



***Technical Committee on NFPA 750 Water Mist Fire Protection Systems (WAM-AAA)***

**MEMORANDUM**

**TO:** Principal and Alternate Members of the Technical Committee on *NFPA 750 Water Mist Fire Protection Systems (WAM-AAA)*

**FROM:** **Sandra Stanek**, NFPA Staff Liaison

**DATE :** March 26, 2012

**SUBJECT:** **AGENDA – NFPA 750 First Draft Meeting (Fall 2013 revision cycle) for the 2014 edition**

---

Enclosed is the agenda for the First Draft Meeting for *NFPA 750, Water Mist Fire Protection Systems* which will be held at **on Wednesday, April 25th through Friday, April 27th, 2012 in Deer Park. TX.**

Please review the meeting notice, sent to your email address of record, for pertinent information concerning hotels, etc. As your new staff liaison, I welcome any questions you may have & look forward to working with all of you.

Office: (617) 984-7498  
Email: [sstanek@nfpa.org](mailto:sstanek@nfpa.org)

For administrative questions, please contact Elena Carroll at (617) 984-7952.



***Technical Committee on NFPA 750 Water Mist Fire Protection  
Systems (WAM-AAA)***

First Draft Meeting (F2013) Agenda  
April 25-27, 2012  
Offices of Dooley Tackaberry Inc.  
1515 W. 13<sup>th</sup> St.  
Deer Park, TX

**Wednesday, April 25, 2012:  
8:00 A.M. -5:00 P.M. or at the discretion of the Chairman**

1. Call to Order – 8:00 A.M. MST
2. Introductions & Attendance
3. Committee member status & Update of membership Roaster
4. Review Agenda
5. Approval of Previous Meeting minutes (see attachments)
6. NFPA Staff Liaison presentation, review of key dates within current cycle and staff presentation of New Process Training
7. Chairman Comments
8. Task Group reports
9. Process Public Input Logs & generate Committee Input for NFPA 750 revision cycles F2013 (see attachments)
10. Adjourn Meeting @ 5:00 P.M. CST or at the discretion of the Chairman



***Technical Committee on NFPA 750 Water Mist Fire Protection  
Systems (WAM-AAA)***

**Thursday, April 26, 2012:**

***8:00 A.M. -5:00 P.M. or at the discretion of the Chairman***

1. Call to Order – 8:00 A.M. CST
2. Process Public Input Logs & generate Committee Input for NFPA 750 revision cycles F2013 (see attachments)
3. Adjourn Meeting @ 5:00 P.M. CST or at the discretion of the Chairman

**Friday, April 27, 2012:**

***8:00 A.M. - ? P.M. or at the discretion of the Chairman***

1. Call to Order – 8:00 A.M. CST
2. Act on Public Input Logs & generate Committee Input for NFPA 750 revision cycles F2013 (see attachments)
3. Old Business
4. New Business
5. Future Second Revision Meeting discussion
6. Adjourn Meeting

**Please submit requests for additional agenda items to the chair at least seven days prior to the meeting.**

**Please notify the chair and staff liaison as soon as possible if you plan to introduce any committee proposals at the meeting.**



## **Technical Committee on NFPA 750 Water Mist Fire Protection Systems (WAM-AAA)**

### **Key Dates for the Fall 2013 Revision Cycle** (NFPA 750 2014 edition)

Public Input (First Draft) Closing Date	Jan. 4, 2012
<b>First Draft Meeting</b>	<b>April 25, 2012</b>
Posting of First Draft for Balloting	August 3, 2012
<b>Ballots Returned By</b>	<b>August 31, 2012</b>
Final First Draft Published & Posted for Public Comments	Sept. 7, 2012
Public Comment Closing Date	Nov. 16, 2012
<b>Final Date for Second Draft Meeting</b>	<b>May 3, 2013</b>
Final date for Second Draft Ballot	June 14, 2013
<b>Ballots Returned By</b>	<b>July 12, 2013</b>
Post final Second Draft for NITMAM review	July 19, 2013
Closing Date for Notice of Intent to Make a Motion (NITMAM)	August 23, 2013
NFPA Annual Meeting Chicago	June 2014
<i>Issuance of Consent Document (No NITMAMs)</i>	<i>Nov. 12, 2013</i>

Technical Committee deadlines are in **bold**.

## **Meeting Preparation**

Committee members are strongly encouraged to review the published Public Inputs Logs prior to the meeting and to be prepared to act on each item.

Handout materials should be submitted to the chair at least seven days prior to the meeting.

Only one posting of the Public Inputs will be made; it will be arranged in section/order and will be pre-numbered. This will be posted to the NFPA Document information pages are located at [www.nfpa.org/750](http://www.nfpa.org/750). If you have trouble accessing the website please contact Elena Carroll at [ecarroll@nfpa.org](mailto:ecarroll@nfpa.org).



## ***Technical Committee on NFPA 750 Water Mist Fire Protection Systems (WAM-AAA)***

### **Materials to have at meeting:**

- Last edition of the standard
- Meeting agenda
- Public Input Logs & associated attachments

## **Regulations and Guiding Documents**

All committee members are expected to behave in accordance with the Guide for the Conduct of Participants in the NFPA Standards Directory (on-line).

All actions during and following the committee meetings will be governed in accordance with the NFPA Regulations Governing Committee Projects. Failure to comply with these regulations could result in challenges to the standards-making process. A successful challenge on procedural grounds could prevent or delay publication of the document.

The style of the document must comply with the Manual of Style for NFPA Technical Committee Documents.

## **General Procedures for Meetings**

- Use of tape recorders or other means capable of producing verbatim transcriptions of any NFPA Committee Meeting is not permitted.
- Attendance at all NFPA Committee Meetings is open. All guests must sign in and identify their affiliation.
- Participation in NFPA Committee Meetings is generally limited to committee members and NFPA staff. Participation by guests is limited to individuals, who have received prior approval from the chair to address the committee on a particular item, or who wish to speak regarding public proposals or comments that they submitted.
- The chairman reserves the right to limit the amount of time available for any presentation.



***Technical Committee on NFPA 750 Water Mist Fire Protection Systems (WAM-AAA)***

- No interviews will be allowed in the meeting room at any time, including breaks.
- All attendees are reminded that formal votes of committee members will be secured by letter ballot. Voting at this meeting is used to establish a sense of agreement, but only the results of the formal letter ballot will determine the official action of the committee.
- Note to Special Experts: Particular attention is called to Section 3.3(e) of the NFPA Guide for the Conduct of Participants in the NFPA Codes and Standards Development Process in the NFPA Directory. This section requires committee members to declare any interest they may represent, other than their official designation as shown on the committee roster. This typically occurs when a special expert is retained by and represents another interest category on a particular subject. If such a situation exists on a specific issue or issues, the committee member shall declare those interests to the committee and refrain from voting on any action relating to those issues.
- Smoking is not permitted at NFPA Committee Meetings.



***Technical Committee on NFPA 750 Water Mist Fire Protection  
Systems (WAM-AAA)***

**Attachment #1:**

***Previous Meeting Minutes***

# Technical Committee on Water Mist Fire Suppression Systems

## ROC Meeting

*May 5, 2009*

### Conference Call and Web Meeting

### Meeting Minutes

1. **Call to Order.** Meeting was called to order by Chair Larry Owen at 11:00AM EDT.
2. **Self-Introductions of members and guests.** Committee members introduced by roll call. (Attachment A – Attendance List)
3. **Review of Distributed Meeting Materials.** Staff Liaison Jim Lake reviewed the materials in the ROC Agenda Package
4. **Approval of F09-ROP Meeting Minutes.** ROP Meeting Minutes were approved without revision.
5. **Review of Meeting Procedures and Revision Process.** Staff Liaison Jim Lake reviewed the current revision cycle schedule and procedures for the ROC Meeting.
6. **Development of Report on Comments.** The committee acted on comments received and developed the Report on Comments. See the Report on Comments for all committee actions.

During this portion Jack Mawhinney provided material from the Obstruction Task Group. The Test Connection Task Group did not report.

7. **New Business.** As a result of ROC Log#5 it was agreed that a liaison should be established between the Technical Committee on Water Mist Systems and the Technical Committee on Inspection and Testing and Maintenance of Water-Based Systems (NFPA 25) prior to the next revision cycle for NFPA 25.
8. **Next Meeting.** The next meeting will be the ROP meeting for the F12 revision cycle.
9. **Adjournment.** The meeting adjourned at 1:45PM EDT.



## Attendance List

### Principals

Larry Owen, Chair	Dooley Tackaberry
Randy Eberly	US Coast Guard
Joshua Fleischer	Edison Electric Institute
Ray Hansen	USAF
Dan Hubert	FSSA
William Janz	XL Global
Robert Kasiski	FM Global
Jack Mawhinney	Hughes & Associates
Bill Reilly	Victaulic
Brad Stilwell	Fike Corp.
Dennis Taylor	Worley Parsons
Victoria Valentine	NFSA
Maarit Tuomisaari	Marrioff Oy

### Alternates

Rick Jackson	AFSA
Mike Koczera	Property Casualty Insurers Assoc.
Hong-Zeng Yu	FM Global
James Lake	NFPA Staff



***Technical Committee on NFPA 750 Water Mist Fire Protection  
Systems (WAM-AAA)***

**Attachment #2:**

***Committee Member Information***

# Address List No Phone

03/23/2012  
Sandra Stanek  
WAM-AAA

## Water Mist Fire Suppression Systems

<b>Larry W. Owen</b> <b>Chair</b> Dooley Tackaberry, Inc. 1515 West 13th Street PO Box 9700 Deer Park, TX 77536	<b>IM 1/10/2002</b> <b>WAM-AAA</b>	<b>Anthony J. Cacioppo</b> <b>Principal</b> Road Sprinkler Fitters UA Local 669 PO Box 400 Abita Springs, LA 70420 <b>United Assn. of Journeymen &amp; Apprentices of the Plumbing &amp; Pipe Fitting Industry</b> <b>Alternate: Charles W. Ketner</b>	<b>L 8/2/2010</b> <b>WAM-AAA</b>
<b>John F. Devlin</b> <b>Principal</b> Aon Fire Protection Engineering Corporation 6305 Ivy Lane, Suite 220 Greenbelt, MD 20770	<b>I 7/1/1993</b> <b>WAM-AAA</b>	<b>Randall Eberly</b> <b>Principal</b> US Coast Guard Commandant (CG-5214) 2100 2nd Street, SW, Mail Stop 7126 Washington, DC 20593-7126	<b>E 4/16/1999</b> <b>WAM-AAA</b>
<b>William A. Froh</b> <b>Principal</b> US Department of Energy National Nuclear Security Administration (NNSA), NA-41 1000 Independence Avenue Washington, DC 20585 <b>Alternate: James G. Bisker</b>	<b>U 7/1/1993</b> <b>WAM-AAA</b>	<b>Raymond N. Hansen</b> <b>Principal</b> US Department of the Air Force HQ AFCESA/CEOA 139 Barnes Drive, Suite 1 Tyndall AFB, FL 32403-5319	<b>E 7/1/1993</b> <b>WAM-AAA</b>
<b>Eric J. Houin</b> <b>Principal</b> Securiplex LLC PO Box 91898 Mobile, AL 36691-1898	<b>M 8/2/2010</b> <b>WAM-AAA</b>	<b>Daniel J. Hubert</b> <b>Principal</b> Janus Fire Systems 1102 Rucpich Drive, Millennium Park Crown Point, IN 46307 <b>Fire Suppression Systems Association</b> <b>Alternate: William MacKay</b>	<b>IM 7/17/1998</b> <b>WAM-AAA</b>
<b>Rick J. Jackson</b> <b>Principal</b> Jackson Associates, Inc. 1111 Oakley Park, Suite 201 Walled Lake, MI 48390 <b>American Fire Sprinkler Association</b>	<b>IM 1/14/2005</b> <b>WAM-AAA</b>	<b>William E. Janz</b> <b>Principal</b> XL Global Asset Protection Services 301 Pine Ridge Drive Washington, IL 61571 <b>Alternate: Bruce H. Clarke</b>	<b>I 7/12/2001</b> <b>WAM-AAA</b>
<b>Robert Kasiski</b> <b>Principal</b> FM Global 1151 Boston Providence Turnpike PO Box 9102 Norwood, MA 02062-9102 <b>Alternate: Hong-Zeng Yu</b>	<b>I 7/26/2007</b> <b>WAM-AAA</b>	<b>Andrew Kim</b> <b>Principal</b> National Research Council of Canada Institute for Research in Construction Montreal Road, M-59 Ottawa, ON K1A 0R6 Canada	<b>RT 10/1/1995</b> <b>WAM-AAA</b>

# Address List No Phone

03/23/2012  
Sandra Stanek  
WAM-AAA

## Water Mist Fire Suppression Systems

<b>Max Lakkonen</b> <b>Principal</b> FOGTEC Fire Protection Schanzenstrasse 19A Cologne, 51063 Germany <b>International Water Mist Association</b>	<b>M 3/15/2007</b> <b>WAM-AAA</b>	<b>George E. Laverick</b> <b>Principal</b> Underwriters Laboratories Inc. 333 Pfingsten Road Northbrook, IL 60062-2096 <b>Alternate: Kerry M. Bell</b>	<b>RT 7/1/1993</b> <b>WAM-AAA</b>
<b>David J. LeBlanc</b> <b>Principal</b> Tyco Fire Suppression & Building Products 1467 Elmwood Avenue Cranston, RI 02910 <b>Alternate: Zachary L. Magnone</b>	<b>M 1/14/2005</b> <b>WAM-AAA</b>	<b>Jack R. Mawhinney</b> <b>Principal</b> Hughes Associates, Inc. 3610 Commerce Drive, Suite 817 Baltimore, MD 21227-1652	<b>SE 4/1/1993</b> <b>WAM-AAA</b>
<b>Janak B. Patel</b> <b>Principal</b> Savannah River Nuclear Solutions 3704 Clark Crossing Martinez, GA 30907	<b>U 3/2/2010</b> <b>WAM-AAA</b>	<b>Thomas Prymak</b> <b>Principal</b> The RJA Group, Inc. Rolf Jensen & Associates, Inc. 2301 West Plano Parkway, Suite 210 Plano, TX 75075 <b>Alternate: Robert J. Libby</b>	<b>SE 3/4/2009</b> <b>WAM-AAA</b>
<b>Milosh T. Puchovsky</b> <b>Principal</b> Worcester Polytechnic Institute Department of Fire Protection Engineering 100 Institute Road Worcester, MA 01609	<b>SE 8/5/2009</b> <b>WAM-AAA</b>	<b>William J. Reilly</b> <b>Principal</b> Victaulic Company of America PO Box 31 Easton, PA 18044-0031	<b>M 11/2/2006</b> <b>WAM-AAA</b>
<b>Allan P. Rhodes</b> <b>Principal</b> UTC/Marioff, Inc. 6767 Hillsvieview Drive Vacaville, CA 95688 <b>Alternate: Maarit Tuomisaari</b>	<b>M 8/5/2009</b> <b>WAM-AAA</b>	<b>Michael B. Stevens</b> <b>Principal</b> National Aeronautics & Space Administration IM-SPS-A Kennedy Space Center, FL 32899 <b>Alternate: Jeffrey T. Dudley</b>	<b>U 7/1/1993</b> <b>WAM-AAA</b>
<b>Brad T. Stilwell</b> <b>Principal</b> Fike Corporation 704 South 10th Street Blue Springs, MO 64015 <b>Alternate: Earl D. Neargarth</b>	<b>M 7/24/1997</b> <b>WAM-AAA</b>	<b>Robert W. Stubblefield</b> <b>Principal</b> AREVA Inc. 806 North Hardeman Circle Justin, TX 76247	<b>U 03/05/2012</b> <b>WAM-AAA</b>

# Address List No Phone

03/23/2012  
Sandra Stanek  
WAM-AAA

## Water Mist Fire Suppression Systems

<b>Thomas M. Suehr</b> <b>Principal</b> Liberty Mutual Property 20 Riverside Road Weston, MA 02493-2231 <b>Property Casualty Insurers Association of America</b> <b>Alternate: Michael Koczera</b>	<b>I 1/18/2001</b> <b>WAM-AAA</b>	<b>Dennis W. Taylor</b> <b>Principal</b> WorleyParsons, Inc. Southwest Office PO Box 271787 Houston, TX 77277-1787 <b>Alternate: Jim Scoggins</b>	<b>SE 10/28/2008</b> <b>WAM-AAA</b>
<b>Scott Tweedie</b> <b>Principal</b> US Department of the Navy Naval Surface Warfare Center Carderock Division 5001 South Broad Street, Code 668 Philadelphia, PA 19112	<b>E 3/2/2010</b> <b>WAM-AAA</b>	<b>Karl Wiegand</b> <b>Principal</b> National Fire Sprinkler Association 40 Jon Barrett Road Patterson, NY 12563 <b>National Fire Sprinkler Association</b> <b>Alternate: Paul J. Felch</b>	<b>M 10/27/2009</b> <b>WAM-AAA</b>
<b>Xiaobo Yao</b> <b>Principal</b> Amerland Inc. 12220 Running Fence Ln Clarksville, MD 21029	<b>SE 3/4/2008</b> <b>WAM-AAA</b>	<b>Thomas F. Ziegler</b> <b>Principal</b> Verizon One Verizon Way, 3rd Floor Mail Code: VC53S451 Basking Ridge, NJ 07920	<b>U 7/1/1993</b> <b>WAM-AAA</b>
<b>Kerry M. Bell</b> <b>Alternate</b> Underwriters Laboratories Inc. 333 Pfingsten Road Northbrook, IL 60062-2096 <b>Principal: George E. Laverick</b>	<b>RT 4/15/2004</b> <b>WAM-AAA</b>	<b>James G. Bisker</b> <b>Alternate</b> US Department of Energy Nuclear Safety Policy & Assistance (HS-21) 1000 Independence Avenue, SW Washington, DC 20585-1290 <b>Principal: William A. Froh</b>	<b>U 7/1/1993</b> <b>WAM-AAA</b>
<b>Bruce H. Clarke</b> <b>Alternate</b> XL Global Asset Protection , LLC 8606 Driscoll Court Charlotte, NC 28269 <b>Principal: William E. Janz</b>	<b>I 7/16/2003</b> <b>WAM-AAA</b>	<b>Jeffrey T. Dudley</b> <b>Alternate</b> National Aeronautics & Space Administration 503 Glenbrook Circle Rockledge, FL 32955 <b>Principal: Michael B. Stevens</b>	<b>U 03/05/2012</b> <b>WAM-AAA</b>
<b>Paul J. Felch</b> <b>Alternate</b> F. E. Moran, Inc. Special Hazard Systems 2265 Carlson Drive Northbrook, IL 60062 <b>National Fire Sprinkler Association</b> <b>Principal: Karl Wiegand</b>	<b>M 8/5/2009</b> <b>WAM-AAA</b>	<b>Charles W. Ketner</b> <b>Alternate</b> National Automatic Sprinkler Fitters LU 669 Joint Apprenticeship & Training Committee 7050 Oakland Mills Road Columbia, MD 20732 <b>United Assn. of Journeymen &amp; Apprentices of the Plumbing &amp; Pipe Fitting Industry</b> <b>Principal: Anthony J. Cacioppo</b>	<b>L 8/2/2010</b> <b>WAM-AAA</b>

# Address List No Phone

03/23/2012  
Sandra Stanek  
WAM-AAA

## Water Mist Fire Suppression Systems

<b>Michael Koczera</b> <b>Alternate</b> Liberty Mutual Property PO Box 30153 Acushnet, MA 02743-0153 <b>Property Casualty Insurers Association of America</b> <b>Principal: Thomas M. Suehr</b>	<b>I 3/4/2009</b> <b>WAM-AAA</b>	<b>Robert J. Libby</b> <b>Alternate</b> The RJA Group, Inc. Rolf Jensen & Associates, Inc. PO Box 326539 Hagatna, GU 96932 <b>Principal: Thomas Prymak</b>	<b>SE 7/1/1996</b> <b>WAM-AAA</b>
<b>William MacKay</b> <b>Alternate</b> Advanced Safety Systems, Inc. 141 Summit Street Peabody, MA 01960 <b>Fire Suppression Systems Association</b> <b>Principal: Daniel J. Hubert</b>	<b>IM 8/2/2010</b> <b>WAM-AAA</b>	<b>Zachary L. Magnone</b> <b>Alternate</b> Tyco Fire Suppression & Building Products 1467 Elmwood Avenue Cranston, RI 02910 <b>Principal: David J. LeBlanc</b>	<b>M 10/20/2010</b> <b>WAM-AAA</b>
<b>Earl D. Neargarth</b> <b>Alternate</b> Fike Corporation 704 South 10th Street Blue Springs, MO 64015 <b>Principal: Brad T. Stilwell</b>	<b>M 4/1/1994</b> <b>WAM-AAA</b>	<b>Jim Scoggins</b> <b>Alternate</b> WorleyParsons, Inc. 6330 West Loop South Bellaire, TX 77401 <b>Principal: Dennis W. Taylor</b>	<b>SE 3/2/2010</b> <b>WAM-AAA</b>
<b>Maarit Tuomisaari</b> <b>Alternate</b> UTC/Marioff Corporation PO Box 86 (Virnatie 3) Vantaa, FI 01301 Finland <b>Principal: Allan P. Rhodes</b>	<b>M 7/22/1999</b> <b>WAM-AAA</b>	<b>Hong-Zeng Yu</b> <b>Alternate</b> FM Global 1151 Boston-Providence Turnpike PO Box 9102 Norwood, MA 02062-9102 <b>Principal: Robert Kasiski</b>	<b>I 10/10/1997</b> <b>WAM-AAA</b>
<b>Douglas J. Pickersgill</b> <b>Nonvoting Member</b> Fire and Safety Systems 6 Bart Place, Chapel Hill Brisbane, QLD Q4089 Australia	<b>SE 1/1/1994</b> <b>WAM-AAA</b>	<b>Woodrow W. Stratton</b> <b>Nonvoting Member</b> US Department of Homeland Security US Fire Administration/National Fire Academy 16825 South Seton Avenue Emmitsburg, MD 21727 <b>Alternate: Lawrence A. McKenna, Jr.</b>	<b>C 4/15/2004</b> <b>WAM-AAA</b>
<b>Fernando Vigara</b> <b>Nonvoting Member</b> APICI Avila, 18 Madrid, 28020 Spain	<b>SE 7/1/1993</b> <b>WAM-AAA</b>	<b>Lawrence A. McKenna, Jr.</b> <b>Alt. to Nonvoting Member</b> US Department of Homeland Security US Fire Administration 16825 South Seton Avenue Emmitsburg, MD 21727 <b>Principal: Woodrow W. Stratton</b>	<b>C 7/23/2008</b> <b>WAM-AAA</b>

# Address List No Phone

03/23/2012

Sandra Stanek

**WAM-AAA**

## Water Mist Fire Suppression Systems

---

**Sandra Stanek**

5/6/2011

**Staff Liaison**

**WAM-AAA**

National Fire Protection Association

1 Batterymarch Park

Quincy, MA 02169-7471



***Technical Committee on NFPA 750 Water Mist Fire Protection  
Systems (WAM-AAA)***

**Attachment #3:**

***Public Input Logs for First Draft  
Meeting***



---

750- Log #20  
(1.1.1 and A.1.1.1 (New) )

Final Action:

---

Submitter: Terry L. Victor, Tyco/SimplexGrinnell

Recommendation: Add new text and annex material as follows:

1.1.1 The water mist fire protection systems designed and installed in accordance with in this standard are not equivalent in the level of fire protection to a sprinkler system designed and installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.1.1.1 Sprinkler systems installed in accordance with NFPA 13 have been accepted in the building codes as providing a level of passive fire protection, in addition to the active fire protection they provide. As a result, building codes have reduced many of the passive fire protection requirements such as separation, construction materials, egress, etc. when the building is fully sprinklered in accordance with NFPA 13. Water mist fire protection systems have not been proven to have the equivalent level of passive fire protection and thus the building should be classified as non-sprinklered.

Substantiation: Almost every building code allows reduction in the passive fire protection requirements because of the history of reliability and fire protection from a properly designed, installed and maintained fire sprinkler system. This standard needs to differentiate water mist fire protection systems from fire sprinkler systems so these "trade-offs" in the building codes will not be mistakenly applied when water mist systems are installed in lieu of a sprinkler system.

---

750- Log #102  
(3.2 Hybrid Extinguishing System (New) )

Final Action:

---

Submitter: William J. Reilly, Victaulic Company of America

Recommendation: Add new text to read as follows:

Hybrid Extinguishing System. A system that introduces both inert gas and water as extinguishing media of a system is a hybrid extinguishing system if the O<sub>2</sub> concentration is between 12.5 and 16% at extinguishment.

Substantiation: There are now multiple "hybrid" or "wet nitrogen" systems being marketed and installed under NFPA 750. While all systems are water mist, certain aspects of their dual extinguishing media are not adequately addressed in 750°.

This is not original material; its reference/source is as follows:

FM 5580 Approval Standard.

---

750- Log #92  
(3.3.x Installation Orientation (New) )

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Add definitions as defined below:

3.3.X Installation Orientation. The following water mist nozzles are defined according to orientation.

3.3.X.1 Directional Water Mist Nozzle. A water mist nozzle designed to be installed in such a way that the primary direction of water spray can be downward, upward, or any angle in between.

3.3.X.2 Pendent Water Mist Nozzle. A water mist nozzle designed to be installed beneath the pipe immediately supplying it, pointing in a generally downward direction.

3.3.X.3 Sidewall Water Mist Nozzle. A water mist nozzle designed to be installed in a horizontal orientation with respect to the pipe immediately supplying it, pointing in a generally horizontal direction.

3.3.X.4 Upright Water Mist Nozzle. A water mist nozzle designed to be installed above the pipe immediately supplying it, pointing in a generally upward direction.

Substantiation: It is proposed that the above definitions be added to help clarify the installation orientation of water mist nozzles. Due to the wide range of water mist nozzle styles and configurations it may not be immediately obvious by looking at the nozzle that it should be installed in a particular orientation. These definitions will be beneficial in supporting requirements and clarifications regarding items such as obstruction criteria.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #21 Final Action:  
(3.3.x Pressure-Regulating Valve, Pressure Relief Device, Unloader Valve (New) )

---

Submitter: Michael L. Hennegan, MLH Fire Protection Ltd.

Recommendation: Add definitions to read as follows:

3.3.X Pressure-Regulating Valve . A valve designed for the purpose of reducing, regulating, controlling, or restricting water pressure.

3.3.X Pressure Relief Device . A device designed for the purpose of preventing pressure levels in excess of the working pressure of the system the system components, or both

3.3.X Unloader Valve A *Pressure Regulating Valve* of the type that regulates pressure by relieving excess flow.

Substantiation: The standard currently uses the terms Pressure-Regulating Valve, Pressure Relief Valve and Unloader Valve but does not currently define these. These devices are similar in nature and are sometimes differentiated through their application rather than their operating method or mechanical configuration.

These devices should be clearly defined in section 3 in order to make subsequent references unambiguous.

The definition of Pressure-Regulating Valve is referenced from NFPA 14-2007

The definition of Unloader valve is fashioned after the explanatory text in NFPA 750-2010 Appendix A, A11.2.

---

750- Log #91 Final Action:  
(3.3.3 Deluge System)

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Move item 3.3.3 to a sub-paragraph of 3.3.22, and reword as indicated below:

3.3.22.X Deluge Water Mist System. A water mist system using open nozzles attached to a piping system that is connected to a water supply through a valve that is opened by means of a detection system installed in the same area as the mist nozzles. When the valve opens, water flows into the piping system and dischargers through all nozzles attached to the system.

Substantiation: For sake of clarity, the definition of Deluge Water Mist System should be grouped with the other specific water mist system definitions.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #90 Final Action:  
(3.3.11 Intermediate Pressure System and 3.3.12 Low Pressure System)

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Revise definitions to read as follows:

**3.3.11 Intermediate Pressure System.** A water mist system where the distribution system piping is exposed to pressures greater than ~~12.1 bar (175 psi)~~ 17.2 bar (250 psi) but less than 34.5 bar (500 psi).

**3.3.12 Low Pressure System.** A water mist system where the distribution piping is exposed to pressures of ~~12.1 bar (175 psi)~~ 17.2 bar (250 psi) or less.

Substantiation: When looking at the technology used in common sprinkler systems – especially pumps, piping, valves, and other components – it would seem that the 12.1 bar (175 psi) threshold is somewhat arbitrary. Under the assumption that the “low pressure system” definition is in many ways used to define a water mist system operating within the pressure ranges of typical sprinkler and fixed water spray systems, the pressure range should be increased from 21.1 bar (175 psi) to 17.2 bar (250 psi) to be in line with the typical pressure ratings of standard sprinkler and water spray system components. In addition, the majority of manufacturers who currently offer low pressure water mist technologies utilize nozzles rated and listed for use up to 250 psi. This change would eliminate a large amount of confusion, especially in terms of low pressure water mist technology being used in lieu of standard sprinkler systems for light and ordinary hazard occupancies.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #85  
(3.3.11 Listing)

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

3.3.11 Listing. Controllers for pumps shall be listed fire pump controllers ~~or listed limited service controllers~~ installed in accordance with NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*.

Substantiation: The current trend in the industry is to phase out the use of limited service controllers from use in fire protection applications. In addition, all aspects related to the design and installation of fire pumps should be addressed in NFPA20. Arguably, if allowed by NFPA 20, the proposed change would not prohibit the use of limited service controllers in water mist systems.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #2  
(3.3.18 Twin-Fluid System)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

3.3.18 Twin-Fluid System. ~~A water mist system in which water and atomizing media are separately supplied to and mixed at the water mist nozzle~~ A water mist system in which water and atomizing media are supplied to the water mist nozzle and may utilize a separate piping system or a single piping system.

Substantiation: The definition of twin fluid system in NFPA 750 directly contradicts the same definition in FM 5560. Proposal is to align the two definitions by adopting the FM 5560, section 1.9 verbiage.

---

750- Log #34  
(3.3.18 Twin-Fluid System)

Final Action:

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Revise existing definition of Twin-fluid System in sentence 3.3.18 as follows:

3.3.18 ~~Twin-Fluid System~~. A water mist system in which water and atomizing media are ~~separately~~ supplied to ~~and mixed at the water mist nozzle~~; the water mist nozzle utilizing a separate piping system or a single piping system.

Substantiation: The definition of twin fluid system in NFPA 750 is based on the idea of two separate piping systems, one for water and one for atomizing medium. It does not agree with the definition in FM 5560 which recognizes that in some cases both water and atomizing medium are delivered in a single piping system.

FM 5560, section 1.9: Twin Fluid System. A water mist system in which water and atomizing media are supplied to the water mist nozzle. These systems may utilize separate piping system or a single piping system.

FM 5560 and NFPA 750 definitions need to align. The proposed change recognizes both types of twin fluid systems.

---

750- Log #101 Final Action:  
(3.3.21.2 Hybrid Water Mist Nozzles and A.3.3.21.2)

---

Submitter: Allen Bunner, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

3.3.21.2 *Hybrid Multi-functional Water Mist Nozzles*. Nozzles capable of operation using both automatic and nonautomatic means.

A.3.3.21.2 *Hybrid Multi-functional Water Mist Nozzles*. The activation of a *hybrid multi-functional* water mist nozzle can.

...

**Substantiation:** The use of the wording 'hybrid water mist nozzles' may potentially cause confusion in the fire protection industry. Recently, independent testing agencies (Factory Mutual) have initiated use of the term 'hybrid' to define a group of twin-fluid water mist technologies using a propellant (nitrogen). The introduction of nitrogen into the risk being protected may reduce the oxygen level below 16%. If the level of Oxygen is lowered to below 16%, Factory Mutual is identifying these systems as 'hybrid', as they impact a fire via both water discharge and inerting with the propellant. The use of the wording 'hybrid' by NFPA and Factory Mutual, both involving water mist technologies, would potentially cause confusion within the fire protection industry. As NFPA is assumed to use the 'hybrid' designation for the water mist nozzles in NFPA 750 only, this wording change could be accommodated.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #33 Final Action:  
(3.3.22.x Sprinkler Equivalent Water Mist Systems (New) )

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Revise text as follows:

In subsection 3.3.22, include all proposed new definitions and revise the order of definitions for the various types of water mist systems as follows:

3.3.22.1 (new) Sprinkler Equivalent Water Mist System. Add new definition.

3.3.22.2 Wet Pipe Water Mist System. Existing definition 3.3.22.6.

3.3.22.3 Dry Pipe Water Mist System. Existing definition 3.3.22.1.

3.3.22.4 Preaction Water Mist System. Existing definition 3.3.22.4.

3.3.22.5 (new) Deluge Water Mist System. Add new from Existing 6.4.1.1

3.3.22.6 (new) Total Compartment Application System. Add new from Existing 6.2.2.2

3.3.22.7 (new) Zoned Application Water Mist System. Add new from Existing 6.2.2.3\*.

3.3.22.8 Local Application Water Mist System. Existing definition 3.3.22.3.

3.3.22.9 Engineered Water Mist System. Existing definition 3.3.22.2.

3.3.22.10\* Pre-engineered Water Mist System. Existing definition 3.3.22.5\*.

**Substantiation:** The list of definitions of types of water mist systems that clarify the full range of types of systems is presented in a logical order, grouped according to those that use automatic water mist nozzles and those that use nonautomatic nozzles combined with an independent detection and actuation system, as opposed to alphabetical order.

---

750- Log #27 Final Action:  
(3.3.22 Water Mist System)

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Revise text to read as follows:

3.3.22 **Water Mist System.** A distribution system connected to a water supply or water and atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended to control, suppress, or extinguish fires and that has been demonstrated to meet the performance requirements of its listing or approval and this standard.

**Substantiation:** The definition is modified by adding the words "or approval" to recognize that some water mist systems have FM approval, as opposed to UL listing.

---

750- Log #46  
(3.3.22 Water Mist System)

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

~~3.3.22 Water Mist System. A distribution system connected to a water supply or water atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended and that has been demonstrated to meet the performance requirements of its listing and this standard.~~ For fire protection purposes, an integrated system of piping designed in accordance with fire protection engineering standards intended to control, suppress, or extinguish fires, which has been demonstrated to meet the performance requirements of its listing and this standard. The installation includes a supply, a network of piping, a series of strainers, nozzles and a device for actuating an alarm when the system is in operation. The water mist system includes at least one automatic water supply or water atomizing media, which supplies one or more water mist zones. The water mist system includes a network of specially sized or hydraulically designed piping installed in a building, structure or area, and to which a water mist nozzle or nozzles are attached to provide a systematic discharge pattern of water mist.

**3.3.XX Water Mist Zone.** The portion of piping and components between the zone control valve and one or more water mist nozzles, which may be located upstream or downstream of the system strainer, and is designed to supply water to a specific portion of a water mist system.

**3.X.X System Strainer.** The strainer located after the last component in a water mist system that is constructed of a non-corrosive resistant material.

**Substantiation:** As water mist technology is growing and encompassing more applications, the definition of Water Mist System must also adapt to clearly encompass all water mist technologies. Water mist systems are being more readily accepted as sprinkler equivalent systems, the definition must be better aligned with the NFPA 13 definition of a sprinkler system while still encompassing all other applications of water mist. As the technology becomes more accepted and widely used, clearly defining certain portions of the water mist system will help facilitate the correlation with other standards not specifically for water mist systems. Although the maintenance of water mist systems is covered in NFPA 25, I feel that it is important to define these portions of the system so that other committees not intimately familiar with water mist systems can appropriately describe the correct actions when it comes to inspection testing and maintenance.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

This is not original material; its reference/source is as follows:

To better align the definition of Water Mist Systems with NFPA 13 portions of section 3.3.18 from NFPA 13 2010 were utilized.

---

750- Log #63a

Final Action:

(3.3.22 Water Mist System and 3.3.27 Sprinkler Equivalent Water Mist System (New))

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

**3.3.22 Water Mist System.** A distribution system connected to a water supply or water and atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended to control, suppress, or extinguish fires and that has been demonstrated to meet the performance requirements of its listing and this standard.

**3.3.22.7 Sprinkler Equivalent Water Mist System .** A water mist system utilizing automatic water mist nozzles installed throughout a building and that is designed to provide automatic fire protection that is equivalent to the protection provided by automatic sprinkler systems.

**Substantiation:** This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

A new definition is added to 3.3.22 to clarify the full range of water mist applications. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

Revised section 6.2 adds discussion of sprinkler equivalent systems to system applications. Section format and content is similar to other criteria in this section. This addition to 6.2 and new section 6.2.4 adds description of what constitutes a sprinkler equivalent system.

These changes establish that water mist systems are equivalent to automatic sprinklers and state the basic requirements that sprinkler equivalent water mist systems must meet. These requirements establish that these systems are a recognized type of water mist system for which design and installation manuals exist. Criteria are based on NFPA 13, Automatic Sprinkler Systems, limitations.

Changes to 8.3 establish basic performance objectives for sprinkler equivalent water mist systems. These requirements are met through the listing of the system for the different hazard occupancies.

---

750- Log #59

Final Action:

(3.3.22 Water Mist System and 3.3.22.7 Sprinkler Equivalent Water Mist System (New) )

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

**3.3.22 Water Mist System.** A distribution system connected to a water supply or water and atomizing media supplies that is equipped with one or more nozzles capable of delivering water mist intended to control, suppress, or extinguish fires and that has been demonstrated to meet the performance requirements of its listing and this standard.

**3.3.22.7 Sprinkler Equivalent Water Mist System.** A water mist system utilizing automatic water mist nozzles installed throughout a building and that is designed to provide automatic fire protection that is equivalent to the protection provided by automatic sprinkler systems.

**Substantiation:** This proposal should be considered with proposals for sections 6.2, 7.1 and 8.3, which collectively incorporate the idea of sprinkler equivalent water mist systems into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

A new definition is added to 3.3.22 to clarify the full range of water mist applications. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

---

750- Log #28

Final Action:

(3.3.22.1 Sprinkler Equivalent Water Mist System (New) )

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Add new text as follows:

**3.3.22.1 Sprinkler Equivalent Water Mist System.** A water mist system utilizing automatic water mist nozzles installed throughout a building and that is designed to provide automatic fire protection that is equivalent to the protection provided by automatic sprinkler systems.

Renumber existing paragraphs 3.3.22.1 to 3.3.22.6.

**Substantiation:** The definition is new. It is added to clarify the full range of types of water mist systems. Water mist systems are widely used in applications that are equivalent to conventional sprinkler systems. The new definition helps distinguish sprinkler equivalent systems from total compartment flooding or zoned systems.

---

750- Log #29 Final Action:  
(3.3.22.5 Deluge Water Mist System (New) )

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Add new text as follows:

3.3.22.5 (NEW) *Deluge Water Mist System.* A water mist system utilizing nonautomatic mist nozzles (open) attached to a piping network connected to the fluid supply(ies) through a valve controlled by an independent detection system installed in the same area as the mist nozzles.

Substantiation: The definition is added to clarify the full range of types of water mist systems. The current set of definitions under 750:3.3.22 is not complete. The definition is taken from existing article 6.4.1.1.

---

750- Log #32 Final Action:  
(3.3.22.5 Pre-engineered Water Mist Systems)

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Revise text to read as follows:

3.3.22.5\* *Pre-engineered Water Mist Systems.* Those systems having predetermined flow rates, nozzle pressures, and water quantities pipe and tube sizes, maximum and minimum pipe lengths, number of fittings and numbers and types of nozzles, nozzle pressures, atomizing media and water storage quantities, and which do not require additional hydraulic calculations.

Substantiation: The revised definition includes more information from the annex note to describe pre-engineered systems, and clarifies that hydraulic calculations are not required.

---

750- Log #30 Final Action:  
(3.3.22.6 Total Compartment Application Water Mist System (New) )

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Add new text as follows:

3.3.22.6 *Total Compartment Application Water Mist System.* A deluge water mist system that provides complete protection of an enclosure or space by the simultaneous operation of all nozzles in the space by manual or automatic means.

Substantiation: The definitions currently included in 3.2.22 do not include the full range of types of water mist systems addressed elsewhere in NFPA 750. The definition is compiled from existing sentences 6.2.2.1 and 6.2.2.2. The existing annex note A.6.2.2.2 stays with that article.

---

750- Log #31 Final Action:  
(3.3.22.7 Zoned Application Water Mist System (New) )

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Add new text as follows:

3.3.22.7 *Zoned Application Water Mist System.* A total compartment application water mist system utilizing nonautomatic nozzles, or intermixed nonautomatic and automatic nozzles, in which the piping network is subdivided into predetermined zones controlled by individual control valves, and which protects a predetermined portion of the compartment by the manual or automatic activation of a selected group of nozzles.  
Renumber existing paragraphs.

Substantiation: The definitions currently included in 3.2.22 do not include the full range of types of water mist systems addressed elsewhere in NFPA 750. The definition is compiled from existing sentences 6.2.3, 6.2.3.1 and 6.2.3.2. The existing annex note A.6.2.3 stays with that article.



---

750- Log #3  
(3.3.23 Working Pressure)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

3.3.23 Working Pressure. The maximum anticipated ~~static (nonflowing)~~ or flowing pressure applied to the system components exclusive of surge pressures.

3.3.23.1 Standby Pressure. The pressure that exists in the distribution system in the static nonflowing state, pre-activation.

3.3.23.2 System Design Pressure. The maximum pressure a system or component is rated to withstand.

3.3.23.3 Operating Pressure. The pressure range at which nozzles are listed to properly function and suppress or extinguish a fire.

Substantiation: Current definition can be interpreted as standby pressure (pre-activation). The proposed modification makes the definition more consistent with NFPA 13 definition of System Working Pressure. Definition should also be added for System Design Pressure, Operating Pressure which is referenced in 5.6.1(11), and Standby Pressure.

---

750- Log #45  
(3.3.23 Working Pressure)

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

3.3.23 System Working Pressure. The maximum anticipated static (nonflowing) or flowing pressure applied to the system components exclusive of surge pressures and exclusive of pressure from the fire department.

Substantiation: The recommendation to change 3.3.23 is to maintain consistency between the standards and is now more applicable to water mist applications as they are becoming more accepted as a sprinkler equivalent system, where an FDC may be installed.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #47  
(4.x (New) )

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Add new text as follows:

4.X Owner's Certificate. The owner(s) of a building or structure where the water mist system is going to be installed or their authorized agent shall provide the water mist system installer/designer with the following information prior to the layout and detailing the of the water mist system.

(1) Intended use of the building including the materials within the building and the maximum height of any storage.

(2) A preliminary plan of the building or structure along with the design concepts, including a hazard analysis and proposed performance objectives, necessary to perform the layout and detail design for the water mist system.

(3) Any special knowledge of the water supply, including known environmental conditions that might be responsible for corrosion, including microbiologically influenced corrosion (MIC).

Substantiation: To better align the NFPA standards the owner's certificate to provide the designers must contain a certain amount of pertinent information. Just as in the design of a sprinkler system the occupancy and hazard of the space must be defined, the design objectives must also be defined before the start of the water mist system design. If the owner does not know or have the technological expertise these requirements will at least start the conversation for the design objectives for the system. This requirement will facilitate discussion and ensure design concepts and objectives are universally understood.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

This is not original material; its reference/source is as follows:

NFPA 13: Standard for the Installation of Sprinkler Systems, 2010 edition.

---

750- Log #70a  
(4.1)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

4.1\* General

A.4.1 A water mist system is a fire protection system using very fine water sprays (i.e., water mist). The very small water droplets allow the water mist to control, suppress or extinguish fires by cooling of the flame and fire plume, oxygen displacement by water vapor, radiant heat attenuation and prevention of fire spread by pre-wetting of combustibles.

Water mist systems have been proven effective in controlling, suppressing, or extinguishing many types of fires.

Potential applications include the following:

- (1) Gas jet fires
- (2) Flammable and combustible liquids
- (3) Hazardous solids, including fires involving plastic foam furnishings
- (4) Protection of aircraft occupants from an external pool fire long enough to provide time to escape
- (5) Ordinary (Class A) combustible fires such as paper, wood, textiles
- (6) Commodities, in applications that are identical to those protected by automatic sprinkler systems
- ~~(67)~~ Electrical hazards, such as transformers, switches, circuit breakers, and rotating equipment
- ~~(78)~~ Electronic equipment, including telecommunications equipment

Substantiation: This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

Proposed addition to 4.1 clarifies that water mist systems can provide protection equivalent to automatic sprinklers. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

A new chapter is proposed between existing Chapters 4 and 5. The proposed changes add wording and Annex notes from NFPA 13 for the installation and design of sprinkler equivalent water mist systems. Water mist systems have the potential to provide fire protection against an equally wide range of hazards as conventional sprinkler systems with the added benefit of water efficiency. To facilitate the incorporation of water mist as a primary suppression system, a similar occupancy hazard approach to NFPA 13 is proposed to provide equivalent technical references. This approach is recognized and used in the fire suppression design industry and facilitates the acquirement of system listings as some of the fire tests are already in place. Light and ordinary hazard listings have already been given to water mist systems.

Revised section 6.1 adds discussion of protection based on classification of occupancy similar to protection method addressed in NFPA 13. This supplements the proposed addition of the new Chapter 5.

Revised section 8.4.2 establishes fire hazard classification approach for sprinkler equivalent water mist systems.

---

750- Log #66  
(4.1 and A.4.1)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

4.1\* General

A.4.1 A water mist system is a fire protection system using very fine water sprays (i.e., water mist). The very small water droplets allow the water mist to control, suppress or extinguish fires by cooling of the flame and fire plume, oxygen displacement by water vapor, radiant heat attenuation and prevention of fire spread by pre-wetting of combustibles.

Water mist systems have been proven effective in controlling, suppressing, or extinguishing many types of fires.

Potential applications include the following:

- (1) Gas jet fires
- (2) Flammable and combustible liquids
- (3) Hazardous solids, including fires involving plastic foam furnishings
- (4) Protection of aircraft occupants from an external pool fire long enough to provide time to escape
- (5) Ordinary (Class A) combustible fires such as paper, wood, textiles
- (6) Commodities, in applications that are identical to those protected by automatic sprinkler systems
- ~~(7)~~ Electrical hazards, such as transformers, switches, circuit breakers, and rotating equipment
- ~~(7)~~ Electronic equipment, including telecommunications equipment

Substantiation: This proposal should be considered with proposals for sections 6.1 and 8.4.2 and new chapter 5, which collectively incorporate the idea of an occupancy hazard classification system into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

Proposed addition to 4.1 clarifies that water mist systems can provide protection equivalent to automatic sprinklers. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

---

750- Log #4  
(4.2.2.1)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

4.2.2.1 When selecting water mist to protect a hazard area, the effects of water runoff on the environment ~~shall~~ should be considered.

Substantiation: Requirement either has to be better defined with more specificity or modified to include an annex recommendation.

---

750- Log #69  
(Chapter 5 (New))

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Add new text to read as follows:

\_Chapter 5 Classification of Occupancies.

5.1\* Classification of Occupancies.

5.1.1 Occupancy classifications for this standard shall relate to water mist system design, installation, and water supply requirements only.

5.1.2 Occupancy classifications shall not be intended to be a general classification of occupancy hazards.

5.2\* Light Hazard Occupancies. Light hazard occupancies shall be defined as occupancies or portions of other occupancies where the quantity and/or combustibility of contents is low and fires with relatively low rates of heat release are expected.

5.3\* Ordinary Hazard Occupancies.

5.3.1\* Ordinary Hazard (Group 1).

5.3.1.1 Ordinary hazard (Group 1) occupancies shall be defined as occupancies or portions of other occupancies where combustibility is low, quantity of combustibles is moderate, stockpiles of combustibles do not exceed 8 ft (2.4 m), and fires with moderate rates of heat release are expected.

5.3.2\* Ordinary Hazard (Group 2).

5.3.2.1 Ordinary hazard (Group 2) occupancies shall be defined as occupancies or portions of other occupancies where the quantity and combustibility of contents are moderate to high, where stockpiles of contents with moderate rates of heat release do not exceed 12 ft (3.66 m) and stockpiles of contents with high rates of heat release do not exceed 8 ft (2.4 m).

5.4 Extra Hazard Occupancies.

5.4.1\* Extra Hazard (Group 1). Extra hazard (Group 1) occupancies shall be defined as occupancies or portions of other occupancies where the quantity and combustibility of contents are very high and dust, lint, or other materials are present, introducing the probability of rapidly developing fires with high rates of heat release but with little or no combustible or flammable liquids.

5.4.2\* Extra Hazard (Group 2). Extra hazard (Group 2) occupancies shall be defined as occupancies or portions of other occupancies with moderate to substantial amounts of flammable or combustible liquids or occupancies where shielding of combustibles is extensive.

5.4.3 Special Occupancy Requirements.

5.4.3.1\* Water mist systems shall be permitted to be used for special occupancies referred to in Chapter 21 of NFPA 13-2010 provided that they have been listed or approved for such occupancies.

5.5 Residential Occupancies up to and Including Four Stories in Height.

5.5.1 Residential Occupancies shall include the following, as defined in NFPA 101, Life Safety Code: (1) apartment buildings, (2) lodging and rooming houses, (3) board and care facilities, and (4) hotels, motels, and dormitories.

5.6 One- and Two-Family Dwellings.

5.6.1 One- and two-family dwellings shall be defined as any detached building, or any part of a townhouse structure that is separated from the remainder of the townhouse structure with fire resistance rated assemblies in accordance with local building code, that contains no more than two dwelling units intended to be used, rented, leased, let, or hired out to be occupied or that are occupied for habitation purposes.

A.5.1 Classification of Occupancies.

A.5.1 Occupancy examples in the listings as shown in the various hazard classifications are intended to represent the norm for those occupancy types. Unusual or abnormal fuel loadings or combustible characteristics and susceptibility for changes in these characteristics, for a particular occupancy, are considerations that should be weighed in the selection and classification. The light hazard classification is intended to encompass residential occupancies; however, this is not intended to preclude the use of listed residential sprinklers in residential occupancies or residential portions of other occupancies.

A.5.2 Light hazard occupancies include occupancies having uses and conditions similar to the following:

Animal shelters

Churches

Clubs

Eaves and overhangs, if of combustible construction with no combustibles beneath

Educational Hospitals, including animal hospitals and veterinary facilities

Institutional  
Kennels  
Libraries, except large stack rooms  
Museums  
Nursing or convalescent homes  
Offices, including data processing  
Residential  
Restaurant seating areas  
Theaters and auditoriums, excluding stages and prosceniums  
Unused attics

Note that it is not the committee's intent to automatically equate library bookshelves with ordinary hazard occupancies or with library stacks. Typical library bookshelves of approximately 8 ft (2.4 m) in height, containing books stored vertically on end, held in place in close association with each other, with aisles wider than 30 in. (762 mm) can be considered to be light hazard occupancies. Similarly, library stack areas, which are more akin to shelf storage or record storage, as defined in NFPA 232, Standard for the Protection of Records, should be considered to be ordinary hazard occupancies.

A.5.3 For purposes of these definitions, Class I, Class II, Class III, and Class IV commodities would be considered to have moderate rates of heat release, while Group A plastics would be considered to have high rates of heat release. Stockpiles are considered to include display merchandise (mercantile) and arrangements of combustibles ancillary to operations within the occupancy as opposed to dedicated storage areas where the fire loading is generally more severe.

A.5.3.1 Ordinary hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Automobile parking and showrooms  
Bakeries  
Beverage manufacturing  
Canneries  
Dairy products manufacturing and processing  
Electronic plants  
Glass and glass products manufacturing  
Laundries  
Restaurant service areas

A.5.3.2 Ordinary hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Agricultural facilities  
Barns and stables  
Cereal mills  
Chemical plants ordinary  
Confectionery products  
Distilleries  
Dry cleaners  
Exterior loading docks

Note that exterior loading docks only used for loading and unloading of ordinary combustibles should be classified as OH2. For the handling of flammable and combustible liquids, hazardous materials, or where utilized for storage, exterior loading docks and all interior loading docks should be protected based upon the actual occupancy and the materials handled on the dock, as if the materials were actually stored in that configuration.

Feed mills  
Horse stables  
Leather goods manufacturing  
Libraries large stack room areas  
Machine shops  
Metal working  
Mercantile  
Paper and pulp mills  
Paper process plants  
Piers and wharves  
Plastics fabrication, including blow molding, extruding, and machining; excluding operations using combustible hydraulic fluids

Post offices  
Printing and publishing  
Racetrack stable/kennel areas, including those stable/kennel areas, barns, and associated buildings at state, county, and local fairgrounds  
Repair garages  
Resin application area  
Stages  
Textile manufacturing  
Tire manufacturing  
Tobacco products manufacturing  
Wood machining  
Wood product assembly  
A.5.4.1 Extra hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:  
Aircraft hangars (except as governed by NFPA 409, Standard on Aircraft Hangars)  
Combustible hydraulic fluid use areas  
Die casting  
Metal extruding  
Plywood and particleboard manufacturing  
Printing [using inks having flash points below 100°F (38°C)] Rubber reclaiming, compounding, drying, milling, vulcanizing  
Saw mills  
Textile picking, opening, blending, ginning, or carding, combining of cotton, synthetics, wool shoddy, or burlap  
Upholstering with plastic foams  
A.5.4.2 Extra hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:  
Asphalt saturating  
Flammable liquids spraying  
Flow coating  
Manufactured home or modular building assemblies (where finished enclosure is present and has combustible interiors)  
Open oil quenching  
Plastics manufacturing  
Solvent cleaning  
Varnish and paint dipping  
A.5.4.3.1 Special occupancies include occupancies having uses and conditions similar to the following:  
Machinery spaces  
Special hazard machinery spaces  
Combustion turbines  
Wet benches and other similar processing equipment  
Local application  
Industrial oil cookers  
Computer room subfloors

**Substantiation:** This proposal should be considered with proposals for Sections 4.1, 6.1 and 8.4.2, which collectively incorporate the idea of an occupancy hazard classification system into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, *Automatic Sprinkler Systems*. The proposed code sections support proposed changes in separate Proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, Group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

A new chapter is proposed between existing Chapters 4 and 5. The proposed changes add wording and Annex notes

from NFPA 13 for the installation and design of sprinkler equivalent water mist systems. Water mist systems have the potential to provide fire protection against an equally wide range of hazards as conventional sprinkler systems with the added benefit of water efficiency. To facilitate the incorporation of water mist as a primary suppression system, a similar occupancy hazard approach to NFPA 13 is proposed to provide equivalent technical references. This approach is recognized and used in the fire suppression design industry and facilitates the acquirement of system listings as some of the fire tests are already in place. Light and ordinary hazard listings have already been given to water mist systems.

750- Log #70b  
(5.1)

Final Action:

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

Chapter 5 Classification of Occupancies

5.1\* Classification of Occupancies.

5.1.1 Occupancy classifications for this standard shall relate to water mist system design, installation, and water supply requirements only.

5.1.2 Occupancy classifications shall not be intended to be a general classification of occupancy hazards.

5.2\* Light Hazard Occupancies . Light hazard occupancies shall be defined as occupancies or portions of other occupancies where the quantity and/or combustibility of contents is low and fires with relatively low rates of heat release are expected.

5.3\* Ordinary Hazard Occupancies.

5.3.1\* Ordinary Hazard (Group 1).

5.3.1.1 Ordinary hazard (Group 1) occupancies shall be defined as occupancies or portions of other occupancies where combustibility is low, quantity of combustibles is moderate, stockpiles of combustibles do not exceed 8 ft (2.4 m), and fires with moderate rates of heat release are expected.

5.3.2\* Ordinary Hazard (Group 2).

5.3.2.1 Ordinary hazard (Group 2) occupancies shall be defined as occupancies or portions of other occupancies where the quantity and combustibility of contents are moderate to high, where stockpiles of contents with moderate rates of heat release do not exceed 12 ft (3.66 m) and stockpiles of contents with high rates of heat release do not exceed 8 ft (2.4 m).

5.4 Extra Hazard Occupancies.

5.4.1 \* Extra Hazard (Group 1). Extra hazard (Group 1) occupancies shall be defined as occupancies or portions of other occupancies where the quantity and combustibility of contents are very high and dust, lint, or other materials are present, introducing the probability of rapidly developing fires with high rates of heat release but with little or no combustible or flammable liquids.

5.4.2\* Extra Hazard (Group 2). Extra hazard (Group 2) occupancies shall be defined as occupancies or portions of other occupancies with moderate to substantial amounts of flammable or combustible liquids or occupancies where shielding of combustibles is extensive.

5.4.3 Special Occupancy Requirements

5.4.3.1\* Water mist systems shall be permitted to be used for special occupancies referred to in Chapter 21 of NFPA 13-2010 provided that they have been listed or approved for such occupancies.

5.5 Residential Occupancies up to and Including Four Stories in Height.

5.5.1 Residential Occupancies shall include the following, as defined in NFPA 101, Life Safety Code: (1) apartment buildings, (2) lodging and rooming houses, (3) board and care facilities, and (4) hotels, motels, and dormitories.

5.6 One- and Two-Family Dwellings.

5.6.1 One- and two-family dwellings shall be defined as any detached building, or any part of a townhouse structure that is separated from the remainder of the townhouse structure with fire resistance rated assemblies in accordance with local building code, that contains no more than two dwelling units intended to be used, rented, leased, let, or hired out to be occupied or that are occupied for habitation purposes.

Substantiation: This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.



Proposed addition to 4.1 clarifies that water mist systems can provide protection equivalent to automatic sprinklers. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

A new chapter is proposed between existing Chapters 4 and 5. The proposed changes add wording and Annex notes from NFPA 13 for the installation and design of sprinkler equivalent water mist systems. Water mist systems have the potential to provide fire protection against an equally wide range of hazards as conventional sprinkler systems with the added benefit of water efficiency. To facilitate the incorporation of water mist as a primary suppression system, a similar occupancy hazard approach to NFPA 13 is proposed to provide equivalent technical references. This approach is recognized and used in the fire suppression design industry and facilitates the acquirement of system listings as some of the fire tests are already in place. Light and ordinary hazard listings have already been given to water mist systems.

Revised section 6.1 adds discussion of protection based on classification of occupancy similar to protection method addressed in NFPA 13. This supplements the proposed addition of the new Chapter 5.

Revised section 8.4.2 establishes fire hazard classification approach for sprinkler equivalent water mist systems.

---

750- Log #5  
(5.2.2.1)

**Final Action:**

---

**Submitter:** Scott J. Harrison, Marioff Inc.

**Recommendation:** Revise text to read as follows:

**5.2.2.1 Installation.** Gas and water containers shall be designed for installation according to the manufacturer's installation manual, including provision for attachment of seismic restraint as required.

**Substantiation:** Not all systems require the need of seismic restraints. This section has been clarified to state this.

---

750- Log #6  
(5.2.2.4)

**Final Action:**

---

**Submitter:** Scott J. Harrison, Marioff Inc.

**Recommendation:** Revise text to read as follows:

**5.2.2.4 Design Pressure.** The design pressure shall be based on the maximum pressure developed by the water mist system at 54°C (130°F) or as specified in the manufacturer's listing.

**Substantiation:** The max temperature some systems can see is less than 54C, so it's suggested this section be changed to reflect the limitations of the manufacturer's listing.

---

750- Log #7  
(5.2.2.5)

**Final Action:**

---

**Submitter:** Scott J. Harrison, Marioff Inc.

**Recommendation:** Revise text to read as follows:

**5.2.2.5 Excess Pressure .** Each pressurized container shall be provided with a safety device to release excess pressure: and for applications with multiple pressurized containers with a common manifold where no individual container can be isolated, a single safety device is allowed.

**Substantiation:** This change allows a single safety device to be used for multiple containers provided no single container can be isolated (they are connected to a common header). This meets the intent of preventing any single container from being over pressurized. It reduces total cost while maintaining the same level of safety protection.

---

750- Log #51  
(5.3.1.1)

Final Action:

---

Submitter: Thierry Carriere, ADA Technologies, Inc.

Recommendation: Add new text as follows:

The requirements of 5.3.1.1 shall not apply where every nozzle orifice passing water is larger than  $\frac{1}{4}$  in. (6.3 mm) in diameter. In that case, all piping, valves and fittings, from the strainer to the nozzle, shall have corrosion resistance in accordance with NFPA 13 Standard for the Installation of Sprinkler Systems.

Substantiation: We recognize that water mist nozzle orifices are usually small in diameter and prone to clogging/blockage due to corroding pipes and therefore restrict the piping material selection. Sprinkler heads can accommodate potentially more corroding piping materials due to larger discharge orifices. Smallest sprinkler heads generally have  $\frac{1}{4}$  in. orifices (K-factor 1.4). Therefore we recommend that water mist systems with all water passing orifices larger than  $\frac{1}{4}$  in. be subjected to sprinkler materials corrosion requirements. ADA Technologies has demonstrated in a project sponsored by the US Air Force that water mist (Dv99 < 1000 microns) can be generated at intermediate pressure with all water passing orifices larger than  $\frac{1}{4}$  in.

---

750- Log #75  
(5.3.1.1)

Final Action:

---

Submitter: Larry W. Owen, Dooley Tackaberry, Inc.

Recommendation: Revise text to read as follows:

All wetted surfaces in piping, valves, and fittings from the system strainer to the nozzle, shall have corrosion resistance at least equivalent to piping specified in Table 5.3.3.1.

Substantiation: Some compression fittings use non-stainless steel nuts as a part of the fitting. Since the nuts do not come in contact with a wetted surface or water, there is no need for the nuts to be stainless steel. This modification to the text will result in lower costs for water mist systems and wider use of the product.

---

750- Log #77  
(5.3.1.2 and A.5.3.1)

Final Action:

---

Submitter: Gerard I. Libby, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

5.3.1.2 Zinc-coated (Galvanized) piping which conforms to ASTM A 795 (Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use) and ANSI B36.10M (Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless) shall be suitable for use on systems which incorporate nozzles with an orifice size of at least 4mm (0.16 inch) in diameter and incorporate integrated strainers.

~~5.3.1.2~~ 5.3.1.3 Where the word pipe is used, it shall be understood also to mean *tube*.

~~A.5.3.1~~ Historically, small-orifice systems had a track record of nozzle blockage due to products of corrosion, water quality, and flaking of pipe coatings. Therefore, it is important to select pipe or tube for water mist systems that exhibits minimal corrosion. With regard to flaking, current standards for galvanized piping cannot ensure that the coating will not flake and obstruct nozzles and strainers. The committee is aware of new technologies and processes that are working to address these issues. Once uniform manufacturing and testing standards are available, the committee will review these technologies for inclusion in NFPA 750.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

Substantiation: NFPA 750 does not allow the usage of Zinc-coated piping due to the omission of any applicable standard in Table 5.3.3.1 In NFPA 15, zinc coated piping is permitted by the ASTM A 795 and ANSI B36.10M standards, as shown in NFPA 15 Table 5.3.1. Since NFPA 15 demonstrates that suitable zinc-coated piping standards exist, Table 5.3.3.1 of NFPA 750 should be updated to permit the use of these materials.

While there is cause for concern due to zinc “flakes” clogging a water mist nozzle, the current standard does not allow for an exception if steps are taken to mitigate the risk. A requirement that the nozzle opening be larger than .16 inch (4mm) will allow for increased flexibility in the piping components permitted for use, while also protecting against the possibility of an obstruction due to zinc “flakes”. NFPA 15 permits the use of nozzles of this orifice size with galvanized pipe as long as nozzle strainers are installed in accordance with section 6.4.6.3. Therefore, it is reasonable to allow systems covered under NFPA 750 to utilize internally galvanized pipe, provided the same protections are taken as are in NFPA 15.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #64  
(Table 5.3.3.2)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Add new text to read as follows:

Table 5.3.3.2

*Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service – UL 1821*

Substantiation: This proposal should be considered with the proposal for section 7.3.2, which collectively incorporate the idea of non-metallic pipe for water mist use into NFPA 750.

This proposal adds wording to support the use of non-metallic pipe. This primarily applies to low pressure systems in residential occupancies similar to NFPA 13D. Where applicable, the use of non-metallic pipe can help reduce the cost of water mist systems. The proposed change provides a referenced standard to standardize the quality of thermoplastic pipe for use in water mist sprinkler equivalent systems. See proposed new paragraph 9.3.1.3.3. A copy of the referenced standard has been filed with NFPA technical staff.

Note: Supporting material is available for review at NFPA Headquarters.

---

750- Log #93  
(5.3.3.3)

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Revise section 5.3.3.3 as follows:

5.3.3.3 Pipe and tube used in low pressure water mist system shall be designed to withstand a working pressure of not less than ~~12.1 bar (175 psi)~~ 17.2 bar (250 psi).

Substantiation: When looking at the technology used in common sprinkler systems – especially pumps, piping, valves, and other components – it would seem that the 12.1 bar (175 psi) threshold is somewhat arbitrary. Under the assumption that the “low pressure system” definition is in many ways used to define a water mist system operating within the pressure ranges of typical sprinkler and fixed water spray systems, the pressure range should be increased from 21.1 bar (175 psi) to 17.2 bar (250 psi) to be in line with the typical pressure ratings of standard sprinkler and water spray system components. In addition, the majority of manufacturers who currently offer low pressure water mist technologies utilize nozzles rated and listed for use up to 250 psi. This change would eliminate a large amount of confusion, especially in terms of low pressure water mist technology being used in lieu of standard sprinkler systems for light and ordinary hazard occupancies.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #8  
(5.3.4.2)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

5.3.4.2 The piping shall be in accordance with ASME B31.1, Power Piping Code- or EN13480-3, Metallic Industrial Piping.

Substantiation: The ASME Code is not adopted in all countries while they still use NFPA 750 since it is a world standard. This European code standard should be referenced to allow its use since it provides a comparable level of safety as the ASME Code.

---

750- Log #9  
(5.3.4.3)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

5.3.4.3 Where using the equations provided in ASME B31.1 or EN13480-3 to calculate either the maximum working pressure (Pw) for a specific pipe or tube or the minimum wall thickness (tm) of the pipe or tube for a specific operating pressure, a steel temperature of 54°C (130F) or the expected ambient temperature to which the pipe or tube will be exposed shall be used, which-ever is greater.

Substantiation: Add reference to European code standard for Metallic Industrial Piping to allow pipe manufactured in Europe to be used.

---

750- Log #52  
(5.4.1.1)

Final Action:

---

Submitter: Thierry Carriere, ADA Technologies, Inc.

Recommendation: Add new text as follows:

The requirements of 5.4.1.1 shall not apply where every nozzle orifice passing water is larger than  $\frac{1}{2}$  in. (6.3 mm) in diameter. In that case, all fittings used on piping described in 5.3.1 shall have corrosion resistance in accordance with NFPA 13 Standard for the Installation of Sprinkler Systems.

Substantiation: We recognize that water mist nozzle orifices are usually small in diameter and prone to clogging/blockage due to corroding pipes and therefore restrict the piping material selection. Sprinkler heads can accommodate potentially more corroding fittings materials due to larger discharge orifices. Smallest sprinkler heads generally have  $\frac{1}{4}$  in. orifices (K-factor 1.4). Therefore we recommend that water mist systems with all water passing orifices larger than  $\frac{1}{4}$  in. be subjected to sprinkler materials corrosion requirements. ADA Technologies has demonstrated in a project sponsored by the US Air Force that water mist (Dv99 < 1000 microns) can be generated at intermediate pressure with all orifices passing water larger than  $\frac{1}{4}$  in.

---

750- Log #10  
(5.4.1.2.1)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

5.4.1.2.1\* Conversion fittings from metric to fractional units shall be identified by color or tagging for quick notification in the field.

Substantiation: Request a clarification of this requirement be added to the Annex. Currently this requirement as stated causes confusion in the field regarding exactly what is required.

---

750- Log #11  
(5.4.1.2.2)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

5.4.1.2.2 A supply of spare adapters shall be maintained on the premises according to the following schedule so that any adapters that have been damaged in any way can be promptly replaced.

(1) For systems having fewer than 50 nozzles, not fewer than 3 adapters.

(2) For systems having 50 to 300 nozzles, not fewer than 6 adapters.

(3) For system having 301 to 1,000 nozzles, not fewer than 12 adapters.

(4) For systems having over 1,000 nozzles, not fewer than 24 adapters.

Substantiation: Defines the requirement similar to the manner in which spare nozzles or sprinklers are currently defined.

---

750- Log #76  
(5.4.3.5)

Final Action:

---

Submitter: Gerard I. Libby, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

~~5.4.3.5~~ 5.4.1.2 Welding and brazing alloys shall have a melting point above 538°C (1000°F).

Substantiation: Due to the current location of the text, it is only required that welding and brazing alloys have a melting point above 538°C (1000°F) when used in high pressure systems. Low pressure systems can protect similar hazards as high pressure systems, subjecting the system piping the same expected temperatures, thus the requirement for the brazing pipe joining method should be required for all types of water mist systems; it is being proposed that the entire text be moved to section 5.4.1 so that it will fall under the general fitting requirements.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #94  
(5.5.x (New) )

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Add new sub-section to item 5.5 as follows:

5.5.X Hangers used on low pressure water mist systems shall be permitted to be designed and installed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems.

Substantiation: One of the common questions that comes up during the design and installation of low pressure water mist systems is the type of hangers and bracing to use on the system piping. Considering that low pressure water mist systems operate in similar pressure and flow ranges to standard sprinkler and fixed water spray systems, it would seem reasonable to allow the same hanging and bracing requirements to apply per standard industry practice. The hanging and bracing requirements in NFPA 13 are extremely detailed, and are more than adequate to cover the range of applications in which low pressure mist systems are utilized. This would also greatly simplify the process of inspection, testing, and maintenance of low pressure systems.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #50  
(5.8.1)

Final Action:

---

Submitter: Thierry Carriere, ADA Technologies, Inc.

Recommendation: Add new text as follows:

The requirements of 5.8.1 shall not apply where every nozzle orifice passing water is larger than  $\frac{1}{4}$  in. (6.3 mm) in diameter. In that case, strainers shall be installed in accordance with NFPA 13 Standard for the Installation of Sprinkler Systems.

Substantiation: We recognize that water mist nozzle orifices are usually small in diameter and prone to clogging/blockage due to corroding pipes and therefore restrict the piping material selection. Sprinkler heads can accommodate potentially more corroding fittings materials due to larger discharge orifices. Smallest sprinkler heads generally have  $\frac{1}{4}$  in. orifices (K-factor 1.4). Therefore we recommend that water mist systems with all water passing orifices larger than  $\frac{1}{4}$  in. be subjected to sprinkler materials corrosion requirements. ADA Technologies has demonstrated in a project sponsored by the US Air Force that water mist (Dv99 < 1000 microns) can be generated at intermediate pressure with all water passing orifices larger than  $\frac{1}{4}$  in.

---

750- Log #12  
(5.9.1.3.2)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

**5.9.1.3 Overpressure.**

5.9.1.3.2 Overpressure shall not exceed the working design pressure of the piping system.

Substantiation: The current requirement is often misinterpreted. Clearer definitions of design, standby, working, system rated and operating pressure should be added to the standard. The working pressure for a given system may be less than the design pressure. If the relief valve set point is set at the working pressure then the relief valve may start to lift at or below this valve thereby potentially reducing flow to the nozzles. Setting it at the design pressure provides operation margin for the system. See proposal 3.3.23.

---

750- Log #22  
(5.9.1.7)

Final Action:

---

Submitter: Michael L. Hennegan, MLH Fire Protection Ltd.

Recommendation: Revise text to read as follows:

**5.9.1.7 Unloader Valves.** Unloader valves shall be listed or approved or as part of ~~the~~ a listed or approved pump assembly.

Substantiation: The current text is unnecessarily restrictive. Listed and approved unloader valves are readily available which can be used on a wide variety of pumps.

---

750- Log #48  
(5.10.1.2 and 5.10.1.3)

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

**5.10.1.2 Automatic Systems.** ~~Unless the requirements of 5.10.1.3 are met, w~~ Where detection system is used to actuate the water mist system and additive system where used, detection and actuation shall be automatic.

**5.10.1.3 Manual Systems.** ~~The requirements of 5.10.1.2 shall not apply to manual-only actuation systems where approved by the authority having jurisdiction.~~

Substantiation: Automatic systems should be mandated by the standard. The AHJ always has the authority to approve systems with extenuating circumstances, which would require a manual operation of the system. By putting this section of code into the standard it gives the impression to designers that a manual system is acceptable and I believe that all systems prescribed by the standard should be automatic because it is simply better fire protection. Restating that the AHJ has the authority to approve any design is redundant because the authority always has the final approval.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #13  
(5.10.3.4)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

**5.10.3.4 Temperature Limitations.** Devices shall be designed to function from -29°C to 54°C (-20°F to 130°F) or ~~shall be marked to indicate temperature limitations~~ as specified in the manufacturer's listing.

Substantiation: System limitations are detailed sufficiently in the manufacturer's listing. The additional requirement to mark components is unnecessary.

---

750- Log #81  
(5.10.3.6.x (New) )

Final Action:

---

Submitter: Luke S. Connery, Tyco Fire Protection Products

Recommendation: Add text to read as follows:

5.10.3.6.X The requirements of 5.10.3.6 shall not apply to dry and wet pipe systems utilizing individual, thermally activated nozzles.

Substantiation: The functionality of a “manual release device” is lost on dry or wet pipe systems utilizing individual, thermally activated nozzles.

5.10.3.6 should include an allowance to relax the requirements for a “manual release device” for dry and wet pipe systems utilizing individual, thermally activated nozzles in the same manner that 5.10.3.5.6 relaxes the “emergency release device” requirements of 5.10.3.5 for dry and wet pipe systems utilizing individual, thermally activated nozzles.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #67  
(6.1)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

6.1 General. Water mist systems shall be described by the following ~~four~~ five parameters as appropriate:

- (1) System application
- (2) Nozzle type
- (3) System operation method
- (4) System media type
- (5) Classification of occupancy

Substantiation: This proposal should be considered with proposals for sections 4.1 and 8.4.2 and new chapter 5, which collectively incorporate the idea of an occupancy hazard classification system into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems’ listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

Revised section 6.1 adds discussion of protection based on classification of occupancy similar to protection method addressed in NFPA 13. This supplements the proposed addition of the new Chapter 5.



---

750- Log #70d  
(6.1)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

6.1 General. Water mist systems shall be described by the following ~~four~~ five parameters as appropriate:

- (1) System application
- (2) Nozzle type
- (3) System operation method
- (4) System media type
- (5) Classification of occupancy

Substantiation: This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

Proposed addition to 4.1 clarifies that water mist systems can provide protection equivalent to automatic sprinklers. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

A new chapter is proposed between existing Chapters 4 and 5. The proposed changes add wording and Annex notes from NFPA 13 for the installation and design of sprinkler equivalent water mist systems. Water mist systems have the potential to provide fire protection against an equally wide range of hazards as conventional sprinkler systems with the added benefit of water efficiency. To facilitate the incorporation of water mist as a primary suppression system, a similar occupancy hazard approach to NFPA 13 is proposed to provide equivalent technical references. This approach is recognized and used in the fire suppression design industry and facilitates the acquirement of system listings as some of the fire tests are already in place. Light and ordinary hazard listings have already been given to water mist systems.

Revised section 6.1 adds discussion of protection based on classification of occupancy similar to protection method addressed in NFPA 13. This supplements the proposed addition of the new Chapter 5.

Revised section 8.4.2 establishes fire hazard classification approach for sprinkler equivalent water mist systems.

750- Log #86  
(6.1 through 6.6)

Final Action:

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Reorganize chapter 6 as follows, and include specific requirements:

6 System Requirements

6.1 General Water mist systems shall be described by the following:

(1) Closed Nozzle System

(2) Open Nozzle System

(3) Multi-Functional Nozzle System

6.1.2 Fire Department Connection

6.1.3 Water flow switches

6.1.4 Control Valves

6.2 Closed Head Systems. Closed head systems are activated by an automatic means.

6.2.1 General Requirements

6.2.2 Wet Systems

6.2.3 Dry Systems

6.2.3.1 Fluid Delivery Time

6.2.3.2 Listing

6.2.4 Pre-Action Systems

6.2.4.1 Fluid Delivery Time

6.2.4.2 Listing

6.2.5 Local Application

6.2.5.1 Local Application systems shall follow the requirements of 6.2.2, 6.2.3, or 6.2.4 depending if the system is wet, dry or pre-action.

6.2.6 Control Mode Systems for the Protection of Light and Ordinary Occupancies

6.2.6.1 Control Mode Systems for the Protection of Light and Ordinary systems shall follow the requirements of 6.2.2, 6.2.3, or 6.2.4 depending if the system is wet, dry or pre-action.

6.3 Open Head System. Open head systems have an open nozzle where the water is held back by a control valve.

6.3.1 General Requirements

6.3.1.1 Detection for open head systems must be accepted by the AHJ and also must be per the manufacturers recommendations, if specifically stated in the installation instructions

6.3.2 Local Application

6.3.3 Total Flooding

6.3.4 Zoned System

6.4 Multi-Functional Nozzle System

6.4.1 General Requirements

6.5 Additive Systems

6.6 Media System Types. Water mist systems shall be classified by two media system types:

(1) Single fluid

(2) Twin fluid

Substantiation: In its current form, Chapter 6 (System Requirements) only contains information regarding the classification of water mist systems into different categories, and does not address any specific minimum "requirements" for their proper application. In order to ensure a minimum level of a safety and dependability of the system, specific minimum requirements need to be included in the standard. Different applications will have different specific minimum requirements. For example, there is currently no mention of any requirements regarding the minimum required fluid delivery time or maximum allowable system volumes for dry and preaction systems, and water mist system for the protection of light and ordinary hazard occupancies are not even mentioned in the chapter at all. Unfortunately, the current structure of the chapter does not allow for the easy incorporation of these types of new specific requirements into the existing text; therefore, it is proposed that the chapter be extensively reorganized to allow for easier incorporation of specific system requirements for particular applications. The current proposal includes a suggested outline of how the new chapter could be structured to help facilitate this process.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #60  
(6.2)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

6.2 System Applications. System applications shall consist of one of the following three four categories:

- (1) Local-application systems
- (2) Total compartment application systems
- (3) Zoned application systems
- (4) Sprinkler equivalent application systems

6.2.4 Sprinkler Equivalent Water Mist Systems.

6.2.4.1 Sprinkler equivalent water mist systems are designed and installed to provide automatic fire protection throughout a building or area.

6.2.4.2 Sprinkler equivalent water mist systems shall be listed or approved for the intended occupancy classification as described in Chapter 5.

6.2.4.3 Sprinkler equivalent water mist systems shall use only automatic water mist nozzles having similar response characteristics to the equivalent automatic sprinkler or as specified by the listing.

6.2.4.4 Sprinkler equivalent water mist systems shall be of the wet pipe or dry pipe type.

Exception: Other system types shall be permitted where dictated by environmental or operational conditions.

Substantiation: This proposal should be considered with proposals for Sections 3.3.22, 7.1 and 8.3, which collectively incorporate the idea of sprinkler equivalent water mist systems into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, *Automatic Sprinkler Systems*.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

Revised Section 6.2 adds discussion of sprinkler equivalent systems to system applications. Section format and content is similar to other criteria in this section. This addition to 6.2 and new Section 6.2.4 adds description of what constitutes a sprinkler equivalent system.

These changes establish that water mist systems are equivalent to automatic sprinklers and state the basic requirements that sprinkler equivalent water mist systems must meet. Criteria are based on NFPA 13, *Automatic Sprinkler Systems*, limitations.

---

750- Log #79  
(6.2)

**Final Action:**

---

**Submitter:** Luke S. Connery, Tyco Fire Protection Products

**Recommendation:** Revise text to read as follows:

**6.2 System Applications.** System applications shall consist of one of the following three categories:

- (1) Local-application systems
- (2) Total compartment application systems
- (3) Zoned application systems
- (X) Control mode systems

**Substantiation:** The standard does not currently address the use of control mode water mist systems, with the exception of the mention of sprinkler equivalent systems in Chapter 14 Marine Systems. Control mode water mist systems are currently being listed for land-based systems by multiple laboratories (FM, UL, VdS) and should be referenced as such in the body of NFPA 750.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

750- Log #63b  
(6.2)

Final Action:

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

6.2 System Applications. System applications shall consist of one of the following ~~three~~ four categories:

- (1) Local-application systems
- (2) Total compartment application systems
- (3) Zoned application systems
- (4) Sprinkler equivalent application systems

**6.2.4 Sprinkler Equivalent Water Mist Systems.**

6.2.4.1 Sprinkler equivalent water mist systems are designed and installed to provide automatic fire protection throughout a building or area.

6.2.4.2 Sprinkler equivalent water mist systems shall be listed or approved for the intended occupancy classification as described in Chapter 5.

6.2.4.3 Sprinkler equivalent water mist systems shall use only automatic water mist nozzles having similar response characteristics to the equivalent automatic sprinkler or as specified by the listing.

6.2.4.4 Sprinkler equivalent water mist systems shall be of the wet pipe or dry pipe type.

Exception: Other system types shall be permitted where dictated by environmental or operational conditions.

**Substantiation:** This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

A new definition is added to 3.3.22 to clarify the full range of water mist applications. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

Revised section 6.2 adds discussion of sprinkler equivalent systems to system applications. Section format and content is similar to other criteria in this section. This addition to 6.2 and new section 6.2.4 adds description of what constitutes a sprinkler equivalent system.

These changes establish that water mist systems are equivalent to automatic sprinklers and state the basic requirements that sprinkler equivalent water mist systems must meet. These requirements establish that these systems are a recognized type of water mist system for which design and installation manuals exist. Criteria are based on NFPA 13, Automatic Sprinkler Systems, limitations.

Changes to 8.3 establish basic performance objectives for sprinkler equivalent water mist systems. These requirements are met through the listing of the system for the different hazard occupancies.

---

750- Log #80  
(6.2.x (New) )

Final Action:

---

Submitter: Luke S. Connery, Tyco Fire Protection Products

Recommendation: Add text to read as follows:

6.2.X Control Mode Systems.

6.2.X.1 Control mode systems provide control-mode fire protection in spaces where the predominant hazard consists of Class A combustibles, such as in light and ordinary hazard occupancies.

6.2.X.2 Examples include non-storage and non-manufacturing occupancies such as residential occupancies, offices, meeting rooms, hotels, museum exhibit areas, restaurant seating areas and schools.

6.2.X.3 Control mode systems shall be actuated by automatic nozzles and/or by an independent detection system.

Substantiation: The standard does not currently address the use of control mode water mist systems, with the exception of the mention of sprinkler equivalent systems in Chapter 14 Marine Systems. Control mode water mist systems are currently being listed for land-based systems by multiple laboratories (FM, UL, VdS) and should be referenced as such in the body of NFPA 750.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #82  
(6.2.3.x (New) )

Final Action:

---

Submitter: Luke S. Connery, Tyco Fire Protection Products

Recommendation: Add text to read as follows:

6.2.3.X The total volume protected by adjacent zoned application systems shall not exceed the maximum volume permitted by the listed design parameters, unless specifically permitted by the listing.

Substantiation: As it currently reads, Section/Paragraph 6.2.3 allows for the use of multiple zones of protection within one large compartment. Given that laboratory testing has found that the primary mechanism of extinguishment of a water mist system (when protecting a combustible/flammable liquid hazard in a total compartment application) is that of global oxygen displacement, compartment volume is a critical parameter and design consideration. Limiting the total protected volume to the maximum volume permitted by the listing reinforces the boundaries of application to that allowed by the listing.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #98  
(6.3)

Final Action:

---

Submitter: Allen Bunner, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

**6.3 Nozzle Types.** Water mist nozzles shall be classified as one of the following types: (1) Automatic, (2) Nonautomatic, (3) Hybrid Multi-functional.

Substantiation: The use of the wording 'hybrid water mist nozzles' may potentially cause confusion in the fire protection industry. Recently, independent testing agencies (Factory Mutual) have initiated use of the term 'hybrid' to define a group of twin-fluid water mist technologies using a propellant (nitrogen). The introduction of nitrogen into the risk being protected may reduce the oxygen level below 16%. If the level of Oxygen is lowered to below 16%, Factory Mutual is identifying these systems as 'hybrid', as they impact a fire via both water discharge and inerting with the propellant. The use of the wording 'hybrid' by NFPA and Factory Mutual, both involving water mist technologies, would potentially cause confusion within the fire protection industry. As NFPA is assumed to use the 'hybrid' designation for the water mist nozzles in NFPA 750 only, this wording change could be accommodated.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

750- Log #14  
(6.4.4.3 (New) )

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Add new text to read as follows:

(NEW) 6.4.4.3 Standby pressure shall be monitored and/or supervised mechanically or electrically to maintain the integrity of the system.

Substantiation: Need to add a requirement that the dry pipe portion of the system needs to be monitored or supervised similar to NFPA 13.

750- Log #61  
(7.1)

Final Action:

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Add new text to read as follows:

7.1 General. This chapter provides requirements for the installation of water mist system components.

7.1.1 Listing. Listed materials and devices shall be installed in accordance with their listing.

7.1.2 System Design Manual. Materials and devices shall be installed in accordance with the system design manual.

7.1.3 Corrosive Environments. Systems installed in corrosive environments shall comply with 5.1.3.

7.1.4 Mechanical and Chemical Damage. System components shall be located, installed, or suitably protected so they are not subject to mechanical, chemical, or other damage that could render them inoperative.

7.1.5 Installation and Testing Procedures. Manufacturers shall provide installation and testing procedures to ensure that the system is installed and will operate as intended.

7.1.6 Sprinkler Equivalent Water Mist Systems

7.1.6.1 Spacing and location of nozzles. The requirements for spacing, location and position of water mist nozzles shall be based on the following principles:

(1) Nozzles shall be installed throughout the premises unless the nozzles are specifically tested and test results demonstrate that omission of water mist nozzles from certain limited areas is permissible.

(2) Nozzles shall be located so as not to exceed the spacing criteria specified by the manufacturer in the system design and installation manual.

(3) Nozzles shall be positioned and located so as to provide satisfactory performance with respect to activation time and distribution pattern.

(4) When nozzles are specifically tested and test results demonstrate that deviations from clearance requirements to obstructions do not impair the ability of the system to control or suppress a fire, their positioning and locating in accordance with the test results shall be permitted.

(5) Clearance between nozzles and ceilings exceeding the maximums specified in the standard or in the manufacturer's system design and installation manual shall be permitted, provided that tests or calculations demonstrate comparable performance of the automatic water mist nozzles to those installed in conformance with this standard.

(6) Furniture, portable wardrobe units, cabinets, trophy cases, and similar objects or features not intended for occupancy, whether freestanding or attached to the finished structure, do not require nozzles to be installed in them.

7.1.6.2 System Protection Area Limitations. The maximum area on any one floor to be protected by water mist supplied by any one water mist system riser or combined system riser shall be as follows:

(1) Light hazard - 52,000 ft<sup>2</sup> (4,831 m<sup>2</sup>)

(2) Ordinary hazard - 52,000 ft<sup>2</sup> (4,831 m<sup>2</sup>)

(3) Extra hazard - 40,000 ft<sup>2</sup> (3,716 m<sup>2</sup>)

(4) Storage - High-piled storage and storage covered by other NFPA standards, 40,000 ft<sup>2</sup> (3,716 m<sup>2</sup>)

7.1.6.3 Mezzanines. The floor area occupied by mezzanines shall not be included in the area limits of 7.1.6.2.

7.1.6.4 Multiple occupancies within a building. Where single sprinkler equivalent water mist systems protect extra hazard, highpiled storage, or storage covered by other NFPA standards, in addition to ordinary or light hazard areas, the extra hazard or storage area coverage shall not exceed the floor area specified for that hazard and the total area coverage shall not exceed 52,000 ft<sup>2</sup> (4831 m<sup>2</sup>).

7.1.6.5 Multiple buildings. Multiple buildings attached by canopies, covered breezeways, common roofs, or a common wall(s) shall be permitted to be supplied by a single system riser provided that the maximum system size complies with 7.1.6.2.

Substantiation: This proposal should be considered with proposals for sections 3.3.22, 6.2 and 8.3, which collectively incorporate the idea of sprinkler equivalent water mist systems into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the



water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

These changes establish that water mist systems are equivalent to automatic sprinklers and state the basic requirements that sprinkler equivalent water mist systems must meet. These requirements establish that these systems are a recognized type of water mist system for which design and installation manuals exist. Criteria are based on NFPA 13, Automatic Sprinkler Systems, limitations.

750- Log #63c  
(7.1)

Final Action:

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

7.1 General. This chapter provides requirements for the installation of water mist system components.

7.1.1 Listing. Listed materials and devices shall be installed in accordance with their listing.

7.1.2 System Design Manual. Materials and devices shall be installed in accordance with the system design manual.

7.1.3 Corrosive Environments. Systems installed in corrosive environments shall comply with 5.1.3.

7.1.4 Mechanical and Chemical Damage. System components shall be located, installed, or suitably protected so they are not subject to mechanical, chemical, or other damage that could render them inoperative.

7.1.5 Installation and Testing Procedures. Manufacturers shall provide installation and testing procedures to ensure that the system is installed and will operate as intended.

#### 7.1.6 Sprinkler Equivalent Water Mist Systems

7.1.6.1 Spacing and location of nozzles . The requirements for spacing, location and position of water mist nozzles shall be based on the following principles:

(1) Nozzles shall be installed throughout the premises unless the nozzles are specifically tested and test results demonstrate that omission of water mist nozzles from certain limited areas is permissible.

(2) Nozzles shall be located so as not to exceed the spacing criteria specified by the manufacturer in the system design and installation manual.

(3) Nozzles shall be positioned and located so as to provide satisfactory performance with respect to activation time and distribution pattern.

(4) When nozzles are specifically tested and test results demonstrate that deviations from clearance requirements to obstructions do not impair the ability of the system to control or suppress a fire, their positioning and locating in accordance with the test results shall be permitted.

(5) Clearance between nozzles and ceilings exceeding the maximums specified in the standard or in the manufacturer's system design and installation manual shall be permitted, provided that tests or calculations demonstrate comparable performance of the automatic water mist nozzles to those installed in conformance with this standard.

(6) Furniture, portable wardrobe units, cabinets, trophy cases, and similar objects or features not intended for occupancy, whether freestanding or attached to the finished structure, do not require nozzles to be installed in them.

7.1.6.2 System Protection Area Limitations. The maximum area on any one floor to be protected by water mist supplied by any one water mist system riser or combined system riser shall be as follows:

(1) Light hazard - 52,000 ft<sup>2</sup> (4,831 m<sup>2</sup>)

(2) Ordinary hazard - 52,000 ft<sup>2</sup> (4,831 m<sup>2</sup>)

(3) Extra hazard - 40,000 ft<sup>2</sup> (3,716 m<sup>2</sup>)

(4) Storage - High-piled storage and storage covered by other NFPA standards, 40,000 ft<sup>2</sup> (3,716 m<sup>2</sup>)

7.1.6.3 Mezzanines . The floor area occupied by mezzanines shall not be included in the area limits of 7.1.6.2.

7.1.6.4 Multiple occupancies within a building . Where single *sprinkler equivalent water mist systems* protect extra hazard, high-piled storage, or storage covered by other NFPA standards, in addition to ordinary or light hazard areas, the extra hazard or storage area coverage shall not exceed the floor area specified for that hazard and the total area coverage shall not exceed 52,000 ft<sup>2</sup> (4,831 m<sup>2</sup>).

7.1.6.5 Multiple buildings. Multiple buildings attached by canopies, covered breezeways, common roofs, or a common wall(s) shall be permitted to be supplied by a single system riser provided that the maximum system size complies with 7.1.6.2.

Substantiation: This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

A new definition is added to 3.3.22 to clarify the full range of water mist applications. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

Revised section 6.2 adds discussion of sprinkler equivalent systems to system applications. Section format and content is similar to other criteria in this section. This addition to 6.2 and new section 6.2.4 adds description of what constitutes a sprinkler equivalent system.

These changes establish that water mist systems are equivalent to automatic sprinklers and state the basic requirements that sprinkler equivalent water mist systems must meet. These requirements establish that these systems are a recognized type of water mist system for which design and installation manuals exist. Criteria are based on NFPA 13, Automatic Sprinkler Systems, limitations.

Changes to 8.3 establish basic performance objectives for sprinkler equivalent water mist systems. These requirements are met through the listing of the system for the different hazard occupancies.

---

750- Log #36  
(7.1.2)

**Final Action:**

---

**Submitter:** Jack R. Mawhinney, Hughes Associates, Inc.

**Recommendation:** Revise section 7.1.2 as follows:

7.1.2 ~~System Design~~ and Installation Manual. Materials and devices shall be installed in accordance with the manufacturer's system design and installation manual.

**Substantiation:** Section 7.1.2 refers to a "system design manual", whereas section 8.2.6 uses the term "Design and Installation Manual". The proposed change reconciles the wording.

---

750- Log #71  
(7.1.2)

**Final Action:**

---

**Submitter:** Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

**Recommendation:** Revise text to read as follows:

7.1.2 ~~System Design~~ and Installation Manual. Materials and devices shall be installed in accordance with the manufacturer's system design and installation manual.

**Substantiation:** Section 7.1.2 refers to a "system design manual", whereas section 8.2.6 uses the term "Design and Installation Manual". The proposed change clarifies that it is the same document referred to.

---

750- Log #95  
(7.2.5 and A.7.2.5)

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Add new sub-paragraphs into section 7.2.5 as follows:

~~7.2.5\* Obstructions to Nozzle Discharge: The location of nozzles with respect to continuous or discontinuous obstructions shall be in accordance with the manufacturer's listing.~~

~~7.2.5.1\* Deluge Systems: The location of nozzles with respect to continuous or discontinuous obstructions shall be in accordance with the manufacturer's listing.~~

~~A-7.2.5 A.7.2.5.1~~ Spray that strikes obstructions too close to the nozzles...

~~7.2.5.2 Control Mode Protection of Light and Ordinary Hazard Occupancies: The location of nozzles with respect to continuous or discontinuous obstructions shall be in accordance with 7.2.5.2.1 and 7.2.5.2.2 unless otherwise specified as part of the manufacturer's listing.~~

~~7.2.5.2.1 Pendent and Upright Water Mist Nozzles: Insert obstruction criteria from NFPA 13, 2010 edition, section 8.8.5 in its entirety.~~

~~7.2.5.2.2 Sidewall Water Mist Nozzles: Insert obstruction criteria from NFPA 13, 2010 edition, section 8.9.5 in its entirety.~~

Substantiation: The current language included in section 7.2.5 and annex note A.7.2.5 require that obstruction criteria be developed as part of the manufacturer's listing. This places an unnecessarily heavy burden on the manufacturer to provide detailed information that is not accounted for in any existing water mist test protocol. While the wide variety of spray patterns generated by different mist technologies may warrant this type of approach, it is proposed that a possible solution would be to split the section up into sub sections related to the specific types of applications they are applicable for. In addition, obstruction criteria is arguably more important for water mist systems used in lieu of sprinkler systems for light and ordinary hazard applications, as the wetting of Class A combustibles is a critical mechanism to provide fire control. As a result, it is suggested that an adequate starting point would be to incorporate the existing obstruction criteria for extended coverage pendent, upright, and sidewall sprinklers from NFPA 13. This is considered to be a conservative approach, as the smaller droplets contained in water mist spray patterns are less likely to be adversely affected by obstructions than typical sprinkler sprays.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #65  
(7.3.2)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

7.3.2 Installation Standards. All water and atomizing media piping and tubing for water mist systems shall be installed in accordance with one of the following:

(1) ASME B31.1, Power Piping Code

(2) Water piping only, in low-pressure systems installed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems

(3) Piping installed in accordance with a water mist system listing where the listing provides installation criteria different from ASME B31.1, Power Piping Code

(4) ASME/UL 1821, Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service

Substantiation: This proposal should be considered with the proposal for Table 5.3.3.2, which collectively incorporate the idea of non-metallic pipe for water mist use into NFPA 750.

This proposal adds wording to support the use of non-metallic pipe. This primarily applies to low pressure systems in residential occupancies similar to NFPA 13D. Where applicable, the use of non-metallic pipe can help reduce the cost of water mist systems. The proposed change provides a referenced standard to standardize the quality of thermoplastic pipe for use in water mist sprinkler equivalent systems. See proposed new paragraph 9.3.1.3.3. A copy of the referenced standard has been filed with NFPA technical staff.

Note: Supporting material is available for review at NFPA Headquarters.

---

750- Log #25  
(7.5.5.3.2)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

7.5.5.3.2 When any cylinder is removed for maintenance, automatic means shall be provided to prevent leakage from the manifold if the system is operated ~~or the system shall be taken out of service.~~

Substantiation: The change will not allow for a system to partially protect an area while it is undergoing maintenance. While a system is undergoing maintenance it may not have its full design capability and the extent to which the maintenance will affect the system will vary and may actually restrict the system from protecting the hazard all together. During these conditions it is safer to take the system out of service if adequate protection cannot be provided.

---

750- Log #43  
(7.6)

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Delete section:

7.6 Pumps and Pump Controllers.

Substantiation: This section is redundant as these requirements are already discussed in Chapter 5 or NFPA 20.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #15  
(7.8.3.1.2)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

7.8.3.1 Water Pressure Regulating Valves.

7.8.3.1.2 These valves shall open when the system pressure reaches 95 percent of the system-~~rated~~ design pressure.

Substantiation: Current requirement references system-rated pressure which has not been defined in the standard. To be consistent, the term design pressure should be used. See also proposal for modifications to definitions of pressures in paragraph 3.3.23.

---

750- Log #23  
(7.8.3.1.8 and 7.8.3.1.9 (New) )

Final Action:

---

Submitter: Michael L. Hennegan, MLH Fire Protection Ltd.

Recommendation: Add text to read as follows:

7.8.3.1.8 Unloader valves shall not be required to meet clauses 7.8.3.1.1 through 7.8.3.1.7

7.8.3.1.9 Unloader valves shall meet the requirements of NFPA 20 Chapter 8 Positive Displacement Pumps

Substantiation: The current text from section 7.8.3 Pressure Regulating and Pressure Relief Valves does not address Pressure Regulating Valves of the Unloader Valve type (see NFPA 750 Tyco proposal XX 20111211 for definitions). Unloader valves and their relief requirements are already addressed in NFPA20, Chapter 8 Positive Displacement Pumps. In order to avoid conflicts Unloader Valves and their pressure relief requirements should only appear in NFPA 20.

---

750- Log #55  
(8.2.1 and A.8.2.1 (New) )

Final Action:

---

Submitter: Brian K. MacDonald, FM Approvals

Recommendation: Revise text to read as follows:

8.2.1\* Scope. Listing of water mist fire protection systems shall be based on a comprehensive evaluation designed to include fire test protocols, system components, and the contents of the manufacturer's design and installation manual.

A.8.2.1 Scope. Requirements for performing a comprehensive evaluation of complete water mist systems, including fire test protocols, system component test procedures, and the manufacturer's design and installation manual review, can be found in ANSI/FM Approvals 5560, American National Standard for Water Mist Systems, and FM Approvals Class Number 5560, Approval Standard for Water Mist Systems.

Substantiation: Currently there is no method identified for the consistent testing of components used in a water mist system as currently exists with Fire Tests: 8.2.2/A.8.2.2/Annex C, *Examples of Fire Test Protocols*. Addition of these reference documents in Annex A allows the public to be aware of established methods to evaluate the performance and operation of components used in a water mist system. These documents are available to the public and are free. Web links are provided to the Technical Committee for their review.

<http://www.fmglobal.com/assets/pdf/fmapprovals/5560.pdf>

<http://www.fmglobal.com/assets/pdf/fmapprovals/5560ansi.pdf>

---

750- Log #84  
(8.2.4.2.x (New) )

Final Action:

---

Submitter: Luke S. Connery, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

8.2.4 Applicability.

8.2.4.1 Fire test protocols shall be designed to replicate the range of the application parameters associated with a particular hazard or occupancy.

8.2.4.2 The system hardware shall be listed for the intended application.

8.2.4.2.X The requirements of 8.2.4.2 shall not apply to system components that have been listed for use with other water-based fire protection systems and are intended to be utilized within the acceptable range of use allowed by their listing.

Substantiation: Low and intermediate pressure water mist systems can often use components that have been tested and listed for use in a sprinkler system or water spray system. As one example, it should be understood that a riser check valve rated to 300 psi can be used on a water mist system whose maximum anticipated design pressure is 240 psi.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #62  
(8.3)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Add new text to read as follows:

**8.3 Performance Objectives.**

**8.3.1 \* Fire Performance Objectives.** The fire-fighting performance objectives of a water mist system shall be described using at least one of the following three terms:

- (1) Control
- (2) Suppression
- (3) Extinguishment

**8.3.1.1 Fire Control.** Fire control shall be measured using three basic approaches:

- (1) A reduction in the thermal exposure to the structure, where the primary objective is to maintain the structural integrity of the building (e.g., prevent flashover)
- (2) A reduction in the threat to occupants, where the primary objective is to minimize the loss of life
- (3) A reduction in a fire-related characteristic, such as heat release rate, fire growth rate, or spread to adjacent objects

**8.3.1.2 Fire Suppression .** Fire suppression is the sharp reduction in the heat release rate of a fire and the prevention of its regrowth by a sufficient application of water mist.

**8.3.1.3 Fire Extinguishment.** Fire extinguishment is the complete suppression of a fire until there are no burning combustibles.

**8.3.2. Performance Objectives for Sprinkler Equivalent Water Mist Systems**

**8.3.2.1** Sprinkler equivalent water mist systems designed in accordance with this standard shall meet or exceed the capabilities of a comparable sprinkler system.

**8.3.2.2.** Sprinkler equivalent water mist systems shall be listed or approved for the appropriate occupancy classifications from Chapter 5.

**Substantiation:** This proposal should be considered with proposals for sections 3.3.22, 6.2 and 7.1, which collectively incorporate the idea of sprinkler equivalent water mist systems into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

Changes to 8.3 establish basic performance objectives for sprinkler equivalent water mist systems. These requirements are met through the listing of the system for the different hazard occupancies.

---

750- Log #63d  
(8.3)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

**8.3 Performance Objectives.**

**8.3.1 \* Fire Performance Objectives.** The fire-fighting performance objectives of a water mist system shall be described using at least one of the following three terms:

- (1) Control
- (2) Suppression
- (3) Extinguishment

**8.3.1.1 Fire Control.** Fire control shall be measured using three basic approaches:

- (1) A reduction in the thermal exposure to the structure, where the primary objective is to maintain the structural integrity of the building (e.g., prevent flashover)
- (2) A reduction in the threat to occupants, where the primary objective is to minimize the loss of life
- (3) A reduction in a fire-related characteristic, such as heat release rate, fire growth rate, or spread to adjacent objects

**8.3.1.2 Fire Suppression .** Fire suppression is the sharp reduction in the heat release rate of a fire and the prevention of its regrowth by a sufficient application of water mist.

**8.3.1.3 Fire Extinguishment.** Fire extinguishment is the complete suppression of a fire until there are no burning combustibles.

**8.3.2. Performance Objectives for Sprinkler Equivalent Water Mist Systems**

**8.3.2.1 Sprinkler equivalent water mist systems designed in accordance with this standard shall meet or exceed the capabilities of a comparable sprinkler system.**

**8.3.2.2. Sprinkler equivalent water mist systems shall be listed or approved for the appropriate occupancy classifications from Chapter 5.**

**Substantiation:** This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option.

A new definition is added to 3.3.22 to clarify the full range of water mist applications. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

Revised section 6.2 adds discussion of sprinkler equivalent systems to system applications. Section format and content is similar to other criteria in this section. This addition to 6.2 and new section 6.2.4 adds description of what constitutes a sprinkler equivalent system.

These changes establish that water mist systems are equivalent to automatic sprinklers and state the basic requirements that sprinkler equivalent water mist systems must meet. These requirements establish that these systems are a recognized type of water mist system for which design and installation manuals exist. Criteria are based on NFPA 13, Automatic Sprinkler Systems, limitations.

Changes to 8.3 establish basic performance objectives for sprinkler equivalent water mist systems. These requirements are met through the listing of the system for the different hazard occupancies.



---

750- Log #38  
(8.3.2, 8.3.2.1, and 8.3.2.2 (New) )

Final Action:

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Insert new section under 8.3 following existing 8.3.1.3:

**8.3.2. Performance Objectives for Sprinkler Equivalent Water Mist Systems**

**8.3.2.1 Sprinkler equivalent water mist systems designed in accordance with this standard shall meet or exceed the capabilities of a comparable sprinkler system.**

**8.3.2.2. Sprinkler equivalent water mist systems shall be listed or approved for the appropriate occupancy classifications from Chapter 5 (NEW).**

Substantiation: The proposed new text clarifies that sprinkler equivalent water mist systems must be listed or approved for one of the relevant occupancy classifications in the new Chapter 5.

---

750- Log #78  
(8.4.1.1)

Final Action:

---

Submitter: Gerard I. Libby, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

**8.4.1.1 Compartment Geometry.** The compartment geometry (e.g., floor area, compartment volume, ceiling height, and aspect ratio) shall be considered when designing such parameters as nozzle locations, system flow rate, and total water use needs of the system.

Substantiation: The current wording of the text implies that all of the aspects written (floor area, compartment volume, ceiling height, and aspect ratio) should be considered. However, compartment volume is not applicable to sprinkler equivalent systems. The addition of “e.g.” implies that only applicable aspects should be considered, and is consistent with how other optional criteria are addressed in the standard.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #68  
(8.4.2)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

**8.4.2 Fire Hazard Classification.** The fire hazard shall be classified by ~~both~~either the combustible loading and fuel type or by the occupancy classifications from Chapter 5.

Substantiation: This proposal should be considered with proposals for sections 4.1 and 6.1 and new chapter 5, which collectively incorporate the idea of an occupancy hazard classification system into NFPA 750.

These code proposals are part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

Revised section 8.4.2 establishes fire hazard classification approach for sprinkler equivalent water mist systems.

---

750- Log #70e  
(8.4.2)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

**8.4.2 Fire Hazard Classification.** The fire hazard shall be classified by ~~both~~either the combustible loading and fuel type or by the occupancy classifications from Chapter 5.

**Substantiation:** This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

Proposed addition to 4.1 clarifies that water mist systems can provide protection equivalent to automatic sprinklers. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

A new chapter is proposed between existing Chapters 4 and 5. The proposed changes add wording and Annex notes from NFPA 13 for the installation and design of sprinkler equivalent water mist systems. Water mist systems have the potential to provide fire protection against an equally wide range of hazards as conventional sprinkler systems with the added benefit of water efficiency. To facilitate the incorporation of water mist as a primary suppression system, a similar occupancy hazard approach to NFPA 13 is proposed to provide equivalent technical references. This approach is recognized and used in the fire suppression design industry and facilitates the acquirement of system listings as some of the fire tests are already in place. Light and ordinary hazard listings have already been given to water mist systems.

Revised section 6.1 adds discussion of protection based on classification of occupancy similar to protection method addressed in NFPA 13. This supplements the proposed addition of the new Chapter 5.

Revised section 8.4.2 establishes fire hazard classification approach for sprinkler equivalent water mist systems.

---

750- Log #74  
(Chapter 9 (New))

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Add new text to read as follows:

Chapter 9 Design Approaches.

9.1 General. The requirements of Section 9.1 shall apply to all engineered water mist systems unless modified by a specific section of this Chapter 9.

9.1.1 A building or portion thereof shall be permitted to be protected in accordance with any applicable design basis conforming to

Section 6.2 at the discretion of the designer.

9.1.2 Water Demand.

9.1.2.1 The water demand requirements for engineered water mist systems shall be specified by the water mist equipment manufacturer's Design and Installation Manual.

9.1.3 Water Supplies.

9.1.3.1 Quantity. Water supplies for water mist systems shall be in conformance with Chapter 10 of this standard and this section.

9.1.3.2 For sprinkler equivalent water mist systems, the minimum water demand requirements for the water mist system shall be determined by adding the hose stream allowance, if any, to the water demand for the water mist nozzles.

9.1.3.3 Duration. The minimum water supply shall be available for the minimum duration specified in Chapter 10.

9.1.3.4 Tanks shall be sized to supply the equipment that they serve.

9.1.3.5 Pumps shall be sized to supply the equipment that they serve.

9.1.4\* Hose Allowance.

9.1.4.1 Where the water supply for a sprinkler equivalent water mist system serves concurrently as the water source for the water mist system, and as the source of water for inside or outside hoses, the concurrent hose stream allowance shall be added to the water mist system demand at the point of entry into the building, and upstream of any pumps, filters or strainers on the water mist system.

9.1.4.2 Intermediate and High Pressure Water Mist Systems. Where inside or outside hose streams are required in areas protected by an intermediate or high pressure sprinkler equivalent water mist system, a separate standpipe for the hose stream shall be provided in accordance with NFPA 14.

9.1.4.3 Low Pressure Water Mist. Where a sprinkler equivalent water mist system is served by a common fire pump capable of meeting the water mist system demand, and the fire standpipe demand in conformance with NFPA 14, a separate riser is not required for each system.

A.9.1.4 Annex material to provide example (diagrams) of the intended point of connection where the hose allowance must be accounted for. Provide a diagram showing separate risers for the standpipe and water mist systems. The water mist system risers must be protected from entry of debris by means of filters or strainers. [Diagram to be prepared by the committee during the 2013 code review cycle.]

9.2 Occupancy Hazard Fire Control Approach.

9.2.1 General.

9.2.1.1 Occupancy Classifications.

9.2.1.1.1 Occupancy classifications for this standard shall relate to water mist installations and their water supplies only.

9.2.1.1.2 Occupancy classifications shall not be used as a general classification of occupancy hazards.

9.2.1.1.3 Occupancies or portions of building occupancies shall be classified according to the quantity and combustibility of contents, the expected rates of heat release, the total potential for energy release, the heights of stockpiles, and the presence of flammable and combustible liquids, using the definitions contained in Section 5.2 through Section 5.4. Classifications shall be as follows:

(1) Light hazard

(2) Ordinary hazard (Groups 1 and 2)

(3) Extra hazard (Groups 1 and 2)

9.3 Residential Occupancy Fire Control Approach.

9.3.1 Residential Occupancies Up To and Including 4 Stories In Height.

9.3.1.1 Scope.

9.3.1.1.1 This section shall cover the design and installation of sprinkler equivalent water mist systems for protection

against fire hazards in residential occupancies up to and including four stories in height.

9.3.1.1.2 This section assumes that the water mist system shall be designed to protect against a fire originating from a single ignition location.

9.3.1.2 General.

9.3.1.2.1 System Arrangement. In townhouse-style buildings protected in accordance with this standard, each dwelling unit shall have its own dedicated water mist system or the control valves for the water mist system shall be located outside the dwelling units or in a common area.

9.3.1.2.2 Listed or Labeled. Listed or labeled devices and materials shall be installed and used in accordance with the listing limitations and the manufacturers' instructions unless permitted by other sections of this document.

9.3.1.3 Nozzles.

9.3.1.3.1 Only new listed nozzles shall be installed on a water mist system.

9.3.1.3.2 Nozzles shall be installed in accordance with their listing.

9.3.1.3.2.1\* Painting and Finish. Nozzle painting and finish material shall only be permitted by the manufacturer. Where nozzles have had paint applied by other than the manufacturer, they shall be replaced with new listed nozzles of the same type.

A.9.3.1.3.2.1 Painting can retard the thermal response of the heat-responsive element, can interfere with the movement of parts, and can render the nozzle inoperative.

9.3.1.3.3 Aboveground Piping and Equipment.

9.3.1.3.3.1 When non-metallic pipe is used, the pipe shall be designed to withstand a working pressure of not less than the anticipated system pressure at 120°F (49°C).

9.3.1.3.3.2 Pipe or tube listed for light hazard occupancies shall be permitted to be installed in ordinary hazard rooms of otherwise light hazard occupancies where the room does not exceed 400 ft<sup>2</sup> (37 m<sup>2</sup>).

9.3.1.3.4 Valves.

9.3.1.3.4.1 Identification of Valves.

9.3.1.3.4.1.1 The control valve sign shall identify the portion of the building served.

9.3.1.3.4.1.2 Systems that have more than one control valve that must be closed to work on a system or space shall have a sign referring to the existence and location of the other valves.

9.3.1.3.5 Nozzle Positioning.

9.3.1.3.5.1 Nozzles shall be positioned so that the response time and discharge are not unduly affected by obstructions such as ceiling slope, beams, or light fixtures.

9.3.1.4 Design Criteria.

9.3.1.4.1 The system shall provide at least the flow required for the multiple and single nozzle operating criteria specified by the system listing.

9.3.1.4.2 The system shall provide at least the flow required to produce a minimum discharge density that meets the nozzle listing.

9.3.1.4.3 Number of Design Nozzles. The number of design nozzles under flat, smooth, horizontal ceilings shall include the number of nozzles based on the listing of the system that requires the greatest hydraulic demand.

9.3.1.5 Pipe Sizing. Piping shall be sized using hydraulic calculation procedures in accordance with Chapter 9 (existing).

9.3.1.6 Water Supply.

9.3.1.6.1 Automatic. Every sprinkler equivalent water mist system shall have at least one automatic water supply in conformance with Chapter 10 of this standard.

9.3.1.6.2 Minimum Duration. The water supply shall be capable of supplying the system demand for at least 30 minutes. (See Section 10.3)

9.3.1.6.3 Source. The water supply source shall be one of the following:

(1) A connection to a reliable waterworks system with or without a pump, as required

(2) An elevated tank

(3) A pressure tank installed in accordance with Chapter 10 and NFPA 22

(4) A stored water source with an automatically operated pump

9.3.1.6.4 Fire Pump. Where a fire pump is installed, the fire pump shall be installed in accordance with Chapter 10 and NFPA 20.

9.3.1.6.5 Domestic Demand. Domestic demand shall be included as part of the overall system demand for systems with common domestic/fire mains where no provisions are made to prevent the domestic waterflow upon sprinkler system activation.

9.3.2 One- and Two-Family Dwellings.

9.3.2.1 Scope.

9.3.2.1.1 This section shall cover the design and installation of sprinkler equivalent water mist systems for protection

against fire hazards in one- and two-family dwellings.

9.3.2.1.2 The sprinkler equivalent water mist system shall be designed to protect against a fire originating from a single ignition location.

9.3.2.2 General.

9.3.2.2.1 The installer shall provide to the owner/occupant instructions on inspecting, testing, and maintaining the system.

9.3.2.2.2\* Smoke alarms shall be provided in accordance with NFPA 72, National Fire Alarm and Signaling Code.

A.9.3.2.2.1 The occupants of a home with a water mist system should understand that maintaining a water mist system is mostly about common sense. Keeping the control valve open, not hanging items from the nozzles, and making sure that the nozzles do not get painted or obstructed are the most important items. It is also important to know where the control valve is located so that the water can be shut down after water mist activation to minimize water damage. The building owner or manager should understand the water mist system operation and should conduct periodic inspections and tests to make sure that the system is in good working condition. A recommended inspection and testing program includes the following:

(1) Monthly inspection of all valves to ensure that they are open.

(2) Monthly inspection of tanks, if present, to confirm they are full.

(3) Monthly testing of pumps, if present, to make sure they operate properly and do not trip circuit breakers when starting.

(4) Testing of all waterflow devices, when provided, every 6 months including monitoring service (note that notification of the monitoring service is essential to make sure that the fire department is not called due to testing).

(5) Ongoing visual inspection of all nozzles to make sure they are not obstructed and decorations are not attached or hung from them.

(6) Whenever painting or home improvements are made in the dwelling unit, special attention should be paid to ensure that nozzles are not painted or obstructed either at the time of installation or during subsequent redecoration. When painting is occurring in the vicinity of nozzles, the nozzles should be protected by covering them with a bag, which should be removed immediately after painting is finished.

9.3.2.3 System Components.

9.3.2.3.1 General. Tanks, pumps, filters, hangers, waterflow detection devices, and waterflow valves shall be in accordance with manufacturer's requirements, but are not required to be listed.

9.3.2.3.2 Aboveground Pipe and Tube. Pipe or tube used in sprinkler equivalent water mist systems shall be of the materials specified in Table 5.3.3.1 or shall be listed for use with water mist systems at the anticipated system pressure.

9.3.2.3.3 Aboveground Fittings. Fittings used in sprinkler equivalent water mist systems shall be in accordance with Section 5.4 or shall be listed for use with water mist systems at the anticipated system pressure.

9.3.2.3.4 Pre-engineered Systems. Where listed pre-engineered systems are installed, they shall be installed within the limitations that have been established by the testing laboratories.

9.3.2.4 Installation Requirements.

9.3.2.4.1 Valves.

9.3.2.4.1.1 A single control valve arranged to shut off both the domestic system and the sprinkler system shall be installed unless a separate shutoff valve for the sprinkler system is installed in accordance with Section 9.3.2.4.1.2.

9.3.2.4.1.2 The sprinkler system piping shall not have a separate control valve installed unless supervised by one of the following methods:

(1) Central station, proprietary, or remote station alarm service

(2) Local alarm service that causes the sounding of an audible signal at a constantly attended location

(3) Valves that are locked open

9.3.2.4.2 Piping Support.

9.3.2.4.2.1 Listed pipe shall be supported in accordance with any listing limitations.

9.3.2.4.2.2 Pipe that is not listed, and listed pipe with listing limitations that do not include piping support requirements, shall be supported from structural members using support methods in accordance with the DIOM.

9.3.2.4.2.3 Piping laid on open joists or rafters shall be supported in a manner that prevents vertical and lateral movement of the nozzle.

9.3.2.4.3 Nozzles.

9.3.2.4.3.1 Listed nozzles shall be used.

9.3.2.4.3.2 Nozzles shall not be used on systems other than wet pipe systems unless specifically listed for use on that particular type of system.

9.3.2.4.3.3 Nozzles shall be supported in manner that prevents lateral and vertical movement.

9.3.2.4.3.4 Painting and Ornamental Finishes. Nozzles shall not be painted or enameled unless applied by the

manufacturer and the nozzle has been listed with such finishes.

#### 9.3.2.4.4 Drains and Test Connections.

9.3.2.4.4.1 Each water mist system shall have a drain on the system side of the control valve.

9.3.2.4.4.2 A valve shall be installed in the drain piping.

9.3.2.4.4.3 A drain shall be installed for each trapped portion of a dry system that is subject to freezing temperatures.

9.3.2.4.4.4 Where waterflow alarms are provided, inspector's test connections shall be installed at locations that allow flow testing of water supplies, connections, and alarm mechanisms.

9.3.2.4.4.5 The inspector's test connections shall contain an orifice equal to or smaller than the smallest nozzle installed in the system.

#### 9.3.2.4.5 Pressure Gauges.

9.3.2.4.5.1 Where a dry system is installed, a pressure gauge shall be installed to indicate system air pressure.

9.3.2.4.5.2 Where a pressure tank is used for the water supply, a pressure gauge shall be installed to indicate tank pressure.

9.3.2.4.6 Alarms. Local waterflow alarms shall be provided on all sprinkler systems in homes not equipped with smoke alarms or smoke detectors in accordance with NFPA 72, National Fire Alarm and Signaling Code.

9.3.2.4.7 Attics. When non-metallic piping is installed in attics, adequate insulation shall be provided on the attic side of the piping to avoid exposure of the piping to temperatures in excess of the pipe's rated temperature.

#### 9.3.2.5 Water Supply.

##### 9.3.2.5.1 General Provisions.

9.3.2.5.1.1 Every automatic water mist system shall have at least one automatic water supply.

9.3.2.5.1.2 Where stored water is used as the sole source of supply, the minimum quantity shall equal the water demand rate times 10 minutes.

##### 9.3.2.5.2 Water Supply Sources.

9.3.2.5.2.1 The water quality for the system shall meet the requirements of Chapter 10.

9.3.2.5.2.2 Prior to system acceptance, a system utilizing a pump shall be tested by opening the drain/test connection.

9.3.2.5.2.2.1 The pump shall sense the flow, turn on, and flow water for the required duration of Sections 6.1.2 or 6.1.3 without interruption.

9.3.2.5.2.3 Where a pump and tank is the source of supply for a fire sprinkler system but is not a portion of the domestic water system, the following shall be met:

(1) A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest sprinkler on the system. The connection shall return water to the tank.

(2) Pump motors using ac power shall be connected to a 240 V normal circuit.

(3) Any disconnecting means for the pump shall be approved.

(4) A method for refilling the tank shall be piped to the tank.

(5) A method of seeing the water level in the tank shall be provided without having to open the tank.

(6) The pump shall not be permitted to sit directly on the floor.

9.3.2.5.2.4 Where more than one dwelling unit is served by the same water supply pipe, each dwelling unit shall have an individual control valve that serves the water mist system in that dwelling unit and the owner shall have access to the valve that controls the water mist system in their unit.

9.3.2.5.2.4.1 The control valve shall be permitted to serve the domestic water supply.

9.3.2.5.2.4.2 In the situation addressed by Section 9.3.2.5.2.4, no valve controlling the water mist system in a unit shall be located in another unit.

9.3.2.5.3 Manufactured Home Water Supply. For buildings manufactured off-site, the minimum pressure needed to satisfy the system design criteria on the system side of the meter shall be specified on a data plate by the manufacturer.

##### 9.3.2.5.4 Common Supply Pipes.

9.3.2.5.4.1 Where common supply pipes serve both water mist and domestic use, they shall comply with Sections 9.3.2.5.4.2 and 9.3.2.5.4.3.

9.3.2.5.4.2 In common water supply connections serving more than one dwelling unit, 5 gpm (19 L/min) shall be added to the water mist system demand to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a nozzle.

9.3.2.5.4.3 A warning sign, with minimum ¼ in. letters, shall be affixed adjacent to the main shutoff valve and shall state the following;

WARNING: The water system for this home supplies water mist nozzles that require certain flows and pressures to fight a fire.

Devices that restrict the flow or decrease the pressure or automatically shut off the water to the water mist system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the water mist system by a fire protection specialist. Do not remove this sign.

#### 9.3.2.6 Discharge Criteria.

9.3.2.6.1 Number of Design Nozzles. The number of design nozzles under flat, smooth, horizontal ceilings shall include all nozzles in accordance with the listing, that require the greatest hydraulic demand.

9.3.2.6.2 The system shall provide at least the flow required for the multiple and single nozzle operating criteria specified by the sprinkler listing.

#### 9.3.2.7 System Design.

##### 9.3.2.7.1 Location of Nozzles.

9.3.2.7.1.1 In basements where ceilings are not required for the protection of piping or where metallic pipe is installed, residential nozzles shall be permitted to be positioned in a manner that anticipates future installation of a finished ceiling.

9.3.2.7.1.2 Nozzles shall be installed in all areas except where omission is permitted by Sections 9.3.2.7.1.3 through 9.3.2.7.1.8.

9.3.2.7.1.3 Nozzles shall not be required in bathrooms of 55 ft<sup>2</sup> (5.1 m<sup>2</sup>) and less.

9.3.2.7.1.4 Nozzles shall not be required in clothes closets, linen closets, and pantries that meet all of the following conditions:

(1) The area of the space does not exceed 24 ft<sup>2</sup> (2.2 m<sup>2</sup>).

(2) The least dimension does not exceed 3 ft (0.9 m).

(3) The walls and ceilings are surfaced with noncombustible or limited-combustible materials as defined in NFPA 220, Standard on Types of Building Construction.

9.3.2.7.1.5\* Nozzles shall not be required in garages, open attached porches, carports, and similar structures.

A.9.3.2.7.1.5 Although NFPA 750 does not require garages to be protected, some authorities having jurisdiction take it upon themselves to add this requirement locally. In such circumstances, residential or quick-response nozzles with a two nozzle design in the garage with the same piping used in the rest of the dwelling can be used. It is recognized that residential nozzles have not been tested specifically for fires in garages, but field experience has shown that having protection helps to alert occupants to the fact that there is a fire, to reduce the possibility of flashover, and to improve the chances for occupants to escape.

9.3.2.7.1.6 Nozzles shall not be required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated exclusively to and containing only dwelling unit ventilation equipment, floor/ceiling spaces, elevator shafts, crawl spaces, and other concealed spaces that are not used or intended for living purposes and do not contain fuel-fired equipment.

9.3.2.7.1.6.1 When fuel-fired equipment is present, at least one quick-response intermediate temperature nozzle shall be installed above the equipment.

9.3.2.7.1.7 Nozzles shall not be required in covered unheated projections of the building at entrances/exits as long as the dwelling unit has another means of egress.

9.3.2.7.1.8 Nozzles shall not be required for ceiling pockets that meet the following conditions:

(1) The total volume of unprotected ceiling pocket does not exceed 100 ft<sup>3</sup> (2.83 m<sup>3</sup>).

(2) The entire floor under the unprotected ceiling pocket is protected by the nozzles at the lower ceiling elevation.

(3) Each unprotected ceiling pocket is separated from any adjacent unprotected ceiling pocket by a minimum 10 ft (3.05 m) horizontal distance.

(4) The interior finish of the unprotected ceiling pocket is noncombustible or limited-combustible material.

(5) Skylights not exceeding 32 ft<sup>2</sup> (2.97 m<sup>2</sup>) shall be permitted to have a plastic cover.

**Substantiation:** This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, *Automatic Sprinkler Systems*.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, Group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

The proposed changes would be a new chapter between the existing Chapters 8 and 9. The new chapter discusses design approaches for water mist systems. The material is in a similar format to NFPA 13, Chapter 11; NFPA 13D and 13R-2010 with appropriate modifications.

New Section 9.1 – Discusses criteria for water supplies and hose allowances. The use of water mist as a sprinkler equivalent system will require interaction with other fire service systems such as hose streams and fire department

connections. In some cases, it is not practical to have a combined standpipe for water mist and hose streams. High pressure water mist systems will require a separate standpipe where hose streams are required. A redundant pump will be required for water mist systems where a fire department pumper cannot meet the system demand. It is the intent of the proposed changes to require a fire department connection wherever it would be of benefit. The location of the fire department connection will be dependent on the system design pressure as proposed in the code changes.

New Section 9.2 – Section discusses the Occupancy Hazard Fire Control approach similar to NFPA 13 Chapter 11 criteria. This section supplements the addition of the new Chapter 5.

New Section 9.3.1 – Section discusses the Residential Occupancy Fire control approach similar to NFPA 13R. The level of protection is intended to reflect safeguards similar to NFPA 13R. Section 9.3.1.2 does not require a separate control valve for each dwelling but requires that any system protecting multiple dwellings has a control valve that is accessible to everyone. Section 9.3.1.3.3.2 is intended to permit the use of non-metallic pipe in small rooms such as closets or mechanical rooms that are typically considered ordinary hazard occupancies without having to make a transition to steel piping (where non-metallic piping is the primary piping). See separate proposal for addition of non-metallic piping. Section 9.3.1.3.4 allows identification of the control valve where multiple valves are located together. Where more than one valve controls the system, signage should be provided to indicate the location of other valves. Section 9.3.1.4 requires the system to be installed in accordance with its listing as numerous types of ceiling and design scenarios can be found in the residential setting. Section 9.3.1.6 describes the water supply requirements for residential systems. Where the fire mains are shared with the domestic piping, the system should be designed to perform concurrently with domestic uses.

New Section 9.3.2 – New Section contains criteria similar to NFPA 13D for protection of one- and two-family dwellings. The level of protection is intended to reflect safeguards similar to NFPA 13D. It is not intended that smoke detectors not be required where water mist systems are installed. Smoke detectors provide advanced early warning to building occupants. Noting that a system would be required to be installed in accordance with its DIOM, to keep water mist systems an affordable option for one- and two-family dwellings, it is proposed that certain parts of the system not require listings for fire protection service. A similar clause is located in NFPA 13D that does not require pumps, tanks, or hangars to be listed. Requiring a listing of every component for residential systems would increase the cost such that residential systems would not be a cost effective solution for home fire protection. The equipment will still have been tested as a whole and installed in accordance with the DIOM. In this case, it is not necessary that each component be “listed”. Section 9.3.2.4.1 requires control valves to shut off both the domestic and water mist water supply unless the requirements of Section 9.3.2.4.1.2 are met to reduce the likelihood of control valve being shut accidentally. The need for domestic water would force the occupants to keep the control valve open and the water mist system active. Section 9.3.2.5 describes the water supply requirements for residential homes. The ten minute water supply time is based on the assumption that ten minutes is adequate time to evacuate most homes. Residential fire tests require that the system limit the room temperature for ten minutes which relates to the ten minute water supply requirement. If more than one dwelling unit is served by a water mist system, each dwelling should have its own control valve, preferably in the configuration described in Section 9.3.2.4.1. Where there is a common water supply connection, additional flow should be added to the demand to ensure the system operates as expected.

The areas listed in Section 9.3.2.8.1 represent areas where fire occurrences are rare or fire locations that rarely result in fatalities. Several of the locations would require more expensive dry systems where a cost-benefit analysis does not support the added benefit of protecting the spaces. Section 9.3.2.8.1.1 allows residential nozzles to be installed in unfinished basements to provide additional protection without increasing the cost. It is assumed that the potential exists for all unfinished basements to become finished and therefore the water mist piping can be laid out as such to prevent a contractor from having to retrofit the system. Although residential nozzles may not be listed for exposed wood joist, it is assumed that people will not be sleeping in an unfinished basement and that the delay in activation time will not jeopardize the life safety of occupants on other floors.



---

750- Log #72  
(9.1.2 and A.9.1.2 (New) )

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

9.1 General.

9.1.1 Flow Calculation Procedures. System flow calculation procedures for water mist systems shall be in accordance with one of the following, as applicable:

(1) Hydraulic calculations shall be performed using the method provided in Section 9.2.

(2) Hydraulic calculations for systems with no additives and with working pressures not exceeding 12 bar (175 psi) shall be permitted to be performed utilizing either the method provided in Section 9.2 or the method provided in Section 9.3.

(3) Calculations for piping carrying atomizing media in twin-fluid systems shall be performed in accordance with Section 9.4.

9.1.2\* The minimum water demand requirements for engineered water mist systems shall be determined by adding concurrent water demands, if any, to the discharge rate and operating pressure of the system determined by hydraulic calculations conforming to this chapter.

A.9.1.2. Concurrent water demands may include domestic or process water usage, or fire hose allowances. It is important to account for concurrent demands as they may diminish the pressure available to the water mist system pump. Water mist systems utilizing stored water from a tank or reservoir require sufficient volume of stored water to meet the water mist system discharge rate for the duration specified in Chapter 10.

9.1.2~~3~~\* Modifications. Where any modification is made that alters the system flow characteristics of an existing, engineered water mist system, system flow calculations shall be furnished indicating the previous design, volume, and pressure at points of connection, and calculations also shall be provided to indicate the effect on existing systems. Substantiation: Modification is intended to reflect current criteria in NFPA 13D and 13R-2010. The connection of water mist systems to water supplies that are shared with domestic or fire use is a concern. Concurrent water demands may include domestic or process water usage, or fire hose allowances. It is important to account for concurrent demands as they may diminish the pressure available to the water mist system pump. Water mist systems utilizing stored water from a tank or reservoir require sufficient volume of stored water to meet the water mist system discharge rate for the duration specified in existing Chapter 10.

---

750- Log #99  
(10.3.1(1) and 10.3.1.(x) (New) )

Final Action:

---

Submitter: Allen Bunner, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

10.3.1 (1) Duration. A minimum duration of 30 minutes for all systems shall be provided.

10.3.1(X) ~~Closed head~~ The minimum duration of water mist systems using automatic nozzles to protect light and ordinary hazard occupancies shall be in accordance with the requirements of NFPA 13, Standard for Installation of Sprinkler Systems.

Substantiation: The duration of water supply for a closed head water mist system, used in place of a standard sprinkler system, should be required to provide the same duration of protection as a standard sprinkler system in the same type of occupancy. The current wording does not address systems used in place of standard sprinkler systems.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #87  
(10.5.1.4.1 and 10.5.1.4.2)

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

~~10.5.1.4.1 Unless the requirements of 10.5.1.4.2 are met, a filter or strainer shall be provided at the supply side of each nozzle.~~

~~10.5.1.4.2 The requirements of 10.5.1.4.1 shall not apply to nozzles with multiple orifices and with minimum waterway dimensions greater than 800 in per opening.~~

10.5.1.4.1 Individual or integral strainers shall be provided at each nozzle where waterways smaller than 3/16 in. (5mm) are used.

**Substantiation:** The current requirements for integrated nozzle strainers are somewhat confusing. One could potentially construe 10.5.1.4.2 to mean that nozzles with orifices greater than 800 microns, or roughly 1/32 of an inch, do not require strainers at all. In addition, nozzles with multiple orifices often require that all orifices remain unobstructed to ensure that the proper water application rates and spray patterns are developed and maintained. The proposed change is to replace the requirements of section 10.5.1.4 with the current language from the 2012 edition of NFPA 15 section 6.4.6.3 regarding the use of integrated nozzle strainers.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #53  
(10.5.1.5)

Final Action:

---

Submitter: Thierry Carriere, ADA Technologies, Inc.

Recommendation: Add new text as follows:

The requirements of 10.5.1.5 shall not apply where every nozzle orifice passing water is larger than 1/4 in. (6.3 mm) in diameter. In that case, filters and strainers shall be installed in accordance with NFPA 13 Standard for the Installation of Sprinkler Systems.

**Substantiation:** We recognize that water mist nozzle orifices are usually small in diameter and prone to clogging/blockage due to corroding pipes and therefore restrict the piping material selection. Sprinkler heads can accommodate potentially more corroding fittings materials due to larger discharge orifices. Smallest sprinkler heads generally have 1/4 in. orifices (K-factor 1.4). Therefore we recommend that water mist systems with all water passing orifices larger than 1/4 in. be subjected to sprinkler materials corrosion requirements. ADA Technologies has demonstrated in a project sponsored by the US Air Force that water mist (Dv99 < 1000 microns) can be generated at intermediate pressure with all water passing orifices larger than 1/4 in.

---

750- Log #56  
(10.5.1.6)

Final Action:

---

Submitter: Brian K. MacDonald, FM Approvals

Recommendation: Revise text to read as follows:

**10.5.1.6 Filter Rating or Strainer Mesh Openings.** The maximum filter rating or strainer mesh opening shall be 80 percent of the minimum nozzle waterway dimension.

The minimum total open area of the strainer mesh shall be 100 percent of the minimum cross-sectional area of the pipe or tube.

**Substantiation:** The current requirement allows for a strainer to be used which could inhibit flow to the nozzle by causing a restriction, thus having an adverse affect on the performance of the water mist system. This additional requirement provides guidance to alleviate this possible obstruction. There should be no negative impact to current nozzle designs by listed manufacturers and is to address possible future designs.

---

750- Log #44  
(10.5.2.2)

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Delete Section 10.5.2.2.

Substantiation: Inherent in many places throughout the standard and Listing agencies safety factors are created. Also it contradicts section 7.6.1 located within NFPA 750. This additional 10 percent safety factor for flow and pressure is overkill as there are so many safety factors throughout the entire Listing and design process. In NFPA 13 there is no required safety factor for the calculations, if any cushion is required it is required by the Authority. In keeping consistency within this standard and between other standards I propose to eliminate this added cushion.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #24  
(10.5.2.3)

Final Action:

---

Submitter: Michael L. Hennegan, MLH Fire Protection Ltd.

Recommendation: Revise text to read as follows:

10.5.2.3 The discharge piping for water mist pumps and pump assemblies for high pressure or intermediate pressure water mist systems shall be equipped with a valved test connection ~~and provisions for the installation of~~ for the purpose of connecting a flow metering device to permit accurate measurement of the pump performance during the acceptance test and during annual testing.

Substantiation: The current wording implies the installation of a flow meter in the pump assembly.

The revised wording makes clear that a flow meter need not be a part of the assembly while providing a means of connecting a portable flow meter temporarily during acceptance testing and during annual testing.

Portable flow measuring devices are more desirable since they can be easily calibrated at regular intervals.

Flow meters which are built into an assembly must either be calibrated in the assembly or removed calibration. In situ calibration is difficult and costly whereas removal from the assembly changes the flow conditions on the meter and leaves the assembly with a missing part during the calibration process. Additionally, the re-installation of the device after calibration allows for the possibility of improper connection.

---

750- Log #16  
(10.5.4.5)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

10.5.4.5 Each pressurized container or cylinder shall be provided with a safety device to release excess pressure: and applications with multiple pressurized containers or cylinders with a common manifold can be used provided no individual container or cylinder is isolated from the safety device.

Substantiation: This change allows a single safety device to be used for multiple containers provided that no single container can be isolated (they are connected to a common header). This meets the intent of preventing any container or cylinder from being over pressurized. It reduces total cost while maintaining the same level of safety protection. (See proposed change to paragraph 5.2.2.5)

---

750- Log #17  
(10.5.4.6)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

10.5.4.6 A reliable means shall be provided to indicate the pressure and level in all storage containers that will be pressurized: including applications with multiple pressure containers where a common manifold can be used provided no individual container is isolated from the pressure indicator.

Substantiation: When a bank of water cylinders are installed in a common manifold arrangement only a single pressure gauge or device should be required.

---

750- Log #96  
(10.5.5)

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Revise existing text as follows:

10.5.5.2 For low pressure water mist systems, the connection to the system shall be made on the upstream (supply) side of the system strainer or filter, ~~for systems with operating pressures less than or equal to 12 bar (175 psi).~~

10.5.5.3 For intermediate and high pressure systems, the connection to the system shall be made on the suction side of the pressure source components ~~for systems with operating pressures in excess of 12 bar (175 psi).~~

10.5.5.4 The following systems shall not require a fire department connection:

- (1) Fire department connections shall not be required for systems protecting less than 200 m<sup>2</sup> (2000 ft<sup>2</sup>).
- (2) Fire department connections shall not be required for intermediate and high pressure systems ~~with operating pressures in excess of 12 bar (175 psi)~~ and supplied only by storage cylinders.
- (3) Fire department connections shall not be required for systems where the atomizing medium is essential for fire suppression.

Substantiation: The above changes are being submitted in support of the proposal to change the pressure ranges specified in the definitions of low and intermediate pressure systems in chapter 3 of the standard. The use of the defined terms in lieu of actual pressure ranges simplifies the process of changing the defined pressure ranges in the standard – either during this or in future revision cycles.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

750- Log #100  
(10.5.5 AND 10.5.5.4(2))

Final Action:

Submitter: Allen Bunner, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

**10.5.5 Fire Department Connection.**

10.5.5.4(2) Fire department connections shall not be required for total compartment deluge type systems (employing nonautomatic water mist nozzles) with operating pressures in excess of 12 bar (175 psi) and supplied by only storage cylinders.

**Substantiation:** The current wording of 10.5.5.4(2) would allow a sprinkler alternative water mist system with pressures in excess of 12 bar (175 psi) to be provided without provision of a fire department connection. As the fire department connection is a critical component of any sprinkler system, this component should be required for any sprinkler alternative technology such as water mist. Despite the limited pressures provided by a responding fire department into a fire department connection, all systems employing automatic water mist nozzles associated with a sprinkler alternative system would ensure water delivery to the fire location through nozzles that have activated. Lower pressure associated with use of a fire department connection on single fluid systems would not destroy the fire fighting characteristics of the water media.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

750- Log #39  
(10.5.5 and A.10.5.5)

Final Action:

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Modify Annex note A 10.5.5. and add new articles to Section 10.5.5.

**10.5.5\* Fire Department Connection.**

A.10.5.5 It is the intention of this subsection to require a fire department connection wherever it would be of benefit. Paragraph 10.5.5.2(1) provides for local area protection where the fire department could effectively respond with small hose streams or portable fire extinguishers. Paragraph 10.5.5.2(2) provides for systems where the pressures available from fire department pumpers would not be adequate to supply the water mist system. Paragraph 10.5.5.2(3) exempts systems where the atomizing medium is essential for fire suppression and water alone would be of no benefit.

~~10.5.5.1 A fire department connection shall be provided on the discharge side of the pressure source components.~~

10.5.5.1\* Except as provided in 10.5.5.2, a fire department connection shall be provided on all water mist systems.

A.10.5.5.1 Add piping diagrams showing FDC arrangements for low pressure, and high and intermediate pressure water mist systems. Diagrams to be developed over the 2013 code change cycle.

10.5.5.2 Fire department connections shall not be required for the following water mist systems:

- (1) Systems protecting less than 200 m<sup>2</sup> (2000 ft<sup>2</sup>).
- (2) Systems with operating pressures in excess of 12 bar (175 psi) and supplied only by storage cylinders.
- (3) Systems where an atomizing medium is essential for the operation of the water mist system.

10.5.5.3 For water mist systems with operating pressures less than or equal to 12 bar (175 psi), the connection of the fire department connection to the system shall be made on the upstream (supply) side of the system strainer or filter.

10.5.5.4 For water mist systems with operating pressures in excess of 12 bar (175 psi), the connection of the fire department connection to the system shall be made on the suction side of the pressure source components.

10.5.5.5 Where high pressure sprinkler equivalent water mist systems are provided in lieu of sprinkler systems in accordance with Section 6.2.4, redundant pressure source components shall be provided. The required water mist pumps shall be arranged such that with the largest pump out of service, the greatest demand can still be satisfied.

**Substantiation:** There is a certain amount of confusion among engineers and AHJs regarding the use of fire department connections on sprinkler equivalent water mist systems. The additional articles clarify how the standpipe riser function may be achieved for low pressure and high pressure water mist systems.

Reference is made to a new annex note that will provide piping diagrams showing conforming arrangements.

750- Log #73  
(10.5.5 and A.10.5.5)

Final Action:

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

**10.5.5\* Fire Department Connection.**

A.10.5.5. It is the intention of this subsection to require a fire department connection wherever it would be of benefit. Paragraph ~~10.5.5.4(1)~~10.5.5.2(1) provides for local area protection where the fire department could effectively respond with small hose streams or portable fire extinguishers. Paragraph ~~10.5.5.4(2)~~10.5.5.2(2) provides for systems where the pressures available from fire department pumpers would not be adequate to supply the water mist system. Paragraph ~~10.5.5.4(3)~~10.5.5.2(3) exempts systems where the atomizing medium is essential for fire suppression and water alone would be of no benefit.

~~10.5.5.1 A fire department connection shall be provided on the discharge side of the pressure source components.~~

~~10.5.5.2 The connection to the system shall be made on the upstream (supply) side of the system strainer or filter for systems with operating pressures less than or equal to 12 bar (175 psi).~~

~~10.5.5.3 The connection to the system shall be made on the suction side of the pressure source components for systems with operating pressures in excess of 12 bar (175 psi).~~

~~10.5.5.4 The following systems shall not require a fire department connection:~~

~~(1) Fire department connections shall not be required for systems protecting less than 200 m<sup>2</sup> (2000 ft<sup>2</sup>).~~

~~(2) Fire department connections shall not be required for systems with operating pressures in excess of 12 bar (175 psi) and supplied only by storage cylinders.~~

~~(3) Fire department connections shall not be required for systems where the atomizing medium is essential for fire suppression.~~

10.5.5.1 Except as provided in 10.5.5.2, a fire department connection shall be provided on all water mist systems.

10.5.5.2 Fire department connections shall not be required for the following water mist systems:

(1) Systems protecting less than 200 m<sup>2</sup> (2,000 ft<sup>2</sup>).

(2) Systems with operating pressures in excess of 12 bar (175 psi) and supplied only by storage cylinders.

(3) Systems where an atomizing medium is essential for the operation of the water mist system.

10.5.5.3 For water mist systems with operating pressures less than or equal to 12 bar (175 psi), the connection of the fire department connection to the system shall be made on the upstream (supply) side of the system strainer or filter.

10.5.5.4 For water mist systems with operating pressures in excess of 12 bar (175 psi), the connection of the fire department connection to the system shall be made on the suction side of the pressure source components.

10.5.5.5 Where high pressure sprinkler equivalent water mist systems are provided in lieu of sprinkler systems in accordance with Section 6.2.4, redundant pressure source components shall be provided. The required water mist pumps shall be arranged such that with the largest pump out of service, the greatest demand can still be satisfied.

Substantiation: Clauses 10.5.5.1 and 10.5.5.3 appear to contradict each other – it is not immediately clear that the former refers to low pressure water mist systems, while the latter applies to intermediate and high pressure water mist systems. The changes clarify where the fire department connection must be made for the different types of water mist systems.

In addition, the proposal includes a new requirement for a redundant pressure pump on high pressure sprinkler equivalent systems where combined sprinkler/standpipe arrangements are not effective. See separate proposal describing sprinkler equivalent systems. The redundant pump provides added back up for locations where combined standpipes are not effective. These criteria are identical to the criteria currently included in NFPA 750 in Chapter 14 for Sprinkler Equivalent Systems in Marine Systems, Section 14.1.6.

---

750- Log #83  
(12.x (New) )

Final Action:

---

Submitter: Luke S. Connery, Tyco Fire Protection Products

Recommendation: Add text to read as follows:

12.X Trapped Gas

12.X.1 For wet pipe systems utilizing individual, thermally activated nozzles, means shall be provided to ensure that any trapped gas in the system is adequately purged at the time of installation.

12.X.2 For dry pipe systems utilizing individual, thermally activated nozzles, means shall be provided to ensure that any trapped gas in the system is accounted for during system design such that the trapped gas does not adversely affect system performance.

Substantiation: Trapped gas (air) in a wet or dry system water mist system utilizing individual, thermally activated nozzles can significantly impair performance. Water mist spray patterns can be delicate and a bubble of gas can create a non-steady event during nozzle discharge. While purging trapped gas from a sprinkler branch line is common practice, it can sometimes be overlooked. Given that a sprinkler's orifice is relatively much larger than that of a water mist nozzle; the requirement to purge trapped gas from the installed system should be underscored in NFPA 750.

For dry pipe systems (including pre-action systems), the designer could account for the collection of gases in reservoir piping beyond the last nozzle in an appropriately pitched branch line, as one example.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #40  
(12.1.1)

Final Action:

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Revise Article 12.1.1 as shown:

12.1.1 Acceptance Test Plan. A complete step-by-step description of the proposed acceptance test procedure, identifying all devices, controls and functions to be tested and how the test will be conducted shall be approved prior to scheduling of acceptance testing.

Substantiation: Editorial. The addition of a heading clarifies that a "step by step description is an "acceptance test plan".

---

750- Log #18  
(12.1.1 and A.12.1.1 (New) )

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Add new text to read as follows:

12.1.1 \*

A.12.1.1 (New) When a water mist system works in conjunction with other building systems, functions or components, the final testing should be conducted simultaneously with those systems per NFPA 3, *Recommended Practice on Commissioning and Integrated Testing of Fire Protection and Life Safety Systems*.

Substantiation: Add the asterisk (\*) to 12.1.1 to reference a new appendix recommendation and add new appendix paragraph A.12.1.1. The addition of this annex will encourage the use of NFPA 3 during final commissioning thereby enabling the proper integration and performance of all related fire protection systems as was intended.

---

750- Log #41  
(12.1.2)

Final Action:

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Proposed change: Add new article 12.1.2.

12.1.2 (New) When a water mist system works in conjunction with other building systems, functions or components, the final testing shall be conducted simultaneously with those systems per NFPA 3, *Recommended Practice on Commissioning and Integrated Testing of Fire Protection and Life Safety Systems*.

Renumber the remaining articles as 12.1.3 to 12.1.6.

Substantiation: The new article establishes the requirement to integrate acceptance testing of the water mist system with related building systems, as per NFPA 3. Sprinkler equivalent water mist systems will have interconnection with automatic door closing, elevator recall and other building functions. It is vital to confirm through the commissioning that the entire system functions as intended. This principle should apply to all buildings, not just buildings with sprinkler equivalent water mist systems.

---

750- Log #88  
(12.2.1.2.1 and 12.2.1.2.2)

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

~~12.2.1.2.1 Each pipe or tube section shall be cleaned internally after preparation and before assembly in accordance with the manufacturer's installation manual.~~

~~12.2.1.2.2~~ 12.2.1.2.1 The piping network shall be free of particulate matter and oil residue before installation of nozzles or discharge devices.

Substantiation: There is a lot of confusion in the industry regarding acceptable methods for preparing and cleaning pipe, and a wide range of piping methods which can be used in water mist systems. As a result, depending on the type of piping and the preparation method used, it is unnecessary to require that it be cleaned in every instance. By keeping the existing paragraph 12.2.1.2.2, it is implied that piping should not be installed if not completely clean. Requiring the manufacturer to specify how to clean each and every pipe section before installation is impractical and unnecessary unless very specific piping systems and preparation methods are required as part of the listing.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.



---

750- Log #89  
(12.2.1.2.1 and 12.2.1.2.2)

Final Action:

---

Submitter: Zachary L. Magnone, Tyco Fire Protection Products

Recommendation: Revise text to read as follows:

~~12.2.1.2.1~~ 12.2.1.2.2 Each pipe or tube section shall be ~~cleaned~~ inspected internally after preparation and before assembly. If deemed necessary or required by the manufacturer, each pipe section shall be internally cleaned prior to installation using an acceptable method to meet the requirements of 12.2.1.2.1, in accordance with the manufacturer's installation manual.

~~12.2.1.2.2~~ 12.2.1.2.1 The piping network shall be free of particulate matter and oil residue before installation of nozzles or discharge devices.

Substantiation: There is a lot of confusion in the industry regarding acceptable methods for preparing and cleaning pipe, and a wide range of piping methods which can be used in water mist systems. As a result, depending on the type of piping and the preparation method used, it is unnecessary to require that it be cleaned in every instance. By keeping the existing paragraph 12.2.1.2.2, it is implied that piping should not be installed if not completely clean. Requiring the manufacturer to specify how to clean each and every pipe section before installation is impractical and unnecessary unless very specific piping systems and preparation methods are required as part of the listing.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #49  
(12.2.2.2.x (New) )

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Add Section

12.2.2.2.X When subject to hydrostatic test pressures, the clapper of a differential-type valve shall be held off its seat to prevent damaging the valve.

Substantiation: This requirement comes directly out of NFPA 13. A differential style valve creates a mechanical advantage for the air side of the valve. If the valve is hydrostatically tested against the clapper, it may damage the clapper or the body of the valve.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #97  
(12.2.6.x)

Final Action:

---

Submitter: John Desrosier, Tyco Fire Protection Products

Recommendation: Add new text to read as follows:

12.2.6.X Dry Pipe Systems

12.2.6.X.1 A working test of the dry pipe valve alone and with a quick-opening device, if installed, shall be made by opening the inspector's test connection.

12.6.X.2 The test shall measure the time to trip the valve and the time for water to be discharged from the inspector's test connection. All times shall be measured from the time the inspector's test connection is completely opened.

16.6.X.3 Dry systems calculated by an approved water delivery program shall be exempt from any specific delivery time acceptance test.

Substantiation: As there is no fluid delivery requirement for dry water mist systems, it can take a very long time for water to get from the control valve to the nozzles. The control or extinguishment of a fire is greatly affected by the time the fire has to grow and the fire size. If there is a long period of time between activation of the nozzle and the arrival of water, the mist system may not be able to control or extinguish the fire.

This proposal is being submitted by the Tyco Codes and Standards NFPA 750 Task Group.

---

750- Log #54  
(14.1.3.2)

Final Action:

---

Submitter: Thierry Carriere, ADA Technologies, Inc.

Recommendation: Revise text to read as follows:

Piping and fittings shall be in accordance with ~~Table 5.3.3.1 and Table 5.4.2.1~~ requirements of 5.3 and 5.4.

Substantiation: We are submitting proposals to change sections 5.3 and 5.4 that should be reflected in 14.1.3.2 as well. For reference the substantiation is repeated here. We recognize that water mist nozzle orifices are usually small in diameter and prone to clogging/blockage due to corroding pipes and therefore restrict the piping material selection. Sprinkler heads can accommodate potentially more corroding fittings materials due to larger discharge orifices. Smallest sprinkler heads generally have  $\frac{1}{4}$  in. orifices (K-factor 1.4). Therefore we recommend that water mist systems with all water passing orifices larger than  $\frac{1}{4}$  in. be subjected to sprinkler materials corrosion requirements. ADA Technologies has demonstrated in a project sponsored by the US Air Force that water mist ( $Dv99 < 1000$  microns) can be generated at intermediate pressure with all water passing orifices larger than  $\frac{1}{4}$  in.

---

750- Log #19  
(A.3.3.22.5)

Final Action:

---

Submitter: Scott J. Harrison, Marioff Inc.

Recommendation: Revise text to read as follows:

**A.3.3.22.5 Pre-engineered Water Mist Systems.** These systems have the specific pipe size, maximum and minimum pipe length, flexible hose specifications, number of fittings, and number and type of nozzles prescribed by a testing laboratory. Systems are provided with either a self-contained or an external water supply. Based on actual test fires, the hazards protected by these systems are specifically limited as to type and size by a testing laboratory. Limitations on hazards that are allowed to be protected by these systems are contained in the manufacturer's installation manual, which is referenced as part of the listing: and additional site specific hydraulic calculations are not required.

Substantiation: For pre-engineered systems, this additional text clarifies that site specific hydraulic calculations are not required.

---

750- Log #35  
(A.4.1)

Final Action:

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Revise text to read as follows:

A.4.1. A water mist system is a water-based fire protection system using very fine water sprays (i.e., water mist). The very small water droplets allow the water mist to control or extinguish fires by cooling of the flame and fire plume, oxygen displacement by water vapor, radiant heat attenuation and prevention of fire spread by pre-wetting of combustibles.

Water mist systems have been proven effective in controlling, suppressing, or extinguishing many types of fires.

Potential applications include the following:

- (1) Gas jet fires
- (2) Flammable and combustible liquids
- (3) Hazardous solids, including fires involving plastic foam furnishings
- (4) Protection of aircraft occupants from an external pool fire long enough to provide time to escape
- (5) Ordinary (Class A) combustible fires such as paper, wood, textiles.
- (6) Electrical hazards, such as transformers, switches, circuit breakers, and rotating equipment
- (7) Electronic equipment, including telecommunications equipment

(8) Highway and railway tunnels where fires potentially exceeding 100 MW are possible, by preventing propagation of fires from vehicle to vehicle and for the protection of structural elements by cooling of hot gases.

Substantiation: Annex note A-4.1 provides examples of applications where WM systems have been proven effective in controlling, suppressing, or extinguishing fires. The proposed additions clarify that water mist systems are water-based fire protection systems, that sprinkler equivalent water mist systems provide fire protection equivalent to automatic sprinkler systems, and also that zoned water mist systems have been proven to be effective fire protection against vehicle fires in tunnels.

---

750- Log #70c  
(A.5.1)

Final Action:

---

Submitter: Eric R. Rosenbaum, Hughes Associates, Inc. / Rep. United Technologies Corp.

Recommendation: Revise text to read as follows:

A.5.1. Classification of Occupancies.

A.5.1 Occupancy examples in the listings as shown in the various hazard classifications are intended to represent the norm for those occupancy types. Unusual or abnormal fuel loadings or combustible characteristics and susceptibility for changes in these characteristics, for a particular occupancy, are considerations that should be weighed in the selection and classification. The light hazard classification is intended to encompass residential occupancies; however, this is not intended to preclude the use of listed residential sprinklers in residential occupancies or residential portions of other occupancies.

A.5.2 Light hazard occupancies include occupancies having uses and conditions similar to the following:

Animal shelters

Churches

Clubs

Eaves and overhangs, if of combustible construction with no combustibles beneath

Educational Hospitals, including animal hospitals and veterinary facilities

Institutional

Kennels

Libraries, except large stack rooms

Museums

Nursing or convalescent homes

Offices, including data processing

Residential

Restaurant seating areas

Theaters and auditoriums, excluding stages and prosceniums

Unused attics

Note that it is not the committee's intent to automatically equate library bookshelves with ordinary hazard occupancies or with library stacks. Typical library bookshelves of approximately 8 ft (2.4 m) in height, containing books stored vertically on end, held in place in close association with each other, with aisles wider than 30 in. (762 mm) can be considered to be light hazard occupancies. Similarly, library stack areas, which are more akin to shelf storage or record storage, as defined in NFPA 232, Standard for the Protection of Records, should be considered to be ordinary hazard occupancies.

A.5.3 For purposes of these definitions, Class I, Class II, Class III, and Class IV commodities would be considered to have moderate rates of heat release, while Group A plastics would be considered to have high rates of heat release. Stockpiles are considered to include display merchandise (mercantile) and arrangements of combustibles ancillary to operations within the occupancy as opposed to dedicated storage areas where the fire loading is generally more severe.

A.5.3.1 Ordinary hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Automobile parking and showrooms

Bakeries

Beverage manufacturing

Canneries

Dairy products manufacturing and processing

Electronic plants

Glass and glass products manufacturing

Laundries

Restaurant service areas

A.5.3.2 Ordinary hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Agricultural facilities

Barns and stables

Cereal mills

Chemical plants ordinary

Confectionery products

Distilleries

Dry cleaners

Exterior loading docks

Note that exterior loading docks only used for loading and unloading of ordinary combustibles should be classified as OH2. For the handling of flammable and combustible liquids, hazardous materials, or where utilized for storage, exterior loading docks and all interior loading docks should be protected based upon the actual occupancy and the materials handled on the dock, as if the materials were actually stored in that configuration.

Feed mills

Horse stables

Leather goods manufacturing

Libraries large stack room areas

Machine shops

Metal working

Mercantile

Paper and pulp mills

Paper process plants

Piers and wharves

Plastics fabrication, including blow molding, extruding, and machining; excluding operations using combustible hydraulic fluids

Post offices

Printing and publishing

Racetrack stable/kennel areas, including those stable/kennel areas, barns, and associated buildings at state, county, and local fairgrounds

Repair garages

Resin application area

Stages

Textile manufacturing

Tire manufacturing

Tobacco products manufacturing

Wood machining

Wood product assembly

A.5.4.1 Extra hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Aircraft hangars (except as governed by NFPA 409, Standard on Aircraft Hangars)

Combustible hydraulic fluid use areas

Die casting

Metal extruding

Plywood and particleboard manufacturing

Printing [using inks having flash points below 100°F (38°C)]Rubber reclaiming, compounding, drying, milling, vulcanizing

Saw mills

Textile picking, opening, blending, ginning, or carding, combining of cotton, synthetics, wool shoddy, or burlap

Upholstering with plastic foams

A.5.4.2 Extra hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Asphalt saturating

Flammable liquids spraying

Flow coating

Manufactured home or modular building assemblies (where finished enclosure is present and has combustible interiors)

Open oil quenching

Plastics manufacturing

Solvent cleaning

Varnish and paint dipping

A.5.4.3.1 Special occupancies include occupancies having uses and conditions similar to the following:

Machinery spaces

Special hazard machinery spaces

Combustion turbines

Wet benches and other similar processing equipment

Local application

Industrial oil cookers

Computer room subfloors

**Substantiation:** This code proposal is part of a larger group of code proposals to recognize the concept of using water mist systems for protection of structures as a sprinkler equivalent system. The use of water mist as an automatic sprinkler equivalent is within the systems' listed applications. The proposed additions recognize that based on performance, listings and field experience, water mist is a viable alternative to provide protection for specific classifications of hazards similar to NFPA 13, Automatic Sprinkler Systems. The proposed code sections support proposed changes in separate proposals 6.2 and 7.1.

Water mist systems are approved by FM for light hazard (FM 5560) and listed by UL for ordinary hazard, group I (UL ZDPA.EX15843) occupancies as defined by NFPA 13. These approvals/listings would permit water mist to be installed as the primary suppression system in a wide range of Occupancy Classifications including Assembly, Business, Educational, Health care, and Residential. Many of these occupancy types benefit from the water efficient nature of the water mist systems. The intent of these code changes is to recognize automatic water mist as being equivalent to automatic sprinklers when listed as an appropriate option. The changes incorporate criteria that define occupancies in the same manner as NFPA 13 and address key design issues.

Proposed addition to 4.1 clarifies that water mist systems can provide protection equivalent to automatic sprinklers. Water mist systems have obtained the same hazard classification listings given to sprinkler systems (i.e. light and ordinary hazard) and these systems should be recognized as an equivalent system to sprinkler systems.

A new chapter is proposed between existing Chapters 4 and 5. The proposed changes add wording and Annex notes from NFPA 13 for the installation and design of sprinkler equivalent water mist systems. Water mist systems have the potential to provide fire protection against an equally wide range of hazards as conventional sprinkler systems with the added benefit of water efficiency. To facilitate the incorporation of water mist as a primary suppression system, a similar occupancy hazard approach to NFPA 13 is proposed to provide equivalent technical references. This approach is recognized and used in the fire suppression design industry and facilitates the acquirement of system listings as some of the fire tests are already in place. Light and ordinary hazard listings have already been given to water mist systems.

Revised section 6.1 adds discussion of protection based on classification of occupancy similar to protection method addressed in NFPA 13. This supplements the proposed addition of the new Chapter 5.

Revised section 8.4.2 establishes fire hazard classification approach for sprinkler equivalent water mist systems.

---

750- Log #37  
(A.5.1, A.5.2, A.5.3, A.5.4, and A.5.7)

Final Action:

---

Submitter: Jack R. Mawhinney, Hughes Associates, Inc.

Recommendation: Add Annex notes for new chapter 5 as extracts from NFPA 13-2010, modified as necessary to reflect relevance to water mist applications.

A.5.1 Classification of Occupancies.

A.5.1 Occupancy examples in the listings as shown in the various hazard classifications are intended to represent the norm for those occupancy types. Unusual or abnormal fuel loadings or combustible characteristics and susceptibility for changes in these characteristics, for a particular occupancy, are considerations that should be weighed in the selection of a classification. The light hazard classification is intended to encompass residential occupancies; however, this is not intended to preclude the use of listed residential sprinklers in residential occupancies or residential portions of other occupancies.

A.5.2 Light Hazard occupancies. Extract from NFPA 13 and edit for water mist.

A.5.3 Ordinary Hazard Occupancies Extract from NFPA 13 and edit for water mist.

A.5.3.1 Ordinary Hazard (Group 1) Extract from NFPA 13 and edit for water mist.

A.5.3.2 Ordinary Hazard (Group 2) Extract from NFPA 13 and edit for water mist.

A.5.4.1 Extra Hazard (Group 1) Extract from NFPA 13 and edit for water mist.

A.5.4.2 Extra Hazard (Group 2) Extract from NFPA 13 and edit for water mist.

A.5.4.3.1 Add new annex note to link the OH1, OH2 and EH1 and EH2 occupancy classifications such as those involving flammable and combustible liquids, spraying or coating operations, industrial deep fat cookers, wet benches, etc. to approved applications in FM 5560.

A.5.7.3.4 Include corresponding annex note from NFPA 13-2010.

A.5.7.5 Include corresponding annex note from NFPA 13-2010.

Substantiation: Water mist systems are applied to provide fire protection against an equally wide range of hazards as conventional sprinkler systems. The classification systems developed for sprinkler protection are brought into NFPA 750 to provide equivalent technical references. If proposals to include a new Chapter 5 based on occupancy classifications in NFPA 13 are accepted, then the corresponding annex notes must also be included, after editing to apply to water mist systems.

750- Log #57  
(Annex C)

Final Action:

Submitter: Brian K. MacDonald, FM Approvals

Recommendation: Revise text as follows:

2. ~~Factory Mutual Research Corporation~~ FM Approvals,

Norwood, MA, USA

~~(a) FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Not Exceeding 2825 ft<sup>3</sup> (80 m<sup>3</sup>);~~

~~(b) FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Not Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>);~~

~~(c) FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>);~~

~~(d) FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Light Hazard Occupancies;~~

~~(e) FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Wet Benches and Other Processing Equipment;~~

~~(f) FMRC Draft Performance Requirements for Water Mist Systems for Local Application System Protection~~

ANSI/FM Approvals 5560, American National Standard for Water Mist Systems

(<http://www.fmglobal.com/assets/pdf/fmapprovals/5560.pdf>)

(a) Fire Tests for Water Mists Systems for the Protection of Combustion Turbines with Volumes up to, and including, 2825 ft<sup>3</sup> (80 m<sup>3</sup>)

(b) Fire Tests for Water Mists Systems for the Protection of Combustion Turbines with Volumes up to, and including, 9175 ft<sup>3</sup> (260 m<sup>3</sup>)

(c) Fire Tests for Water Mists Systems for the Protection of Combustion Turbines with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>)

(d) Fire Tests for Water Mists Systems for the Protection of Wet Benches and Other Similar Processing Equipment

(e) Fire Tests for Water Mists Systems for the Protection of Local Applications

(f) Fire Tests for Water Mists Systems for the Protection of Industrial Oil Cookers

(g) Fire Tests for Water Mists Systems for the Protection of Computer Room Sub Floors

(h) General Requirements

(i) Performance Requirements (Water Mist Nozzles and System Components)

(j) Operations Requirements

FM Approvals Class Number 5560, Approval Standard for Water Mist Systems

(<http://www.fmglobal.com/assets/pdf/fmapprovals/5560ansi.pdf>)

(a) Fire Tests for Water Mists Systems for the Protection of Machinery in Enclosures with Volumes not Exceeding 2825 ft<sup>3</sup> (80 m<sup>3</sup>)

(b) Fire Tests for Water Mists Systems for the Protection of Combustion Turbines in Enclosures with Volumes not Exceeding 2825 ft<sup>3</sup> (80 m<sup>3</sup>)

(c) Fire Tests for Water Mists Systems for the Protection of Machinery in Enclosures with Volumes not Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>)

(d) Fire Tests for Water Mists Systems for the Protection of Combustion Turbines in Enclosures with Volumes not Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>)

(e) Fire Tests for Water Mists Systems for the Protection of Machinery in Enclosures with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>)

(f) Fire Tests for Water Mists Systems for the Protection of Combustion Turbines in Enclosures with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>)

(g) Fire Tests for Water Mists Systems for the Protection of Light Hazard Occupancies

(h) Fire Tests for Water Mists Systems for the Protection of Wet Benches and Other Similar Processing Equipment

(i) Fire Tests for Water Mists Systems for the Protection of Local Applications

(j) Fire Tests for Water Mists Systems for the Protection of Industrial Oil Cookers



- (k) Fire Tests for Water Mists Systems for the Protection of Computer Room Sub Floors.
- (l) Fire Tests for Water Mists Systems for the Protection of Continuous Wood Board Presses
- (k) General Requirements
- (l) Performance Requirements (Water Mist Nozzles and System Components)
- (m) Operations Requirements

**Substantiation:** Editorial updates. Proper legal business entity of FM Approvals from Factory Mutual Research Corp. The draft fire test protocol requirements are now in a published Standard with free access to the public and are no longer draft documents.

<http://www.fmglobal.com/assets/pdf/fmapprovals/5560.pdf>  
<http://www.fmglobal.com/assets/pdf/fmapprovals/5560ansi.pdf>

750- Log #26  
(C.1.2)

**Final Action:**

**Submitter:** Scott J. Harrison, Marioff Inc.

**Recommendation:**

Replace exciting table with the following:

\*\*\*INSERT TABLE C.1.2 HERE\*\*\*

**Substantiation:** The purpose of substituting the text in this table is due to the fact that information in Annex C and this table is badly outdated. Reference is given to documents that have been replaced by new ones and many IMO documents are missing altogether. Even though Annex C and this table are for information purposes only, the information is wrong, even with respect to FM.

Category #4 in the old table (VdS) has been eliminated because VdS 2498 does not seem to be publicly available anywhere. VdS does require fire testing for their approval but the test protocols are only in their internal files, so they cannot be referred to in this Table.

*As this revision demonstrates, a complete review of Annex C is necessary to bring it up to date and in line with recent protocols, listings and approvals. It's recommended a task group be assembled to address the sections/paragraphs of the text that are out of date, revised or no longer valid.*

750- Log #42  
(C.1.2)

**Final Action:**

**Submitter:** Jack R. Mawhinney, Hughes Associates, Inc.

**Recommendation:** Update Table C.1.2 under Item 1, International Maritime Organization, add reference to IMO 1165:

Test method: IMO MSC/Circ. 1165, Appendix B. "Revised guidelines for the approval of equivalent water-based fire extinguishing systems for machinery spaces and cargo pump rooms". International Maritime Organization, London, England.

Under FMRC (FM Approvals): delete the word "Draft" in each of the protocols listed, and in C.3 articles.

Add reference to FM 5560, 2009 edition to C.3.1.

**Substantiation:** Annex C is intended to inform readers of sources of recognized fire test protocols. The annex should be reviewed and updated to be current to 2012.

**Table C.1.2 Table C.1.2 Internationally Recognized Agencies with Published Fire Test Protocols for Water Mist Fire Protection Systems**

Agency	Water Mist Fire Test Protocol
1. International Maritime Organization, London, UK	<p>MSC/Circ.1165, <i>Revised guidelines for the approval of equivalent water-based fire-extinguishing systems for machinery spaces and cargo pump-rooms.</i>  Appendix B “Test method for fire testing equivalent water-based fire-extinguishing systems for machinery spaces of category A and cargo pump-rooms”, June 2005  as amended in MSC.1/Circ.1237, <i>Amendments to the revised guidelines for the approval of equivalent water-based fire-extinguishing systems for machinery spaces and cargo pump-rooms (MSC/Circ.1165)</i>, October 2007  and in MSC.1/Circ.1269, <i>Amendments to the revised guidelines for the approval of equivalent water-based fire-extinguishing systems for machinery spaces and cargo pump-rooms (MSC/Circ.1165)</i>, June 2008</p>
	<p>MSC.1/Circ.1387, <i>Revised guidelines for the approval of fixed water-based local application fire-fighting systems for use in category A machinery spaces (MSC/Circ.913)</i>,  Appendix “Test method for fixed water-based local application fire-fighting systems”, December 2010</p>
	<p>Res. A.800, <i>Revised Guidelines for Approval of Sprinkler Systems Equivalent to that Referred to in SOLAS Regulation II-2/12</i>  Appendix 2 “Fire test procedures for equivalent sprinkler systems in accommodation, public space and service areas on passenger ships”, December 1995  as amended in Res.MSC.265(84) , <i>Amendments to the revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulationII-2/12 (Resolution A.800(19))</i>, May 2008</p>
	<p>MSC.1/Circ.1268, <i>Guidelines for the Approval of Fixed Pressure Water-spraying and Water-based Fire Extinguishing Systems for Cabin Balconies</i>  Appendix “Test method for fixed pressure water-spraying and water-based fire-extinguishing systems for cabin balconies”, May 2008</p>
	<p>MSC.1/Circ.1272, <i>Guidelines for the Approval of Fixed Water-based Fire Extinguishing Systems for Ro-ro Spaces and Special Category Spaces equivalent to that referred to in Resolution A.123(V)</i>  Appendix “Test method for fixed water-based fire-fighting systems for ro-ro spaces and special category spaces”, May 2008</p>
	2. FM Approvals, Norwood, MA, USA
3. Underwriters Laboratories Inc., Northbrook, IL, USA	ANSI / UL 2167, <i>Water Mist Nozzles for Fire Protection Service</i> [contents can be read from the standard]
4. CEN, Europe	CEN/TS 14972, <i>Fixed firefighting systems - watermist systems - design and installation</i> [contents can be read from the standard]

---

750- Log #58  
(C.3)

Final Action:

---

Submitter: Brian K. MacDonald, FM Approvals  
Recommendation: Revise as follows:

\*\*\*\*\*Insert Include 750\_L58\_Rec Here\*\*\*\*

Substantiation: Editorial – The proposed information for Annex C.3 is to replace the dated information with more current specifications. It is also to simply the information provided in Annex C.3 since the FM Approval Standard 5560, Water Mist Systems is now a published document and access to the test specifications in the Standard are free to the public. <http://www.fmglobal.com/assets/pdf/fmapprovals/5560.pdf>

---

750- Log #1  
(E.1.2.9)

Final Action:

---

Submitter: John F. Bender, Underwriters Laboratories Inc.

Recommendation: Revise text to read as follows:

E.1.2.9 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 2167, *Standard for Water Mist Nozzles for Fire Protection Service*, 2002 ~~with revisions through January 2009~~  
Revised 2010.

Substantiation: Update referenced standards to most recent edition.

### **C.3 Factory Mutual Research Corporation FM Approvals Fire Test Protocols.**

**C.3.1 General.** FM Approvals Class Number 5560, *Approval Standard for Water Mist Systems*, contains comprehensive test requirements for evaluating a complete water mist system including the water mist nozzles, water mist system components, design, installation, and operations manual(s), hydraulic calculation method, and fire test protocols for the following applications. Similar fire test protocols can be found in ANSI/FM Approvals 5560, *American National Standard for Water Mist Systems*.

**C.3.2 Machinery in Enclosures with Volumes not Exceeding 2825 ft<sup>3</sup> (80 m<sup>3</sup>).** This application includes enclosures with machinery such as internal combustion engines, oil pumps, oil tanks, fuel filters, generators, transformer vaults, gear boxes, drive shafts, lubrication skids, diesel engine driven generators, and other similar equipment using liquid hydrocarbon fuel and/or hydraulic, heat transfer, and lubrication fluids; enclosures with incidental use or storage of hydrocarbon ignitable liquids (also known as flammable liquids) of not more than two 55 gal (208 L) drums. All hazards included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, time to shut down process equipment, or 10 minutes, whichever is greater.

**C.3.3 Combustion Turbines in Enclosures with Volumes not Exceeding 2825 ft<sup>3</sup> (80 m<sup>3</sup>).** Combustion turbines included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, turbine rundown time (including the time that the turbine surfaces are above the auto-ignition temperature of the lubricating fluid), the time to shut down process equipment, or 10 minutes, whichever is greater. Consultation with FM Global Property Loss Prevention Data Sheet Number 7-79, *Fire Protection for Combustion Turbine Installations*, is required for installation of these systems.

**C.3.4 Machinery in Enclosures with Volumes not Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>).** This application includes rooms with machinery such as oil pumps, oil tanks, fuel filters, generators, transformer vaults, gear boxes, drive shafts, lubrication skids, diesel engine driven generators, and other similar machinery using fuel and/or lubrication fluids with volatilities less than or equal to light diesel. All hazards included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, the time to shut down process equipment, or 10 minutes, whichever is greater.

**C.3.5 Combustion Turbines in Enclosures with Volumes not Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>).** Combustion turbines included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, turbine rundown time (including the time that the turbine surfaces are above the auto-ignition temperature of the lubricating fluid), the time to shut down process equipment, or 10 minutes, whichever is greater. Consultation with FM Global Property Loss Prevention Data Sheet Number 7-79, *Fire Protection for Combustion Turbine Installations*, is required for installation of these systems.

**C.3.6 Machinery in Enclosures with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>).** This application includes enclosures with machinery such as internal combustion engines, oil pumps, oil tanks, fuel filters, generators, transformer vaults, gear boxes, drive shafts, lubrication skids, diesel

engine driven generators, and other similar equipment using liquid hydrocarbon fuel and/or hydraulic, heat transfer, and lubrication fluids; enclosures with incidental use or storage of hydrocarbon ignitable liquids (also known as flammable liquids) of not more than two 55 gal (208 L) drums. All hazards included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, the time to shut down process equipment, or 10 minutes, whichever is greater. For primary protection consideration, see Section 1.9 of FM 5560, Definitions, "Primary Protection", and consult the FM Global Property Loss Prevention Data Sheet for the recommended protection of the specific hazard in the applicable occupancy.

### **C.3.7 Combustion Turbines in Enclosures with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>).**

Combustion turbines included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, the turbine rundown time (including the time that the turbine surfaces are above the auto-ignition temperature of the lubricating fluid), the time to shut down process equipment, or 10 minutes, whichever is greater. Consultation with FM Global Property Loss Prevention Data Sheet Number 7-79, *Fire Protection for Combustion Turbine Installations*, is required for installation of these systems. For primary protection consideration, see Section 1.9 of FM 5560, Definitions, "Primary Protection".

**C.3.8 Light Hazard Occupancies.** Typical light hazard occupancies within the scope of this application are defined in FM Global Property Loss Prevention Data Sheet Number 3-26, *Fire Protection Water Demand for Nonstorage Sprinklered Properties*. The occupancies are defined as Hazard Category 1 (HC-1). Water mist systems shall not be used to protect HC-2, HC-3, or HC-4 occupancies. The applications will be limited to ceiling heights of 8 ft (2.4 m) for restricted areas and 16 ft 5 in. (5 m) for unrestricted areas (refer to Section 1.9 of FM 5560, Definitions, "Light Hazard Occupancy," for specific descriptions of restricted and unrestricted areas). The water supply shall be capable of supplying 60 minutes of water to the hydraulically most remote nine automatic nozzles or all automatic nozzles within a 1,500 ft<sup>2</sup> (140 m<sup>2</sup>) demand area, whichever is greater, for systems Approved for the protection of unrestricted areas. For installations with less than 1500 ft<sup>2</sup> (140 m<sup>2</sup>) in area, the water supply shall be capable of supplying 60 minutes of water to all nozzles in the protected area. For systems Approved for the protection of restricted areas, the water supply shall be capable of supplying 60 minutes of water to all automatic nozzles within the compartment. Consultation with FM Global Property Loss Prevention Data Sheet Number 4-2, *Water Mist Systems*, and FM Global Property Loss Prevention Data Sheet Number 3-26, *Fire Protection Water Demand for Nonstorage Sprinklered Properties*, are required for installation of these systems.

**C.3.9 Wet Benches and Other Similar Processing Equipment.** This application includes tools which consist of ventilated and unventilated compartments, spin rinse dryers, alcohol vapor dryers, chemical and mechanical polishing tools, and step and repeat exposure systems. All hazards included under the scope of this local application shall be protected for a minimum of 10 minutes or twice the longest time to extinguish the worst case fire scenario, whichever is greater. Consultation with FM Global Property Loss Prevention Data Sheet Numbers 4-2, *Water Mist Systems*, and 7-7, *Semiconductor Fabrication Facilities*, is required for installation of these systems.

**C.3.10 Local Application Occupancies.** Typical local application occupancies within the scope of this section are defined in FM Global Property Loss Prevention Data Sheet Number 7 Series (Hazards). Consultation with these data sheets is required for installation of these systems. Water mist systems which successfully pass the local application fire scenarios shall be limited to the protection of the following applications:

- A. Ignitable liquid (also known as flammable liquid) pool fires where the liquid release can be confined to a diked area. The entire surface of the diked area shall be protected by the water mist system.
- B. Ignitable liquid (also known as flammable liquid) channel fires in channels not exceeding the water mist system manufacturer's maximum specified width and with no limit to channel length.
- C. Partially obstructed ignitable liquid (also known as flammable liquid) pool fires where the percentage of obstructed surface is limited to that tested.
- D. Spray fires up to 6 MW fueled by ignitable liquids (also known as flammable liquids).
- E. Spray and pool fire combinations where the release can be confined to a diked area.
- F. Ignitable liquid (also known as flammable liquid) residues (ink and paper dust) on printing presses.

Applicants desiring to protect special hazard equipment with ignitable liquids (also known as flammable liquids) with volatilities less than or equal to that of heptane will need to conduct the local application fire scenarios substituting heptane for diesel as the test fuel where appropriate. All hazards shall be protected for a minimum of twice the longest time to extinguish the test fires, time to shut down process equipment, or 10 minutes, whichever is greater. Consultation with FM Global Property Loss Prevention Data Sheet Number 4-2, *Water Mist Systems*, is required for installation of these systems.

**C.3.11 Industrial Oil Cookers.** Application of the water mist system is limited to the protection of the industrial oil cookers only, and does not include the protection of other equipment such as exhaust ducts, heaters, heat exchangers, and food processing areas, unless tested for these applications. Consideration of the application and use of nozzle protection caps to prevent or reduce the amount of nozzle contamination should be given and the use of such caps should be included in the fire test and nozzle performance test requirement programs. This local application does not include the protection of other equipment such as exhaust air ducts, heaters, heat exchangers, and food processing or food preparation areas. Consultation with FM Global Property Loss Prevention Data Sheet Numbers 4-2, *Water Mist Systems*, and 7-20, *Oil Cookers*, is required for installation of these systems.

Industrial oil cookers are typically non-insulated conveyORIZED fryers, or occasional batch kettles, used in food processing plants for chicken, fish, potato products (e.g., fries/chips), doughnuts and many other food products. These cookers are extremely different in size, configuration, and

construction from standard kitchen or restaurant oil cookers or fryers and require a different type of extinguishment system.

Industrial oil cookers normally have large cooking surfaces, from 50 ft<sup>2</sup> (4.6 m<sup>2</sup>) to several hundred square feet. They contain from several hundred gallons up to approximately 5000 gallons (18900 L) of cooking oil. Industrial oil cookers (except for some batch kettles) typically have moveable covers, or hoods, that may be hydraulically operated.

The hood is generally in a closed position during a normal operation period. However, the hood may be occasionally opened for routine maintenance. There are also exhaust stacks connected on top of the hood.

The most severe fire incident involving industrial oil cookers is a fire caused by overheating the cooking oil until it reaches its auto-ignition temperature (AIT). Installation of an interlocking system to prevent the oil

from reaching its AIT is a normal practice in the industry. However, the AIT fire may still occur due to a system malfunction or simple human error. Thus, all the performance tests proposed in this document require extinguishment of an AIT fire. The AIT fire is particularly challenging because of its rapid spread of flame over the oil surface and its difficulty in extinguishment, as it requires flame extinction over the entire surface with simultaneous rapid cooling to prevent re-ignition.

Exhaust air fans should be interlocked to automatically shutdown upon fire detection or operation of the water mist system. Exhaust duct protection, as outlined in FM Global Property Loss Prevention Data Sheet Number 7-78, *Industrial Exhaust Systems*, is required and should be specified in the manufacturer's design, installation, operation and maintenance manual. (Note: Water spray protection for the ducts is required if operation of the duct system during water mist system discharge is necessary. Automatic sprinkler protection is recognized as an effective alternative to water spray.)

Commonly used cooking oils, their flash points, and AITs are listed in Table C.3.11 as a reference only. Canola oil is considered a representative vegetable oil and may be used as the testing medium in the industrial oil cooker fire tests. Canola oil has a nominal density equal to 7.8 lb/gal (0.93 kg/L) and nominal specific heat equal to 0.59 BTU/lb·°F (2.5 kJ/kg·°C). Alternative cooking oils may be used based on the manufacturer's intended applications for protection, and Approval shall be limited to cooking oils with flash points and AITs less than or equal to the tested oil.

Table C.3.11. Nominal Flash Points and Auto Ignition Temperatures (AIT) of Typical Commonly Used Cooking Oils

<u>Cooking Oil</u>	<u>Flash Point</u>		<u>Auto Ignition Temperature (AIT)</u>	
	<u>°F</u>	<u>(°C)</u>	<u>°F</u>	<u>(°C)</u>
<u>Canola</u>	<u>641</u>	<u>(338)</u>	<u>686</u>	<u>(363)</u>
<u>Corn</u>	<u>647</u>	<u>(342)</u>	<u>684</u>	<u>(362)</u>
<u>Cotton Seed</u>	<u>633</u>	<u>(334)</u>	<u>690</u>	<u>(366)</u>
<u>Peanut</u>	<u>659</u>	<u>(348)</u>	<u>698</u>	<u>(370)</u>
<u>Soybean (Soya)</u>	<u>631</u>	<u>(333)</u>	<u>710</u>	<u>(377)</u>
<u>Sunflower</u>	<u>644</u>	<u>(340)</u>	<u>678</u>	<u>(359)</u>
<u>Palm</u>	<u>623</u>	<u>(328)</u>	<u>710</u>	<u>(377)</u>

The agent supply shall be capable of supplying agent to all open nozzles at the maximum rated operating pressure for a minimum of twice the total time needed to extinguish the worst case fire scenario and subsequently cool the oil to a temperature below its flash point, as established by the testing, or 10 minutes, whichever is greater.

**C.3.12 Computer Room Sub Floors.** Typical occupancies within the scope of this application are defined in FM Global Property Loss Prevention Data Sheet Numbers 4-2, *Water Mist Systems*, and 5-32, *Electronic Data Processing Systems*. System installations shall be limited to computer room sub-floor areas and heights not exceeding those tested. Additionally, the equivalent opening area of the sub-floor shall not exceed those tested. The agent supply shall be capable of supplying agent to all nozzles at the maximum rated operating pressure for a minimum of twice the longest time to extinguish the test fires or 10 minutes, whichever is greater. This protocol only evaluates the fire extinguishment capabilities of the water mist system. An evaluation of the smoke cleansing capabilities is not made. Consultation with FM Global Property Loss Prevention Data Sheet Numbers 4-2, *Water Mist Systems*, and 5-32, *Electronic Data Processing Systems*, is required for installation of these systems.

**C.3.13 Continuous Wood Board Presses.** This application is further defined in FM Global Property Loss Prevention Data Sheet Number 7-10, *Wood Processing and Woodworking Facilities*. Application of the water mist system is limited to the protection of the continuous wood board press only, and does not include the protection of other equipment unless tested for other applications. All hazards included under the scope of this application shall be protected for a minimum of twice the longest time to extinguish the test fires or 30 minutes, whichever is greater. Consultation with FM Global Property Loss Prevention Data Sheet Numbers 4-2, *Water Mist Systems*, and 7-10, *Wood Processing and Woodworking Facilities*, is required for installation of these systems.

Factory Mutual Research Corporation (FMRC) has developed the following test protocols, which are the basis for current listings of water mist systems and components [denoted by FMRC as Fine Water Spray (FWS) systems]:



- (1) — ~~FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Not Exceeding 2825 ft<sup>3</sup> (80 m<sup>3</sup>)~~
- (2) — ~~FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Not Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>)~~
- (3) — ~~FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>)~~
- (4) — ~~FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Light Hazard Occupancies~~
- (5) — ~~FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Wet Benches and Other Processing Equipment~~
- (6) — ~~FMRC Draft Performance Requirements for Water Mist Systems for Local Application System Protection~~

**C.3.1.1** Note that the term *machinery space* refers to flammable liquid hazards no greater than those of diesel fuel, and the term *special hazard machinery space* refers to flammable liquid hazards no greater than those of n-heptane. These terms should not be confused with the term *machinery space* used in the International Maritime Organization (IMO) documents relating to fine water spray. They are not intended to be interchangeable.

**C.3.1.2** The standards describe fire test performance criteria and methods. Because each fine water spray system is unique in its design and use of components, the component testing of each fine water spray system is evaluated on a case-by-case basis. The components are tested for functionality, performance, integrity, and reliability. The manufacturers' design, installation, and maintenance manual(s) are reviewed for technical content and clarity. The supplied hydraulic calculations are also reviewed.

**~~C.3.2 FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Not Exceeding 2825 ft<sup>3</sup> (80 m<sup>3</sup>).~~**

**C.3.2.1** The objective of this standard is to ensure that the fine water spray system extinguishes spray and pool fires that can occur, for example, due to breaks in lubrication, hydraulic, or fuel lines. Typically, these fires are highly shielded. While spray fires can occur only as the result of a supply line break, pool fires can occur as a result of a breakage or as a result of a small leak over a large period of time. This standard is limited to volumes not exceeding 80 m<sup>3</sup> (2825 ft<sup>3</sup>). The FMRC standard assumes automatic interlocks for the following:

- (1) — All fuel supply lines (for combustion turbines, bearing lubrication can be left on to allow the turbine to coast down)
- (2) — Door closures
- (3) — Ventilation shutdown
- (4) — Electrical systems

~~C.3.2.2~~ The water supply required is dependent on the application. For combustion turbines, the water supply has to be sufficient to protect the turbine for the duration of its coast downtime. For machinery spaces and special hazard machinery spaces, the protection time is 10 minutes.

~~C.3.2.3~~ The detection is by means of heat detectors. The detection is so designed as to detect the fire and activate the fine water spray system within 60 seconds of the ignition.

~~C.3.2.4~~ The fine water spray system has to extinguish all spray and pool fires within 5 minutes from the time of ignition. Tests are conducted in closed enclosures as well as enclosures with natural ventilation. For optional protection of insulated combustion turbines, the insulation mat can be suppressed rather than extinguished.

~~C.3.2.5~~ In addition to the fire performance criteria, fine water spray systems used for the protection of combustion turbines cannot cause damage to the turbine by means of thermal shock or cracking of the turbine casing or induce blade rubbing. The rate of cooling of the steel test plate (1m×2m×5cmthick) must not exceed limits set by FMRC. It can be more difficult to successfully pass the cooling test than to pass the fire tests, and the results of the cooling test often indicate the number, type, and placement of the fine water spray nozzles.

~~**C.3.3 FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Not Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>).**~~

~~C.3.3.1~~ The objective of this standard is to ensure that the fine water spray system extinguishes spray and pool fires that can occur, for example, due to breaks in lubrication, hydraulic, or fuel lines. Typically, these fires are highly shielded. While spray fires can occur only as the result of a supply line break, pool fires can occur as a result of a breakage or as a result of a small leak over a large period of time. This standard is limited to volumes not exceeding 260 m<sup>3</sup> (9175 ft<sup>3</sup>). The FMRC standard assumes automatic interlocks for the following:

- ~~(1) — All fuel supply lines (for combustion turbine, bearing lubrication can be left on to allow the turbine to coast down)~~
- ~~(2) — Door closures~~
- ~~(3) — Ventilation shutdown~~
- ~~(4) — Electrical systems~~

~~C.3.3.2~~ The water supply required is dependent on the application. For combustion turbines, the water supply has to be sufficient to protect the turbine for the duration of its coast downtime. For machinery spaces and special hazard machinery spaces, the protection time is 10 minutes.

~~C.3.3.3~~ The detection is by means of heat detectors. The detection is so designed as to detect the fire and activate the fine water spray system within 60 seconds of the ignition.

~~C.3.3.4~~ The fine water spray system has to extinguish all spray and pool fires within 5 minutes from the time of ignition. Tests are conducted in closed enclosures as well as enclosures with natural ventilation. For optional

protection of insulated combustion turbines, the insulation can be suppressed rather than extinguished. In addition to demonstrating performance in volumes not exceeding 260 m<sup>3</sup> (9175 ft<sup>3</sup>), systems also have to demonstrate the capability to perform in small [130 m<sup>3</sup> (4590 ft<sup>3</sup>)] enclosures.

~~C.3.3.5~~ In addition to the fire performance criteria, fine water spray systems used for the protection of combustion turbines cannot cause damage to the turbine by means of thermal shock, cause cracking of the turbine casing, or induce blade rubbing. The rate of cooling of the steel test plate (1m×2m×5cm thick) cannot exceed limits set by FMRC. It can be more difficult to successfully pass the cooling test than to pass the fire tests, and the results of the cooling test often indicate the number, type, and placement of the fine water spray nozzles.

~~**C.3.4 FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Combustion Turbine Enclosures, Machinery Spaces, and Special Hazard Machinery Spaces with Volumes Exceeding 9175 ft<sup>3</sup> (260 m<sup>3</sup>).**~~

~~C.3.4.1~~ The objective of this standard is to ensure that the fine water spray system extinguishes spray and pool fires that can occur, for example, due to breaks in lubrication, hydraulic, or fuel lines. Typically, these fires are highly shielded. Although spray fires can occur only as the result of a supply line break, pool fires can occur as a result of a breakage or as a result of a small leak over a large period of time. The FMRC standard assumes automatic interlocks for the following:

- (1) — All fuel supply lines (for combustion turbines, bearing lubrication can be left on to allow the turbine to coast down)
- (2) — Door closures
- (3) — Ventilation shutdown
- (4) — Electrical systems

~~C.3.4.2~~ This standard is based on the IMO *Standard for Shipboard Machinery Spaces*, although the hazards discussed in both documents are different. Due to differences in system design and performance, extrapolation of results to larger room sizes is not permitted by FMRC at this time.

~~C.3.4.3~~ The water supply required is dependent on the application. For combustion turbines, the water supply has to be sufficient to protect the turbine for the duration of its coast downtime. For machinery spaces and special hazard machinery spaces, the protection time is 60 minutes. Typically, the volumes tested exceed 800 m<sup>3</sup> (28,230 ft<sup>3</sup>).

~~C.3.4.4~~ The detection is by means of heat detectors. The detection is so designed as to detect the fire and activate the fine water spray system within 60 seconds of the ignition.

**C.3.4.5** The fine water spray system has to extinguish all spray, pool, and crib fires within 30 minutes from the time of ignition. The exception is a small shielded diesel pool fire that has to be suppressed. Tests are conducted in enclosures with natural ventilation. For optional protection of insulated combustion turbines, the insulation mat can be suppressed rather than extinguished.

**C.3.4.6** In addition to the fire performance criteria, fine water spray systems used for the protection of combustion turbines cannot cause damage to the turbine by means of thermal shock or cracking of the turbine casing or induce blade rubbing. The rate of cooling of the steel test plate (1 m × 2 m × 5 cm thick) cannot exceed limits set by FMRC. It can be more difficult to successfully pass the cooling test than to pass the fire tests, and the results of the cooling test often indicate the number, type, and placement of the fine water spray nozzles.

### ***C.3.5 FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Light Hazard Occupancies.***

**C.3.5.1** The objective of this standard is to ensure that the fine water spray system controls fires typically found in light hazard occupancies and prevents the spread of the fire beyond the room or area of origin. These fires typically involve furnishings and wall coverings. This standard limits the heights of enclosed spaces to 2.4 m (8 ft) and the heights of unrestricted spaces to 5 m (16 ft 5 in.).

**C.3.5.2** This standard is based on the IMO *Standard for Shipboard Corridors, Cabins, and Public Spaces*, although the hazards discussed in both documents are different.

**C.3.5.3** The water supply required is 60 minutes for the most remote nine nozzles at the rated operating pressure.

**C.3.5.4** The detection is by means of individual heat responsive elements on the nozzles. The nozzles should meet FMRC requirements for quick response sprinklers and are limited to a maximum nominal temperature rating of 107°C (225°F). Nozzle spacing is to be uniform with uniform spacing, preferably one half of the standard nozzle spacing, from the wall.

**C.3.5.5** The fire performance tests consist of three test areas: small compartment, large compartment, and open space.

**C.3.5.5.1** The small compartment [3 m × 4 m × 2.4 m (10 ft × 13 ft × 8 ft) high] has a door 0.8 m × 2.2 m (2 ft 6 in. × 7 ft 2 in.) high and represents a small ship cabin. The fuel package for this room consists of two bunk beds identical to the IMO specification. The purpose of this test is to delineate mist nozzles from sprinklers. The fire is ignited on the lower mattress, and the test methodology is identical to that specified in the IMO test series. Pass/fail criteria are based on damage of the lower bunk (maximum of 40 percent), ceiling surface temperature over ignition [maximum of 260°C (500°F)], and a maximum gas temperature 76 mm (3 in.) below the ceiling of 315°C (600°F).

**C.3.5.5.2** The large compartment [having equal sides not exceeding 6 m (20 ft) and a height of 2.4 m (8 ft)] has two doors [each 0.8 m × 2.2 m (2 ft 6 in. × 7 ft 2 in.) high] located in diagonally opposite corners. A nozzle is placed in the doorway opposite the fuel package. The fuel package and test method are identical to the IMO specification. The heptane under the wood crib is ignited first, then followed 40 seconds later by the ignition of the excelsior. The doorway nozzles do not operate (indicating that the fire would not have spread to an adjacent area). Additional pass/fail criteria include ceiling surface temperature over ignition [maximum of 265°C (510°F)] and a maximum gas temperature 76 mm (3 in.) below the ceiling of 315°C (600°F).

**C.3.5.5.3** The open space test is conducted under a ceiling with a minimum area of 80m<sup>2</sup> (860 ft<sup>2</sup>) to simulate an uninterrupted area and a ceiling height of 5 m (16 ft 5 in.). At least 16 nozzles are installed in the ceiling and the fuel package (sofas, as outlined in the IMO specification) are to be arranged per the IMO specification. The test is conducted three times: once each with the ignition under one nozzle, between two nozzles, and between four nozzles. Pass/fail criteria are based on fewer than five nozzles operating, at least one unoperated nozzle beyond those that operate, damage of the sofa cushions (maximum of 50 percent), ceiling surface temperature over ignition [maximum of 260°C (500°F)], and a maximum gas temperature 76mm(3 in.) below the ceiling of 315°C (600°F).

### ***C.3.6 FMRC Draft Performance Requirements for Fine Water Spray Systems for the Protection of Wet Benches and Other Processing Equipment.***

**C.3.6.1** The objective is to ensure that the fine water spray system extinguishes pool fires typically found in wet benches and other similar clean room processing equipment.

**C.3.6.2** The detection system has to be approved specifically for use in wet bench applications. Fine water spray systems used for this application are typically of the zoned, deluge type. Operating elements currently used in automatic sprinklers have not been shown to be sufficiently fast enough to prevent significant nonthermal damage.

**C.3.6.3** The simulated clean room is 5.5m × 3.7m × 3.7m (18 ft × 12 ft × 12 ft) high with porous ceiling and floor plates. An airflow (downward) with a velocity of 0.31 m/sec (60 ft/min) is maintained throughout the test. The minimum airflow by the open face of the wet bench is 4.5 m<sup>3</sup>/min/linear m (150 ft<sup>3</sup>/min/linear ft). The wet bench measures approximately 2.3 m × 1.4m × 2m (7.5 ft × 4.5 ft × 6.5 ft) high and is divided into two areas: the ventilated subsurface (or plenum) area and the working surface area. The subsurface dimensions are 0.8 m × 2.3 m × 0.6 m (2.6 ft × 7.5 ft × 2 ft) high. The working surface area is 0.8 m × 2.3 m (2.6 ft × 7.5 ft).

**C.3.6.4** All fires have to be extinguished in less than 60 seconds.

**C.3.6.5** Various fire scenarios are conducted to test the fine water spray system for the ventilated subsurface area. These include five pool fires (various sizes) utilizing polypropylene beads and solid coupons for fuel and at least one pool fire for each of the following flammable liquids: acetone, isopropyl alcohol (IPA), and n-heptane. The pan sizes and fire locations for the

flammable liquid pool fire are at the discretion of FMRC based on observations of the fine water spray system. Obstructions are placed within the subsurface area such that approximately 50 percent of the nozzle discharge is blocked.

**C.3.6.6** Two tests are conducted to determine the effectiveness of a single nozzle in an unventilated space utilizing the subsurface area as a test chamber. The first test utilizes a polypropylene pool fire, and the second test uses a flammable liquid pool fire. Pan size and flammable liquid are at the discretion of FMRC based on the outcome of the ventilated subsurface tests. Suitable barriers are placed in the test area to prevent direct impingement on the fire and to provide 50 percent blockage of the discharge.

**C.3.6.7** Several fire scenarios are conducted to test the fine water spray system for the working surface area. These include five pool fires (various sizes) utilizing polypropylene beads and solid coupons for fuel and at least one pool fire for each of the following flammable liquids: acetone, isopropyl alcohol (IPA), and n-heptane. The pan sizes and fire locations for the flammable liquid pool fire are at the discretion of FMRC based on observations made of the fine water spray system. The flammable liquid fires are also tested at the minimum and maximum nozzle heights, as specified by the manufacturer. A splashing test is conducted in which a single nozzle, located at the minimum vertical height above a pan of liquid containing dye, is discharged at the maximum pressure. None of the contents of the liquid pool are splashed outside a 0.4 m (16 in.) diameter circle centered on the pool.

### ***C.3.7 FMRC Draft Fire Test Protocol for Water Mist Systems for Local Application Protection.***

**C.3.7.1** The objective of this standard is to ensure that the water mist system will extinguish combustible liquid spray and pool fires. These fires can occur on printing press stands, dip tanks, quench tanks, or lube oil conditioning systems. The standard assumes the following:

- (1) — Room ventilation is normal.
- (2) — Obstructions over the protected area do not exceed that tested.
- (3) — Fluid is contained within the diked area.

**C.3.7.2** The time required to extinguish the fire scenarios will be reported. The water supply required depends on the occupancy and the authority having jurisdiction.

**C.3.7.3** The system is to be automatically activated by a listed heat or flame detection system.

**C.3.7.4** The water mist system must extinguish the following fires at the maximum and minimum nozzle elevations and spacing. Maximum and minimum heights apply as follows:

- (1) — For square pool fires, maximum height only for 1 m × 1 m and 2m×2mpools; maximum and minimum heights for the 3 m × 3 m pool
- (2) — For channel fires, maximum height only for Y and 2Y lengths; maximum and minimum heights for 3Y length

- (3) — For heptane spray fires, maximum and minimum heights
- (4) — For combined pool and spray fires, maximum height only
- (5) — For offset pool fire, obstructed pool fire, and spray fire with external ignition source, maximum and minimum heights

**C.3.7.4.1 Pool Fires.** Pool fires are to be in square shapes from 1m<sup>2</sup>, 4 m<sup>2</sup>, and 9m<sup>2</sup> (10.8 ft<sup>2</sup>, 43.6 ft<sup>2</sup>, and 96 ft<sup>2</sup>) in area.

**C.3.7.4.2 Obstructed Pool Fires.** The obstruction must be at least equivalent to a 0.6 m (2 ft) diameter drum located 0.5 m (1.6 ft) over the center of the pool.

**C.3.7.4.3 Channel Fires.** Channel fires are to be at the width of the channel and at lengths of one, two, and three times the width.

**C.3.7.4.4 Spray Fires.** Six MW heptane spray fires are conducted with the spray fire axis in the horizontal and vertical directions.

**C.3.7.4.5 Spray and Pool Fires.** Horizontal spray fire tests are conducted with a 6 MW diesel spray fire at two different elevations and two different locations above the surface of a 2m×2m diesel pool fire. A 45-degree spray fire is conducted with a 6 MW diesel spray fire at two locations at one elevation above a 2 m × 2 m diesel pool fire.

**C.3.7.4.6 Diesel Soaked Paper Dust Fire.** A fire involving a quantity of diesel fuel soaked into paper dust.

**C.3.7.5** The tests are conducted in enclosures large enough so that oxygen concentrations do not decrease below 20 percent.