Designation: G 128 – 02$^{\epsilon 1}$

Standard Guide for Control of Hazards and Risks in Oxygen Enriched Systems[1]

This standard is issued under the fixed designation G 128; 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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

ϵ[1] NOTE—Editorial corrections were made throughout in May 2003.

1. Scope

1.1 This guide covers an overview of the work of ASTM Committee G-4 on Compatibility and Sensitivity of Materials in Oxygen-Enriched Atmospheres. It is a starting point for those asking the question: "Are there any problems associated with my use of oxygen?" An introduction to the unique concerns that must be addressed in the handling of oxygen. The principal hazard is the prospect of ignition with resultant fire, explosion, or both. This hazard requires design considerations beyond those that apply to all systems, such as adequate strength, corrosion resistance, fatigue resistance, and pressure safety relief.

1.2 This guide also lists several of the recognized causes of oxygen system fires and describes the methods available to prevent them. Sources of information about the oxygen hazard and its control are listed and summarized. The principal focus is on Guides G 63, G 88, Practice G 93, and Guide G 94. Useful documentation from other resources and literature is also cited.

NOTE 1—This guide is an outgrowth of an earlier (1988) Committee G-4 videotape adjunct entitled *Oxygen Safety* and a related paper by Koch[2] that focused on the recognized ignition source of adiabatic compression as one of the more significant but often overlooked causes of oxygen fires. This guide recapitulates and updates material in the videotape and paper.

1.3 *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.* For specific precautionary statements see Sections 8 and 11.

NOTE 2—ASTM takes no position respecting the validity of any evaluation methods asserted in connection with any item mentioned in this guide. Users of this guide are expressly advised that determination of the validity of any such evaluation methods and data and the risk of use of such evaluation methods and data are entirely their own responsibility.

2. Referenced Documents

2.1 *ASTM Standards:*

G 63 Guide for Evaluating Nonmetallic Materials for Oxygen Service[3]

G 88 Guide for Designing Systems for Oxygen Service[3]

G 93 Practice for Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments[3]

G 94 Guide for Evaluating Metals for Oxygen Service[3]

G 125 Test Method for Measuring Liquid and Solid Material Fire Limits in Gaseous Oxidants[3]

G 126 Terminology Relating to the Compatibility and Sensitivity of Materials in Oxygen Enriched Atmospheres[3]

G 145 Guide for Studying Fire Incidents in Oxygen Systems[3]

2.2 *ASTM Adjuncts:*

Video: Oxygen Safety[4]

2.3 *ASTM CHETAH Program:*

CHETAH Chemical Thermodynamic and Energy Release Evaluation[5]

2.4 *Compressed Gas Association (CGA) Standards:*[6]

G-4.1 Cleaning Equipment for Oxygen Service

G-4.4 Industrial Practices for Gaseous Oxygen Transmission and Distribution Piping Systems

2.5 *European Industrial Gas Association (EIGA) Standards:*[7]

[1] This guide is under the jurisdiction of ASTM Committee G4 on Compatibility and Sensitivity of Materials in Oxygen- Enriched Atmospheres and is the direct responsibility of Subcommittee G04.02 on Recommended Practices.

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[2] Koch, U. H., "Oxygen System Safety," *Flammability and Sensitivity of Materials In Oxygen-Enriched Atmospheres*, Vol 6, ASTM STP 1197, ASTM, 1993, pp. 349–359.

[3] *Annual Book of ASTM Standards*, Vol 14.04.

[4] *Oxygen Safety*, adjunct is available from ASTM Customer Service, 100 Barr Harbor Drive, West Conshohocken, PA 19428. Request ADJG0088.

[5] Available from ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428, Order # DSC 51C, Version 7.2.

[6] Available from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151.

[7] Available from European Industrial Gas Association, Publication de la Soudure Autogene, 32 Boulevard de la Chapelle, 75880 Paris Cedex 18, France.

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