



Standard Guide for Designing Systems for Oxygen Service¹

This standard is issued under the fixed designation G88; 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.

1. Scope

1.1 This guide applies to the design of systems for oxygen or oxygen-enriched service but is not a comprehensive document. Specifically, this guide addresses system factors that affect the avoidance of ignition and fire. It does not thoroughly address the selection of materials of construction for which Guides G63 and G94 are available, nor does it cover mechanical, economic or other design considerations for which well-known practices are available. This guide also does not address issues concerning the toxicity of nonmetals in breathing gas or medical gas systems.

NOTE 1—The American Society for Testing and Materials 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.

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 requirements prior to use.*

1.3 This standard guide is organized as follows:

Section Title	Section
Referenced Documents	2
ASTM Standards	2.1
ASTM Adjuncts	2.2
ASTM Manuals	2.3
NFPA Documents	2.4
CGA Documents	2.5
EIGA Documents	2.6
Terminology	3
Significance and Use	4
Purpose of G88	4.1

¹ This guide 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 G04.02 on Recommended Practices.

Current edition approved Oct. 1, 2013. Published November 2013. Originally approved in 1984. Last previous edition approved in 2005 as G88 – 05. DOI: 10.1520/G0088-13.

Section Title	Section
Role of G88	4.2
Use of G88	4.3
Factors Affecting the Design for an Oxygen or Oxygen-Enriched System	5
General	5.1
Factors Recognized as Causing Fires	5.2
Temperature	5.2.1
Spontaneous Ignition	5.2.2
Pressure	5.2.3
Concentration	5.2.4
Contamination	5.2.5
Particle Impact	5.2.6
Heat of Compression	5.2.7
Friction and Galling	5.2.8
Resonance	5.2.9
Static Electric Discharge	5.2.10
Electrical Arc	5.2.11
Flow Friction	5.2.12
Mechanical Impact	5.2.13
Kindling Chain	5.2.14
Other Ignition Mechanisms	5.2.15
Test Methods	6
System Design Method	7
Overview	7.1
Final Design	7.2
Avoid Unnecessarily Elevated Temperatures	7.3
Avoid Unnecessarily Elevated Pressures	7.4
Design for System Cleanliness	7.5
Avoid Particle Impacts	7.6
Minimize Heat of Compression	7.7
Avoid Friction and Galling	7.8
Avoid Corrosion	7.9
Avoid Resonance	7.10
Use Proven Hardware	7.11
Design to Manage Fires	7.12
Anticipate Indirect Oxygen Exposure	7.13
Minimize Available Fuel/Oxygen	7.14
Avoid Potentially Exothermic Material Combinations	7.15
Anticipate Common Failure Mechanism Consequences	7.16
Avoid High Surface-Area-to-Volume (S/V) Conditions where Practical	7.17