Spacecraft Fire Detection and Extinguishment: A Bibliography

Nora H. Jason

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
National Engineering Laboratory
Center for Fire Research
Gaithersburg, MD 20899

February 1988
Contract No. C-32000-J

Prepared for
National Aeronautics and Space Administration
Lewis Research Center
Cleveland, Ohio
SPACECRAFT FIRE DETECTION AND EXTINGUISHMENT: A BIBLIOGRAPHY

Nora H. Jason

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
National Engineering Laboratory
Center for Fire Research
Gaithersburg, MD 20899

February 1988
Contract No. C-32000-J

Prepared for
National Aeronautics and Space Administration
Lewis Research Center
Cleveland, Ohio
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>iii</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2. Bibliography</td>
<td>2</td>
</tr>
<tr>
<td>2.1 Aerosols and Droplets</td>
<td>4</td>
</tr>
<tr>
<td>2.2 Aircraft</td>
<td>4</td>
</tr>
<tr>
<td>2.3 Detection Systems</td>
<td>9</td>
</tr>
<tr>
<td>2.4 Extinguishing Agents</td>
<td>16</td>
</tr>
<tr>
<td>2.5 Human Behavior</td>
<td>24</td>
</tr>
<tr>
<td>2.6 Materials Flammability</td>
<td>25</td>
</tr>
<tr>
<td>2.7 Microgravity and Zero Gravity</td>
<td>35</td>
</tr>
<tr>
<td>2.8 Atmospheres, Oxygen Enriched and Modified</td>
<td>40</td>
</tr>
<tr>
<td>2.9 Ships</td>
<td>43</td>
</tr>
<tr>
<td>2.10 Smoke</td>
<td>44</td>
</tr>
<tr>
<td>2.11 Spacecraft</td>
<td>45</td>
</tr>
<tr>
<td>2.12 Standards</td>
<td>49</td>
</tr>
<tr>
<td>2.13 Suppression</td>
<td>51</td>
</tr>
<tr>
<td>3. Author Index</td>
<td>55</td>
</tr>
</tbody>
</table>
Abstract

Pertinent fire detection and extinguishment references have been identified to further the knowledge of spacecraft fire safety. To broaden the scope of the bibliography, other unusual environments, e.g., aircraft, submarine, ship, have been included. In addition, for a more comprehensive view of the spacecraft fire safety problem, selected subjects are included, e.g., materials flammability, smoke, human behavior. The references will provide the research worker with access to state-of-the-art works and to historic works. Selected references from the 1960s have been included, but the emphasis is on references published from 1975 to 1987. The references are arranged by very broad categories. Often a paper will cover more than one topic, but for the purposes of this bibliography it will be cited only once.
1. Introduction

A NASA Lewis Spacecraft Fire Safety Workshop, held in Cleveland, Ohio, on August 20 and 21, 1986, reviewed the state of the art and assessed the needs for spacecraft fire safety. In addition, one of the suggestions was to develop bibliographic resources to aid an on-going study on fire safety technology development experiments for the Space Station. This bibliography is an outgrowth of that Workshop. It is a compilation of references to assist the researcher in resolving the problem of fire detection and extinguishment in a spacecraft environment and other environments that might be related to it. To develop a more comprehensive view of the spacecraft fire safety problem, additional subjects are included, e.g., materials flammability, smoke, human behavior. As these subjects are interrelated, references will be cited in the most appropriate category although they may ideally be cited on several categories. Cited references are from the 1960s, but the emphasis is on works published from 1975 to 1987.

The following automated bibliographic databases were searched, using a broad array of keywords to include not only the spacecraft environment, but other unusual environments, e.g., submarines, aircraft, ships, to identify potential references for this bibliography. In turn, references cited within the selected references were reviewed. When appropriate, these references also were included. Center for Fire Research (CFR) experts made valuable contributions, as well as several other experts in the fire research field. The combination of machine and human input data made this bibliography a reality.

The databases queried on Dialog Information Services, Inc. were:

- Aerospace
- Chemical Abstracts
- Engineering Index
- Ei Engineering Meetings
- Inspec
- National Technical Information Service
- Textile Technology Digest
- World Textiles

Other data systems queried were:

- Defense Technical Information Service
- FIREDOC (a National Bureau of Standards fire research database)
- NASA/RECON
Pertinent references were incorporated into the FIREDOC database. Each record contains the full bibliographic reference, keywords, and abstract. To assist the user, in-depth indexing was instituted to compensate for short abstracts. An identifier was assigned to each record for the purpose of developing the bibliography and it corresponds to those sections noted in the Table of Contents. The identifiers are intentionally broad, e.g., Microgravity and Zero Gravity, Extinguishing Agents. Each reference only appears once in the bibliography, in the most appropriate identifier category. However, to access a reference in FIREDOC any combination of keywords and/or identifiers may be used.

FIREDOC is the automated database of the National Bureau of Standards, Fire Research Information Services (FRIS) bibliographic collection. The collection, started in 1971, reflects the programmatic interests of the CFR. It contains national and international fire research reports, books, journal articles and conference proceedings. FIREDOC contains the complete bibliographic reference (e.g., author, title, corporate source, journal name, volume number, pagination, date of publication) and, if appropriate, abstract, keyword(s) and identifier(s). The full text of the document is not included in the database. FIREDOC is growing daily; it currently contains information on 9000 of the 30,000 documents in the FRIS collection. Documents added to the FRIS collection since 1983 are included, as well as some older CFR documents. If you are interested in accessing FIREDOC, please contact Nora H. Jason; the telephone number is (301) 975-6862 during normal work hours, Eastern Time.

U. S. Government reports, e.g., NASA CP-2476, may be purchased directly from the National Technical Information Service, Port Royal Road, Springfield, VA 22161. Conference proceedings, if not published in a U. S. Government report series, may be obtain from the sponsoring organization. Complete citations are provided for the journal articles and they may be obtained from the journal, the author, or a library.

ACKNOWLEDGEMENTS

Special thanks go to Robert S. Levine and Richard W. Bukowski for reviewing this document and sharing their expertise. Other colleagues in the fire research field have been most generous with their time in offering their contributions to this bibliography.
2.1 AEROSOLS AND DROPLETS

Mulholland, G. W. and Ohlemiller, T. J.
Aerosol Characterization of a Smoldering Source.
National Bureau of Standards, Gaithersburg, MD

Williams, F. A.
Ignition and Burning of Single Liquid Droplets.
Princeton Univ., NJ

2.2 AIRCRAFT

Blake, D. R. and Hill, R. G.
Federal Aviation Admin., Atlantic City Airport, NJ

Botteri, B. P.
Aircraft Fire Protection Technology.
Air Force Aero-Propulsion Lab., Wright-Patterson AFB, OH

Botteri, B. P.
Aircraft Fire Safety Research.
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH
National Aeronautics and Space Administration. Spacecraft Fire Safety. August 20-21, 1986, Cleveland, OH.

Bruggink, G. M.
Uncontrollable Cabin Fire.
2.2 Aircraft (cont)

Chicarello, P. J. and Shpilberg, D. C.
Minimum Extinguishment Area Required for Safe Escape of Aircraft Occupants During a Fuel Spill Fire.
Factory Mutual Research Corp., Norwood, MA

Davis, R. A.
Concorde Fire Protection.
Graviner Mfg. Co., Ltd., Colnbrook, England

Enders, J. H. and Wood, E. C.
Department of Transportation, Washington, DC

Enders, J. H. and Wood, E. C.
Department of Transportation, Washington, DC

Federal Aviation Administration
Engineering and Development Program Plan Aircraft Cabin Fire Safety.
Federal Aviation Administration, Atlantic City Airport, NJ

Goonan, T. E.
Hazards Assessment and Protective Clothing Requirements.
Veterans Admin., Washington, DC

Hill, I. R.
Immediate Problems of Aircraft Fires.
London Hospital Medical College, England
2.2 Aircraft (cont)

Johnston, W. L. and Cahalane, P. T.
Examination of Fire Safety of Commercial Aircraft Cabins.
Texas A & M Univ., College Station

Jones, J. and Sarkos, C. P.
Design Calculations for a Halon 1301 Distribution Tube for
an Aircraft Cabin Fire Extinguishing System.
Federal Aviation Admin., Atlantic City, NJ

Kourtides, D. A., Parker, J. A., Gilwee, W. J., Jr., Lerner, N. R.,
Hilado, C. J., LaBossiere, L. A. and Hsu, M.
Composite System Approach to Aircraft Cabin Fire Safety.
San Francisco Univ., CA
San Jose State Univ., CA

and Mikeska, J. L.
Fire Safety Evaluation of Aircraft Lavatory and Cargo
Compartments.
National Aeronautics and Space Admin., Moffett Field, CA
San Francisco Univ., CA
Boeing Commercial Airplane Co., Seattle, WA
McDonnell-Douglas Corp., Long Beach, CA
Journal of Fire and Flammability, Vol. 7, 125-159, January
1976.

Kourtides, D. A., Parker, J. A., Leon, H. A., Williamson, R. B.,
Hasegawa, H., Fisher, F., Draemel, R., Marcussen, W. H.
and Hilado, C. J.
Fire Containment Tests of Aircraft Interior Panels.
National Aeronautics and Space Admin., Moffett Field, CA
California Univ., Berkeley
San Francisco Univ., CA
Journal of Fire and Flammability, Vol. 7, 257-278, April
1976.
2.2 Aircraft (cont.)

Kubin, R. F.  
Thermal Characteristics of 3501-6/AS and 5208/T300 Graphite Epoxy Composites.  
Naval Weapons Center, China Lake, CA  
NWC-TP-6104, 18 P. May 1979.

Madgwick, T.  
Aircraft Post Crash Fire Reduction/Survivability Enhancement From a Manufacturer’s Viewpoint.  
British Aerospace, Bristol, England  
Advisory Group for Aerospace Research and Development (AGARD).  

Miniszewski, K. R., Waterman, T. E., Campbell, J. A. and Salzberg, F.  
IIT Research Inst., Chicago, IL  
Gage-Babcock and Associates, Elmhurst, IL  

Cabin Interiors/Smoke and Fire Panel.  
National Aeronautics and Space Admin., Moffett Field, CA  

Parker, J. A., Kourtides, D. A., Fish, R. H. and Gilwee, W. J., Jr.  
Fire Dynamics of Modern Aircraft From a Materials Point of View.  
National Aeronautics and Space Admin., Moffett Field, CA  
2.2 Aircraft (cont.)

Parker, J. A. and Kourtides, D. A.
Fireworthiness of Transport Aircraft Interior Systems.
National Aeronautics and Space Admin., Moffett Field, CA
Advisory Group for Aerospace Research and Development.
(AGARD). Aircraft Fire Safety. June 7-8, 1982, Oslo, Norway
and June 10-11, 1982, London, England and June 15-16,

Payne, G. C.
Aircraft Fire Detection and Suppressant Systems.
Graviner Colnbrook Ltd., Colnbrook, England

Pelouch, J. J., Jr. and Hacker, P. T.
Bibliography on Aircraft Fire Hazards and Safety. Volume 2.
National Aeronautics and Space Admin., Cleveland, OH

Ramsden, J. M.
Fire-Hard Airliner.
1986.

Reeves, J. B. and MacArthur, C. D.
Dayton Aircraft Cabin Fire Model. Volume 1. Basic
Dayton Univ., OH

Sarkos, C. P., Hill, R. G. and Howell, W. D.
Development and Application of a Full-Scale Wide Body Test
Article to Study the Behavior of Interior
Materials During a Postcrash Fuel Fire.
Federal Aviation Admin., Washington, DC
Advisory Group for Aerospace Research and Development (AGARD).
Aircraft Fire Safety. June 7-8, 1982, Oslo, Norway and June

Stevens, J. R.
Fire Protection for the Concorde.
Graviner Mfg. Co., Ltd., Colnbrook, England
Industrial Electronics, Vol. 6, 396-398, October 1968.
2.3 DETECTION SYSTEMS

Alvares, N. J. and McKee, R. J.
Response of Smoke Detectors to Pyrolysis and Combustion Products From Aircraft Interior Materials.
Stanford Research Inst., Menlo Park, CA

Blumke, R. E.
McDonnell Douglas Corp., Long Beach, CA

Bricker, R. W.
Test Results from a Comparative Evaluation of a Condensation Nuclei Fire Detector.
Webb, Murray and Associates, Inc., Houston, TX

Bukowski, R. W.
Detection of Fires in Electrical Cables.
National Bureau of Standards, Gaithersburg, MD

Bukowski, R. W.
Techniques for Fire Detection.
National Bureau of Standards, Gaithersburg, MD
National Aeronautics and Space Administration. Spacecraft Fire Safety. August 20-21, 1986, Cleveland, OH.

Bukowski, R. W. and Istvan, S. M.
National Bureau of Standards, Gaithersburg, MD
2.3 Detection Systems (cont.)

Conforti, F.
Upgraded UL Standards Trigger Smoke Detector Improvements.
BRK Electronics, Aurora, IL

Custer, R. L. and Bright, R. G.
National Bureau of Standards, Gaithersburg, MD

Delaney, C. L.
Technology Forecasting: Aircraft Hazard Detection.
Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH

Dusston, D. K.
Laser Smoke Detection.
Espey Mfg. and Electronics Corp., Saratoga Springs, NY

Southwest Research Inst., San Antonio, TX

Fox, D. G.
Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH

Fox, D. G.
Development of Feasibility Demonstration Hardware for an Integrated Fire and Overheat Detection System.
Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH
2.3 Detection Systems (cont.)

Grabowski, G. J.
Fire Detection and Actuation Devices for Halon Extinguishing Systems.
Fenwall, Inc., Ashland, MA

Griffin, R. E.
In-Mine Evaluation of Underground Fire and Smoke Detectors.
Bureau of Mines, Twin Cities, MN
IC 8808, 27 P. 1979.

Hawkins, R. L. and Rao, K. N.

Heitmann, H.
Design and Testing of the Ultraviolet Flame Radiation Detectors for Automatic Fire Detection. Duisburg Univ., West Germany

Horvath, Z. J.
High Reliability IREDs, Custom Designed for Fire Protection Detectors.
Cerberus Ltd., Maennedorf, Switzerland

Johnson, J. E.
How to Specify Effective Smoke and Fire Detection. Pyrotronics, Cedar Knolls, NJ
Actual Specifying Engineer, Vol. 33, No. 4, 64-69, April 1975.

2.3 Detection Systems (cont.)

Kamath, A. R. R., Keller, A. Z. and Wooliscroft, M.
Reliability Assessment of Smoke Detectors.
Bradford Univ., West Yorks., England

Linford, R. M. F.
Experiments With the Skylab Fire Detectors in Zero Gravity.
McDonnell-Douglas Corp., St. Louis, MO
Institute of Environmental Sciences, American Institute of
Aeronautics and Astronautics, American Society
for Testing and Materials and the National
Aeronautics and Space Administration. Space
Simulation. New York, NY, May 1-3, 1972. NASA SP-298,
Paper No. 8, 41-56 pp., 1972.

Linford, R. M. F.
Integration of a Fire Detector into a Spacecraft.
McDonnell Douglas Corp., St. Louis, MO
Journal of Spacecraft and Rockets, Vol. 9, No. 9, 697-701,
September 1972.

Litton, C. D.
Mathematical Model for Ionization-Type Smoke Detectors and
the Reduced Source Approximation.
Bureau of Mines, Pittsburgh, PA

Litton, C. D.
Optimizing Ionization-Type Smoke Detectors.
Bureau of Mines, Pittsburgh, PA

Litton, C. D. and Hertzberg, M.
Principles of Ionization Smoke Detection. Development of a
New Sensor for Combustion-Generated Submicrometer Particulates.
Bureau of Mines, Pittsburgh, PA
RI 8242, 24 P. 1977.

Lundstrom, I., Shivaraman, M. S., Stibilert, L. and Svensson, C.
Hydrogen in Smoke Detected by the Pd-Gate Field-Effect
Transistor.
Chalmers Univ. of Technology, Gothenburg, Sweden
Review of Scientific Instruments, Vol. 47, No. 6, 738-740,
June 1976.
2.3 Detection Systems (cont.)

Matthews, J. D. and Walker, F. K.
Naval Civil Engineering Lab., Port Hueneme, CA

McCormack, R. G.
Department of the Army, Washington, DC

McGuingle, R. D., Jackson, H. W. and Beavers, R. R.
HTL Industries Inc., Santa Ana, CA

Mulholland, G. W. and Liu, B. Y. H.
Response of Smoke Detectors to Monodisperse Aerosols.
National Bureau of Standards, Gaithersburg, MD
Minnesota Univ., Minneapolis

Pomroy, W. H.
Bureau of Mines, Pittsburgh, PA

Rajan, K. S., Snelson, A., Schechter, H. R., Mniszewski, K. R.,
Waterman, T. E., Yamate, G. and Harpe, S. W.
New Concepts of Fire Detection.
IIT Research Inst., Chicago, IL
Underwriters Laboratories, Northbrook, IL
Project J6391 and Project 77NK1309, 97 P. December 1978.

Raskauskas, B. J.
Integrated Fire and Overheat Detection System for Aircraft.
General Motors Corp., Kokomo, IN
2.3 Detection Systems (cont.)

Springer, R. J., Sheath, P. H., Robinson, S. P. and Smith, D. J. V.
Advanced Ultra-Violet (UV) Aircraft Fire Detection System.
Volume 3. Ground Support Equipment (GSE) for
System Checkout. Final Report. December
General Dynamics Fort Worth Div., Fort Worth, TX

Street, T. T., Lawrence, K. D., Williams, F. W. and Alexander, J. I.
NRL Processor-Aided Fire Detection System.
Naval Research Lab., Washington, DC

Suminski, G., Riemer, O. and Hankey, F.
Integrated Fire and Overheat Detection System. Final
Report.
McGraw-Edison Co., Manchester, NH

Thomas, E. C.
Pneumatic Sampling Fire Detection System in an Underground
Haulageway.
Brunswick Corp., Costa Mesa, CA

Transue, R. E. and Hall, C.
Fire Safety and Electronics.
Rolf Jensen & Assoc., Deerfield, IL
Pyrotronics, Cedar Knolls, NJ

Trumble, T. M.
Smoke Detection System for Manned Spacecraft Applications.
Air Force Aero-Propulsion Lab., Wright-Patterson AFB, OH

Unger, E.
Problems of the Operating Reliability in Control and
Indicating Equipment.
Friedrich Merk Telefonbau G.m.b.H., Munich, Germany

Von Tomkewitsch, R.
Fire Detector Systems With 'Distributed Intelligence'. The
Pulse Polling System.
Siemens AG, Munich, F.R.G.
2.4 EXTINGUISHING AGENTS

Affens, W. A.
Naval Research Lab., Washington, DC

Altman, R. L.
Extinction of In-Flight Engine Fuel-Leak Fires With Dry Chemicals.
National Aeronautics and Space Admin., Moffett Field, CA
American Institute of Aeronautics and Astronautics, Inc.
Progress in Astronautics and Aeronautics.
Bowen, J. R., Manson, N., Oppenheim, A. K.
and Soloukhin, R. I., Editors, 273-290 pp., 1983.

Atallah, S. and Crowley, D.
Novel Fire Suppression Materials for Advanced Aircraft.
Arthur D. Little, Inc., Cambridge, MA

Atallah, S. and Stricoff, R. S.
Little (Arthur D.), Inc., Cambridge, MA

Auck, S. E.
Short History of Halogenated Fire Extinguishing Agents.
Underwriters Laboratories Inc., Northbrook, IL
National Research Council. Appraisal of Halogenated Fire Extinguishing Agents. April 11-12, 1972,
Washington, DC. Proceedings, 7-12 pp., 1972.

Back, K. C. and Van Stee, E. W.
Cardiovascular and Nervous System Effects of Bromotrifluoromethane: A Short Review.
Aerospace Medical Research Lab., Wright-Patterson AFB, OH
National Research Council. Appraisal of Halogenated Fire Extinguishing Agents. April 11-12, 1972,
2.4 Extinguishing Agents (cont.)

Botteri, B. P., Cretcher, R. E. and Kane, W. R.
Aircraft Applications of Halogenated Hydrocarbon Fire Extinguishing Agents.
Wright-Patterson Air Force Base, OH

Call, D. W.
Human and Rat Exposures to Halon 1301 Under Hypobaric Conditions.
Naval Air Station, Miramar, CA

Carhart, H. W. and Fielding, G. H.
Applications of Gaseous Fire Extinguishants in Submarines.
Naval Research Lab., Washington, DC

Carter, D. I.
Fire Extinguishment and Protective Clothing Evaluations.
Aerospace Medical Div., Brooks AFB, TX

Charno, R. J.
Evaluation of High Expansion Foam for Spacecraft Fire Extinguishment.
E. W. Bliss Co., Swarthmore, PA

Clark, D. G.
Toxicity of Halon 1211.
Imperial Chemical Industries Ltd., Cheshire, England

Coulston, F. and Griffin, T. B.
Albany Medical College, NY
2.4 Extinguishing Agents (cont.)

de Rís, J.
Factory Mutual Research, Norwood, MA
National Aeronautics and Space Administration. Spacecraft Fire Safety Conference. August 20-21, 1986, Cleveland, OH.

Desmarais, L. A. and Tolle, F. F.
Boeing Military Airplane Co., Seattle, WA

Desmarais, L. A. and Tolle, F. F.
Boeing Military Airplane Co., Seattle, WA

Energy and Minerals Research Co.
Energy and Minerals Research Co., Exton, PA
10 P. December 1983.

Fiala, R.
Aircraft Post-Crash Fire Fighting/Rescue.
Institut fuer Antriebstechnik, Kolon-Porz, Germany

Fiala, R. and Winterfeld, G.
Investigation of Fire Extinguishing Powders by Means of a New Measuring Procedure.
Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt E. V., Institut fur Luftstrahlantriebe, Germany
AGARD CP-84-71, 24/1-12 pp., 1971.
2.4 Extinguishing Agents (cont.)

Fohlen, G. M., Parker, J. A., Riccitiello, S. R. and Sawko, P. M.
Intumescence: An In Situ Approach to Thermal Protection.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety.
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
12/1-6 pp., 1970.

Ford, C. L.
Extinguishment of Surface and Deep-Seated Fires With Halon
1301.
E. I. du Pont de Nemours and Co., Wilmington, DE
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Gassmann, J. J. and Marcy, J. F.
Application of Halon 1301 to Aircraft Cabin and Cargo Fires.
Federal Aviation Admin., Atlantic City, NJ
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Gassmann, J. J. and Hill, R. G.
National Aviation Facilities Experimental Center, Atlantic
City, NJ

Geller, I., Garcia, B. A., Gleiser, C., Haines, R., Jr.,
Hamilton, M., Hartmann, R., Jr., Mendez, V., Samuels, A.
and Miguel, M. S.
Evaluation of the CNS and Cardiovascular Effects of
Prolonged Exposure to Bromotrifluoromethane (CBrF3).
March 1, 1980-May 1, 1981.
Southwest Foundation for Research and Education, San
Antonio, TX

Grenich, A. F. and Tolle, F. F.
Electrostatic Safety With Explosion Suppressant Foams. Final
Boeing Military Airplane Co., Seattle, WA
2.4 Extinguishing Agents (cont.)

Griffin, T. B., Byard, J. L. and Coulston, F.
Toxicological Responses to Halogenated Hydrocarbons.
Albany Medical College of Union Univ., NY
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Harris, W. S.
Cardiac Effects of Halogenated Hydrocarbons.
University of Illinois Hospital, Chicago, IL
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Hill, R.
Evaluation of a Halon 1301 System for Aircraft Internal
Protection From a Postcrash External Fuel
Federal Aviation Admin., Atlantic City, NJ

Jamison, H. H.
Evaluation of Bromotrifluoromethane as a Fire Extinguishing
Agent for Apollo Hypergolic Propellants.
National Aeronautics and Space Admin., Houston, TX

Johnson, A. M. and Grenich, A. F.
Vulnerability Methodology and Protective Measures for
Aircraft Fire and Explosion Hazards. Volume 2.
Aircraft Engine Nacelle Fire Test Program.
Part 1. Fire Detection, Fire Extinguishment
Boeing Military Airplane Co., Seattle, WA

Kuchta, J. M. and Burgess, D.
Effectiveness of Halogenated Agents Against Gaseous
Explosions and Propellant Fires.
Bureau of Mines, Pittsburgh, PA
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,
2.4 Extinguishing Agents (cont.)

MacEwen, J. D.
Toxicology of Pyrolysis Products of Halogenated Agents.
SysteMed Corp., Dayton, OH
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

McDaniel, D. E.
Evaluation of Halon 1301 for Shipboard Use.
Coast Guard, Washington, DC
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Plugge, M. A., Wilson, C. W., Zallen, D. M. and Walker, J. L.
Fire Extinguishing Agents for Oxygen-Enriched Atmospheres.
New Mexico Engineering Research Inst., Albuquerque, NM

Rainaldi, N.
Appraisal of Halogenated Fire Extinguishing Agents.
Montecatini-Edison, Porto Marghera, Italy
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Report of Test Results: Halon 1301 vs Water Sprinkler Fire
Protection for Essential Electronic Equipment.
Air Force Engineering Services Center, Tyndall AFB, FL

Reinhardt, C. F. and Reinke, R. E.
Toxicology of Halogenated Fire Extinguishing Agents Halon
1301 (Bromotrifluoromethane).
E. I. du Pont de Nemours and Co., Wilmington, DE
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Scheichl, L.
Extinguishants for Use in Aviation Fires.
2.3 Detection Systems (cont.)

Schade, O. H., Jr.
BiMOS Micropower IC's.
RCA, Somerville, NJ
IEEE Journal of Solid-State Circuits, Vol. SC-13, No. 6,
791-798, December 1978.

Scheidweiler, A.
Distribution of Intelligence in Future Fire Detection
Systems.
Cerberus AG, Mannedorf, Switzerland

Senturia, S. D.
Chromatographic Analysis of the Response of Polymeric
Fire Detection Devices to Combustion Products.
Massachusetts Inst. of Technology, Cambridge

Shigiyama, K., Miura, K., Yoshida, T., Shimura, T. and NiII, Y.
Matsushita Communication Industrial Co., Ltd., Yokohama,
Japan
Japanese Patent 54-998 and ORNL/tr--86/56, 13 P. January 6,
1979.

Simon, F. N. and Rork, G. D.
Ionization-Type Smoke Detectors.
Honeywell Corporate Research Center, Bloomington, MN
Review of Scientific Instruments, Vol. 47, No. 1, 74-80,
January 1976.

Springer, R. J. and Sheath, P. H., Robinson, S. P. and
Smith, D. J. V.
Advanced Ultra-Violet (UV) Aircraft Fire Detection System.
Volume 1. System Description and Flight Test.
General Dynamics Fort Worth Div., TX

Springer, R. J., Sheath, P. H., Robinson, S. P. and Smith, D. J. V.
Advanced Ultra-Violet (UV) Aircraft Fire Detection System.
General Dynamics Fort Worth Div., TX
2.4 Extinguishing Agents (cont.)

Seshadri, K. and Williams, F. A.
Effect of CF3Br on Counterflow Combustion of Liquid Fuel with Diluted Oxygen.
San Diego Univ., CA
American Chemical Society Symposium Series No. 16.
Halogenated Fire Suppressants. Chapter 5.

Seeger, P. G.
Laboratory Test Method of Evaluating the Extinguishing Efficiency of Dry Powders.
Forschungsstelle fur Brandschutztechnik an der Universitat Karlsruhe, West Germany
Advisory Group for Aerospace Research and Development (AGARD). Aircraft Fire Safety. April 11, 1975,
Rome, Italy. AGARD CP-166, 24/1-9 pp., 1975.

Smith, D. G. and Harris, D. J.
Human Exposure to Halon 1301 (CBrF3) During Simulated Aircraft Cabin Fires.
Naval Air Test Center, Patuxent River, MD

Stewart, R. D., Newton, P. E., Wu, A., Hake, C. L. and Krivanek, N. D.
Human Exposure to Halon 1301.
Medical College of Wisconsin, Milwaukee
20 P. June 1978.

Thomas, A. A.
Pathology Report on the Toxicity of the Pyrolysis Products of Freon 1301.
Aerospace Medical Research Lab., Wright-Patterson AFB, OH

Vernot, E. H.
Inhalation Toxicity and Chemistry of Pyrolysis Products of Bromotrifluoromethane.
Aerojet-General Corp., Dayton, OH
2.4 Extinguishing Agents (cont.)

Walker, J. L., Vickers, R. N. and Kwan, A. J.
Test and Evaluation of Commercially Available Halon 1211
Hand-Portable Fire Extinguishers for Use in Habitable
Air Force Engineering and Service Center, Tyndall AFB, FL

Wands, R. C.
Toxicology of Halogenated Agents (Halon 2402).
National Research Council, Ottawa, Ontario, Canada
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972,

Wickham, R. T.
Engineering and Economic Aspects of Halon Extinguishing
Equipment.
Wickham Associates, Marinette, WI
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972, Washington, DC.

Yamashika, S.
Dependence of Extinction Time and Decomposition of
Halogenated Extinguishing Agent on Its
Application Rate.
Fire Research Inst., Tokyo, Japan
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1972, Washington, DC.
Proceedings, 326-335 pp., 1972.

Zikria, B. A.
Inhalation Injuries in Fires.
Columbia-Presbyterian Medical Center, New York, NY
National Research Council. Appraisal of Halogenated Fire
Extinguishing Agents. April 11-12, 1971, Washington, DC.
2.5 HUMAN BEHAVIOR

Human Response to Fire.
Army Aeromedical Research Lab., Fort Rucker, AL
Advisory Group for Aerospace Research and Development.
Aircraft Fire Safety. June 7-8, 1982, Oslo, Norway and

Knight, D. R.
Fire-Related Medical Science.
Naval Submarine Medical Research Lab., Groton, CT
National Aeronautics and Space Administration. Spacecraft
Fire Safety. August 20-21, 1986, Cleveland, OH. NASA

Nober, E. H., Peirce, H. and Well, A.
Waking Effectiveness of Household Smoke and Fire Detection
Massachusetts Univ., Amherst

Nober, E. H., Peirce, H., Well, A., Johnson, C. C. and
Clifton, C.
Waking Effectiveness of Household Smoke and Fire Detection
Devices.
Massachusetts Univ., Amherst

Pezoldt, V. J. and Van Cott, H. P.
Arousal from Sleep by Emergency Alarms: Implications from
National Bureau of Standards, Gaithersburg, MD
NBSIR 78-1484, 37 P. June 1978.
2.6 MATERIALS FLAMMABILITY

Babrauskas, V.
Bench-Scale Methods for Prediction of Full-Scale Fire Behavior of Furnishings and Wall Linings.
National Bureau of Standards, Gaithersburg, MD

Babrauskas, V.
Fire-Related Standards and Testing.
National Bureau of Standards, Gaithersburg, MD

Babrauskas, V., Levin, B. C. and Gann, R. G.
New Approach to Fire Toxicity Data for Hazard Evaluation.
National Bureau of Standards, Gaithersburg, MD

Babrauskas, V. and Walton, W. D.
Simplified Characterization of Upholstered Furniture Heat Release Rates.
National Bureau of Standards, Gaithersburg, MD

Bass, R. S. and Hirasaki, J. K.
Fire-Safety Design of a Mobile Quarantine Facility.
National Aeronautics and Space Admin., Houston, TX

Benz, F. J., Shaw, R. C. and Homa, J. M.
Burn Propagation Rates of Metals and Alloys in Gaseous Oxygen.
National Aeronautics and Space Admin., Las Cruces, NM
Lockheed/EMSCO, Las Cruces, NM
2.6 Materials Flammability (cont.)

Benz, F. J. and Zhu, S.
Ignition and Combustion of Metals in Oxygen.
NASA JSC White Sands Test Facility, Las Cruces, NM
National Aeronautics and Space Administration. Spacecraft
Fire Safety. August 20-21, 1986, Cleveland, OH. NASA

Bukowski, R. W.
Introduction to Fire Hazard Modeling.
National Bureau of Standards, Gaithersburg, MD

Christopher, A. J.
Some Aspects of Smoke and Fume Evolution From Overheated
Non-Metallic Materials.
Royal Aircraft Establishment, Farnborough, England
Advisory Group for Aerospace Research and Development
(AGARD). Aircraft Fire Safety. April 11, 1975,
Rome, Italy. AGARD CP-166, 13/1-12 pp., 1975.

Craig, J. W.
Apollo Spacecraft Nonmetallic Materials Application.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety.
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
14/1-7 pp., 1970.

Dawn, F. S.
Nonmetallic Materials Development for Spacecraft
Applications.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety,
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
6/1-6 pp., 1970.

Dawn, F. S. and Jarboe, R. L.
Apollo Space Suit Materials.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety,
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
16/1-4 pp., 1970.
2.6 Materials Flammability (cont.)

Dawn, F. S. and Morton, G. P.
Cotton Protective Apparel for the Space Shuttle.
National Aeronautics and Space Admin., Houston, TX
Cotton Inc., Raleigh, NC

Denison, D. M.
Further Studies on the Problems of Fire in Artificial Gas Environments.
Royal Air Force Institute of Aviation Medicine, Farnborough Hants., England

Dorr, V. A.
Fire Studies in Oxygen-Enriched Atmospheres.
Ocean Systems, Inc., Tarrytown, NY

Duncan, W. C.
Baylor College of Medicine, Houston, TX

Einhorn, I. N., Chatfield, D. A. and Mickelson, R. W.
Analysis of the Products of Thermal Decomposition of an Aromatic Polyamide Fabric Used as an Aircraft Interior Material.
Utah Univ., Salt Lake City, UT

Godfried, L. M.
Fokker-VFW B.V., Schiphol-East, The Netherlands

Grand, A. F. and Valys, A. J.
Assessment of Burning Characteristics of Aircraft Interior Materials.
Southwest Research Inst., San Antonio, TX
2.6 Materials Flammability (cont.)

House, P. A. and Berner, W. E.
Dayton Univ., OH

Huggett, C.
National Bureau of Standards, Gaithersburg, MD

Johnston, R. S.
Flammability Test Methods and Protective Clothing Development.
National Aeronautics and Space Admin., Houston, TX

Judd, M. D. and Meehan, J.
Flammability Testing of Materials for the European Spacelab. 
ESTEC, Noordwijk, The Netherlands
Marconi Space Systems, Hants, England
Conference Workbook. March 26-28, 1985, 

Kanury, A. M.
Stanford Research Inst., Menlo Park, CA
Edinburgh University. Fire Safety of Combustible Materials. 

Kline, H. F.
Development of Nonflammable Potting Compounds for Spacecraft Usage.
National Aeronautics and Space Admin., Houston, TX
2.6 Materials Flammability (cont.)

Gross, D., Loftus, J. J., Lee, T. G. and Gray, V. E.
National Bureau of Standards, Gaithersburg, MD
NBS BSS 18, 90 P. June 1968.

Harris, E. S.
Toxicology of Spacecraft Materials.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
25/1-3 pp., 1970.

Hilado, C. J.
Evaluation of the NASA Animal Exposure Chamber as a Potential Chamber for Fire Toxicity Screening Tests.
San Francisco Univ., CA

Hilado, C. J.
San Francisco Univ., CA

Hilado, C. J., Barnes, G. J., Kourtides, D. A. and Parker, J. A.
Use of the High Flux Heater in the Smoke Chamber to Measure Ignitability and Smoke Evolution of Composite Panels.
San Francisco Univ., CA
National Aeronautics and Space Admin., Moffett Field, CA

Hill, R. G. and Speitel, L. C.
Federal Aviation Admin., Atlantic City Airport, NJ

Hillenbrand, L. J. and Wray, J. A.
Full-Scale Fire Program to Evaluate New Furnishings and Textile Materials Utilized by the National Aeronautics and Space Administration. Final Report.
Battelle, Columbus, OH
2.6 Materials Flammability (cont.)

Lawrence, W. H.
Tennessee Univ., Memphis

Lawrence, W. H.
Tennessee Univ., Memphis

Lawrence, W. H.
Tennessee Univ., Memphis

Lawrence, W. H.
Tennessee Univ., Memphis

Ledoux, P. W.

Marcy, J. F. and Johnson, R.

Naimer, J.
2.6 Materials Flammability (cont.)

Quintiere, J. G. and Harkleroad, M. F.
National Bureau of Standards, Gaithersburg, MD
NBSIR 84-2943, 154 P. November 1984, and
American Society for Testing and Materials. Fire Safety:
Science and Engineering. Harmathy, T. Z.,

Quintiere, J. G., Babrauskas, V., Cooper, L. Y., Harkleroad, M.,
Steckler, K. D. and Tewarson, A.
Role of Aircraft Panel Materials in Cabin Fires and Their
National Bureau of Standards, Gaithersburg, MD
Factory Mutual Research Corp., Norwood, MA

Radnofsky, M. I.
New Materials for Manned Spacecraft, Aircraft, and Other
Applications.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety.
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
10/1-4 pp., 1970.

Radnofsky, M. I.
Nonflammable Clothing Development Program.
National Aeronautics and Space Admin., Houston, TX
NASA TM X-60897, 37 P. 1867.

Ramsden, J. M.
Burning Questions.

Reynolds, J. R.
Fire and Safety Materials Utilization at the John F. Kennedy
Space Center.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety.
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
18/1-2 pp., 1970.
2.6 Materials Flammability (cont.)

Sarkos, C. P., Spurgeon, J. C. and Nicholas, E. B.
Laboratory Fire Testing of Cabin Materials Used in Commercial Aircraft.
Federal Aviation Admin., Atlantic City, NJ

Sauers, D. G.
Development and Application of Flame-Resistant Polymers and Composites.
National Aeronautics and Space Admin., Houston, TX

Sauers, D. G.
Special Flammability Test Techniques.
National Aeronautics and Space Admin., Houston, TX

Sibulkin, M. and Little, M. W.
Propagation and Extinction of Downward Burning Fires.
Brown Univ., Providence, RI

Simpson, C. G.
Federal Aviation Admin., Washington, DC

Steintthal, M. W.
Nonmetallic Material Configuration Control in the Apollo Spacecraft.
National Aeronautics and Space Admin., Houston, TX
2.6 Materials Flammability (cont.)

Olson, S. L. and Sotos, R. G.
Combustion of Velcro in Low Gravity.
National Aeronautics and Space Admin., Cleveland, OH

O'Neill, J. H., Sommers, D. E. and Nicholas, E. B.
Federal Aviation Admin., Atlantic City, NJ

O'Neill, T. J. and Punderson, J.
Toxicity Tests and Fire Safety.
E. I. Du Pont de Nemours and Co., Inc., Wilmington, DE
QMC Industrial Research Ltd. and Fire Research Station.
Smoke and Toxic Gases From Burning Plastics.
12/1-12/3 pp., 1982.

Primeaux, G. R.
Flammability Testing of Components.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety.
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
4/1-4 pp., 1970.

Quintiere, J. G.
Assessment of Correlations Between Laboratory and Full-Scale
Experiment for the FAA Aircraft Fire Safety Program.
Part 2. Rate of Energy Release in Fire.
National Bureau of Standards, Gaithersburg, MD
NBSIR 82-2536, 24 P. July 1982.

Quintiere, J. G.
Assessment of Correlations Between Laboratory and Full-Scale
Experiments for the FAA Aircraft Fire Safety
National Bureau of Standards, Gaithersburg, MD
NBSIR 82-2525, 21 P. July 1982.
2.6 Materials Flammability (cont.)

Stevens, M. R., Fisher, H. D. and Breen, B. P.
Dynamic Science Corp., Monrovia, CA

Summerfield, M. and Messina, N.
Smoldering Combustion in Porous Fuels.
Princeton Combustion Research Labs., NJ
American Inst. of Aeronautics & Astronautics, New York, NY,

Supkis, D. E.
Development and Applications of Fluorel.
National Aeronautics and Space Admin., Houston, TX

Tewarson, A.
Burning Intensity.
Factory Mutual Research Corp., Norwood, MA
FMRC Serial 22429 and RC75-T-6, 78 P. February 1975.

Wardell, A. W.
Manned Spacecraft Electrical Fire Safety.
National Aeronautics and Space Admin., Houston, TX

Wickstrom, U. and Goransson, U.
Prediction of Heat Release Rates of Surface Materials in Large-Scale Fire Tests Based on Cone Calorimeter Results.
Swedish National Testing Inst., Boras, Sweden
2.7 MICROGRAVITY AND ZERO GRAVITY

Altenkirch, R. A., Eichhorn, R. and Brancic, A. B.
Buoyancy Induced Extinction of Laminar Gas Jet Diffusion Flames.
Kentucky Univ., Lexington

Altenkirch, R. A., Eichhorn, R. and Shang, P. C.
Buoyancy Effects on Flames Spreading down Thermally Thin Fuels.
Kentucky Univ., Lexington

Andracchio, C. R. and Aydelott, J. C.
Comparison of Flame Spreading Over Thin Flat Surfaces in Normal Gravity and Weightlessness in an Oxygen Environment.

Study of Combustion Experiments in Space.

Bonne, U.
Radiative Extinguishment of Diffusion Flames at Zero Gravity.

Calcote, H. F.
Cochran, T. H. and Masica, W. J.

DeWitt, R. L.
Combustion Experimentation Aboard the Space Transportation System.

Illinois University

Kanno, H., Okajima, S., Iinuma, K. and Kumagai, S.

Kanury, A. M.

Kanury, A. M.
Kimzey, J. H.
Flammability During Weightlessness.
Manned Spacecraft Center, Houston, TX
NASA TM X-58001, 12 P. May 1966, and
Institute of Environmental Sciences. 12th Annual Technical

Kimzey, J. H.
Skylab Experiment M479 Zero Gravity Flammability.
National Aeronautics and Space Admin., Houston, TX
3rd Space Processing Symposium on Skylab Results. M-74-5.
Volume 1. April 30-May 1, 1974, Marshall

Kimzey, J. H., Downs, W. R., Eldred, C. H. and Norris, C. W.
Flammability in Zero-Gravity Environment.
Manned Spacecraft Center, Houston, TX
NASA TR R-246, 49 P. October 1966.

Kumagai, S.
Survey of Research on Gravitational Effects on Combustion.
Iwate Univ., Morioka, Japan
Combustion Institute. Central States Section. Spring

Noe, K. A. and Strehlow, R. A.
Behavior of the Lean Methane-Air Flame at Zero-Gravity.
Illinois Univ., Urbana

Okajima, S., Iinuma, K., Yamaguchi, S. and Kumagai, S.
Measurement of Slow Burning Velocities and Their Pressure
Dependence Using a Zero-Gravity Method.
Hosei Univ., Tokyo, Japan
Combustion Institute, Symposium (International) on
Combustion, 20th. August 12-17, 1984, Ann Arbor, MI.

Okajima, S. and Kumagai, S.
Further Investigations of Combustion of Free Droplets in a
Freely Falling Chamber Including Moving Droplets.
Tokyo Univ., Japan
Combustion Institute, Symposium (International) on

38
2.7 Microgravity (cont.)

Pearce, J. P., Kimzey, J. H. and Pippen, D. L.
Effects of Gravity on Flammability.
Manned Spacecraft Center, Houston, TX
National Aeronautics and Space Admin. Materials for
Improved Fire Safety. May 6-7, 1970, Houston, TX.

Pentecost, E.
Microgravity Science and Applications Bibliography. 1986
Revision.
National Aeronautics and Space Admin., Washington, DC

Pentecost, E.
Microgravity Science and Applications Bibliography. 1985
Revision.
National Aeronautics and Space Admin., Washington, DC
Universities Space Research Assoc., Washington, DC

Pentecost, E.
Microgravity Science and Applications Bibliography--1984
Revision.
Universities Space Research Assoc., Washington, DC

Ronney, P. D.
Effect of Gravity on Halocarbon Flame Retardant Effectiveness.
National Aeronautics and Space Admin., Cleveland, OH

Ronney, P. D. and Wachman, H. Y.
Effect of Gravity on Laminar Premixed Gas Combustion I:
Flammability Limits and Burning Velocities.
Massachusetts Inst. of Technology, Cambridge

Ronney, P. D.
Effect of Gravity on Laminar Premixed Gas Combustion II:
Ignition and Extinction Phenomena.
Massachusetts Inst. of Technology, Cambridge
2.7 Microgravity (cont.)

Sacksteder, K. R.
Microgravity Combustion Fundamentals.
NASA Lewis Research Center, Cleveland, OH
NASA CP-2476,
National Aeronautics and Space Administration. Spacecraft
Fire Safety. August 20-21, 1986., Cleveland, OH.

Strehlow, R. A. and Reuss, D. L.
Effect of a Zero g Environment on Flammability Limits as
Determined Using a Standard Flammability Tube
Illinos Univ., Urbana

Strehlow, R. A. and Reuss, D. L.
Flammability Limits in a Standard Tube.
Illinois Univ., Urbana
General Motors Research Laboratories, Warren, MI
Combustion Experiments in Zero-Gravity Laboratory. Progress
in Astronautics and Aeronautics. Volume 73.
American Inst. of Aeronautics & Astronautics, New York, NY,

Vedha-Nayagam, M. and Altenkirch, R. A.
Gravitational Effects on Flames Spreading Over Thick Solid
Surfaces.
Kentucky Univ., Lexington

Wherley, B. L. and Strehlow, R. A.
Behavior of Fuel-Lean Premixed Flames in a Standard
Flammability Limit Tube Under Controlled
Illinois Univ. at Urbana-Champaign
NASA CR 177132, NASA NCC 3-35, and UILU ENG 86-0503, 143 P.
July 1986.

Williams, F. A.
Droplet Burning.
Princeton Univ., NJ
Combustion Experiments in Zero-Gravity Laboratory. Progress
in Astronautics and Aeronautics. Volume 73.
American Inst. of Aeronautics & Astronautics, New York, NY,
2.8 ATMOSPHERES, OXYGEN ENRICHED AND MODIFIED

Alger, R. S. and Nichols, J. R.
Survey of Fires in Hypobaric and Hyperbaric Chambers.
Naval Ordnance Lab., Silver Spring, MD

Botteri, B. P.
Fire Protection for Oxygen Enriched Atmospheres Applications.
Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH

Carter, D. I.
Fire Prevention and Protection in Oxygen Enriched Atmospheres.
Air Force Systems Command, Brooks AFB, TX

Denison, D. M.
Further Studies on the Problems of Fires in Artificial Gas Environments.
Royal Air Force Institute of Aviation Medicine, Farnborough, Hants., England

Dorr, V. A.
Fire Studies in Oxygen-Enriched Atmospheres.
Ocean Systems, Inc., Tarrytown, NY
2.8 Atmospheres (cont.)

Knight, D. R.
Naval Submarine Medical Research Lab., Groton, CT

Knight, D. R.
Medical Research Programs, Past and Future, for Designing Submarine Atmospheres to Retard Fires.
Naval Submarine Medical Research Lab., Groton, CT

McHale, E. T.

Robertson, A. F. and Rappaport, M. W.

Voss, K.
Oxygen Environment--A Peril in Space?
National Aeronautics and Space Admin., Cocoa Beach, FL Technology Week, 12-17, February 6, 1967.

Woods, F. J. and Johnson, J. E.
Naval Research Lab., Washington, DC
2.9 SHIPS

Callahan, J. T.

Carhart, H. W.
Inerting and Atmospheres.
Naval Research Lab., Washington, DC
National Aeronautics and Space Administration. Spacecraft Fire Safety. August 20-21, 1986, Cleveland, OH.

Cook, G. A.
Combustion Safety in Diving Atmospheres.
Union Carbide Corp., Tonawanda, NY

Fu, T. T.
Smoke Detection in Hyperbaric Chambers: An Experimental Study.

Harter, J. V.
Review of the Navy Chamber Fire Safety Program.
Washington Navy Yard, Washington, DC

Lugar, J. R.
Water Mist Fire Protection.
2.10 SMOKE

Baum, H. R., Rehm, R. G. and Mulholland, G. W.
Prediction of Heat and Smoke Movement in Enclosure Fires.
National Bureau of Standards, Gaithersburg, MD

Foster, W. W.
Attenuation of Light by Wood Smoke.
Torry Research Station
British Journal of Applied Physics, Vol. 10, 416-420,
September 1959.

Miyama, J. and Saito, F.
Fire Detection and Smoke Property.
Sophia Univ., Tokyo, Japan
Building Research Inst., Tokyo, Japan
U.S./Japan Cooperative Program in Natural Resources. Fire
Research and Safety. 5th Joint Panel Meeting.
October 15-24, 1980, Gaithersburg, MD. National Bureau of
Standards NBS SP 639, 31-38, 1981.

National Academy of Sciences, National Materials Advisory Board
Smoke and Toxicity (Combustion Toxicology of Polymers).

Quintiere, J. G.
Assessment of Correlations Between Laboratory and Full-Scale
Experiments for the FAA Aircraft Fire Safety Program.
National Bureau of Standards, Gaithersburg, MD
NBSIR 82-2508, 53 P. July 1982.

Van Luik, F. W., Jr.
Characteristics of Invisible Particles Generated by
Precombustion and Combustion.
Environment One Corp., Schenectady, NY
2.11 SPACECRAFT

Berlad, A. L. and Joshi, N. D.
Gravitational Effects on the Extinction Conditions for Premixed Flames.
San Diego Univ., CA
New York State Univ., Stony Brook

Bricker, R. W., Crabb, J. P. and Spiker, I. K.
Flammability Tests for Apollo Command Module and Lunar Module Mockup.
National Aeronautics and Space Admin., Houston, TX

DeMeis, R.
Safety in the Space Station.

Friedman, R.
Fire Safety Concerns in Space Operations.
National Aeronautics and Space Admin., Cleveland, OH

Friedman, R. and Sacksteder, K. R.
Science and Technology Issues in Spacecraft Fire Safety.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH
2.11 Spacecraft (cont.)

Gartner, R.
Spacelab Environmental Control/Life Support System-Design Safety.
Dornier System GmbH, Friedrichshafen, Germany

Gibb, J.W., McIntosh, M. E., Heinrich, S. R., Thomas, E., Steele, M. and Schubert, F.
Other Challenges in the Development of the Orbiter Environment Control Hardware.
Fairchild Control Systems Co., Manhattan Beach, CA
Brunswick Corp., Costa Mesa, CA
Life Systems, Inc., Cleveland, OH

Johnston, R. S.
Combustion Safety in the Spacecraft Environment.
National Aeronautics and Space Admin., Houston, TX
Aerospace Medicine, Vol. 40, No. 11, 1197-1202, November 1969.

Katsikas, C. J. and Levine, J. H.
Manned Spacecraft Nonmetallic Materials Flammability Selection Criteria and Requirements.
National Aeronautics and Space Admin., Houston, TX

Kring, G. and Spintig, J.
SPACELAB Flight Unit Environmental Control/Life Support System.
Dornier System GmbH, West Germany
78-ENAs-14, 13 P. 1978.
2.8 Atmospheres (cont.)

Durfee, R. L. and Spurlock, J. M.
Quenching and Extinguishment of Burning Solids in
Atlantic Research Corp., Alexandria, VA

Fisher, H. D. and Gerstein, M.
Investigation of Materials Combustibility and Fire and
Explosion Suppression in a Variety of Atmospheres.
Summary Report.
Dynamic Science Corp., Monrovia, CA
SN-6401, 60 P. May 1966.

Holley, M. D. and Bachman, S.
Flammability Control in the Oxygen Environment of the Apollo
Guidance and Navigation Equipment.
Manned Spacecraft Center, Houston, TX
National Aeronautics and Space Admin. NASA Conference on
Materials for Improved Fire Safety. May 6-7, 1970,

Huggett, C.
Habitable Atmospheres Which Do Not Support Combustion.
Atlantic Research Corp., Alexandria, VA

Johnson, J. E. and Woods, F. J.
Flammability in Unusual Atmospheres. Part 1. Preliminary
Studies of Materials in Hyperbaric Atmospheres Containing
Oxygen, Nitrogen, and/or Helium. Interim Report.
Naval Research Lab., Washington, DC
NRL 6470, 28 P. October 31, 1966.

Johnston, R. L. and Pippen, D. L.
Development of Materials Screening Tests for Oxygen-Enriched
Environments.
National Aeronautics and Space Admin., Houston, TX
National Aerospace and Space Administration. NASA
Conference on Materials for Improved Fire Safety.
May 6-7, 1970, Houston, TX. NASA CR TM X-14330,
3/1-3 pp., 1970.
2.11 Spacecraft (cont.)

Krupnick, A. D.
Proposed Incipient Fire and Toxic Gas Caution and Warning for Shuttle.
National Aeronautics and Space Admin., Huntsville, AL

Kubicki, D. J.
Fire Protection and Rescue Planning for the NASA Space Shuttle.

Lautenbach, P., Vaeth, R. and Swider, J. E.

McAlevy, R. F., III and Magee, R. S.
Criterion for Space Capsule Fire Hazard Minimization.

Pearson, O. L.
Facility and Test Support Equipment for the Manned Thermal Vacuum Tests of the Apollo-Soyuz Docking Module.

Preiss, H. and Padwater, A. D.
Spacelab Cabin Loop.
2.11 Spacecraft (cont.)

Prewo, K. M.

Raasch, R. F., Peercy, R. L., Jr. and Rockoff, L. A.


Schulze, N. R. and Prichard, R. P.

Swan, A. G.

Velupillai, D.
2.12 STANDARDS

American Society for Testing and Materials.
Building Seals and Sealants; Fire Standards; Building

American Society for Testing and Materials
Proposed Test Method for Heat and Visible Smoke Release
Rates for Materials and Products Using an
Oxygen Consumption Calorimeter.
ASTM E-5 Proposal P 190.

American Society for Testing and Materials
Standard Method for Measuring the Minimum Oxygen
Concentration to Support Candle-Like Combustion of Plastics
Combustion of Plastics (Oxygen Index). ASTM D2863.

American Society for Testing and Materials
Standard Test Method for Heat and Visible Smoke Release
Rates for Materials and Products. ASTM E906.

American Society for Testing and Materials
Standard Test Method for Resistance of Electrical Wire
Insulation Materials to Flame at 60 deg. ASTM F777.

American Society for Testing and Materials
Standard Test Method for Resistance of Materials to
Horizontal Flame Propagation (For Aerospace Vehicles,

American Society for Testing and Materials
Standard Test Method for Specific Optical Density of Smoke
Generated by Solid Materials. ASTM E662.

European Space Agency
Flammability Testing for the Screening of Space Materials.
ESA PSS-01-721 Issue 1, 42 P. October 1982.
European Space Agency, Noordwijk, The Netherlands
2.12 Standards (cont.)

International Maritime Organization

National Aeronautics and Space Administration

National Fire Protection Association

National Fire Protection Association

National Fire Protection Association

Underwriters Laboratories Inc.

Underwriters Laboratories Inc.
2.13 SUPPRESSION

Alpert, R. L.
Calculated Spray Water-Droplet Flows in a Fire Environment.
Factory Mutual Research, Norwood, MA
FMRC J.I. OJOJ1.BU and RC86-BT-6, 56 P. October 1986.

Ault, W. E. and Carter, D. I.
Influence of Hyperbaric Chamber Pressure on Water-Spray Patterns.
Automatic Sprinkler Corporation of America

Selective Automatic Extinguisher for Computer Cabinets Class A, B, or C With Notification (SAFECOMP).
New Mexico Univ., Albuquerque
ESL-TR-86-14 and NMERI-WA3-5-(3.01), 148 P. July 1986.

Blake, D. R.
Federal Aviation Administration, Atlantic City, NJ

Cole, M. B.
Space Station Internal Environmental and Safety Concerns.
NASA Lyndon B. Johnson Space Center, Houston, TX
National Aeronautics and Space Administration. Spacecraft Fire Safety. August 20-21, 1986, Cleveland, OH.

Davies, D.
Naval Fire Protection for the 1990’s.
Graviner, Ltd., United Kingdom
2.13 Suppression (cont.)

Dressler, D. P., Robinson, R. S., Gann, R. G., Stone, J. P., Williams, F. W. and Carhart, H. W.
Biological Effect of Fire Suppression by Nitrogen Pressurization in Enclosed Environments.
Harvard Medical School, Cambridge, MA
Naval Research Lab., Washington, DC

Fiala, R.
Contribution to the Selection of Fire Extinguishing Systems and Agents for Aircraft Fires.
Deutsche Dorschungs- und Versuchsanstalt fur Luft- und Raumfahrt E. V., Institut fur
Luftstrahlantriebe, Germany

Fiala, R., Dussa, K. and Winterfeld, G.
On the Applicability of Reticulated Foams for the Suppression of Fuel Tank Explosions.
Advisory Group for Aerospace Research and Development (AGARD). Aircraft Fire Safety. April 11, 1975,
Rome, Italy. AGARD CP-166, 16/1-12 pp., 1975.

Fish, R. H.
Performance of Lightweight Plastic Foams Developed for Fire Safety.
National Aeronautics and Space Admin., Houston, TX

Naval Research Lab., Washington, DC
2.13 Suppression (cont.)

Kimzey, J. H.
Fire Extinguishment in Hypobaric and Hyperbaric Environments.
National Aeronautics and Space Admin., Houston, TX

Krasner, L. M.
Factory Mutual Research Corp., Norwood, MA

Kuchta, J. M., Cato, R. J., Martindill, G. H. and Spolan, I.
Ignition and Fire Suppression in Aerospace Vehicles.
Bureau of Mines, Pittsburg, PA

Kung, H. C.
Cooling of Room Fires by Sprinkler Spray.
Factory Mutual Research Corp., Norwood, MA

Martindill, G. H., Spolan, I. and Kuchta, J. M.
Bureau of Mines, Pittsburgh, PA

Sarkos, C. P.
Federal Aviation Admin., Atlantic City, NJ

Slusher, G. R., Wright, J. and Demaree, J.
Federal Aviation Admin., Atlantic City Airport, NJ
DOT/FAA/CT-86/5, 58 P. June 1986.
2.13 Suppression (cont.)

Slusher, G. R., Wright, J. A. and Speitel, L. C.
Federal Aviation Admin., Atlantic City Airport, NJ

Washington Univ.
Thermal Model of Fire Suppression by Nitrogen Pressurization.
Washington Univ., Seattle
39 P. November 22, 1983.

Wilson, C. W., Trujillo, T. M. and Zallen, D.
New Mexico Univ., Albuquerque

Wilson, C. W., Trujillo, T. M. and Zallen, D.
New Mexico Univ., Albuquerque

You, H. Z., Kung, H. C. and Han, Z.
Spray Cooling in Room Fires.
Factory Mutual Research Corp., Norwood, MA
NBS-GCR-86-515, 45 P. July 1986, and
3. AUTHOR INDEX

A

Affens, W. A., 16
Alexander, J. I., 15
Alger, R. S., 40
Alpert, R. L., 51
Altenkirch, R. A., 35, 39
Altman, R. L., 16
Alvares, N. J., 9
American Society for Testing and Materials, 49
Anderson, R. A., 6
Andracchio, C. R., 35
Arnold, D. B., 6
Atallah, S., 16
Auck, S. E., 16
Ault, R., 7
Ault, W. E., 51
Aydelott, J. C., 35

B

Babrauskas, V., 25, 32
Bachman, S., 41
Back, K. C., 16
Barnes, G. J., 28
Bass, R. S., 25
Baum, H. R., 44
Beaudry, J. P., 51
Beavers, R. R., 13
Benz, F. J., 25, 26
Berlad, A. L., 35, 45
Berner, W. E., 29
Bigelow, A., 7
Binding, A. T., 6
Blake, D. R., 4, 51
Blumke, R. E., 9
Bonne, U., 35
Botteri, B. P., 4, 17, 40
Brancic, A. B., 35
Breen, B. P., 34
Bricker, R. W., 9, 45
Bright, R. G., 10
Bruggink, G. M., 4
Bukowski, R. W., 9, 26
Burgess, D., 20
Byard, J. L., 20

C

Cahalane, P. T., 6
Calcote, H. F., 35
Call, D. W., 17
Callahan, J. T., 43
Campbell, J. A., 7
Campbell, P., 51
Carhart, H. W., 17, 43, 52
Carter, D. I., 17, 40, 51
Cato, R. J., 53
Charno, R. J., 17
Chatfield, D. A., 27
Chicarello, P. J., 5
Christopher, A. J., 26
Clark, D. G., 17
Clifton, C., 24
Cochran, T. H., 36
Cole, M. B., 51
Commerford, G. E., 10
Conforti, F., 10
Cook, G. A., 43
Cooper, L. Y., 32
Coulston, F., 17, 20
Crabb, J. P., 45
Craig, J. W., 26
Cretcher, R. E., 17
Crowley, D., 16
Custer, R. L., 10
I
Inuma, K., 36, 37
Illinois Univ., 36
International Maritime Org., 50
Istvan, S. M., 9

J
Jackson, H. W., 13
Jamison, H. H., 20
Jarboe, R. L., 26
Johnson, A. M., 20
Johnson, C. C., 24
Johnson, J. E., 11, 14, 42
Johnson, L. C., 11
Johnson, R., 30
Johnston, R. L., 41
Johnston, R. S., 29, 46
Johnston, W. L., 6
Jones, J., 6
Joshi, N. D., 45
Judd, M. D., 29

K
Kamath, A. R. R., 12
Kane, W. R., 17
Kanno, H., 36
Kanury, A. M., 29, 36
Katsikas, C. J., 46
Kaufman, P., 35
Keller, A. Z., 12
Kimzey, J. H., 37, 38, 53
Kline, H. F., 29
Knapp, S. C., 24
Knight, D. R., 24, 42
Knox, F. S., III, 24
Kourtides, D. A., 6, 7, 8, 28
Krasner, L. M., 53
Kring, G., 46
Krivaneck, N. D., 22
Krupnick, A. D., 47
Kubicki, D. J., 47
Kubin, R. F., 7
Kuchta, J. M., 20, 53
Kumagai, S., 36, 37
Kung, H. C., 53, 54
Kwan, A. J., 21, 23

L
LaBossiere, L. A., 6
Lautenbach, P., 47
Lawrence, K. D., 15
Lawrence, W. H., 30
Ledoux, P. W., 30
Lee, T. G., 28
Leon, H. A., 6
Lerner, N. R., 6
Levin, B. C., 25
Levine, J. H., 46
Linford, R. M. F., 12
Little, M. W., 33
Litton, C. D., 12
Liu, B. Y. H., 13
Loftus, J. J., 28
Lugar, J. R., 43
Lundstrom, I., 12

M
MacArthur, C. D., 8
MacEwen, J. D., 21
Madgwick, T., 7
Magee, R. S., 47
Marcussen, W. H., 6
Marcy, J. F., 19, 30
Markstein, G. H., 35
Martindill, G. H., 53
Masica, W. J., 36
Matthews, J. D., 13
McAlvey, R. F., III, 47
McCormack, R. G., 13
McDaniel, D. E., 21
McGuingle, R. D., 13
McGuire, R. J., 7
McHale, E. T., 41
McIntosh, M. E., 46
McKee, R. J., 9
Meehan, J., 29
Mendez, V., 19
Messina, N., 34
Mickelson, R. W., 27
Miguel, M. S., 19
Mikeska, J. L., 6
Miniszewski, K. R., 7
Miura, K., 14
Miyama, J., 44
Mniszewski, K. R., 13

58
<table>
<thead>
<tr>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morton, G. P.</td>
<td>27</td>
</tr>
<tr>
<td>Mott, D. R.</td>
<td>7</td>
</tr>
<tr>
<td>Mulholland, G. W.</td>
<td>4, 13, 44</td>
</tr>
<tr>
<td>Muzet, A. G.</td>
<td>11</td>
</tr>
<tr>
<td>Naimer, J.</td>
<td>30</td>
</tr>
<tr>
<td>National Academy of Sciences</td>
<td>44</td>
</tr>
<tr>
<td>National Aeronautics and Space Admin.</td>
<td>50</td>
</tr>
<tr>
<td>National Fire Protection Assoc.</td>
<td>50</td>
</tr>
<tr>
<td>Newton, P. E.</td>
<td>22</td>
</tr>
<tr>
<td>Nicholas, E. G.</td>
<td>31, 33</td>
</tr>
<tr>
<td>Nichols, J. R.</td>
<td>40</td>
</tr>
<tr>
<td>Nii, Y.</td>
<td>14</td>
</tr>
<tr>
<td>Nober, E. H.</td>
<td>24</td>
</tr>
<tr>
<td>Noe, K. A.</td>
<td>37</td>
</tr>
<tr>
<td>Norris, C. W.</td>
<td>37</td>
</tr>
<tr>
<td>Ohlemiller, T. J.</td>
<td>4</td>
</tr>
<tr>
<td>Okajima, S.</td>
<td>36, 37</td>
</tr>
<tr>
<td>Olson, S. L.</td>
<td>31</td>
</tr>
<tr>
<td>O'Neill, J. H.</td>
<td>31</td>
</tr>
<tr>
<td>O'Neill, T. J.</td>
<td>31</td>
</tr>
<tr>
<td>Padwater, A. D.</td>
<td>47</td>
</tr>
<tr>
<td>Palmer, H. B.</td>
<td>35</td>
</tr>
<tr>
<td>Parker, J. A.</td>
<td>6, 7, 8, 19, 28</td>
</tr>
<tr>
<td>Payne, G. C.</td>
<td>8</td>
</tr>
<tr>
<td>Pearce, J. P.</td>
<td>38</td>
</tr>
<tr>
<td>Pearson, O. L.</td>
<td>47</td>
</tr>
<tr>
<td>Peercy, R. L., Jr.</td>
<td>48</td>
</tr>
<tr>
<td>Peirce, H.</td>
<td>24</td>
</tr>
<tr>
<td>Pelouch, J. J., Jr.</td>
<td>8</td>
</tr>
<tr>
<td>Pentecost, E.</td>
<td>38</td>
</tr>
<tr>
<td>Pezoldt, V. J.</td>
<td>24</td>
</tr>
<tr>
<td>Pippen, D. L.</td>
<td>38, 41</td>
</tr>
<tr>
<td>Plugg, M. A.</td>
<td>21</td>
</tr>
<tr>
<td>Pomroy, W. H.</td>
<td>13</td>
</tr>
<tr>
<td>Preiss, H.</td>
<td>47</td>
</tr>
<tr>
<td>Prewo, K. M.</td>
<td>48</td>
</tr>
<tr>
<td>Prichard, R. P.</td>
<td>48</td>
</tr>
<tr>
<td>Primeaux, G. R.</td>
<td>31</td>
</tr>
<tr>
<td>Punderson, J.</td>
<td>31</td>
</tr>
<tr>
<td>Q</td>
<td>Quintiere, J. G., 31, 32, 44</td>
</tr>
<tr>
<td>R</td>
<td>Raasch, R. F., 48</td>
</tr>
<tr>
<td>Radnofsky, M. I.</td>
<td>32</td>
</tr>
<tr>
<td>Rainaldi, N.</td>
<td>21</td>
</tr>
<tr>
<td>Rajan, K. S.</td>
<td>13</td>
</tr>
<tr>
<td>Ramsden, J. M.</td>
<td>8, 32</td>
</tr>
<tr>
<td>Rao, K. N.</td>
<td>11</td>
</tr>
<tr>
<td>Rappaport, M. W.</td>
<td>42</td>
</tr>
<tr>
<td>Raskauskas, B. J.</td>
<td>13</td>
</tr>
<tr>
<td>Reeves, J. B.</td>
<td>8</td>
</tr>
<tr>
<td>Rehm, R. G.</td>
<td>44</td>
</tr>
<tr>
<td>Reichelt, E. F.</td>
<td>21</td>
</tr>
<tr>
<td>Reinhardt, C. F.</td>
<td>21</td>
</tr>
<tr>
<td>Reinke, R. E.</td>
<td>21</td>
</tr>
<tr>
<td>Reuss, D. L.</td>
<td>39</td>
</tr>
<tr>
<td>Reynolds, J. R.</td>
<td>32</td>
</tr>
<tr>
<td>Riccitiello, S. R.</td>
<td>19</td>
</tr>
<tr>
<td>Riemer, O.</td>
<td>15</td>
</tr>
<tr>
<td>Robertson, A. F.</td>
<td>42</td>
</tr>
<tr>
<td>Robinson, R. S.</td>
<td>52</td>
</tr>
<tr>
<td>Robinson, S. P.</td>
<td>14, 15</td>
</tr>
<tr>
<td>Rockoff, L. A.</td>
<td>48</td>
</tr>
<tr>
<td>Ronney, P. D.</td>
<td>38</td>
</tr>
<tr>
<td>Rork, G. D.</td>
<td>14</td>
</tr>
<tr>
<td>Sacksteder, K. R.</td>
<td>39, 45</td>
</tr>
<tr>
<td>Saito, F.</td>
<td>44</td>
</tr>
<tr>
<td>Salzberg, F.</td>
<td>7</td>
</tr>
<tr>
<td>Samuels, A.</td>
<td>19</td>
</tr>
<tr>
<td>Sarkos, C. P.</td>
<td>6, 8, 33, 53</td>
</tr>
<tr>
<td>Sauers, D. G.</td>
<td>33</td>
</tr>
<tr>
<td>Sawko, P. M.</td>
<td>19</td>
</tr>
<tr>
<td>Schade, O. H., Jr.</td>
<td>14</td>
</tr>
<tr>
<td>Schechter, H. R.</td>
<td>13</td>
</tr>
<tr>
<td>Scheichl, L.</td>
<td>21</td>
</tr>
<tr>
<td>Scheidweiler, A.</td>
<td>14</td>
</tr>
<tr>
<td>Schubert, F.</td>
<td>46</td>
</tr>
<tr>
<td>Schulze, N. R.</td>
<td>48</td>
</tr>
<tr>
<td>Seeger, P. G.</td>
<td>22</td>
</tr>
<tr>
<td>Senturia, S. D.</td>
<td>14</td>
</tr>
<tr>
<td>Seshadri, K.</td>
<td>22</td>
</tr>
<tr>
<td>Shang, P. C.</td>
<td>35</td>
</tr>
<tr>
<td>Shaw, R. C.</td>
<td>25</td>
</tr>
<tr>
<td>Sheath, P. H.</td>
<td>14, 15</td>
</tr>
</tbody>
</table>
Shigiyama, K., 14
Shimura, T., 14
Shivaraman, M. S., 12
Shpilberg, D. C., 5
Sibulkin, M., 33
Simon, F. N., 14
Simpson, C. G., 33
Slusher, G. R., 53, 54
Smith, D. G., 22
Smith, D. J. V., 14, 15
Snellman, A., 13
Sommers, D. E., 31
Sotos, R. G., 31
Speitel, L. C., 28, 54
Spiker, I. K., 45
Spintig, J., 46
Spinweber, C. L., 11
Spolan, I., 53
Springer, R. J., 14, 15
Spruance, W. W., 7
Spurgeon, J. C., 33
Spurlock, J. M., 41
Steele, M., 46
Steinthal, M. W., 33
Stevens, J. R., 8
Stevens, M. R., 34
Stewart, R. D., 22
Stiblert, L., 12
Stone, J. P., 52
Street, T. T., 15
Strehlow, R. A., 37, 39
Stricoff, R. S., 16
Suminski, G., 15
Summerfield, M., 34
Supkis, D. E., 34
Svensson, C., 12
Swan, A. G., 48
Swider, J. E., 47

T
Tatem, P. A., 52
Tewarson, A., 34
Thomas, A. A., 22
Thomas, E., 46
Thomas, E. C., 15
Tolle, F. F., 18, 19
Transue, R. E., 15
Trujillo, T. M., 51, 54
Trumble, T. M., 15
Tustin, E., 6

U
Underwriters Laboratories, Inc., 50
Unger, E., 15

V
Vaeth, R., 47
Valys, A. J., 27
Van Cott, N. P., 24
Van Luik, F. W., Jr., 44
Van Stee, E. W., 16
Vedha-Nayagam, M., 39
Vellupillai, D., 48
Vernot, E. H., 22
Vickers, R. N., 21, 23
Von Tomkewitsch, R., 15
Voss, K., 42

W
Wachman, H. Y., 38
Walker, F. K., 13
Walker, J. L., 21, 23, 51
Walton, W. D., 25
Wands, R. C., 23
Wardell, A. W., 34
Washington Univ., 54
Waterman, T. E., 7, 13
Webb, S. C., 11
Well, A., 24
Wherley, B. L., 39
Wickham, R. T., 23
Wickstrom, U., 34
Williams, F. A., 4, 22, 39
Williams, F. W., 15, 52
Williamson, R. B., 6
Wilson, C. W., 21, 54
Winterfeld, G., 18, 52
Wood, E. C., 5
Woods, F. J., 41, 42
Wooliscroft, M., 12
Wray, J. A., 28
Wright, J., 53, 54
Wu, A., 22
Y

Yamaguchi, S., 37
Yamashika, S., 23
Yamate, G., 13
Yang, C. H., 35
Yoshida, T., 14
You, H. Z., 54

Z

Zallen, D. M., 21, 51, 54
Zhu, S., 26
Zikria, B. A., 23
Pertinent fire detection and extinguishment references have been identified to further the knowledge of spacecraft fire safety. To broaden the scope of the bibliography, other unusual environments, e.g., aircraft, submarine, ship, have been included. In addition, for a more comprehensive view of the spacecraft fire safety problem, selected subjects are included, e.g., materials flammability, smoke, human behavior. The references will provide the researcher with access to state-of-the-art works and historic works. Selected references from the 1960s have been included, but the emphasis is on references published from 1975 to 1987. The references are arranged by very broad categories. Often a paper will cover more than one topic, but for the purposes of this bibliography it will be cited only once.