
Standard Practice for Installation, Operation, and Maintenance of Ignition Furnaces

AASHTO Designation: R 96-19 (2023)¹

First Published: 2019

Reviewed but Not Updated: 2023

Technical Subcommittee: 2c, Asphalt–Aggregate Mixtures



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. This standard practice is for the initial installation, operation, and maintenance of an ignition furnace for measuring the asphalt content of an asphalt mixture according to T 308. The aggregate recovered after ignition can be used for gradation analysis according to T 30.
 - 1.2. Failure to properly install, operate, or maintain the ignition furnace may result in erroneous measurements, additional hazards, or both.
 - 1.3. The values stated in SI units are to be regarded as the standard.
 - 1.4. *This standard practice does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish safety and health practices along with determining the applicability of regulatory limitations prior to use.*
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2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
 - < R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - < T 30, Mechanical Analysis of Extracted Aggregate
 - < T 308, Determining the Asphalt Binder Content of Asphalt Mixtures by the Ignition Method
 - 2.2. *Manufacturers' Manuals:*
 - < Carbolite Gero, Operating and Maintenance Instructions—Asphalt Binder Analyser
 - < Gilson Company, Inc., Operating Manual—Gilson Binder Ignition System HM-378
 - < ThermoFisher, Thermolyne National Center for Asphalt Technology (NCAT) Asphalt Content Tester Installation and Operation Manual
 - < Troxler Electronic Laboratories, Inc., Manual of Operation and Instruction—Troxler New Technology Oven (NTO) Asphalt Content Ignition Oven
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3. FURNACE INSTALLATION

- 3.1. Prior to installing the furnace, read the manufacturer's manual.
- 3.2. *Locating the Ignition Furnace:*

- 3.2.1. *There are a number of considerations when choosing a location to install an ignition furnace:*
- 3.2.1.1. *Spacing from Wall*—Follow manufacturer’s recommendation for clear space between furnace and wall. Recommended clear space ranges from 150 to 300 mm (6 to 12 in.) and can be dependent on wall type.
- 3.2.1.2. *Space for Cooling Baskets*—If possible, situate the furnace such that there is adequate space to place hot baskets beside or below the furnace for cooling. This minimizes the distance the hot baskets need to be moved. The Carbolite, ThermoFisher (Thermolyne), and Troxler doors are hinged on the left, so it is ideal to have clear space on the right side of or below the furnace. The Gilson furnace door swings down, so the cooling zone may be placed on either side of the furnace. Some laboratories have constructed shelves that allow hot baskets to be placed below the furnace.
- 3.2.1.3. *Furnace Height*—If possible, situate the furnace so that the sample baskets are approximately at waist height when loaded inside the furnace. Typically, a height of 0.6 to 0.7 m (24 to 28 in.) is recommended by the ignition furnace manufacturer.
- 3.2.1.4. *Internal Scale Access*—The lower front panel of the ThermoFisher furnace is hinged for access to the scale. If possible, situate the ThermoFisher furnace so that the front panel can be opened without moving the furnace. The scale for the Carbolite furnace is accessed and installed through a panel on the lower left side of the furnace. The furnace should be situated with adequate clear space on the left side to allow this panel to be accessed.
- 3.2.1.5. *Access for Routine Cleaning*—Read the manufacturer’s maintenance instructions. The Carbolite, ThermoFisher, and Troxler furnaces require routine cleaning. A vacuum cleaner (with appropriate filter) can be used to remove accumulated soot. The motor/impeller assembly may need to be removed for better cleaning depending on the accumulation of soot.
- 3.2.1.5.1. *Carbolite*—Soot must be removed from the plenum chamber, impeller, chimney, and ducts. The plenum chamber is accessed through the upper side access panel.
- 3.2.1.5.2. *ThermoFisher*—Access the top of the furnace to clean and lubricate the blower motor. This requires detaching the exhaust duct. ThermoFisher recommends a minimum of 40 in. clear space above the furnace for this purpose.
- 3.2.1.5.3. *Troxler*—The exhaust plenum box on the right side of the Troxler furnace requires routine cleaning as well. Having clear space to place sample baskets on the right side of the Troxler furnace will also provide adequate space to access the plenum box.
- 3.2.1.6. *Exhaust Routing*—Consider how the furnace’s exhaust will be routed. Further details on exhaust venting requirements are provided in Section 3.4.
- 3.3. *Electrical Requirements:*
- 3.3.1. The furnace should be wired by a qualified electrician to meet the electrical requirements detailed by the manufacturer. Prior to ordering the furnace, the available laboratory voltage should be confirmed. Only Troxler makes a furnace that can function on a 110 V circuit. Carbolite, Gilson, and Troxler make furnaces that will function on 208 to 240 V. ThermoFisher makes a model for 208 V and a model for 220/240 V. The ThermoFisher 220/240 V model can function on 208 V with the addition of a transformer.
- 3.3.2. Furnaces should generally be wired with a plug instead of hard wired unless required by local codes. If hard wired, a disconnect or isolator switch should be included for maintenance. Plugged connections allow the furnace to be rotated, if necessary, and provide a convenient method for disconnecting power when servicing.