument includes an RS-232C interface for connecting to a computer or printer, allowing for data export and record-keeping. Consult the software/driver instructions for connectivity.

6. Maintenance

- **Cleaning:** After each use, especially when using water, empty the sink and wipe it dry with a soft, lint-free cloth. Clean the exterior of the densimeter with a damp cloth. Do not use abrasive cleaners or solvents.
- **Storage:** When not in use, store the densimeter in a clean, dry, and dust-free environment. Use the provided windproof and dustproof cover to protect the instrument.
- **Calibration:** While the instrument is designed for high accuracy, periodic calibration with known reference standards is recommended to maintain precision. Refer to the full manual for detailed calibration procedures or contact HFBTE support.
- **Accessory Care:** Clean all accessories (test board, tweezers, etc.) after use and store them properly to prevent damage.

7. Troubleshooting

Problem	Possible Cause	Solution
Instrument does not power on.	Power adapter not connected; Power outlet faulty; Instrument fault.	Check power connections; Try a different outlet; Contact support.
Inaccurate readings.	Unstable surface; Air bubbles on sample/sink; Incorrect zeroing; Temperature fluctuations; Sample touching sink walls.	Ensure stable surface; Remove air bubbles; Re-zero before measurement; Ensure stable environment; Reposition sample.
Display shows "OVERLOAD".	Sample weight exceeds maximum capacity (300g).	Remove sample; Use a sample within the specified weight range.
No response from buttons.	Temporary software glitch; Button malfunction.	Power off and restart the instrument; If issue persists, contact support.

8. Specifications

- **Density Resolution:** 0.001 g/cm^3
- **Maximum Weight Capacity:** 300g
- **Minimum Weight:** 0.005g
- **Measuring Range:** 0.001 – 99.999 g/cm^3
- **Product Dimensions:** 17.32 x 7.48 x 13.78 inches (L x W x H)
- **Item Weight:** Approximately 10.58 ounces (300 grams)

- **Power Source:** Battery Powered (via included power transformer)
- **Interface:** RS-232C
- **Color:** Blue (control panel) / White (main body)

9. Warranty and Support

For warranty information, technical support, or service inquiries, please contact HFBTE customer service. Refer to your purchase documentation for specific warranty terms and contact details. You may also visit the official HFBTE store on Amazon for additional resources and contact information.

HFBTE Store Link: Visit the HFBTE Store