



Standard Test Method for Evaluating the Ignition Sensitivity and Fault Tolerance of Oxygen Regulators Used for Medical and Emergency Applications¹

This standard is issued under the fixed designation G 175; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This standard describes a test method for evaluating the ignition sensitivity and fault tolerance of oxygen regulators used for medical and emergency applications.

1.2 For the purpose of this standard, a pressure regulator is a device, also called a pressure-reducing valve, that is intended for medical or emergency purposes and that is used to convert a medical or emergency gas pressure from a high, variable pressure to a lower, more constant working pressure [21 CFR 868.2700 (a)].

1.3 This standard applies only to oxygen regulators used for medical and emergency applications that are designed and fitted with CGA 540 inlet connections or CGA 870 pin-index adapters (CGA V-1).

1.4 This standard provides an evaluation tool for determining the fault tolerance of oxygen regulators used for medical and emergency applications. A fault tolerant regulator is defined as (1) having a low probability of ignition as evaluated by rapid pressurization testing, and (2) having a low consequence of ignition as evaluated by forced ignition testing.

1.5 This standard is not a design standard; however, it can be used to aid designers in designing and evaluating the safe performance and fault tolerance capability of oxygen regulators used for medical and emergency applications (G 128).

NOTE 1—It is essential that a risk assessment be carried out on breathing gas systems, especially concerning oxygen compatibility (refer to ASTM G 63 and G 94) and toxic product formation due to ignition or decomposition of nonmetallic materials as weighed against the risk of flammability (refer to ISO 15001.2). See Appendix X1 and X2.1 for details.

1.6 This standard is also used to aid those responsible for purchasing or using oxygen regulators used for medical and emergency applications in ensuring that selected regulators are tolerant of the ignition mechanisms that are normally active in oxygen systems.

1.7 This standard does not purport to address the ignition sensitivity and fault tolerance of an oxygen regulator caused by contamination during field maintenance or use. Regulator designers and manufacturers should provide design safeguards to minimize the potential for contamination or its consequences (G 88).

1.8 *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:

G 63 Guide for Evaluating Nonmetallic Materials for Oxygen Service²

G 88 Guide for Designing Systems for Oxygen Service²

G 93 Practice for Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments²

G 94 Guide for Evaluating Metals for Oxygen Service²

G 128 Guide for Control of Hazards and Risks in Oxygen Enriched Systems²

2.2 ASTM Adjuncts:

Manual 36, Safe Use of Oxygen and Oxygen Systems³

2.3 Compressed Gas Association (CGA) Standards:

CGA E-4, Standard for Gas Pressure Regulators⁴

CGA G-4, Oxygen⁴

CGA G-4.1, Cleaning Equipment for Oxygen Service⁴

CGA V-1, American National/Compressed Gas Association Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections⁴

2.4 United States Pharmacopeial Convention Standard:

² Annual Book of ASTM Standards, Vol 14.04.

³ Available from American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.

⁴ Available from Compressed Gas Association (CGA), 1725 Jefferson Davis Hwy., Suite 1004, Arlington, VA 22202-4102.

¹ This test method is under the jurisdiction of ASTM Committee G04 on Compatibility and Sensitivity of Materials in Oxygen Enriched Atmospheres and is the direct responsibility of Subcommittee G04.01 on Test Methods.

Current edition approved April 10, 2003. Published May 2003. Originally published as PS 127 – 00. Last previous edition PS 127 – 00.