UTAH DEPARTMENT OF TRANSPORTATION

TECHNICAL BULLETIN MT-04.08 December 22, 2004

BARNSTEAD NCAT ASPHALT CONTENT TESTER

INTRODUCTION

The NCAT Asphalt Content Tester is an analyzer that determines the asphalt content of a sample by loss on ignition. The sample is weighed continuously throughout the ignition procedure. The NCAT Asphalt Content Tester's software identifies the endpoint of ignition and indicates the completion of the test. A printer documents the results.

HOW IT IS USED

UDOT determines Asphalt Content for acceptance on construction projects according to AASHTO T 308, Determining Asphalt Binder Content of HMA by the Ignition Method. Central, Region and Field Laboratories



have been utilizing the NCAT Asphalt Content Tester since 1995. Although other manufacturers have produced an ignition oven, UDOT currently only has Barnstead NCAT Asphalt Content Testers. Throughout the years the basic oven has not changed although the software has been updated and the manufacturer of the internal balance has changed. The operator will need to read the Operation Manual for a given oven.

SETTINGS

Printer: The printer automatically prints a record of the ignition oven's operation. At the beginning of the test the printer will print the current date and time, then print spaces to record sample identification information, and will then print the filter and chamber temperature set points. If the printer is set to print the intermediate information, it will print the elapsed minutes, chamber temperature, direct weight loss in grams and uncorrected percentage of sample weight loss each minute throughout the testing. When the test is complete the printer will print:

- The calibrated asphalt content
- The Bitumen Ratio
- The calibration factor
- The temperature compensation factor
- The total uncorrected percentage of the sample weight lost
- Total weight lost in grams
- The initial sample weight
- The total elapsed time for the test

Chamber Set Point: The chamber set point has a range of 0°C to 900°C. When performing a test according to AASHTO T 308, the Chamber Set Point is 538° C, unless, by test procedure the temperature has been lowered to 482° C due to aggregate degradation, indicated by a correction factor greater than 1.0%.

Stability Threshold: The Stability Threshold is the set point that determines when the test is complete. AASHTO T 308 requires the **Stability Threshold set at 0.01%**. This means that if there is less than 0.01% loss after three consecutive minutes the test is complete. The Stability Threshold has a range of 0.01% to 0.5%. If the Stability Threshold is not set correctly there is a potential for a large variation in

test results. The Stability Threshold is only discernable for a given test if the intermediate values have been printed; therefore it is necessary to print all intermediate values (continuous tape) to meet AASHTO procedure.

Filter Temperature: The normal operating temperature of the filter is 750° C.

LIFT TESTS

The lift test measures the blower efficiency when the ignition oven is in an unloaded condition and at room temperature. To run a lift test the operator is required to tare the balance, depress the start /stop key, and observe the balance display. The display should read –3.2 to –8.2 grams, indicating the airflow through the chamber; a high negative number in this range (approaching –8.2) indicates good airflow, which is necessary for ignition in the chamber and a reliable test. A high velocity of the exhaust flow (a reading of a negative number exceeding –8.2 grams) may blow fines from the basket resulting in an exaggerated asphalt cement content. As the negative number decreases less airflow is indicated and action should be taken if a lift test is out of specification or approaching borderline, e.g. -3.5 grams. Typical actions may include: blower maintenance, evaluating the exhaust system and/or adjusting the door fit. If these steps do not improve the lift test results sufficiently, contact Graham Starkie, Equipment Certification Supervisor, listed below. The lift test should be performed at intervals frequent enough to ensure proper operation of the equipment (more frequently during heavy use of the equipment). Results, dates and actions taken, if necessary, are recorded in the laboratory quality systems manual.

ROUTINE CARE AND MAINTENANCE

Follow the manufacturer's instructions. In operation manuals dated from 1997 and newer, the recommendation is: periodically fire the chamber at 650°C for two hours in the idle mode to clean element plates. During heavy use of the equipment this may be necessary daily.

Blower Maintenance: The blower chamber accumulates soot and the effectiveness of the blower diminishes resulting in a loss of airflow through the ignition chamber. Clean and oil the blower about every six months or when the "lift test" results indicate a decline in blower efficiency. Blower maintenance may be required more frequently during heavy use. See Operation Manual for specific instructions on cleaning the blower and the oil recommended.

Vacuum the floor of the ignition chamber as needed.

MOVING THE IGNITION OVEN

Barnstead International's technical support recommends: When moving an ignition oven it should be thoroughly cleaned and the scale, hearth plate and ceramic tubes removed. The ignition chamber should be stuffed with an insulating material to support and stabilize the element plates. It is suggested that when moving or storing the ignition oven the scale be wrapped in insulation, stored in the ignition chamber and the rest of the chamber then filled with insulating material. This will keep the scale with the appropriate oven as not all scale and ignition oven hardware/software are compatible. After the ignition oven is in its new location it is necessary to schedule an equipment inspection at the website listed http://www2.udot.utah.gov/index.php/m=c/tid=418.

WINTERIZING THE IGNITION OVEN

If the ignition oven will not be in use for a period of time, clean the oven as mentioned above and disconnect it from the power source, as surges have damaged printers in the past. If possible, it is also recommended to disconnect the exhaust ducting. Upon start-up, reconnect power, inspect exhaust system for blockage and reconnect, check all settings and perform "lift test."

FURTHER INFORMATION

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