



USER MANUAL

VeroRes

CARBON RESIDUE ANALYZER

The Ramsbottom Carbon Residue Tester, following ASTM D524 Standard Test Method for Ramsbottom Carbon Residue of Petroleum Products, heats a sample to 550°C, evaporating volatile matter and leaving a carbon residue. After cooling and weighing, the residue is calculated as a percentage of the original sample. The instrument operates up to 650°C and requires placement in a flat, low-vibration area away from hazards.

TABLE OF CONTENTS

2

INSTRUMENT FEATURES & OPERATIONS

Key features and operational guide of the instrument.

6

ESSENTIAL PRODUCT INSTALLATION

Overview of essential product installation steps.

8

VeroRes STANDARD TEST METHOD

Overview of the VeroRes standard test method.

INSTRUMENT

FEATURES & OPERATIONS

INSTRUMENT FEATURES & OPERATIONS

INSTRUMENT DESCRIPTIONS

Power Switch

This switch controls the power to the entire unit. When the power switch is in the ON position, the digital temperature display and digital control panel are on and illuminated.

Temperature Controller

Temperature controller as shown in Figure 1 provides full temperature up to 650°



Figure 1: Temperature Controller



INSTRUMENT FEATURES & OPERATIONS

INSTRUMENT OPERATION

1. Power On the Tester

Turn on the main power switch to the Ramsbottom Carbon Residue Tester.

2. Set the Required Temperature

Set the required temperature by through the temperature controller as prescribed by the test method.



The unit will take approximately 20 minutes to heat and equilibrate the sample chamber to 550 °C.

3. Sample Temperature Display

The sample temperature sensor with the sample well temperature.



Figure 2: Instrument Operation

INSTRUMENT FEATURES & OPERATIONS

INSTRUMENT DETAILS



1. Temperature Control 2. Heater On/Off 3. Sample Temperature 4. Sample Tray 5. Sample Wells 6. Sample Temp. Sensor

Figure 3: Instrument details

ESSENTIAL
**PRODUCT
INSTALLATION**

ESSENTIAL PRODUCT INSTALLATION

PRODUCT INSTALLATION ENVIRONMENT

- Avoid direct sunlight
- Install at a flat place with low vibration
- Do not install in a place where flammable gas may leak
- Do not install in a place where strong and high frequency noise may occur
- Do not install the product where there is a risk of water leakage or short circuit
- Do not install the product in an enclosed area

POWER CONNECTION

- Set the power switch to OFF
- Connect the power cord to the main body, connect main body power to power outlet.



Figure 4: Power Connection

VeroRes

STANDARD TEST METHOD

SUMMARY OF TEST METHOD

ASTM D524 Standard Test Method for Ramsbottom Carbon Residue of Petroleum Products.

The sample, after being weighed into a special glass bulb with a capillary opening, is placed in a metal furnace maintained at approximately 550°C. The sample is quickly heated to the point where all volatile matter evaporates from the bulb, with or without decomposition, while the heavier residue remaining in the bulb undergoes cracking and coking reactions.

During the latter portion of the heating period, the coke or carbon residue is subjected to further slow decomposition or slight oxidation due to the possible intake of air into the bulb. After the specified heating period, the bulb is removed from the furnace, cooled in a desiccator, and weighed again.

The residue remaining is calculated as a percentage of the original sample and reported as the Ramsbottom carbon residue.

Provision is made to determine the proper operating characteristics of the furnace with a control bulb containing a thermocouple, which must provide a specified time-temperature relationship.

PROCEDURE

Place a new glass coking bulb in the coking furnace at 550°C for about 20 minutes to decompose any foreign organic matter and remove water. Then, place it in a closed desiccator over CaCl₂ for 20 to 30 minutes, and then weigh it to the nearest 0.1 mg.

Shake thoroughly the sample to be tested, first heating it to 50°C ± 10°C for 0.5 hours when necessary to reduce its viscosity. Immediately following the heating and shaking, strain the sample through a 100-mesh wire screen.

By means of a hypodermic syringe or the device shown in Fig. 3, introduce into the coking bulb an amount of sample as indicated in Table 1. Make sure that no oil remains on the exterior surface or on the inside of the neck of the bulb. Reweigh the bulb and contents to the nearest milligram.

If the sample foams or spatters, repeat the test using the next smaller sample size listed in Table 1. In reporting the results, include the size when such small samples are used.

If difficulty is encountered in loading very viscous or asphaltic samples of any size into the glass coking bulb, consider preheating the sample or using a different loading technique to ensure proper sample transfer.

Sample sizes

RAMSBOTTOM CARBON RESIDUE, (%)	SAMPLE SIZE, (GRAM)
Less than 6.0	4.0 ± 0.1
6.0 to 14.0	1.0 ± 0.1
14.1 to 20.0	0.5 ± 0.1

Table 1: Sample sizes

VeroRes STANDARD TEST METHOD

PROCEDURE

Place the coking bulb in a standard performance well with the furnace at the checking temperature, and allow it to remain for 20 ± 2 minutes.

Remove the bulb with metal tongs, the tips of which have just been heated.

Duplicate the furnace and bulb conditions used when standardizing that bulb well.

If there is appreciable loss of oil from frothing, discard the test and repeat the determination using a smaller sample.

i Frothing can be due to water which can be removed by heating gently in a vacuum and sweeping out the vapor with nitrogen prior to filling the bulb.

After removal, cool the bulb in a desiccator under the same conditions (including time for weighing) used before filling the bulb.

When removing the bulb from the desiccator, examine it to make sure there are no foreign particles adhering to the bulb. If any are found, such as black particles sometimes on the capillary neck, brush them off with a piece of sized paper or a camel's hair brush.

Weigh the bulb to the nearest 0.1 mg.

Discard the used glass coking bulb.

i In studies of oil characteristics, valuable information can often be obtained from a simple visual inspection of the coking bulb after the test. Observations such as whether the coke nearly fills the bulb, whether any liquid residue or droplets remain, and whether the residue is black and flaky or instead colored and powdery (indicating the presence of inorganic materials) can provide useful insights into the sample's composition and behavior.

PHONE
+1 781 818 8133

EMAIL
sales@verosci.com

WEBSITE
www.verosci.com

ADDRESS
Vero Scientific LLC
867 Boylston Street
5th Floor #1409
Boston, MA 02116
United States

Copyright © 2025
Vero Scientific
All rights reserved.



As Vero Scientific, we provide advanced measurement technologies, preventive maintenance solutions, and cloud-based analytics for oil and fuel analysis. Our mission is to empower industries with precise, reliable, and sustainable solutions.