



Standard Test Method for Visualizing Particulate Sizes and Morphology of Particles Contained in Hydrogen Fuel by Microscopy¹

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1. Scope

1.1 This test method is primarily intended for visualizing and measuring the sizes and morphology of particulates in hydrogen used as a fuel for fuel cell or internal combustion engine powered vehicles. This test method describes procedures required to obtain size and morphology data of known quality. This test method can be applied to other gaseous samples requiring determination of particulate sizes and morphology provided the user's data quality objectives are satisfied.

1.2 Mention of trade names in standard does not constitute endorsement or recommendation. Other manufacturers of equipment, software or equipment models can be used.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

D7650 Test Method for Test Method for Sampling of Particulate Matter in High Pressure Hydrogen used as a Gaseous Fuel with an In-Stream Filter

2.2 SAE Standards:³

SAE TIR J2719 Hydrogen Quality Guideline for Fuel Cell Vehicles, April 2008

¹ This test method is under the jurisdiction of ASTM Committee D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.14 on Hydrogen and Fuel Cells.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, <http://www.sae.org>.

SAE J6000 Compressed Hydrogen Surface Vehicle Refueling Connection Devices

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *constituent*—component (or compound) found within a hydrogen fuel mixture

3.1.2 *contaminant*—impurity that adversely affects the components within the fuel cell system or the hydrogen storage system

3.1.3 *fuel cell grade hydrogen*—hydrogen satisfying the specifications in SAE TIR J2719.

3.1.4 *gaseous fuel*—material to be tested, as sampled, without change of composition by drying or otherwise.

3.1.5 *HEPA Filter*—A high efficiency particulate air filter which, by definition, removes at least 99.97% of airborne particles 0.3 μ m in diameter.

3.1.6 *SAE TIR J2719*—Information Report on the development of a hydrogen quality guideline for fuel cell vehicles

3.2 Acronyms:

3.2.1 *FCV*—Fuel Cell Vehicle

3.2.2 *PSA*—Particulate sampling adapter for sampling particulate in hydrogen fuel

3.2.3 *HQSA*—Hydrogen quality sampling adapter for sampling gaseous hydrogen fuel

3.2.4 *SAE*—Society of Automotive Engineers International

3.2.5 *PEM*—Polymer Electrolyte Membrane, also called Proton Exchange Membrane

3.2.6 *PEMFC*—proton exchange membrane fuel cells

4. Summary of Test Method

4.1 This procedure is for visualizing and measuring, by microscopy, the sizes and morphology of particulates after collection of particulates contained within hydrogen fuel at fueling station dispenser nozzles (Test Method **D7650**, SAE J2600) or other gaseous fuel delivery system dispenser interfaces. Every precaution should be taken to avoid contamination of particulates onto the filter coming from the PSA, the analytical system, ambient air, filter handling or other environmental sources.