



Standard Test Method for Carbon Tetrachloride Activity of Activated Carbon¹

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INTRODUCTION

Carbon tetrachloride has been identified as a potential contributor to stratospheric ozone depletion. Amendments to the Montreal Protocol in 1990 mandate the global phase-out of carbon tetrachloride production by the year 2000. The 1990 Amendments to the U.S. Clean Air Act were even more aggressive, accelerating the U.S. phase-out deadline to the mid-1990's. A small amount of carbon tetrachloride will still be produced for critical industrial applications; however, in 1993 carbon tetrachloride will not be available for laboratory purposes. With these developments, use of this test method is not recommended.

Instead, the use of Test Method D 5742 is recommended. The correlation obtained between n-butane activity values and carbon tetrachloride activity values is contained in that test method.²

1. Scope

1.1 This test method covers the determination of the activation level of activated carbon. Carbon tetrachloride (CCl_4) activity is defined herein as the ratio (in percent) of the weight of CCl_4 adsorbed by an activated carbon sample to the weight of the sample, when the carbon is saturated with CCl_4 under conditions listed in this test method.

1.2 *This standard 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 appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Specific hazards statements are given in Section 7.*

2. Referenced Documents

2.1 ASTM Standards:

- D 2652 Terminology Relating to Activated Carbon³
- D 2854 Test Method for Apparent Density of Activated Carbon³
- D 2867 Test Method for Moisture in Activated Carbon³
- D 5742 Test Method for the Determination of Butane Activity of Activated Carbon³
- E 300 Practice for Sampling Industrial Chemicals⁴
- E 691 Practice for Conducting an Interlaboratory Study to

¹ This test method is under the jurisdiction of ASTM Committee D-28 on Activated Carbon and is the direct responsibility of Subcommittee D28.04 on Gas Phase Evaluation Tests.

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² The data for this correlation is available from ASTM Headquarters. Request RR: D 28–1000.

³ *Annual Book of ASTM Standards*, Vol 15.01.

⁴ *Annual Book of ASTM Standards*, Vol 15.05.

Determine the Precision of a Test Method⁵

3. Terminology

3.1 *Definitions*—Terms relating to this test method are defined in Terminology D 2652.

4. Summary of Test Method

4.1 Activity is determined by flowing CCl_4 -laden air through a sample of carbon of known weight, under specified conditions, until there is no further increase in the weight of the sample, then determining the weight of the CCl_4 adsorbed. The apparatus required for the test consists essentially of means to control the supply air pressure, to remove oil and water in both liquid and vapor states from the supply air, to produce the specified concentration of CCl_4 in the air flowed through the carbon sample, and to control the flow rate of the gas (air + CCl_4) mixture through the sample.

5. Significance and Use

5.1 Activity as measured by this test method is basically a measure of the pore volume of the activated carbon sample. This test method is therefore a means of determining the degree of completion of the activation process, hence a useful means of quality control for gas-phase activated carbons. This activity number does not necessarily provide an absolute or relative measure of the effectiveness of the tested carbon on other adsorbates, or at other conditions of operation.

6. Apparatus and Materials

6.1 *Carbon Tetrachloride*, reagent grade.

6.2 *Supply of Clean, Dry, Oil-Free Air*—The air must be passed through a HEPA filter and a bed of activated carbon

⁵ *Annual Book of ASTM Standards*, Vol 14.02.