



Standard Terminology Relating to the Compatibility and Sensitivity of Materials in Oxygen Enriched Atmospheres¹

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1. Scope

1.1 This terminology defines terms related to the compatibility and sensitivity of materials in oxygen enriched atmosphere. It includes those standards under the jurisdiction of ASTM Committee G-4.

1.2 The terminology concentrates on terms commonly encountered in and specific to practices and methods used to evaluate the compatibility and sensitivity of materials in oxygen. This evaluation is usually performed in a laboratory environment, and this terminology does not attempt to include laboratory terms.

2. Referenced Documents

2.1 ASTM Standards:

- G 63 Guide for Evaluating Nonmetallic Materials for Oxygen Service²
- G 72 Test Method for Autogenous Ignition Temperature of Liquids and Solids in a High-Pressure Oxygen-Enriched Environment²
- G 74 Test Method for Ignition Sensitivity of Materials to Gaseous Fluid Impact²
- G 86 Test Method for Determining the Ignition Sensitivity of Materials to Mechanical Impact in Pressurized Oxygen Environments²
- G 88 Guide for Designing Systems for Oxygen Service²
- G 93 Practice for Cleaning Methods for Material and Equipment Used in Oxygen-Enriched Environments²
- G 94 Guide for Evaluating Metals for Oxygen Service²
- G 120 Test Method for Evaluating the Effectiveness of Cleaning Agents²
- G 121 Practice for Preparation of Contaminated Test Coupons for the Evaluation of Cleaning Agents²
- G 122 Test Method for Evaluating the Effectiveness of Cleaning Agents²

3. Terminology

3.1 Definitions:

aging—the exposure of a material to stress, such stress of

¹ This terminology is under the jurisdiction of ASTM Committee G-4 on Compatibility and Sensitivity of Materials in Oxygen Enriched Atmospheres and is the direct responsibility of Subcommittee G04.03 on Nomenclature and Definitions.

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² *Annual Book of ASTM Standards*, Vol 14.02.

which may include time, pressure, contact with materials or chemicals, temperature, abrasion, ionizing radiation, light, impact with gas or particles, tensile or compressive force (either static or cyclic), or any other feature that may be present during a material's service life. These stressors may be present individually or in combination. **G 114**

artificial aging—aging in which a stress variable is outside the domain of exposure that the material might see in a component for oxygen service or in which an alternative mechanism is used to produce an effect that simulates the results of natural aging. The degree of artificiality may vary on a large scale. An example of mild artificiality might be exposure of a material to a greater pressure than it experiences in the use conditions. An example of extreme artificiality would be the use of sand paper to increase a material's surface roughness to simulate particle-impact abrasion that occurs in the use condition. A high degree of artificiality affects the strength of conclusion that can be drawn, because it may be difficult to relate the results to the use condition. Artificial aging that accelerates natural aging but does not alter it is preferred. **G 114**

autoignition temperature—the lowest temperature at which a material will spontaneously ignite in oxygen under specific test conditions. **G 63, G 95**

blank, n—the contamination level of the fluid when the test coupon is omitted.

DISCUSSION—Sometimes referred to as “background” level. **G 121**

cleaning effectiveness factor (CEF), n—the fraction of contaminant removed from an initially contaminated test coupon and determined by gravimetric techniques. **G 122**

contaminant—(1) a foreign or unwanted substance that can have deleterious effects on system operation, life or reliability. (2) unwanted molecular and particulate matter that could affect or degrade the performance of the components upon which they reside. **G 93, G 120, G 121**

contamination, n—a process of contaminating. **G 120, G 121**

control coupon (witness coupon), n—a coupon made from the same material and prepared in exactly the same way as the test coupons, which is used to verify the validity of the method or part thereof. **G 120, G 121**

direct oxygen service—component surfaces in contact with oxygen-enriched environments during normal operations.