Meeting Agenda
First Draft Meeting for NFPA 402, NFPA 405, NFPA 412, and NFPA 414
Technical Committee on Aircraft Rescue and Fire Fighting
August 29th through Sept 1st, 2017
Seattle, WA

I. Welcome and call to order by Chairman Mathis

II. Introductions- members and guests

III. Approval of Previous Meeting Minutes

IV. NFPA Update- Ken Holland

V. Task Group Meetings (if time allows in am on first day)

VI. Full TC to meet to address public inputs (402, 405, 412, and 414)

VII. Task Group reports/recommendations on public inputs

VIII. TC development of first revisions

IX. Other Business- New and Old

    a. AIR/FDA cross committee TG on ITM for ARFF apparatus

X. Date and location for next meeting

XI. Adjournment

Meeting Minutes

MEETING MINUTES
Aircraft Rescue and Fire Fighting AIR-AAA
NFPA 402/NFPA 424 ROC Meeting
14 Sept 2011
Telephone Conference

Members on the Call:

Robert Lindstrom, Chair
John McDonald, Secretary
Ken Holland, NFPA Staff Liaison
Keith Bagot
Peter Bordeleau
Charles Cinquemani
Ralph Colet
Ross Davidson
Graydon Matheson
Robert Mathis
Grady North
Pam Phillips
Danny Pierce
Joseph Scheffey
Jason Shively
Jeremy Souza
Kirk Steyn
Marc Tonnacliff
Ronald Jones
Randy Krause
Nicholas Subbotin

19 October

The full committee meeting was opened by Chair Robert Lindstrom at 13:05 on 14 September with a roll call of members followed by opening remarks by the Chair.

The minutes of the meeting on 19-21 October in Orlando, FL were approved.

It was mentioned that Vic Hughes, a committee member emeritus has passed away. Discussion was held about recognizing his service in our upcoming documents.

Ken Holland, staff liaison, briefed the committee on high level changes in the NFPA processes (going to all electronic) and changes in the substantiation process for the committee members.

More information can be found on the NFPA web site at
www.nfpa.org/categoryList.asp?categoryID=124&URL=Codes%20&%20Standards.

Ken updated the committee on the progress of filling the vacant positions on the committee. Larry Krasner has been appointed as a member emeritus.

Ken reviewed the possible timelines for publishing of 402 & 424.

Discussion was held on the Code Fund Request process. Our proposal for last year concerning response times was not selected. The committee can make a new proposal for this year if they wish.

No public comments were received on 402 and 424. Discussion was held about submitting committee comments for both documents:

NFPA 402, 5 committee comments were generated
NFPA 424, 3 committee comments were generated

The Chair gave the committee an overview of a presentation to be given to the AARF Working Group Conference. Discussion was held on ways to better reach all the users of our documents and get them more involved in our standards process.

NFPA Aviation section looking to increase participation in the section through more articles for the NFPA Journal, as well as through educational means. Discussion of the success of Joe Scheffey's presentation/seminar at the NFPA Annual meeting in 2011. Another Aviation Section Seminar will be at the NFPA 2014 Annual meeting in Las Vegas. Dan Pierce would like to be noted as the contact person for that seminar at that conference.

The next meeting will be held in the last week of January in the Newport, CA area.

The meeting was adjourned at 14:55.

MEETING MINUTES
Aircraft Rescue and Fire Fighting AIR-AAA

23-24 October 2012
Drury Inn & Suites
San Antonio, TX

Members in Attendance

Duane Kann (Chair)
John McDonald (Secretary)
Peter Bordeleau
Charles Cinquemani
Ralph Colet
Ross Davidson
Hanh Deniston
Fred Goodnight
Mark Lawler
Stephen Listerman
John Maddox
Graydon Matheson
Robert Mathis
John McLoughlin
Paul Meyer
Kevin Petit
Pam Phillips
Danny Pierce
James Podolske
Joseph Scheffey
Jason Shively
Dirk Steyn
Pierre Voisine
Abdulrahman Alsaadi
Randy Krause
Bradford Colton
William Major
Steven Schwartz
Ken Holland (Staff Liaison)

Guests in Attendance

Grady North
Bernard Valois
Brian McKinney
Denny Heitman
Kaare Holm
Tim Van Fleet

MEETING MINUTES
Aircraft Rescue and Fire Fighting AIR-AAA

23-24 October 2012
Drury Inn & Suites
San Antonio, TX

23 October

The full committee meeting was opened by Chair Duane Kann at 09:04 on 23 October with the introduction of members and guests followed by opening remarks by the Chair.

The minutes of the 31 January meeting were approved.

Ken Holland, staff liaison, reviewed the ROC process.

Ken reviewed the cycles for NFPA 403 & 412, legal considerations, use of the Fire Protection Research Foundation, Doc info Pages, and the new electronic code process.

Following a 10 minute break, a presentation concerning response times was given by Danny Pierce.

The committee began processing 12 public comments for NFPA 403 .

The committee broke for lunch at 12:15.

Work resumed at 13:35 with the committee processing the remainder of the 403 public comments.

The committee created 2 committee comments for NFPA 403

After a brief review of tomorrow's activities, The Chair adjourned the meeting at 16:45.

24 October

The Chair called the meeting to order at 08:15.

Miami was proposed as the location for the next meeting the week of 6 May.

Danny Pierce gave his task group report on realigning our documents and at the conclusion of his report and work his task group was dissolved.

MEETING MINUTES
Aircraft Rescue and Fire Fighting AIR-AAA

23-24 October 2012
Drury Inn & Suites
San Antonio, TX

Forming task groups to assist in the revision of NFPA 1003, which is a pro-qual document under the auspices of the Fire Fighter Professional Qualifications project written in job performance requirement (JPR) text, was discussed by the entire committee. Further work on that will be done based on the revision cycle of NFPA 1003.

Merging 412 in to 414 and 408 in to 10 was discussed.

The committee began processing 2 public comments for NFPA 412

The substantiation for holding logs 2, 3 & 4 for 403 was presented by Jo Scheffey and was accepted by the committee.

The committee finished processing public comments on 412

Ken conducted a live demonstrated the new process for submitting public input

Danny Pierce presented a Salt Lake City driver training video

The Chair appointed task groups to work on the following subjects relevant to NFPA 403 while the document is not in revision in hopes that they would each bring the work back for the next First Draft Meeting, or sooner being submitted as with a public input or possibly a TIA if deemed appropriate. These task groups can include non committee members as well.

Generic Foam task group:

Keith Bagot
Brad Colton
Grame Day
Bernard Valois
Jim Podolske
Bob Darwin
Dennis Kennedy

MEETING MINUTES
Aircraft Rescue and Fire Fighting AIR-AAA

23-24 October 2012
Drury Inn & Suites
San Antonio, TX

Response Time task group:

Mark Lawler- co-chair
Danny Pierce- co-chair
Grady North
Ross Davidson
Peter Bordeleau
Jim Podolske
Bob Mathis
John Maddox
Graydon Matheson

The meeting was adjourned at 11:40 on October 24th, 2012.

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

18 -19 March 2014

Sheraton

Denver, CO

<u>Members</u>

Duane Kann- Chair

John McDonald- Secretary

Keith Bagot

Ralph Colet

Howard Costa

Graeme Day

Hanh Deniston

Michael Greenup

Stephen Listerman

John Maddox- Called in

Douglas Mangels

Graydon Matheson-Called in

Robert Mathis

Kevin Petit

Pam Phillips

Danny Pierce

James Podolske

Joseph Scheffey

Jason Shively

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

18 -19 March 2014

Sheraton

Denver, CO

Marc Tonnacliff

Pierre Voisine

William Major- Called in

Christopher Toten

Bradford Colton

Ronald Jones

Ronald Krusleski

Thomas Littlepage

Paul Powell

James Price

Darrell Sooter- Called in

Guests

Philip DiMaria

Bernard Valiois

Staff

Ken Holland- Staff Liaison

18 March

The full committee meeting was opened by Chair Duane Kann at 08:03 on 18 March with the introduction of members and guests followed by opening remarks by the Chair.

The minutes of the 8 May, 2013 meeting were approved.

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

18 -19 March 2014

Sheraton

Denver, CO

Ken Holland, staff liaison, after explaining the reason for a change in staff liaison, reviewed the general procedures for the meeting

The cycles for NFPA 405 and 422 were reviewed.

Due to transferring the responsibility of NFPA 408 from this committee to the Technical Committee on Portable Fire Extinguishers, the need for a change to the AIR-AAA committee's scope was discussed.

The committee began processing public comments, of which 4 were received, for NFPA 405. The committee developed 7 second revisions for the second draft.

Work resumed at 13:45 with the committee creating an additional first revision to 405.

At 14:15 the committee began work on the 422 public comments, finishing at 14:45. The committee received two public comments for the document.

Following a 15 min break, discussion was held on using some of the material from 422 to develop a training evaluation check list that can become an appendix to one of the committee's existing documents.

The committee is still planning on withdrawing the document, which was addressed and balloted as part of the first draft meeting.

The meeting was adjourned at 16:00

19 March

The Chair called the meeting to order at 08:31.

A video on training devices was shown by Jim Podolske

Ken reviewed the operation and use of the Doc Info Pages

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

18 -19 March 2014

Sheraton

Denver, CO

The need for a TIA to 402 was presented to the committee based on the request of the NTSB. This concerns an incorrect link in 7.5.11.4.3 to the NTSB.

The Chair held a discussion on the importance of having an alternate, noting the committee members who need to get an alternate.

Task group assignments were made for the review of 414. The chair of each group will need to submit the group's recommendations electronically as public comment by 1 July. The list will be distributed to the entire committee.

The chair reviewed the cycle time adjustments for the committee's documents.

Task groups were updated to develop public input for response times and generic foam classification.

The chair requests that he and the staff liaison be included on all meeting invites

Response Times

Danny Pierce-Chair

Grady North

Ross Davidson

Denny Weitman

Jim Podolske

Darrell Sooter

Pam Phillips

Marty Huffman

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

18 -19 March 2014

Sheraton

Denver, CO

Graydon Matheson

Tom Littlepage

Steve Schwartz

Marc Tonnaclif

Hahn Deniston

Ralph Colet

Phil Dimaria

<u>Generic Foam Classifications</u>

Brad Colton-Chair

Keith Bagot

Graeme Day

Bernard Valois

Bob Darwin

Dennis Kennedy

Rob Mathis

Joe Scheffey

Dirk Steyn

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

18 -19 March 2014

Sheraton

Denver, CO

Jim Podolske

Ross Davidson

Dave Pelton

Kevin Petit

Pierre

Phil Dimaria

Jason Shively

Due to the elimination of 408 & 422 from the committee's documents, the committee's scope will need to be changed. A proposed new scope was developed. The committee also discussed the possibility of modifying revision cycles of the remaining documents to improve the efficiency of the committee. More work has to be done on that due to NFPA regulations. The staff liaison will work with the Chair to take the appropriate actions and report back to the committee as needed.

Orlando or Tampa was proposed as the location for the next meeting the week in October/November 2014.

A discussion was held on proximity gear. Jim Podolske stated that the AF anticipates a position statement on the use of proximity gear from OSHA in about the 3 weeks.

The meeting was adjourned at 11:26

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

27-30 July 2015

DoubleTree Downtown

Salt Lake City, UT

27 July

The full committee meeting was opened by Chair Duane Kann at 08:00 on 27 July with the introduction of members and guests followed by opening remarks by the Chair.

Members Present:

Duane Kann-Chair, John McDonald-Secretary, Curt Floyd-NFPA, Keith Bagot, Ralph Colet, Ted Costa, Ross Davidson, Hanh Deniston, John Huffman, Douglas Mangels, Robert Mathis, Kevin Petit, Pam Phillips, James Podolske, Joseph Scheffey, Jason Shively, Marc Tonnacliff, Christopher Toten, Bradford Colton, Danny Pierce, Paul Powell, Ronald Jones, Tim Vanfleet, Graydon Matheson, Ron Krusleski, Nick Subbotin, Bill Major.

Guests Present: Rita Herron-Embry Riddle University, Elizabeth Hendel-Phoenix Fire, Jonathon Torres-FAA, John Cudahy-ICAS, Tim Butters-FAA.

The chair reminded everyone that all members need an alternate.

The minutes of the 28 October meeting were approved.

Curt Floyd, staff liaison, reviewed the general procedures for the meeting

NFPA’s new vision and mission was reviewed

The use of Doc Info Pages was reviewed

The cycle for NFPA 414 was reviewed.

The Chair discussed the merits of having task group work being submitted as public comments

The Chair explained that Curt is the staff liaison for ARFF documents. He is partnered with Ken who can help in Curt’s absence.

The cycles for the committee's documents were reviewed.

At 08:40, the committee began processing public comments for NFPA 414.

After a break, the committee resumed work on 414, Chapter 5.

After a lunch break, work resumed with the committee continuing work on Chapter 5.

Committee review of public comments on NFPA 414 concluded with Second Revisions created.

After a break and a review of the method for processing public inputs, the committee began work on the Public Inputs for 402.

The meeting adjourned for the day at 16:45

28 July

The Chair called the meeting to order at 08:00.

The Chair held a brief discussion on the US National Grid proposals.

Work on Public Inputs for 402 continued.

The committee broke for lunch.

After break, the committee resumed work on Public Inputs for 402.

Committee work on 402 Public Input review was completed with First Revisions being created.

Work on Public Inputs for 403 commenced.

The meeting was adjourned for the day at 16:15.

MEETING MINUTES

Aircraft Rescue and Fire Fighting AIR-AAA

27-30 July 2015

DoubleTree Downtown

Salt Lake City, UT

29 July

The Chair called the meeting to order at 08:00.

There will be call in participation by the FAA, and ICAS on air show crash protection tomorrow at 10:00.

Joe Scheffey gave a presentation on response times.

Discussion was held on the presentation and response times.

The Chair summarized the discussions, reinforcing the fact that our minimum standards must create a safe environment for everyone involved in a response.

Work on Public Input for 403 continued at 09:48.

The committee broke for lunch.

After lunch, work on Public Inputs for 403 continued.

Initial work on 403 Public Inputs completed with First Revisions developed by the committee.

Work on Public Inputs for 424 began.

The meeting was adjourned for the day at 16:35.

30 July

The Chair called the meeting to order at 08:00.

Work on Public Inputs for 424 continued.

The initial work on the 424 Public Inputs and First Revisions was completed.

After a break, The Chair held discussion on Public Input-13, for 403 concerning air shows.

The committee began work on PI 13, with the assistance of the FAA air show rep Tim Butters and ICAS Public Input submitter John Cudahy.

Discussion on the proposal with input from the Technical Committee along with review of the proposal and drafting of First Revisions.

The Chair thanked the Technical Committee for all the work done on the documents in preparation for the meeting.

The Committee reviewed and discussed proposal for scope change to be sent back to the Standards Council.

Briefly discussed response time letter.

Discussion on Air Show Proposal that is before the Standards Council.

Discussion on next Technical Committee meeting to be held either the last week in August or last week in September preferably in Charleston, SC or Atlantic City, NJ.

Meeting adjourned 1530

NFPA 402 Revision Cycle

402 2019 custom Revision Cycle

Process Stage	Process Step	Dates for TC
Public Input Stage (First Draft)	Public Input Closing Date*	6/05/2017
	Final Date for TC First Draft Meeting	9/04/2017
	Posting of First Draft and TC Ballot	10/23/2017
	Final date for Receipt of TC First Draft ballot	11/13/2017
	Final date for Receipt of TC First Draft ballot - recirc	11/20/2017
	Posting of First Draft for CC Meeting	
	Final date for CC First Draft Meeting	
	Posting of First Draft and CC Ballot	
	Final date for Receipt of CC First Draft ballot	
	Final date for Receipt of CC First Draft ballot - recirc	
	Post First Draft Report for Public Comment	11/27/2017
Comment Stage (Second Draft)	Public Comment Closing Date*	2/05/2018
	Notice Published on Consent Standards (Standards that received no Comments) Note: Date varies and determined via TC ballot.	
	Appeal Closing Date for Consent Standards (Standards that received no Comments)	
	Final date for TC Second Draft Meeting	5/07/2018
	Posting of Second Draft and TC Ballot	6/25/2018
	Final date for Receipt of TC Second Draft ballot	7/16/2018
	Final date for receipt of TC Second Draft ballot - recirc	7/23/2018
	Posting of Second Draft for CC Meeting	
	Final date for CC Second Draft Meeting	
	Posting of Second Draft for CC Ballot	
	Final date for Receipt of CC Second Draft ballot	
	Final date for Receipt of CC Second Draft ballot - recirc	
	Post Second Draft Report for NITMAM Review	8/02/2018
Tech Session Preparation (& Issuance)	**Notice of Intent to Make a Motion (NITMAM) Closing Date**	8/30/2018
	Posting of Certified Amending Motions (CAMs) and Consent Standards	10/11/2018
	Appeal Closing Date for Consent Standards	
	SC Issuance Date for Consent Standards	
Tech Session	Association Meeting for Standards with CAMs	
Appeals and Issuance	Appeal Closing Date for Standards with CAMs	
	SC Issuance Date for Standards with CAMs	

TC = Technical Committee or Panel
CC = Correlating Committee

As of 6/27/2017

A2019 Revision Cycle

Annual 2019 Revision Cycle

Process Stage	Process Step	Dates for TC	Dates for TC with CC
Public Input Stage (First Draft)	Public Input Closing Date*	6/28/2017	6/28/2017
	Final Date for TC First Draft Meeting	12/06/2017	9/06/2017
	Posting of First Draft and TC Ballot	1/24/2018	10/18/2017
	Final date for Receipt of TC First Draft ballot	2/14/2018	11/08/2017
	Final date for Receipt of TC First Draft ballot - recirc	2/21/2018	11/15/2017
	Posting of First Draft for CC Meeting		11/22/2017
	Final date for CC First Draft Meeting		1/03/2018
	Posting of First Draft and CC Ballot		1/24/2018
	Final date for Receipt of CC First Draft ballot		2/14/2018
	Final date for Receipt of CC First Draft ballot - recirc		2/21/2018
	Post First Draft Report for Public Comment	2/28/2018	2/28/2018
Comment Stage (Second Draft)	Public Comment Closing Date*	5/09/2018	5/09/2018
	Notice Published on Consent Standards (Standards that received no Comments) Note: Date varies and determined via TC ballot.		
	Appeal Closing Date for Consent Standards (Standards that received no Comments)		
	Final date for TC Second Draft Meeting	11/07/2018	8/01/2018
	Posting of Second Draft and TC Ballot	12/19/2018	9/12/2018
	Final date for Receipt of TC Second Draft ballot	1/09/2019	10/03/2018
	Final date for receipt of TC Second Draft ballot - recirc	1/16/2019	10/10/2018
	Posting of Second Draft for CC Meeting		10/17/2018
	Final date for CC Second Draft Meeting		11/28/2018
	Posting of Second Draft for CC Ballot		12/19/2018
	Final date for Receipt of CC Second Draft ballot		1/09/2019
	Final date for Receipt of CC Second Draft ballot - recirc		1/16/2019
	Post Second Draft Report for NITMAM Review	1/23/2019	1/23/2019
Tech Session Preparation (& Issuance)	**Notice of Intent to Make a Motion (NITMAM) Closing Date**	2/20/2019	2/20/2019
	Posting of Certified Amending Motions (CAMs) and Consent Standards	4/03/2019	4/03/2019
	Appeal Closing Date for Consent Standards	4/18/2019	4/18/2019
	SC Issuance Date for Consent Standards	4/28/2019	4/28/2019
Tech Session	Association Meeting for Standards with CAMs	6/20/2019	6/20/2019
Appeals and Issuance	Appeal Closing Date for Standards with CAMs	7/10/2019	7/10/2019
	SC Issuance Date for Standards with CAMs	8/07/2019	8/07/2019

TC = Technical Committee or Panel
CC = Correlating Committee

As of 4/12/2017

NFPA 402 Public Input

Public Input No. 13-NFPA 402-2015 [Section No. 1.3.1]

1.3.1

Providing protection for the occupants of an aircraft takes precedence over all other operations. Fire control is frequently an essential condition to ensure such survival. The objectives of the airport fire department should be to respond to any aircraft

~~emergency in the minimum possible time and~~

emergency as expeditiously and as safely possible and employ rescue and fire-fighting techniques effectively. These objectives can be accomplished when properly trained personnel work together as a team and apply the operational procedures presented in this guide.

Statement of Problem and Substantiation for Public Input

Substantiation: Committee believes that this wording takes into account the need for a fast response but insure that it's done in a safe manner.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub- Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jun 10 16:24:14 EDT 2015

Public Input No. 2-NFPA 402-2014 [Chapter 2]

Chapter 2 Referenced Publications

2.1 General.

The documents or portions thereof listed in this chapter are referenced within this guide and should be considered part of the recommendations of this document.

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports,* ~~2009 edition~~ ***2014*** .

NFPA 405, *Standard for the Recurring Proficiency of Airport Fire Fighters,* ~~2010 edition~~ ***2015*** .

NFPA 407, *Standard for Aircraft Fuel Servicing,* ~~2012 edition~~ ***2017*** .

NFPA 414, *Standard for Aircraft Rescue and Fire-Fighting Vehicles,* ~~2012 edition~~ ***2017*** .

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2013 ~~edition~~ .

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* ~~2010 edition~~ ***2015*** .

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2013 ~~edition~~ .

2.3 Other Publications.

2.3.1 FAA Publications.

Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591.

~~FAA Advisory Circular~~ FAA **AC** 150/~~5220–7~~ **5210-7D** , *Aircraft Rescue and Firefighting Communications*, **2008** .

FAA ~~Advisory Circular~~ **AC** 150/5220–17**B** , *Aircraft Rescue and Firefighting Training Facilities*, **2010** .

2.3.2 ICAO Publications.

International standards and recommended practices are promulgated by the International Civil Aviation Organization, **999** ~~University St., Montreal~~ **Robert-Bourassa Boulevard, Montréal , Quebec H3C 5H7 , Canada** ~~H3C 5H7~~ .

Airport Services Manual, Part 7: "Airport Emergency Planning," second edition, 1991.

2.3.3 ~~Research and Special Programs Administration, Materials Transportation Bureau~~ **PHMSA Publications** .

Request for single free copy for emergency service organizations may be addressed to U.S. Department of Transportation, ~~Materials Transportation Bureau, 400 Seventh Street SW, Attention: DMT-11~~ **Pipeline and Hazard Materials Safety Administartion, Office of Pipeline Safety, East Building, 2nd Floor , 1200 New Jersey Avenue SE , Mail Stop: E24-455** , Washington, DC 20590.

Emergency Response Guidebook, U.S. Department of Transportation, ~~2004 edition~~ **2012** .

2.3.4 U.S. Government Publications.

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

Title 18, U.S. Code, Section 2332a, "Use of Weapons of Mass Destruction."

2.3.5 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Advisory Sections.

NFPA 10, *Standard for Portable Fire Extinguishers,* ~~2010 edition~~ ***2017*** .

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* ~~2010 edition~~ ***2015*** .

NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems,* ~~2011 edition~~ ***2015*** .

NFPA 17, *Standard for Dry Chemical Extinguishing Systems,* ~~2009 edition~~ ***2013*** .

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft,* ~~2010 edition~~ ***2015*** .

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports,* ~~2009 edition~~ ***2014*** .

NFPA 408, *Standard for Aircraft Hand Portable Fire Extinguishers,* ~~2010 edition~~ ***2017*** .

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2013~~ edition~~ .

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents,* 2013~~ edition~~ .

NFPA 600, *Standard on Industrial Fire Brigades,* ~~2010 edition~~ ***2015*** .

NFPA 921, *Guide for Fire and Explosion Investigations,* ~~2011 edition~~ ***2017*** .

NFPA 1051, *Standard for Wildland Fire Fighter Professional Qualifications,* ~~2012 edition~~ ***2016*** .

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents,* ~~2009 edition~~ ***2017*** .

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services,*~~2007 edition~~ **2013** .

Statement of Problem and Substantiation for Public Input

Referenced current editions.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3-NFPA 402-2014 [Chapter G]	

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk
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Street Address:
City:
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Submittal Date: Wed Jun 25 19:11:57 EDT 2014

Public Input No. 14-NFPA 402-2015 [Section No. 2.3.2]

2.3.2 ICAO Publications.

International standards and recommended practices are promulgated by the International Civil Aviation Organization, 999 University St., Montreal, Quebec, Canada H3C 5H7.

Airport Services Manual, Part 7: "Airport Emergency Planning,"

~~second edition, 1991.~~

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
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Submittal Date:	Wed Jun 10 16:53:20 EDT 2015

Public Input No. 15-NFPA 402-2015 [Section No. 2.3.3]

2.3.3 Research and Special Programs Administration, Materials Transportation Bureau.

Request for single free copy for emergency service organizations may be addressed to U.S. Department of Transportation, Materials Transportation Bureau, 400 Seventh Street SW, Attention: DMT-11, Washington, DC 20590.

Emergency Response Guidebook, U.S. Department of Transportation~~, 2004 edition~~ .

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub-Committee
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City:	
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Zip:	
Submittal Date:	Wed Jun 10 17:00:59 EDT 2015

Public Input No. 16-NFPA 402-2015 [Section No. 2.3.5]

2.3.5 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA~~, 2003~~ .

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS

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City:

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Zip:

Submittal Date: Wed Jun 10 17:02:34 EDT 2015

Public Input No. 25-NFPA 402-2015 [Section No. 2.3.5]

2.3.5 Other Publications.

Merriam-Webster's Collegiate Dictionary, ~~11th edition,~~ Merriam-Webster, Inc., Springfield, MA~~, 2003~~ .

Statement of Problem and Substantiation for Public Input

Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS

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Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 19 10:53:45 EDT 2015

Public Input No. 17-NFPA 402-2015 [Section No. 3.1]

3.1 General.

The definitions contained in this chapter apply to the terms used in this guide. Where terms are not defined in this chapter or within another chapter, they should be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*~~, 11th edition,~~ is the source for the ordinarily accepted meaning.

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:

Submittal Date: Wed Jun 10 17:05:16 EDT 2015

Public Input No. 35-NFPA 402-2015 [New Section after 3.2.4]

TITLE OF NEW CONTENT

Shall: Indicates a mandatory requirement

Statement of Problem and Substantiation for Public Input

Shall definition not listed in general definitions.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:12:16 EDT 2015

Public Input No. 52-NFPA 402-2015 [New Section after 3.2.4]

TITLE OF NEW CONTENT

Type your content here ...

Standard: A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the *Manual of Style for NFPA Technical Committee Documents* .

Statement of Problem and Substantiation for Public Input

Consistent with NFPA 402, 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 24 13:20:43 EDT 2015

Public Input No. 36-NFPA 402-2015 [Section No. 3.3.9]

3.3.9 * Aircraft Rescue and Fire Fighting (ARFF).

The fire-fighting action taken to prevent, control, or extinguish fire involved or adjacent to an aircraft for the purpose of maintaining maximum escape routes for occupants using normal and emergency routes for egress. Additionally, ARFF personnel will enter the aircraft to provide assistance to the extent possible in the evacuation of the occupants. Although life safety is primary to ARFF personnel, responsibilities such as fuselage integrity and salvage should be maintained to the extent possible

Statement of Problem and Substantiation for Public Input

Change to match 414.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:16:06 EDT 2015

Public Input No. 18-NFPA 402-2015 [Section No. 3.3.13]

3.3.13 ~~Airport~~ _ Air Traffic Control (ATC).

A service established to provide air and ground traffic control for airports.

Statement of Problem and Substantiation for Public Input

Substantiation: Proper term is Air Traffic Control. The use in the document is only as air traffic control and air traffic controller.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS

Organization: THE BOEING COMPANY

Affilliation: NFPA 402 Sub-Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 10 17:07:36 EDT 2015

Public Input No. 19-NFPA 402-2015 [Section No. 3.3.16.1]

3.3.16.1 Critical Rescue and Fire-Fighting Access Area.

The rectangular area surrounding any runway within which most aircraft accidents can be expected to occur on airports. Its width extends 150 m (500 ft) from each side of the runway centerline, and its length is 1000 m (3300 ft) beyond each runway ~~end~~ threshold .

Statement of Problem and Substantiation for Public Input

Substantiation: Proper term for end of runway.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS

Organization: THE BOEING COMPANY

Affilliation: NFPA 402 Sub-Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 10 17:09:35 EDT 2015

Public Input No. 21-NFPA 402-2015 [Section No. 3.3.18]

~~**3.3.18** – Backdraft.~~

~~A phenomenon that occurs when a fire takes place in a confined area, such as a sealed aircraft fuselage, and burns undetected until most of the oxygen within is consumed. The heat continues to produce flammable gases, mostly in the form of carbon monoxide. These gases are heated above their ignition temperature and when a supply of oxygen is introduced, as when normal entry points are opened, the gases could ignite with explosive force.~~

Statement of Problem and Substantiation for Public Input

Substantiation: This term is not used anywhere in the document.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub-Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jun 10 17:18:55 EDT 2015

Public Input No. 45-NFPA 402-2015 [Section No. 3.3.18]

3.3.18 Backdraft.

A

~~phenomenon that occurs when a fire takes place in a confined area, such as a sealed aircraft fuselage, and burns undetected until most of the oxygen within is consumed. The heat continues to produce flammable gases, mostly in the form of carbon monoxide. These gases are heated above their ignition temperature and when a supply of oxygen is introduced, as when normal entry points are opened, the gases could ignite with explosive force.~~

deflagration resulting from the sudden introduction of air into a confined spcae containing oxygen-deficient products of incomplete combustion

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 921 and 1403.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:45:47 EDT 2015

Public Input No. 20-NFPA 402-2015 [Section No. 3.3.19]

~~**3.3.19** * – Bogie.~~

~~A tandem arrangement of aircraft landing gear wheels.~~

Statement of Problem and Substantiation for Public Input

Substantiation: This term is not used anywhere in the document.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub-Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jun 10 17:14:36 EDT 2015

Public Input No. 37-NFPA 402-2015 [Section No. 3.3.32.1]

3.3.32.1 Complementary Extinguishing Agent.

~~Refers to an extinguishing agent that has the compatibility to perform fire-suppression functions in support of a primary extinguishing agent and where extinguishment might not be achievable using only the primary agent.~~

Agents that provide unique extinguishing capability beyond the primary chosen agent.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 414.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:19:33 EDT 2015

Public Input No. 46-NFPA 402-2015 [Section No. 3.3.36.1]

3.3.36.1 Class A.

~~Ordinary combustibles~~

Fire in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics .

Statement of Problem and Substantiation for Public Input

Consistent with NFPA 11 and 16

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:47:31 EDT 2015

Public Input No. 47-NFPA 402-2015 [Section No. 3.3.36.2]

3.3.36.2 Class B.

~~Flammable liquids~~

A fire in flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases .

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 11 and 16

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:48:45 EDT 2015

Public Input No. 48-NFPA 402-2015 [Section No. 3.3.36.2]

3.3.36.2 Class B.

~~Flammable liquids~~

A fire that involves energized equipment where the electrical resistivity of the extinguishing media is of importance .

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 11

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:49:40 EDT 2015

Public Input No. 22-NFPA 402-2015 [Section No. 3.3.43]

~~3.3.43 – Flight Technical Crew (FTC).~~

~~Includes pilots, flight engineers, and flight attendants who crew on aircraft movement.~~

Statement of Problem and Substantiation for Public Input

Substantiation: This term is not used anywhere in the document.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub-Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jun 10 17:21:48 EDT 2015

Public Input No. 44-NFPA 402-2015 [Section No. 3.3.44.1]

3.3.44.1 * Aqueous Film Forming Foam (AFFF) Concentrate.

A concentrate based on fluorinated surfactants plus foam stabilizers to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors and usually diluted with water to a 1 percent, 3 percent, or 6 percent

~~solution. [**16,** 2011]~~

solution

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 11, 403, and 412

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:43:43 EDT 2015

Public Input No. 38-NFPA 402-2015 [Section No. 3.3.44.3]

3.3.44.3 * Fluoroprotein Foam.

A protein

~~-based~~

foam concentrate

~~to which fluorochemical surfactants have been added.~~

incorporating one or more fluorochemical surfactants to enhance its tolerance to fuel contamination

Statement of Problem and Substantiation for Public Input

Consistency with 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:28:46 EDT 2015

Public Input No. 136-NFPA 402-2015 [Section No. 3.3.44.4]

3.3.44.4 Protein Foam Concentrate .

A

~~protein-based foam concentrate that is stabilized with metal salts to make a fire-resistant foam blanket.~~
[**403,** ~~2009~~]
concentrate consisting primarily of products from a
protein hydrolysate, plus stabilizing additives and inhibitors
to protect against freezing, to prevent corrosion of
equipment and containers, to resist bacterial decomposition,
to control viscosity, and otherwise to ensure readiness for use
under emergency conditions.

Statement of Problem and Substantiation for Public Input

Maintain same definition throughout NFPA documents

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 08:54:46 EDT 2015

Public Input No. 49-NFPA 402-2015 [Section No. 3.3.46]

3.3.46 Foam Blanket.

A covering of foam over

~~the~~

a surface

~~of flammable liquids to provide extinguishment and~~

to insulate, prevent ignition , or extinguish the fire .

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 1145

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
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Zip:
Submittal Date: Tue Jun 23 14:52:01 EDT 2015

Public Input No. 39-NFPA 402-2015 [Section No. 3.3.50]

3.3.50 Forward Looking Infrared (FLIR).

~~A thermal imaging system (camera), which can be vehicle-mounted, designed to detect thermal energy.~~

The detection of heat energy radiated by objects to produce a “thermal image.” This thermal image is converted by electronics and signal processing into a visual image that can be viewed by the operator.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:31:40 EDT 2015

Public Input No. 40-NFPA 402-2015 [Section No. 3.3.56]

3.3.56 Halogenated ~~Agent~~ Agents .

A liquefied gas extinguishing agent that extinguishes fire by chemically interrupting the combustion reaction between fuel and oxygen. Halogenated agents leave no residue.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:33:08 EDT 2015

Public Input No. 50-NFPA 402-2015 [Section No. 3.3.59]

3.3.59 Hazardous Materials.

~~A substance~~

Substances (

~~either matter —~~

solid, liquid, or gas

~~— or energy~~

) that when released

~~is~~

are

capable of creating harm to people, the environment, and

~~property, including weapons of mass destruction (WMD) as defined in 18, *U.S. Code, Section 2332a*, and as well as any other criminal use of hazardous materials, such as illicit labs, environmental crimes, or industrial sabotage. [**472,** 2013] *(See Annex F.)*~~

property

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 1851, 1855, 1991, 1992.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

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Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:53:40 EDT 2015

Public Input No. 41-NFPA 402-2015 [Section No. 3.3.64]

3.3.64 International Civil Aviation Organization (ICAO).

An international

~~aviation~~

body

~~, operating under the auspices of the United Nations, that produces technical safety documents for civil air transport.~~

charged with matters dealing with the development, coordination, and preservation of international civil aviation.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 403

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:34:33 EDT 2015

Public Input No. 51-NFPA 402-2015 [Section No. 3.3.72]

3.3.72 Overhaul.

The

~~process~~

final stages of

~~final extinguishment after~~

fire extinguishment, following knockdown

of the main body of

~~a fire has been knocked down. All traces of fire must be extinguished at this time~~

fire, during which pockets of fire are

sought out to complete extinguishment .

Statement of Problem and Substantiation for Public Input

Maintain consistency with 1145

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN

Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 23 14:56:08 EDT 2015

Public Input No. 23-NFPA 402-2015 [Section No. 3.3.82]

3.3.82 Runoff.

Liquids that flow by gravity away from an aircraft accident and might include aviation fuel (ignited or not), water/foam from fire-fighting streams, liquid cargo, or a combination of these liquids.

Statement of Problem and Substantiation for Public Input

Substantiation: "Foam" was not included and should be as it is part of the environmental concern.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:25:23 EDT 2015

Public Input No. 24-NFPA 402-2015 [Section No. 3.3.87]

3.3.87 – Aircraft Skin.

The outer covering of an aircraft fuselage, wings, and empennage.

Statement of Problem and Substantiation for Public Input

Substantiation: The word skin is used within the document for both aircraft and human terminology. Adding aircraft to the term clarifies the context of the term.

****Same addition of the word “aircraft” will be needed in the body in the following sections. This may require individual Task Group Comments or may be editorial. (3.3.15, 3.3.73, 6.11, 7.5.11.1(3), 8.1.2(4), Figure 8.1.2, 8.1.3, Figure 8.1.3, 9.4.3, 11.4.4, Figure 11.4.4 and E2 Substantial Damage).

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS

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Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 10 17:32:52 EDT 2015

Public Input No. 43-NFPA 402-2015 [Section No. 3.3.93.2]

3.3.93.2 Response Time.

The total period of time measured from the time of an alarm until the first ARFF vehicle arrives at the scene of an aircraft accident /incident and is in position to apply

~~agent to any fire.~~

agent

Statement of Problem and Substantiation for Public Input

Maintain consistency with 403

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:36:57 EDT 2015

Public Input No. 9-NFPA 402-2014 [New Section after 3.3.100.1]

3.3.101 US National Grid

The United States National Grid is a standard area and point grid reference system that quickly enables multi-discipline and multi-jurisdictional emergency service agencies to precisely locate incidents and universally communicate locations using paper maps and/or electronic applications. It is based upon the widely used Universal Transverse Mercator (UTM) Coordinate system developed in 1947 and the Military Grid Reference System (MGRS) used by all NATO forces and the National Guard, since 1949. It became the national standard (FGDC-STD-011-2001) for civilian purposes in 2001. It was designated as the land search & rescue standard coordinate system in 2011, by the National Search & Rescue Commitee; a group of federal agencies.

Statement of Problem and Substantiation for Public Input

In reference to Public Input submitted for 4.5.2.1 that is about US National Grid use, this is a definition for US National Grid. Corroboration: a) NAPSG Implementation Guide: http://napsgfoundation.org/wp-content/uploads/2014/01/Implementation-Guide-to-The-USNG.pdf b) land SAR: http://www.epcupdates.org/2012/03/nsarc-designates-usng-as-land-sar.html c) standard: https://www.fgdc.gov/usng

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 8-NFPA 402-2014 [New Section after 4.5.2]	Definition for grid type specified

Submitter Information Verification

Submitter Full Name: ALBERT W STUDT

Organization: URS FEDERAL TECHNICAL SERVICES

Street Address:

City:

State:

Zip:

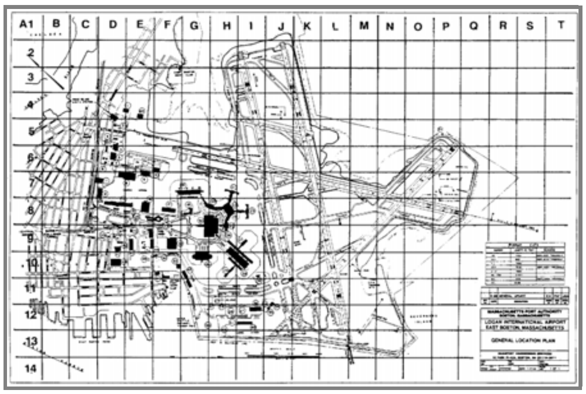
Submittal Date: Wed Dec 24 09:47:15 EST 2014

Public Input No. 26-NFPA 402-2015 [Section No. 4.2.6]

4.2.6

Grid maps should be provided for each airport and its environs. They should be ruled with numbered and lettered grids, as shown in Figure 4.2.6, to permit rapid identification of any response area. The area covered by a grid map should be a distance of 8 km (5 mi) from the center of the airport. This distance can vary depending upon the type of terrain or location of the airport in relation to other emergency facilities. Map nomenclature should be compatible with that used by off-airport public safety authorities. Two or more maps might be required where the area exceeds an 8 km (5 mi) radius. One map should display medical facilities, heliports, and other features according to the airport/community emergency plan. Where more than one grid map is used, grid identifications should differ by color and scale to assist in their identification. Prominent local features, access routes, staging areas, and compass headings should be shown to facilitate locating accident and medical facility sites. Copies of grid maps should be prominently displayed at ATC, the airport operations office, each airport and community fire station, and all mutual aid services, and should be carried on all appropriate emergency vehicles.

Figure 4.2.6 Typical Airport Grid Map. Update Grid Map



Statement of Problem and Substantiation for Public Input

Grid map provided is too busy and needs to be replaced with a less complex example. Committee will provide same samples to choose from.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Street Address:
City:
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Zip:
Submittal Date: Fri Jun 19 11:46:22 EDT 2015

Public Input No. 27-NFPA 402-2015 [Section No. 4.2.10]

4.2.10

Sufficient ARFF vehicles ~~and~~ , personnel and equipment should be provided to meet the required level of protection as specified in NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, for the airport during flight operations. When this protection level is reduced for any reason (e.g., off-airport response, mechanical breakdown, lack of qualified personnel, etc.), all incoming and departing aircraft should be notified of the change in ARFF capability.

Statement of Problem and Substantiation for Public Input

“personnel” should be included along with vehicles and equipment to complete the requirement.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: 402 Sub Committee
Street Address:
City:
State:
Zip:

Submittal Date: Fri Jun 19 11:51:15 EDT 2015

Public Input No. 29-NFPA 402-2015 [Section No. 4.2.10]

4.2.10

Sufficient ARFF vehicles and equipment should be provided to meet the required level of protection as specified in NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, for the airport during flight operations. When this protection level is reduced for any reason (e.g., off-airport response, mechanical breakdown, lack of qualified personnel, etc.), all incoming and departing aircraft should be notified of the change in ARFF ~~capability~~ category .

Statement of Problem and Substantiation for Public Input

"category" more clearly defines the service level available.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
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Affilliation:	402 Sub Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jun 19 11:54:28 EDT 2015

Public Input No. 30-NFPA 402-2015 [Section No. 4.3.3]

4.3.3

The complexity of modern aircraft and the variety of types in service make it difficult to train ARFF personnel in all the important design features of each model. However, personnel should become as familiar as possible with each type of aircraft that normally uses the airport. Particular emphasis should be placed on all of the following:

(1) Location and operation of normal and emergency exits, cargo doors, equipment, and galley access doors

(2) Seating configurations

(3) Type of fuel and location of fuel tanks

(4) Location of ejection seats and armament (military aircraft)

(5) Locations of batteries, hydraulics, and oxygen systems

(6) Positions of break-in points on the aircraft

(7) Location of rapidly activated standby generators or turbines

(8) Fire access panels

(9) Location of aircraft construction materials (carbon fibers, composite materials, etc.) that are subject to releasing hazardous/toxic substances while burning

(10) Hazard Areas e.g.collapse zones

Statement of Problem and Substantiation for Public Input

Add hazard areas to capture other hazards that might not be identified in 1-9.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
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Affilliation:	402 Sub Committee
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City:	
State:	
Zip:	
Submittal Date:	Fri Jun 19 12:01:58 EDT 2015

Public Input No. 31-NFPA 402-2015 [Section No. 4.4.2]

4.4.2

It is desirable that airport ARFF vehicles be able to monitor or be in direct voice communications with an aircraft during an emergency situation. This procedure is especially important when airport control towers are not in operation. A discrete emergency frequency (DEF), where available, should be used for communications between the aircraft crew and the ARFF incident commander. ~~(See 10.4.2.1 for additional information on this topic.)~~

Statement of Problem and Substantiation for Public Input

10.4.2.1 provides no additional information on DEF.

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	402 Sub Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jun 19 16:55:13 EDT 2015

Public Input No. 8-NFPA 402-2014 [New Section after 4.5.2]

4.5.2.1 Grid map standard

Grid maps of the airport and surrounding area shall display federal standard FGDC-STD-011-2001 US National Grid for interoperability across all jurisdictions. Quick reference atlas grids (A-Z, 1-99) while not prohibited, are known to be non-interoperable.

Additional Proposed Changes

File Name	Description	Approved
USNG-NFPA402-Studt-1.jpg	US National Grid, 100 meter grid squares. Explanatory only, not intended for use as a figure	
USNG-NFPA402-Studt-2.jpg	US National Grid, 1 Km grid squares, location of crash plotted. Rules for USNG are "right, then up". Explanatory only, not intended for use as a figure	

Statement of Problem and Substantiation for Public Input

US National Grid is the national standard coordinate system of the USA. It is designed for ground based operations and is functionally equivalent to US military's and NATO's Military Grid Reference System. It is the land search & rescue standard per the National Search & Rescue Committee since 2011. Many after action reports for wide area events cite a need for a common grid system. The use of a grid on a map to make it a tool is not disputed as a grid concept is referenced in 4.5.2. However the type of grid is undefined. Crash maps showing atlas grid of A-Z, 1-99, are not interoperable. Coordinate B,27 cannot be displayed on a GPS or web application. Additionally, responders to B, 27 must have that specific map where B.27 is displayed. In contrast, and with valued-added, US National Grid can be on the local maps made & issued by the airport to surrounding jurisdictions. However, if that map was not in the hand of a responder, or if an incident was beyond the map's margins, all could use their own tools of GPS, computer aided dispatch, mobile data terminal, smart phone or web tool to display the grid and navigate accordingly. On 12/8/14, there was a crash in Maryland. The geo-location by US National Grid was: 18T UJ 116 390 on Drop Forge Lane, Gaithersburg. Those 11 characters are the worldwide coordinate to 100 meter square. For local operations, the reference could have been just 116 390, just six(6) digits. Regionally (state) the reference could have been UJ 116 390.

Corroboration: a) Land SAR directive: http://www.epcupdates.org/2012/03/nsarc-designates-usng-as-land-sar.html b) federal standard: https://www.fgdc.gov/standards/projects/FGDC-standards-projects/usng/fgdc_std_011_2001_usng.pdf c) Fire Engineering article: http://www.fireengineering.com/articles/2014/08/the-us-national-grid-right-then-up.html d) link to map display of 18T UJ 116 390: http://t.co/sB6urn7pd8 e) crash notice: https://twitter.com/USNGFlorida/status/542006086069280768 f) crash to runway graphic: https://twitter.com/USNGFlorida/status/542013398415077377

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 9-NFPA 402-2014 [New Section after 3.3.100.1]	

Submitter Information Verification

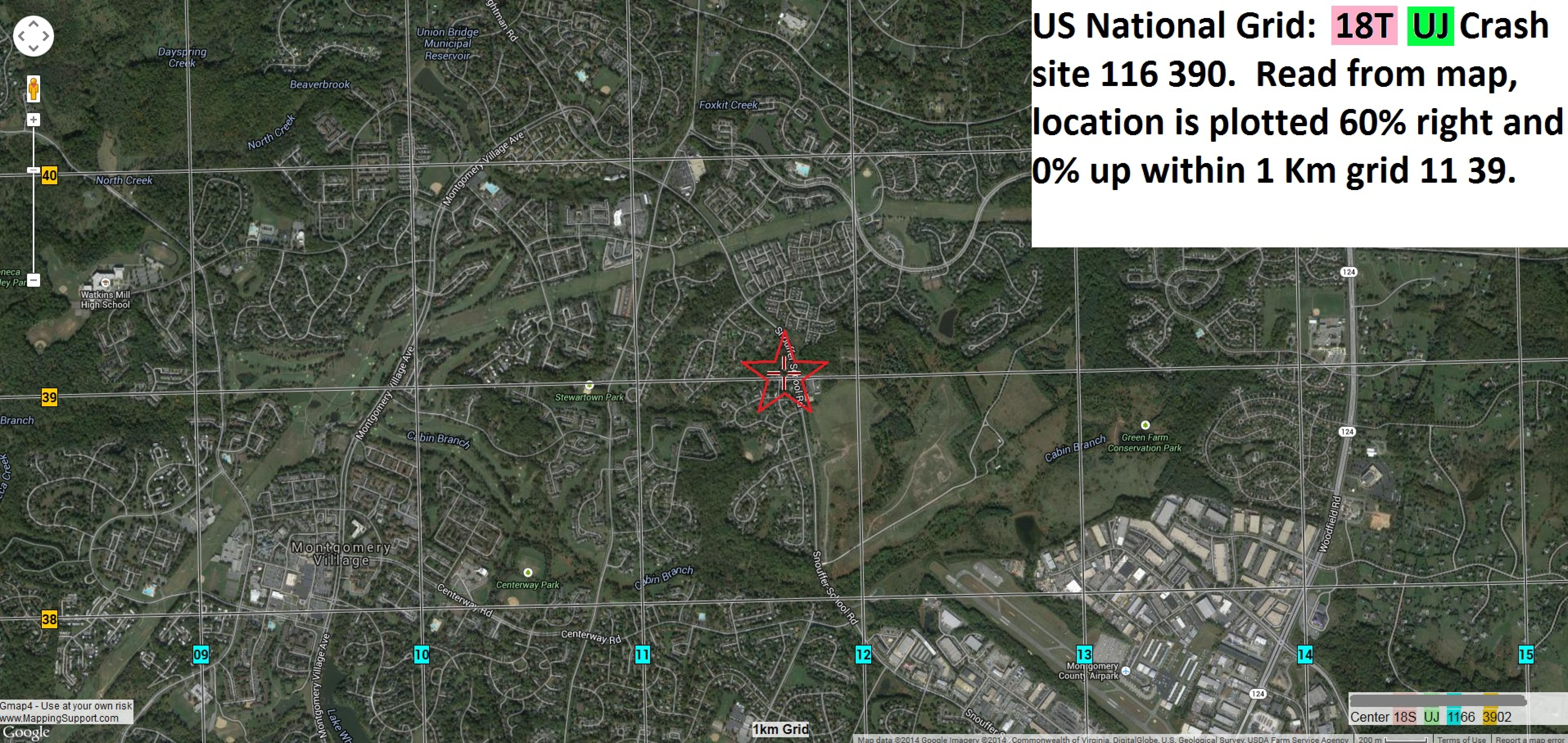
Submitter Full Name: ALBERT W STUDT
Organization: URS FEDERAL TECHNICAL SERVICES
Street Address:
City:
State:
Zip:

Submittal Date:	Wed Dec 24 08:14:10 EST 2014

Plane Crash 12-8-14

US National Grid: 18T UJ

US National Grid: 18T UJ Crash site 116 390. Read from map, location is plotted 60% right and 0% up within 1 Km grid 11 39.



Public Input No. 32-NFPA 402-2015 [Section No. 5.1.2]

5.1.2

The prime mission of all concerned is the safety of all persons aboard the aircraft and any others involved in the emergency. Duties and responsibilities can generally be defined as follows:

(1) Flight deck crews ~~hold the primary responsibility~~ and flight attendants bility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew~~, provided they are able to function in the normal manner at the time~~ .

(2) Flight deck crews and flight attendants share responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew and flight attendants, provided they are able to function in the normal manner at the time.

(3) It is the duty of responding ARFF personnel to create conditions in which survival is possible and evacuation or rescue can be conducted. As visibility from within an aircraft is limited, any external features or situations likely to be of significance in the evacuation process should be communicated to the aircraft's crew. Should it become apparent that crew incapacitation precludes their initiation of evacuation, the incident commander of the ARFF personnel should take the initiative to do so.

Statement of Problem and Substantiation for Public Input

The original first 2 paragraphs were identical with the exception of a few words. The proposed re-write is intended to remove the duplicate information and separate the two points.

Submitter Information Verification

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Submittal Date: Fri Jun 19 17:08:21 EDT 2015

Public Input No. 33-NFPA 402-2015 [Section No. 5.1.2]

5.1.2

The prime mission of all concerned is the safety of all persons aboard the aircraft and any others involved in the emergency. Duties and responsibilities can generally be defined as follows:

(1) Flight deck crews hold the primary responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew, provided they are able to function in the normal manner at the time.

(2) ~~Flight deck crews and flight attendants share responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew and flight attendants, provided they are able to function in the normal manner at the time.~~

(3)

(4) It is the duty of responding ARFF personnel to create conditions in which survival is possible and evacuation or rescue can be conducted. As visibility from within an aircraft is limited, any external features or situations likely to be of significance in the evacuation process should be communicated to the aircraft's crew. Should it become apparent that crew incapacitation precludes their initiation of evacuation, the incident commander of the ARFF personnel should take the initiative to do so.

Statement of Problem and Substantiation for Public Input

The original paragraphs were identical with the exception of a few words. The proposed re-write is intended to remove the duplicate information and separate the two points.

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Public Input No. 34-NFPA 402-2015 [Section No. 5.1.2]

5.1.2

The prime mission of all concerned is the safety of all persons aboard the aircraft and any others involved in the emergency. Duties and responsibilities can generally be defined as follows:

(1) Flight deck crews hold the primary responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew, provided they are able to function in the normal manner at the time.

(2) Flight deck crews and flight attendants share responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew and flight attendants, provided they are able to function in the normal manner at the time.

(3) It is the duty of responding ARFF personnel to create conditions in which survival is possible and evacuation or rescue can be conducted. As visibility from within an aircraft is limited, any external features or situations likely to be of significance in the evacuation process should be communicated to the aircraft's crew. Should it become apparent that crew incapacitation precludes their initiation of evacuation, the incident commander of the ARFF personnel should take the initiative to do so.

(4) In some cases evacuation and passenger assisted rescues may have already commenced prior to the arrival of the ARFF crews.

Statement of Problem and Substantiation for Public Input

The addition of (4) takes into account all possible scenarios.

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Submittal Date: Fri Jun 19 17:16:02 EDT 2015

Public Input No. 53-NFPA 402-2015 [Section No. 5.2.3]

5.2.3

Where a more direct means of communication cannot be established, a designated ARFF individual should go to the left side of the aircraft nose and establish direct eye contact and voice communications with the captain of the flight deck crew. If engine noise is a problem and a power megaphone is not available, it might be necessary to resort to hand signals to communicate. Figure 5.2.3 depicts standard international ground-to-aircraft hand signals that should be used by ARFF personnel to communicate with the captain during emergencies. These hand signals are established for emergency communication between the ARFF Incident Commander and/or ARFF Fire Fighters and the Cockpit and/or Cabin Crews of the Incident Aircraft. ARFF Emergency Hand Signals should be given from the left front side of the aircraft for the cockpit crew. (Note: In order to communicate more effectively with the cabin crew, Emergency Hand Signals may be given by ARFF Fire Fighters from other positions.)

Figure 5.2.3 Standard International Ground-to-Aircraft Signals. (Photos courtesy of the Air Line Pilots Association.)

Add an additional hand signal for "Which side of the Aircraftthe Evacuation Should take Place On".

Recommend Evacuation — Evacuation recommended based on ARFF Incident Commander's assessment of external situation.

Arm extended from body, and held horizontal with hand upraised at eye level. Execute beckoning arm motion angled backward. Non-beckoning arm held against body.

Night — same with wands.

Recommend Stop — Recommend evacuation in progress be halted. Stop aircraft movement or other activity in progress.

Arms in front of head, crossed at wrists.

Night — same with wands.

Emergency Contained — No outside evidence of dangerous condition or "all clear."

Arms extended outward and down at a 45-degree angle. Arms moved inward below waistline simultaneously until wrists crossed, then extended outward to starting position (umpire's "safe" signal).

Night — same with wands.

Statement of Problem and Substantiation for Public Input

This will provide a better level of safety of for occupants as well as ARFF crews.

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Public Input No. 10-NFPA 402-2015 [Section No. 5.2.4]

5.2.4

If aircraft engines are operating, ARFF personnel should use extreme caution when approaching an aircraft for communications purposes as described in 5.2.2 and 5.2.3. The aircraft should be approached only from the front and well ahead of the nose and, if possible, in full view of the captain. Vehicle and hand-held lights should be used in periods of darkness and poor visibility. See Table 5.2.4 for light-gun signals.

Table 5.2.4 Standard Air Traffic Control Tower Light-Gun Signals

Color and Type of Signal	Meaning		
	Movement of Vehicles, Equipment, and Personnel	Aircraft on the Ground	Aircraft in Flight
Steady green	Cleared to cross, proceed, or go	Cleared for takeoff	Cleared to land
Flashing green	Not applicable	Cleared for taxi	Return for landing (to be followed by steady green at the proper time)
Steady red	STOP	STOP	Give way to other aircraft and continue circling
Flashing red	Clear the taxiway/runway		
~~Return to starting point on airport~~			
Taxi clear of runway in use	Airport unsafe, do not land		
Flashing white	Return to starting point on airport	Return to starting point on airport	Not applicable
Alternating red and green	Exercise extreme caution	Exercise extreme caution	Exercise extreme caution

Statement of Problem and Substantiation for Public Input

The wrong text was inserted in this one box on table 5.2.4. Please see Advisory Circular 150/5210-7D to verify.

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Submittal Date: Tue Jan 20 14:33:18 EST 2015

Public Input No. 54-NFPA 402-2015 [Section No. 6.2.7]

6.2.7

Positioning equipment (e.g., ~~DEVS~~ Driver's Enhanced Vision Sysytem) can be installed on ARFF vehicles so drivers know their position on the airport at all times. See NFPA 414

Statement of Problem and Substantiation for Public Input

DEV need to be spelled out and reference NFPA 414

Submitter Information Verification

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Public Input No. 55-NFPA 402-2015 [Section No. 7.2.2.2]

~~7.2.2.2~~ –

~~A Local Standby Alert should also be initiated when an aircraft approaching the airport is known or suspected to have developed some defect, but the trouble is not such as would normally involve any serious difficulty in effecting a safe landing.~~

Statement of Problem and Substantiation for Public Input

This paragraph states the same thing as 7.2.2. There is no new or additional information provided.

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Public Input No. 56-NFPA 402-2015 [Section No. 7.3.1]

7.3.1

ARFF vehicles should approach any aircraft accident by the route that provides the ~~quickest response time~~ most expeditious and safe as possible response . This might not necessarily be the shortest distance to the scene. Traversing unimproved areas can take longer than traveling a greater distance on paved surfaces such as taxiways, ramps, and roads. Total response time is vital. Preferred routes, especially those within the critical rescue and fire-fighting access area, should be preselected. Practice response runs should be made under both ideal and inclement weather conditions.

Statement of Problem and Substantiation for Public Input

: Committee believes that this wording takes into account the need for a fast response but insure that it's done in a safe manner. It is also consistent with recommendation in 1.3.1.

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Submittal Date: Wed Jun 24 16:24:18 EDT 2015

Public Input No. 57-NFPA 402-2015 [Section No. 7.5.9]

7.5.9

On a Boeing 767, if the ground spoilers are deployed and an ~~overwing plug~~ overwing exit is opened, the ground spoilers will rapidly retract down. This is done so that exiting passengers will not be hampered in evacuation. The slide also deploys from the side of the fuselage.

Statement of Problem and Substantiation for Public Input

The term overwing plug is not a term used in the document. In the situation explained in the text, a plug style door is described however an overwing exit is the object being discussed.

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Submittal Date: Wed Jun 24 17:17:48 EDT 2015

Public Input No. 65-NFPA 402-2015 [New Section after 7.5.11.1]

TITLE OF NEW CONTENT

Type your content here ...

7.5.11.5 Lithium Ion Main Battery Events

Some airplanes, both commercial and military are being equipped with lithium-ion batteries. These batteries store energy that can generate intense heat in the event of a short circuit or other failures. Lithium-ion batteries can short circuit if they are improperly packaged, dropped, damaged or have manufacturing defects.

Each lithium-ion cell contains a flammable electrolyte. If the cell has a short circuit or is exposed to high temperatures, it can swell and the electrolyte may begin to vaporize creating internal pressure resulting in a thermal runaway.

For example on the Boeing 787 the lithium-ion batteries are secured inside a reinforced stainless steel enclosure that is capable of containing a lithium-ion battery event. Venting of vapor during a battery failure event may be visible from an exterior vent on the bottom of the airplane under the forward or aft Electrical and Electronic (E&E) bay. During active venting, there is no reason to make access to the E&E bay.

Statement of Problem and Substantiation for Public Input

Consideration needs to be given to other Lithium battery locations on the aircraft as well as batteries that are carried and in cargo.

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Public Input No. 58-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1 (Add a diagram)

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

  (7) Carbon fiber gives off cyanide gas at 150°C (328°F).

  (8) Carbon fiber supports a flame at 195°C (409°F).

  (9) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(10) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(11) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

(12) If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).

(13) Airborne fibers are highly conductive and can seriously damage electrical installations.

(14) All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.

(15) All foot traffic through the area must be curtailed.

(16) Motorized traffic in the area must be kept to a minimum.

(17) Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.

(18) Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.

(19) Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.

(20) Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.

(21) The spread of exposure of composite materials should be limited.

(22) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

Diagram could possibly provide better clarity of what the ARFF crews should be looking for.

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Public Input No. 59-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented.

~~Composite material characteristics relative to heat are as follows:~~

(1)

- ~~Carbon fiber gives off cyanide gas at 150°C (328°F).~~
- ~~Carbon fiber supports a flame at 195°C (409°F).~~
- ~~Delamination occurs between 250°C and 300°C (508°F and 598°F).~~

(1) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(1) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

(2) If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).

(3) Airborne fibers are highly conductive and can seriously damage electrical installations.

(4) All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.

(5) All foot traffic through the area must be curtailed.

(6) Motorized traffic in the area must be kept to a minimum.

(7) Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.

(8) Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.

(9) Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.

(10) Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.

(11) The spread of exposure of composite materials should be limited.

(12) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

The validity of the information is debatable. The information is very specific to certain types of composites. The point of the section is simply to be cognizant of the hazards of composite materials.

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Submittal Date:	Wed Jun 24 17:27:57 EDT 2015

Public Input No. 60-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

  (7) Carbon fiber gives off cyanide gas at 150°C (328°F).

  (8) Carbon fiber supports a flame at 195°C (409°F).

  (9) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(10) ~~The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)~~

(11)

(12) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

(13) If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).

(14) Airborne fibers are highly conductive and can seriously damage electrical installations.

(15) All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.

(16) All foot traffic through the area must be curtailed.

(17) Motorized traffic in the area must be kept to a minimum.

(18) Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.

(19) Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.

(20) Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.

(21) Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.

(22) The spread of exposure of composite materials should be limited.

(23) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

No recommended action provided with this statement and topic is covered elsewhere.

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Submittal Date: Wed Jun 24 17:38:41 EDT 2015

Public Input No. 62-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) ~~Composite material fibers cannot normally be detected by the naked eye.~~

(6)

(7) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

  (8) Carbon fiber gives off cyanide gas at 150°C (328°F).

  (9) Carbon fiber supports a flame at 195°C (409°F).

  (10) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(11) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(12) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

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(22) The spread of exposure of composite materials should be limited.

(23) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

This is not a valid statement. Composites are utilized in varying degrees. Individually products of combustion are not discernable

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Public Input No. 63-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. ~~This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:~~

  (7) ~~Carbon fiber gives off cyanide gas at 150°C (328°F).~~

  (8) ~~Carbon fiber supports a flame at 195°C (409°F).~~

  (9) ~~Delamination occurs between 250°C and 300°C (508°F and 598°F).~~

  (10)

  (11)

  (12)

(13) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(14) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

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(24) The spread of exposure of composite materials should be limited.

(25) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

Not necessary due to the fact that the section does not provide a special tactic or strategy for composite material.

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Public Input No. 64-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

(7) Carbon fiber gives off cyanide gas at 150°C (328°F).

(8) Carbon fiber supports a flame at 195°C (409°F).

(9) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(10) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(11) ~~A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.~~

(12) ~~If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).~~

(13) ~~Airborne fibers are highly conductive and can seriously damage electrical installations.~~

(14) ~~All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.~~

(15) ~~All foot traffic through the area must be curtailed.~~

(16) ~~Motorized traffic in the area must be kept to a minimum.~~

(17) ~~Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.~~

(18) ~~Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.~~

(19) ~~Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.~~

(20) ~~Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.~~

(21) ~~The spread of exposure of composite materials should be limited.~~

(22) ~~The exposure of personnel and valuable equipment to composite materials should be limited.~~

(23)

(24)

(25)

(26)

(27)

(28)

(29)

(30)

(31)

(32)

(33)

(34)

Statement of Problem and Substantiation for Public Input

These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

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Public Input No. 66-NFPA 402-2015 [Section No. 7.5.11.4]

7.5.11.4 Ballistic Parachutes Recovery System .

7.5.11.4.1

An increasing number of certified general aviation, amateur built, light sport, and ultralight aircraft are now being fitted with a Ballistic Recovery System (~~BRS~~ BPRS). In the event of an aircraft structural failure or loss of flight control, the pilot can activate the ~~BRS~~ BPRS . The ~~BRS~~ BPRS is designed to recover control and lower the aircraft and occupants to the ground at a survivable rate. A typical ~~BRS~~ BPRS consists of a parachute, attachment cables, and a propellant system for deployment.

7.5.11.4.2

The components of the propellant system will contain detonators, small explosive charges, and solid-fuel rocket motors, which cannot be rendered safe by emergency response personnel.

7.5.11.4.3

Inadvertent operation of a ~~BRS~~ BPRS may result in serious injury or death. When approaching a general aviation accident, an early assessment should be made to determine if a ~~BRS~~ BPRS is installed. A robust emergency plan should be developed for dealing with ~~BRS~~ BPRS that safeguards emergency responding personnel and the aircraft occupants against inadvertent operation during extrication activities and wreckage movement. Further information can be found on the NTSB website (www.ntsb.gov).

Statement of Problem and Substantiation for Public Input

BRS is a manufacturers name and BPRS is considered a more accurate term.

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Public Input No. 12-NFPA 402-2015 [Section No. 7.5.11.4.3]

7.5.11.4.3

Inadvertent operation of a BRS may result in serious injury or death. When approaching a general aviation accident, an early assessment should be made to determine if a BRS is installed. A robust emergency plan should be developed for dealing with BRS that safeguards emergency responding personnel and the aircraft occupants against inadvertent operation during extrication activities and wreckage movement. Further information can be found on ~~the NTSB~~ the FAA website

(http:// www.

~~ntsb~~

faa .gov /airports/airport_safety/aircraft_rescue_fire_fighting/) u n d er ARFF and first responder training and also

specifically see Certification Alert 13-04 under ARFF related CertAlerts .

Additional Proposed Changes

File Name	Description	Approved
NFPA_402_TIA_13-1.pdf	NFPA TIA 13-1 Log # 1154	

Statement of Problem and Substantiation for Public Input

"Note: This public input originates from Tentative Interim Amendment No. 13-1 (Log #1154) issued by the Standards Council on August 14, 2014 and per the NFPA Regs., needs to be reconsidered by the Technical Committee for the next edition of the Document"

Emergency Nature: This proposed temporary interim amendment (TIA) meets the emergency nature threshold due to the fact that the link to the NTSB website that is in the current document does not provide any training on the ballistic recovery systems (BRS). In fact the NTSB website does not contain any of the information that is suggested in the text of the section, thus necessitating the submission of this TIA. The new text that is being proposed and provided offers users some in-depth training and information on the BRS that can be incorporated into an emergency plan keeping emergency personnel safe.

Submitter Information Verification

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Submittal Date: Mon Mar 30 13:11:51 EDT 2015

Tentative Interim Amendment

NFPA® 402

Guide for Aircraft Rescue and Fire-Fighting Operations

2013 Edition

Reference: 7.5.11.4.3
TIA 13-1
(SC 14-8-30 / TIA Log #1154)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 402, *Guide for Aircraft Rescue and Fire-Fighting Operations*, 2013 edition. The TIA was processed by the Technical Committee on Aircraft Rescue and Fire Fighting, and was issued by the Standards Council on August 14, 2014, with an effective date of September 3, 2014.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a public input of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Revise 7.5.11.4.3 to read as follows:

7.5.11.4.3 Inadvertent operation of a BRS may result in serious injury or death. When approaching a general aviation accident, an early assessment should be made to determine if a BRS is installed. A robust emergency plan should be developed for dealing with BRS that safeguards emergency responding personnel and the aircraft occupants against inadvertent operation during extrication activities and wreckage movement. Further information can be found on the FAA website (http://www.faa.gov/airports/airport_safety/aircraft_rescue_fire_fighting/) under ARFF and first responder training and also specifically see Certification Alert 13-04 under ARFF related CertAlerts. ~~NTSB website (www.ntsb.gov)~~.

Issue Date: August 14, 2014
Effective Date: September 3, 2014

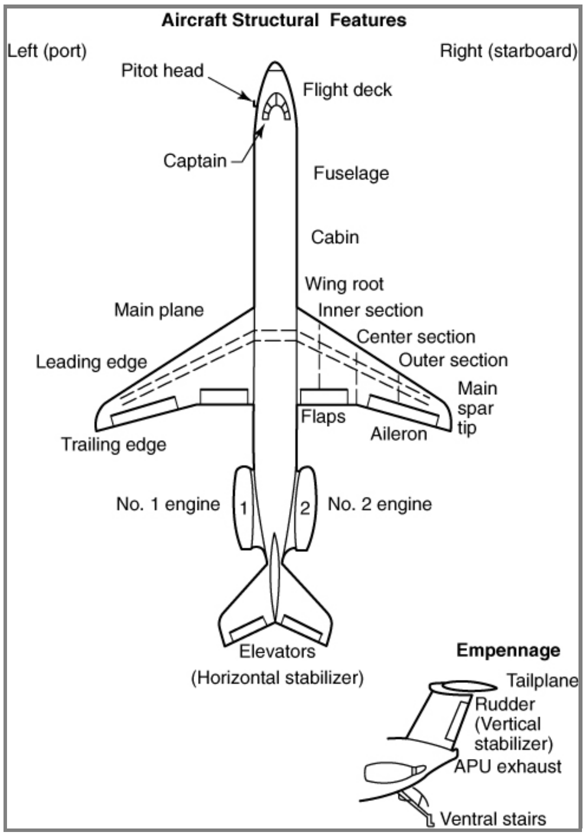
(**Note: For further information on NFPA Codes and Standards, please see** www.nfpa.org/codelist)

Public Input No. 67-NFPA 402-2015 [Section No. 8.1.1]

8.1.1

It is fundamental that ARFF personnel have a working knowledge of named parts and construction of an aircraft to ensure commonality in terms used and recognition of potential difficulties and hazards when gaining access or extricating casualties. Aircraft are manufactured in many sizes. However, the terms used in respect to identification of structural features are common to most sizes of aircraft. These are identified in Figure 8.1.1.

Figure 8.1.1 Nomenclature for Aircraft Structural Features. (Update diagram and add a side view)



Statement of Problem and Substantiation for Public Input

Need to provide the most up to date diagrams possible. The current diagram is out of date and there should also include a diagram of a side view of the aircraft.

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Public Input No. 68-NFPA 402-2015 [Section No. 8.2.7]

8.2.7

Many aircraft cabin materials in current and continuing use, as well as newer fire-resistive materials, can produce high concentrations of toxic gases when heated even though no open flaming is visible. Some examples of toxic gases given off by cabin materials are ~~shown in Table 8.2.7 . (Therefore, it~~ Hydrogen Cyanide (HCN), Ammonia (NH3), Benzene and Sulfur Dioxide (SO2). (It is imperative that positive-pressure SCBA be worn by all fire fighters engaged in rescue, fire-fighting, and overhauling operations.)

Table 8.2.7 Toxic Gases Given Off by Aircraft Materials

Material	Use	Toxic Gases
Nylon	Seats, curtains, carpeting	Hydrogen cyanide (HCN) Ammonia (NH_3)
Silk	Headcloth and curtains	Hydrogen cyanide (HCN) Ammonia (NH_3)
Wool	Seats, curtains, carpeting	Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2)
Acrylics	Glazing	Hydrogen cyanide (HCN)
Polystyrene	Insulation	Benzene
Rubber	Wiring systems	Sulfur dioxide (SO_2) Hydrogen sulfide (H_2S)
Urethanes	Seating and insulation	Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2)
Melamine	Decorative laminates	Hydrogen cyanide (HCN) Ammonia (NH_3)
Polyvinylchoride (PVC)	Wiring insulation, paneling, and trim	Nitrogen dioxide (NO_2) Hydrogen chloride (HCl) Carbon dioxide (CO_2) Carbon monoxide (CO) Halogen acids
Acrylo-nitrile- butadiene- styrene (ABS)	Window surrounds, seat side paneling	Hydrogen cyanide (HCN)
Fluorocarbon materials	Wiring insulation/covering	Hydrofluoric acid (HF)

Statement of Problem and Substantiation for Public Input

A few examples of toxic gases are needed here to make the point rather than a full table of all possibilities and locations.

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Public Input No. 69-NFPA 402-2015 [Section No. 8.2.7]

~~8.2.7~~

~~Many aircraft cabin materials in current and continuing use, as well as newer fire-resistive materials, can produce high concentrations of toxic gases when heated even though no open flaming is visible. Some examples of toxic gases given off by cabin materials are shown in Table 8.2.7 . (Therefore, it is imperative that positive-pressure SCBA be worn by all fire fighters engaged in rescue, fire-fighting, and overhauling operations.)~~

~~Table 8.2.7 Toxic Gases Given Off by Aircraft Materials~~

~~Material Use Toxic Gases Nylon Seats, curtains, carpeting Hydrogen cyanide (HCN) Ammonia (NH_3) Silk Headcloth and curtains Hydrogen cyanide (HCN) Ammonia (NH_3) Wool Seats, curtains, carpeting Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2) Acrylics Glazing Hydrogen cyanide (HCN) Polystyrene Insulation Benzene Rubber Wiring systems Sulfur dioxide (SO_2) Hydrogen sulfide (H_2S) Urethanes Seating and insulation Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2) Melamine Decorative laminates Hydrogen cyanide (HCN) Ammonia (NH_3) Polyvinylchoride (PVC) Wiring insulation, paneling, and trim Nitrogen dioxide (NO_2) Hydrogen chloride (HCl) Carbon dioxide (CO_2) Carbon monoxide (CO) Halogen acids Acrylo-nitrile-~~

~~butadiene-~~

~~styrene (ABS) Window surrounds, seat side paneling Hydrogen cyanide (HCN) Fluorocarbon materials Wiring insulation/covering Hydrofluoric acid (HF)~~

Statement of Problem and Substantiation for Public Input

A few examples of toxic gases in the body text make the point rather than a full table of all possibilities and locations. The table could be moved to the annex if so there is a strong desire to keep the full table.

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Public Input No. 70-NFPA 402-2015 [Section No. 8.3.1]

8.3.1

In some aircraft, where the wing joins the fuselage there is no substantial separation to provide a desired fire wall. As all aircraft have wing tanks, many without separate metal or synthetic bladders within the wing cavity, vapors are seriously exposed under fire conditions. Fuel is carried in storage tanks that are structurally separate but interconnected, incorporating vent systems to ensure equalization of pressure and prevent collapse of the tank. Aircraft with a high rate of climb have fuel tanks that are pressurized to prevent the fuel from boiling off or with vapor locks.

8.3.1.1

~~The principal types~~ Types of fuel tanks in use are as follows:

(1) *Rigid Tanks.* These are usually made of aluminum or Duralumin with internal baffles to brace the tank and reduce surging of fuel. These tanks are normally covered in fabric, fitted with cradles, and held by metal straps.

(2) *Integral Tanks.* These are shaped by compartments formed by the airframe structure, and are made fueltight. The advantage to this type of tank is that it does not add weight to the structure.

(3) *Flexible/Semi-flexible Tanks.* These are bags made from plastic or other man-made material that are held in place by rubber-buttoned area press studs. The advantage to this type of tank is that it is not ruptured by shock; however, they are susceptible to rupture by piercing.

(4) *Auxiliary Tanks.* These are normally constructed of metal or fiberglass, and found in the form of pods, which can be fitted under wing, wing tips, or within the fuselage. The fuel in auxiliary tanks is usually used in flight first, and in some circumstances, these tanks may be jettisoned in an emergency.

Statement of Problem and Substantiation for Public Input

Should begin “type” the lead in of “The principal” add no further clarity to the statement.

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Public Input No. 71-NFPA 402-2015 [Section No. 8.3.3]

8.3.3

~~Currently entering commercial service are wide~~ Wide -body ~~aircraft with~~ aircraft have provisions for additional fuel storage within both the horizontal and vertical stabilizers. Damage to these tanks in the event of an aircraft accident poses a number of problems, including those where fuel or vapors might enter occupied sections of the aircraft and become ignited. These additional fuel storage locations can complicate the fire-fighting operations and will require additional agent. *(See also NFPA 403, Standard for Aircraft Rescue and Fire-Fighting Services at Airports.)*

Statement of Problem and Substantiation for Public Input

The lead in statement gives the impression that these fuel storage locations are new. These locations for fuel tanks are now common.

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Public Input No. 72-NFPA 402-2015 [Section No. 8.3.5]

8.3.5 *

Aviation fuels that are in use for civil and military aircraft include the following (Table 8.3.5 provides a summary of aviation fuel designations and their significant fire hazard characteristics):

(1) Fuels for piston-driven aircraft are aviation gasoline (AVGAS) or motor gasoline (MOGAS).

(2) Fuels in use in turbine engines are Jet A and Jet A1 (AVTUR) kerosene, Jet B (AVTAG) 60 percent gasoline 40 percent kerosene, and JP-5 (AVCAT) for naval carrier–borne aircraft.

Note: Bio fuels are currently being developed for use in commercial aviation and are generally blended with other fuels . Limited informations was available during time of publication.

Table 8.3.5 Aviation Fuel Designations and Characteristics

Fuel Type	Civil Aviation Designation	UK Designation	Military Designation	Minimum Flash Point	Auto-Ignition Temp	Explosive Range (Volume %)
Kerosene	Jet A Jet A1	AVTUR	JP-8	37.8°C (100°F)	246.1°C (475°F)	0.7–5.3
Kerosene (high flash)	JP-5	AVCAT	JP-5	60°C (140°F)	246.1°C (475°F)	0.7–5.3
Kerosene and gasoline mixture	Jet B	AVTAG	JP-4	–23.3°C (-10°F)	248.9°C (480°F)	1.2–7.6
Aviation gasoline	AVGAS	AVGAS	AVGAS	–45.6°C (-50°F)	448.9°C (840°F)	1.4–7.6
Motor gasoline	MOGAS	MOGAS	MOGAS	–45.6°C (-50°F)	448.9°C (840°F)	1.4–7.6

Statement of Problem and Substantiation for Public Input

Bio Fuels are being used in the industry. Their mixtures and characteristic vary and it might be better served with a simple note at the end of the table referencing them.

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Public Input No. 73-NFPA 402-2015 [New Section after 8.4.10]

8.4.11 Re-enforced Flight Deck Doors

Commercial aircraft flight deck doors are secured and in the event that the aircraft is unoccupied or occupants are incapacitated forcible entry will be required for access in the event emergency.

Statement of Problem and Substantiation for Public Input

Flight deck door previously unsecured and required no special training or consideration.

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Public Input No. 74-NFPA 402-2015 [New Section after 9.1]

9.1 Suggested Addition

It is imperative that, before commencing rescue operations, a scene survey and risk assessment is carried out. This should consider at least the following: -

(1) Stability of the aircraft and/or its wreckage

(2) Training and competence of crews

(3) Availability and suitability of equipment

(4) Hazards arising from the accident site

(5) Prevailing weather conditions

(6) Hazards that may emerge during rescue operations

Statement of Problem and Substantiation for Public Input

Committee feels that this is a good introductory paragraph for Chapter 8

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Public Input No. 75-NFPA 402-2015 [Section No. 9.2.1]

9.2.1

Evacuation slides are provided to expedite occupant egress from aircraft that have normal door sill heights above 1.5 m (5 ft). Because passengers are not trained in proper evacuation slide use, as shown in Figure 9.2.1, there is a degree of personal injury risk (approximately 6 percent) when slides are used. ARFF personnel should expect the occurrence of sprains, bruises, friction burns, and other minor injuries whenever evacuation slides are used.

Figure 9.2.1 Deployed Evacuation Slide. (Update photo)

Statement of Problem and Substantiation for Public Input

Needs to be up to date

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Public Input No. 76-NFPA 402-2015 [Section No. 9.2.2]

9.2.2

If the nose gear fails during landing, the aircraft might come to rest in a tail-high attitude. The failure of one or more landing gears can result in a nose-high or listing attitude. In these instances, evacuation slides become somewhat ineffective because they do not deploy at the proper angle to the ground. A high percentage of injuries can be expected when evacuation slides are used under these circumstances. ARFF personnel should be able to reduce the amount and severity of injuries and expedite evacuation by manipulating the slides and assisting evacuees as shown in Figure 9.2.2.

Figure 9.2.2 Assisting Evacuees at the Base of an Evacuation Slide. (Update photo)

Statement of Problem and Substantiation for Public Input

Needs to be up to date

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Public Input No. 77-NFPA 402-2015 [Section No. 9.2.3]

9.2.3

Aircraft evacuation slides are ~~susceptible to~~ coated with grey aluminized paint to protect them from nearby fires for up to 90 seconds however they remain susceptible to heat and fire exposure. They are combustible, and when exposed to radiant heat they may melt and deflate , ~~then deflate,~~ rendering them unusable. ARFF personnel should protect evacuation slides from heat and flame to the best of their ability but should be extremely careful not to apply foam to the operational area of the slide. Foam on the slide makes it very slippery and increases the descent speed of evacuees, potentially causing severe injuries.

Statement of Problem and Substantiation for Public Input

This description better depicts the current manufacturer standard for slides

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Public Input No. 80-NFPA 402-2015 [New Section after 9.2.4]

9.2.4 XX Suggested Addition

Emergency stairs and equipment are now being used provided at larger aerodromes particularly where multi-deck aircraft operate

Statement of Problem and Substantiation for Public Input

Suggested addition calls attention to the use of emergency air stairs and other equipment that is currently being utilized by ARFF responders

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Public Input No. 78-NFPA 402-2015 [Section No. 9.2.4]

9.2.4

If time and conditions permit, mobile stairways should be used as an alternative to deploying evacuation slides. This method of evacuation, when there is no immediate danger to aircraft occupants, would prevent many injuries. Response of available non-emergency mobile stairways should be prearranged between ARFF personnel and one or more of the following:

(1) Airlines

(2) Airport maintenance facilities

(3) Airport operations

Statement of Problem and Substantiation for Public Input

“non-emergency” takes into account that there also is “Emergency Stairs” e.g. Air Stairs.

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Public Input No. 79-NFPA 402-2015 [Section No. 9.2.4]

9.2.4

If time and conditions permit, mobile stairways should be used as an alternative to deploying evacuation slides. This method of evacuation, when there is no immediate danger to aircraft occupants, would prevent many injuries. Response of available mobile stairways should be prearranged between ARFF personnel and one or more of the following ~~:~~ and detailed in the aerodrome Emergency oders/Aerodrome manual.

(1) Airlines

(2) Airport maintenance facilities

(3) Airport operations

Statement of Problem and Substantiation for Public Input

Suggested addition provides clarity and a reference point

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Public Input No. 81-NFPA 402-2015 [Section No. 9.4.3]

9.4.3

Turbine-powered aircraft have heavier skins and structures than the older piston aircraft. Due to this heavy construction, the only practical method of entry, other than using normal or emergency exits, is through the use of portable power tools. Power saws can be used to cut through aircraft skin and structural materials *[see Figure 9.4.3(a)]*. CAUTION SHOULD BE EXERCISED WHEN USING SPARK-PRODUCING POWER TOOLS WHERE FLAMMABLE VAPORS EXIST. Claw and pry tools can be used for forcing doors and hatches that are jammed, to pull down panels and partitions, to dislodge aircraft seats, and so forth *[see Figure 9.4.3(b)]*. The air chisel can be used to cut aluminum and other light metals found on aircraft *[see Figure 9.4.3(c)]*. Hydraulic rescue tools are used to assist with forcible entry during aircraft accident operations *[see Figure 9.4.3(d)]*. These tools take the form of electric-, pneumatic-, hydraulic-, or gasoline-powered cutting, spreading, or shifting equipment. At best, this type of entry into a modern jet aircraft fuselage is very difficult and time consuming. Areas safe to cut or pry into should be depicted on aircraft emergency diagrams.

Figure 9.4.3(a) Rescue Saws. (Update all photos)

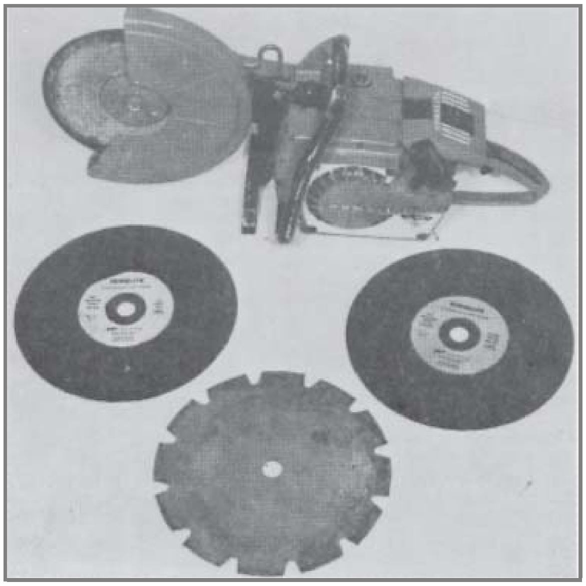

Figure 9.4.3(b) Prying Tools.

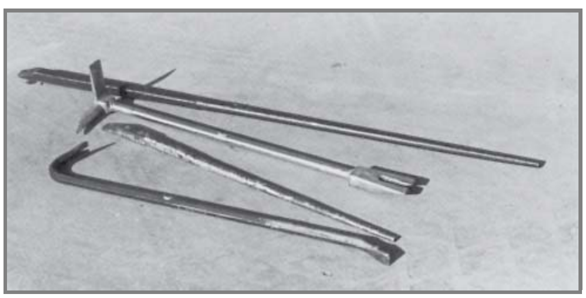

Figure 9.4.3(c) Air Chisel.

Figure 9.4.3(d) Hydraulic Rescue Tools [from left: life or spread (long), spread cut, and lift or spread (short)].

Statement of Problem and Substantiation for Public Input

All photos need to be up to date

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Submittal Date: Wed Jun 24 21:43:40 EDT 2015

Public Input No. 82-NFPA 402-2015 [Section No. 9.4.4.2]

9.4.4.2

Caution should be exercised in ~~the area at the front of~~ 360 degree area around this type of aircraft because it can carry fixed guns and rockets.

Statement of Problem and Substantiation for Public Input

This better depicts true danger area all the way around an aircraft equipped with munitions.

Submitter Information Verification

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Submittal Date: Wed Jun 24 21:47:07 EDT 2015

Public Input No. 11-NFPA 402-2015 [Section No. 9.5.7]

9.5.7

Aircraft accidents can occur during temperature extremes. These conditions can seriously aggravate the condition of persons trapped within an aircraft wreckage for an extended period. During this time it is extremely important to maintain the critical body temperature and vital functions of trapped victims. Tarps, blankets, portable lights, fans, oxygen units, and portable temperature control units (heating and cooling) should be immediately available at an accident site. Portable heating ~~and cooking~~ and cooling units should be designed or located so as not to be an ignition hazard.

Statement of Problem and Substantiation for Public Input

It appears there is a typo in section 9.5.7. Please review to see if you intended to refer to "cooling" of "cooking".

Thanks,

Chad

Submitter Information Verification

Submitter Full Name: Chad Greathouse

Organization: Blue Grass Airport

Street Address:

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Submittal Date: Fri Jan 23 14:26:14 EST 2015

Public Input No. 83-NFPA 402-2015 [Section No. 10.1.4]

10.1.4

Aircraft designers are continuously studying design factors and construction material changes that will increase “crashworthiness” and limit the development of fire situations that can impede evacuation. Additional modifications intended to increase the impact survivability of occupants are also being developed. ~~Other changes being planned include improved passenger~~ Passenger restraints, reduced combustibility of cabin interiors, better marking of exit routes, upgraded emergency exits, and greater emphasis on the training of flight deck crews. ~~If these design improvement measures are as successful as anticipated, the prompt~~ Prompt and effective intervention by trained ARFF personnel becomes even more important ~~than at present~~ because a greater number of aircraft accident survivors needing assistance can be expected. ARFF personnel should become intimately familiar with all aircraft types using the airport and should pre-incident plan the optimum rescue and fire-fighting effort that the fire department can produce with the resources it has at its disposal. Careful consideration of the recommendations in this guide can facilitate the development of practical operational plans.

Statement of Problem and Substantiation for Public Input

These upgrades are now in place and no longer a future vision.

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Submittal Date: Wed Jun 24 21:50:21 EDT 2015

Public Input No. 85-NFPA 402-2015 [Section No. 10.1.4]

10.1.4

Aircraft designers are continuously studying design factors and construction material changes that will increase “crashworthiness” and limit the development of fire situations that can impede evacuation. Additional modifications intended to increase the impact survivability of occupants are also being developed. Other changes being planned include improved passenger restraints, reduced combustibility of cabin interiors, better marking of exit routes, upgraded emergency exits, and greater emphasis on the training of flight deck crews. If these design improvement measures are as successful as anticipated, the prompt and effective intervention by trained ARFF personnel becomes even more important than at present because a greater number of aircraft accident survivors needing assistance can be expected. ARFF personnel should become ~~intimately~~ familiar with all aircraft types using the airport and should pre-incident plan the optimum rescue and fire-fighting effort that the fire department can produce with the resources it has at its disposal. Careful consideration of the recommendations in this guide can facilitate the development of practical operational plans.

Statement of Problem and Substantiation for Public Input

The term “intimately” is not a measurable term.

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Submittal Date: Wed Jun 24 21:55:18 EDT 2015

Public Input No. 87-NFPA 402-2015 [New Section after 10.2.1]

10.2.1 Suggested addition

It is important that complementary and principal agents are carefully selected to ensure they do not adversely affect each other's firefighting or vapour suppression capability

Statement of Problem and Substantiation for Public Input

Provides clear and concise direction in regards to complimentary agent selection and is a good lead in statement for complimentary agents.

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Submittal Date: Wed Jun 24 21:58:50 EDT 2015

Public Input No. 86-NFPA 402-2015 [Section No. 10.2.1]

10.2.1

~~Aqueous film forming foam (AFFF), film forming fluoroproteins (FFFP), protein foam, and fluoroprotein foam~~ Approved foam solutions are the primary extinguishing agents preferred for aircraft rescue and fire fighting.

Statement of Problem and Substantiation for Public Input

There are serval different types of foams and there's a strong chance that there will be more in the near future. The 402 committee suggested the use of the term "approved foam" rather than listing all of them every time. This should be done throughout the document.

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Submittal Date:	Wed Jun 24 21:56:26 EDT 2015

Public Input No. 88-NFPA 402-2015 [Section No. 10.2.2]

10.2.2

Complementary extinguishing agents consist of approved dry chemicals or halogenated/gaseous agents. These are generally best for use on three-dimensional flammable liquid fires or on fires in concealed spaces, such as those occurring behind wall panels, engine nacelles, or wheel wells.

Statement of Problem and Substantiation for Public Input

The 402 committee suggested the use of the term “halogenated/gaseous” rather than listing all of them every time. This should be done throughout the document. This will cover the regulatory removal of halogenated agent in future rewrites.

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Street Address:

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Submittal Date: Wed Jun 24 22:01:10 EDT 2015

Public Input No. 89-NFPA 402-2015 [Section No. 10.2.4]

10.2.4

If dry chemicals or halogenated agents are used, a fire area, once extinguished, ~~could reflash~~ could re-ignite if exposed to a source of ignition. Therefore, a follow-up application of foam is recommended when these agents are used.

Statement of Problem and Substantiation for Public Input

Reflash is not an approved or recognized term.

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Submitter Full Name: ROBERT MATHIS
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Submittal Date: Wed Jun 24 22:04:15 EDT 2015

Public Input No. 90-NFPA 402-2015 [Section No. 10.2.4]

~~10.2.4~~ –

~~If dry chemicals or halogenated agents are used, a fire area, once extinguished, could reflash if exposed to a source of ignition. Therefore, a follow-up application of foam is recommended when these agents are used.~~

Statement of Problem and Substantiation for Public Input

The recommendation to delete this paragraph is due to its confusing nature. Regardless of the fire source or agent used, there is always a possibility for rekindle. Foam is not the solution to preventing a rekindle. The dry chemical or halogenated agent was chosen initially based on tactics such as an E&E bay fire. Flowing foam in that bay would not be a recommended practice.

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Submittal Date: Wed Jun 24 22:06:20 EDT 2015

Public Input No. 91-NFPA 402-2015 [Section No. 10.2.5]

10.2.5

~~AFFF and FFFP should not be mixed with protein-based concentrates. Before film-forming foams are used in equipment that formerly contained protein-based foam concentrate, the foam tank and system must be thoroughly flushed with fresh water.~~
It is imperative that differing foam types are not mixed. The ARFF vehicle manufacturer should be consulted to ensure that the agent system design is compatible with the agent to be used.

Statement of Problem and Substantiation for Public Input

Suggested rewrite incorporates all types of approved foams and stresses the fact that they should not be mixed without manufacturers approval.

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Submittal Date: Wed Jun 24 22:08:07 EDT 2015

Public Input No. 92-NFPA 402-2015 [Section No. 10.2.11]

10.2.11

If the fire has not been completely extinguished by foam, the secured area will "burn back" at a rate that is dependent on the stability of the foam being used. ~~Also, under certain circumstances, fire can "flash back" over a portion of an area covered by foam.~~

Statement of Problem and Substantiation for Public Input

The recommendationis is to delete this sentence. It is unclear what type of situation is being explained. It is also improper to use what appears to be a slang term; "flash back". The intent of the paragraph is to remind the operator that the foam blanket will not hold back fire spread indefinitely.

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Submittal Date: Wed Jun 24 22:10:55 EDT 2015

Public Input No. 93-NFPA 402-2015 [Section No. 10.3]

10.3 Water and Agent Resupply and Conservation.

~~Auxiliary~~ Additional water ~~tankers~~ supplies should be ~~dispatched whenever~~ available whenever there is any indication of possible need, especially when the aircraft accident site is known to be beyond water relay capability. Prearrangements should be made to ensure that additional supplies of extinguishing agents are brought to the scene. Prudent utilization of agents under these circumstances is particularly important, and application methods should be carefully selected to ensure their most effective use.

10.3.1

It is considered impractical to require airport authorities to provide quantities of extinguishing agents to deal with the worst situation that could arise using only the equipment located on the airport. Therefore, it is necessary for airport emergency plans to contain instructions for requesting support from externally based fire services following an emergency. It is not easy to specify an operational requirement that makes adequate provision in all circumstances. It is clear that a need for additional water could arise in as little as 5 minutes, although in this time the initial fire situation should be greatly reduced. If total extinguishment has not been achieved, the fire can quickly extend and the equipment must be replenished.

10.3.2

Airports should consider providing additional water as a support facility. There might be exceptions where airports have adequate piped, stored, or natural water supplies, provided that these are available at an accident in sufficient quantity and in time to meet the operational requirement.

10.3.3

In each case, the authority having jurisdiction (AHJ) should consult closely with the Chief Fire Officer of the Mutual Aid Fire Service regarding response and supply of additional agent/media supplies. The airport authority will need to assess the suitability of the agent/media resources that can be mobilized to support the airport fire service when a serious and prolonged post-accident fire occurs. The speed of mobilization and the rate at which the agent/media can be delivered to the accident site, and its compatibility, are important factors.

Statement of Problem and Substantiation for Public Input

This takes into account other water sources beyond tankers

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Submittal Date: Wed Jun 24 22:12:29 EDT 2015

Public Input No. 94-NFPA 402-2015 [Section No. 10.4.2 [Excluding any Sub-Sections]]

Occupant survival is generally limited to aircraft accidents that are of low impact in nature, where the fuselage is not severely broken up and a fuel fire has not developed. In more severe accidents, even those where fire does develop, ARFF personnel should assume that there is always the possibility of survivors and ~~take aggressive steps~~ take actions to control the fire, initiate evacuation, and rescue those unable to self-evacuate.

Statement of Problem and Substantiation for Public Input

"aggressive steps" is not measureable.

Submitter Information Verification

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Submittal Date:	Wed Jun 24 22:15:00 EDT 2015

Public Input No. 95-NFPA 402-2015 [Section No. 10.4.2.1]

10.4.2.1

Local procedures should be in place for ARFF/pilot communications ~~on a discrete emergency frequency~~ during declared emergency situation .

Statement of Problem and Substantiation for Public Input

Many airports do not have a discrete emergency frequency. Important point here is that there ‘is” a means of communication between ARFF and Pilot.

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Submittal Date:	Wed Jun 24 22:16:53 EDT 2015

Public Input No. 96-NFPA 402-2015 [Section No. 10.4.4]

~~10.4.4~~ –

~~One rescue team method consists of four ARFF personnel equipped with full PPE and SCBA. Two of the persons are handline operators and precede the other two, who are equipped with appropriate hand-held tools needed for forcible entry, extrication, and access to hidden fuselage fires behind panels, floors, and compartments. A procedure preferred by some fire departments is to provide an additional handline operator, similarly attired and equipped with SCBA, operating behind the rescue team with a spray stream, as their protection throughout the entire operation.~~

Statement of Problem and Substantiation for Public Input

This is explanatory material and should be removed or moved to the Annex.

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Submittal Date: Wed Jun 24 22:19:24 EDT 2015

Public Input No. 97-NFPA 402-2015 [Section No. 10.5.1]

10.5.1

The size-up (risk assessment) process is

~~the gathering of facts in preparation for making decisions. The facts pertaining to an aircraft accident, when mentally assembled, enable the responsible ARFF personnel to establish both initial tactics and overall strategy~~

initiated by first responding ARFF personnel and is carried on throughout the duration of the incident in varying degrees of depth and scope by later-arriving superior officers .

Statement of Problem and Substantiation for Public Input

Suggested rewrite provide a better description of what truly takes place in a more concise manner.

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Submittal Date: Wed Jun 24 22:24:55 EDT 2015

Public Input No. 6-NFPA 402-2014 [Section No. 10.7.2]

10.7.2

The location of survivors, if known, and the area of fire will determine where the first streams should be applied. If the fire has penetrated the fuselage, a direct interior attack with handlines and/or boom-mounted turrets and/or boom-mounted penetrating nozzles should be initiated as soon as possible.

Statement of Problem and Substantiation for Public Input

Immediate interior fire suppression with all available ARFF resources is necessary to stop an immediate life danger hazard to any surviving incapacitated passengers. This was noted by the NTSB in the recent Asiana 214 accident at SFO. This is a recommendation by the NTSB.

Submitter Information Verification

Submitter Full Name: Danny Pierce

Organization: ARFF Solutions

Street Address:

City:

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Zip:

Submittal Date: Tue Sep 30 16:25:28 EDT 2014

Public Input No. 98-NFPA 402-2015 [Section No. 10.7.10]

10.7.10

~~AFFF and FFFP agent~~ Fire fighting foam solutions can be applied with ~~aspirating nozzles,~~ turret nozzles ~~used for protein and fluoroprotein foams, or~~ or handline nozzles or conventional water spray nozzles. Either spray or straight streams can be used as the situation dictates. It is best to approach the fire area as closely as possible and apply the foam in a wide spray pattern initially, changing to a narrower pattern after the heat has been reduced. The stream should be applied gently to avoid unnecessary plunging of the stream into the burning fuel. The foam should be applied to the near edge of the fire with a rapid side-to-side sweeping motion to distribute the foam rapidly and thinly over the burning fuel. Advance as the fire is controlled, always applying the foam to the nearest burning fuel surface, and advance only after a continuous, unbroken foam cover is established. The entire foam blanket integrity should be maintained to compensate for voids created by movements of ARFF personnel, evacuees, and equipment, as well as the normal drain down of the foam.

Statement of Problem and Substantiation for Public Input

Rewrite provides better clarity.

Submitter Information Verification

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Submittal Date: Wed Jun 24 22:29:04 EDT 2015

Public Input No. 99-NFPA 402-2015 [Section No. 10.8.2]

10.8.2

When selecting vehicle positions for applying ~~foam~~ from a turret, remember that wind has a considerable influence upon the quality of the ~~foam~~ pattern and the rate of fire and heat travel. Utilize the wind whenever possible to achieve more effective fire control.

Statement of Problem and Substantiation for Public Input

Changes covers “all” agents and not just foam.

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Submittal Date: Wed Jun 24 22:34:11 EDT 2015

Public Input No. 100-NFPA 402-2015 [Section No. 10.9]

10.9 ~~AFFF and FFFP for~~ Turret Application.

10.9.1

The basic principle of this type of foam application is to distribute a visible AFFF or FFFP blanket of sufficient thickness over the burning fuel to act as a blanket for vapor suppression. The original blanket should not be relied on to be permanent and should be maintained as necessary until the fuel vapor hazard no longer exists.

10.9.2

Both aspirating and nonaspirating nozzles can be used for AFFF or FFFP application. A nonaspirated nozzle typically provides longer reach and quicker control and extinguishment. However, expansion rates and foam drainage times are generally less when AFFF or FFFP is applied with nonaspirating nozzles, and it should be understood that the foam blanket might be less stable and have a lower resistance to burnback than that formed using aspirating nozzles. Manufacturers should be consulted for guidance on nozzle performance. Extreme caution should be taken when using the straight stream method, as this can cause an increase in the liquid pool surface or cause an opening in the foam blanket, releasing flammable vapors.

Statement of Problem and Substantiation for Public Input

No reason to call out particular types of foam.

Submitter Information Verification

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Submittal Date: Wed Jun 24 22:36:50 EDT 2015

Public Input No. 101-NFPA 402-2015 [Section No. 10.9.1]

10.9.1

The basic principle of this type of foam application is to distribute a visible ~~AFFF or FFFP~~ blanket ~~of sufficient thickness~~ over the burning fuel ~~to act as a blanket~~ for vapor suppression. The original blanket should not be relied on to be permanent and should be maintained as necessary until the fuel vapor hazard no longer exists.

Statement of Problem and Substantiation for Public Input

No reason to call out particular types of foam. “Sufficient thickness” and “to act as a blanket” are hard to measure and more descriptive than anything. The objective is to cover the fuel to keep vapors suppressed.

Submitter Information Verification

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Submittal Date: Wed Jun 24 22:38:14 EDT 2015

Public Input No. 102-NFPA 402-2015 [Section No. 10.10]

10.10 ~~Foam Turret Application~~ . ~~10.10.~~ 1

Foaming agents should be applied to burning fuel so that they gently form a uniform and cohesive blanket with the least possible turbulence to the fuel surface.

10.10.2

Aspirating nozzles should be used for applying protein and fluoroprotein foams in either the straight stream or dispersed patterns to distribute the foam over a wide area. When using the straight stream method of application, the foam should be applied indirectly using deflection techniques, and special care should be exercised to avoid disturbing the established foam blanket.

Statement of Problem and Substantiation for Public Input

Suggest removing since it’s already covered in 10.9

Submitter Information Verification

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Submittal Date: Wed Jun 24 22:40:44 EDT 2015

Public Input No. 103-NFPA 402-2015 [Section No. 10.11.2]

~~**10.11.2**~~ –

~~Charged handlines should be placed in strategic positions as soon as possible after ARFF personnel arrive on the scene. This practice would ensure their immediate availability for use when the need arises.~~

Statement of Problem and Substantiation for Public Input

The recommendation to delete this paragraph. The recommendation is in conflict with 10.8.5 which identifies the "pump and roll" technique as being an effective fire control technique. Pulling and charging handlines "as soon as possible after ARFF personnel arrive on scene" prohibits the relocation of the vehicle for better fire attack or agent re-servicing. Transitioning from a turret based attack to a handline attack or foam blanket maintenance is a command decision based on the scenario and should not be a described as a "reflex" step for any event incurred.

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Submittal Date:	Wed Jun 24 22:42:50 EDT 2015

Public Input No. 104-NFPA 402-2015 [New Section after 11.1]

11.1.1

ARFF personnel should consider the development and behavior of fire in interior aircraft fires, and adopt firefighting techniques that minimize the risk of sudden conflagration.

Statement of Problem and Substantiation for Public Input

The additional text provides the reader with a more detailed description of circumstances that can lead to aircraft interior fires.

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Submittal Date:	Wed Jun 24 22:45:27 EDT 2015

Public Input No. 105-NFPA 402-2015 [Section No. 11.1.1]

11.1.1

The recommendations contained in this chapter are provided for the guidance of ARFF personnel encountering interior aircraft fires occurring in both parked, unoccupied aircraft and aircraft with passengers and crew aboard.

The following are some examples of the circumstances that could lead to an aircraft internal fire: -

(1) An external fire (normally burning aviation fuel) penetrates the fuselage skin and combustible materials inside are ignited

(2) Combustible materials inside the aircraft cabin are for some reason ignited. In this situation the fire may be discovered early and may be dealt with by trained aircraft crew or, the fire may have developed and the crew can merely strive to contain or minimize the effects of the fire until the aircraft can effect an emergency landing at a suitable airport

(3) Smoke or fumes may be present in the aircraft cabin but the source may not be obvious and may be difficult to locate

(4) A fire involving aircraft engines, auxiliary power units, or undercarriages may spread to areas inside the fuselage

(5) Cargo or baggage carried on the aircraft may for some reason cause a fire which may develop and spread to occupied areas of the aircraft

However an internal fire comes about, if there is, or there is suspected to be, life involvement, a prompt response following the correct tactics is vital

Statement of Problem and Substantiation for Public Input

The additional text provides the reader with a more detailed description of circumstances that can lead to aircraft interior fires.

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Submittal Date:	Wed Jun 24 22:47:48 EDT 2015

Public Input No. 109-NFPA 402-2015 [Section No. 11.1.7]

11.1.7

An interior aircraft fire location and its intensity can, to some degree, be determined by observation through cabin windows, smoke characteristics, aircraft skin that shows buckling or paint blisters, or by use of a handheld or boom mounted thermal imaging camera.

Statement of Problem and Substantiation for Public Input

Covers both types of thermal imaging cameras.

Submitter Information Verification

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Submittal Date: Wed Jun 24 23:07:59 EDT 2015

Public Input No. 110-NFPA 402-2015 [Section No. 11.2.2]

11.2.2

Aircraft emergency landings or accidents can be the result of uncontrolled fires occurring in flight. The ~~most frequent~~ most common types of in-flight fires involve the following:

(1) Engines

(2) Cabin areas

(3) Lavatories

(4) Heaters

(5) Cargo areas

(6) Electrical compartments

Statement of Problem and Substantiation for Public Input

"Common" is a better word. "Frequent" implies that it happens all the time.

Submitter Information Verification

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Submittal Date: Wed Jun 24 23:10:44 EDT 2015

Public Input No. 111-NFPA 402-2015 [Section No. 11.2.4]

11.2.4

When the aircraft is on the ground, ~~whether or not the air-conditioning system is operating,~~ heat, smoke, and gases will build up, creating a toxic atmosphere and setting the stage for a flashover.

Statement of Problem and Substantiation for Public Input

Suggest removing non-relevant information.

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Submittal Date:	Wed Jun 24 23:12:12 EDT 2015

Public Input No. 112-NFPA 402-2015 [Section No. 11.2.6]

11.2.6

If there is no evidence of occupant evacuation, immediate steps should be taken to make entry for control of the fire and rescue of occupants. Entry will permit an inrush of fresh air into a possibly overheated or unstable atmosphere that could rapidly accelerate the fire. Toxic gases will be present, so ventilation and a thorough search for survivors should take place immediately and simultaneously with the fire-fighting effort. In darkness or heavy smoke conditions these efforts will be much more difficult.

Consideration should be given to details of such aspects as:

(1) Options for gaining access

(2) Methodical search patterns

(3) Communications

(4) Hose management

Statement of Problem and Substantiation for Public Input

Addition provides more detail and help clarify what the responder should be thinking about and looking for.

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Submittal Date:	Wed Jun 24 23:17:12 EDT 2015

Public Input No. 113-NFPA 402-2015 [Section No. 11.3.4 [Excluding any Sub-Sections]]

Extinguishment of a hot, smoldering, internal aircraft fire can be very difficult. Where this type of fire exists, one method is worth consideration. It can be referred to as an indirect attack that is made from small fuselage openings such as slightly opened exits or openings made in cabin windows. A coordinated multiple-point attack is more effective than a single-point attack and is necessary when applying the method to fires in wide-body ~~or jumbo aircraft~~ or muli deck with large-volume interiors. It must be remembered that this method is not suitable if there is any possibility of occupants being onboard the aircraft.

Statement of Problem and Substantiation for Public Input

"Multi deck" is a more common day term.

Submitter Information Verification

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Submittal Date: Wed Jun 24 23:18:46 EDT 2015

Public Input No. 114-NFPA 402-2015 [Section No. 11.3.4.2]

11.3.4.2

Should a smoldering, interior aircraft fire occur in compartments below the passenger and flight deck levels, the indirect attack method can also be applied and adapted to the particular circumstances involved. However, it can be more difficult to achieve convenient openings in these compartments.~~ Consideration should be given to attacking fires in these areas through openings in the cabin floor.~~

Statement of Problem and Substantiation for Public Input

This is not a sound tactic to recommend.

Submitter Information Verification

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Submittal Date: Wed Jun 24 23:20:40 EDT 2015

Public Input No. 106-NFPA 402-2015 [Section No. 11.4.4]

11.4.4

The skin penetrator agent applicator tool (SPAAT), shown in Figure 11.4.4, was introduced by the U.S. Air Force. This tool incorporates a pneumatic device that drills through aircraft skin and windows within 10 seconds and can immediately inject any of several agents into the fuselage.

Figure 11.4.4 Skin Penetrator Agent Applicator Tool (SPAAT). **(Suggest moving to Annex A)**

Statement of Problem and Substantiation for Public Input

The recommendation to move this figure to Annex A. This section describes 3 handheld penetrators, SPAATs and boom mounted penetrating nozzle. Why would this be the only style shown in the body of the document?

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Submittal Date: Wed Jun 24 22:52:08 EDT 2015

Public Input No. 5-NFPA 402-2014 [Section No. 11.4.5]

11.4.5*– _ _ Boom Mounted Turrets & Penetrating Nozzles

Boom-mounted turrets and penetrating nozzles can be used to discharge extinguishing agents inside the aircraft. Boom-mounted penetrating nozzles can easily knock cabin/fuselage windows of the aircraft inward allowing access for interior agent application. Boom mounted penetrating nozzles should not be used to penetrate forward facing cockpit windows. Boom-mounted turrets can also be extended and oriented through open doors to discharge agent into the interior of the fuselage. Boom-mounted penetrating nozzles should pierce the aircraft fuselage approximately 12" above windows for effective interior fire suppression by penetrating below overhead baggage storage compartments. Boom mounted penetrating nozzles have proven themselves effective at penetrating the fuselage below the cabin floor level and baggage compartments to extinguish fire burning in concealed spaces. Boom-mounted penetrating nozzles should be deployed rapidly when arriving on scene if any evidence of an interior fire exists before the aircraft is known to be completely evacuated.

Statement of Problem and Substantiation for Public Input

Priority should be given to immediate use of boom-mounted turrets and penetrating nozzles for interior fire suppression. This was demonstrated by the recent Asiana 214 aircraft accient at SFO. This is a recommendation in the NTSB accident report.

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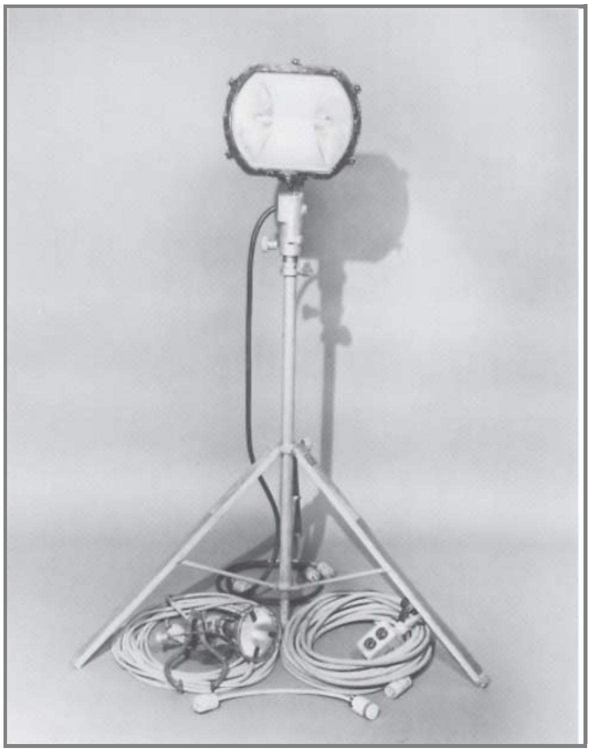
Submittal Date: Tue Sep 30 15:47:19 EDT 2014

Public Input No. 107-NFPA 402-2015 [Section No. 11.5]

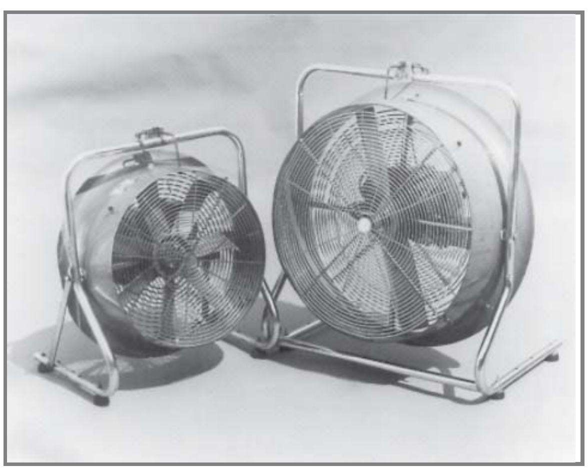
11.5 Interior Aircraft Fire Overhaul.

During the overhaul phase of an interior aircraft fire, hose lines should remain charged and available to extinguish any deep-seated fire, hidden uncovered fire, or reignition. Carpeting, wall panels, partitions, and ceiling covering should be removed when necessary to ensure that all fire is extinguished and that there is no threat of reignition. The use of portable lighting units and ventilation fans, as shown in Figure 11.5(a) and Figure 11.5(b), will help to make the aircraft interior safer and more tenable for ARFF personnel. Any person entering the aircraft during the overhaul phase should use positive-pressure SCBA.

Figure 11.5(~~a) Portable Lighting Units.~~



~~Figure 11.5(b) Ventilation Fans.~~



Statement of Problem and Substantiation for Public Input

The recommendation to delete this figure. It should not be necessary to provide a visual reference for what a portable lighting unit is.

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Public Input No. 108-NFPA 402-2015 [Section No. 11.5]

11.5 Interior Aircraft Fire Overhaul.

During the overhaul phase of an interior aircraft fire, hose lines should remain charged and available to extinguish any deep-seated fire, hidden uncovered fire, or reignition. Carpeting, wall panels, partitions, and ceiling covering should be removed when necessary to ensure that all fire is extinguished and that there is no threat of reignition. The use of portable lighting units and ventilation fans, as shown in Figure 11.5(a) and Figure 11.5(b), will help to make the aircraft interior safer and more tenable for ARFF personnel. Any person entering the aircraft during the overhaul phase should use positive-pressure SCBA.

Figure 11.5(a) Portable Lighting Units.

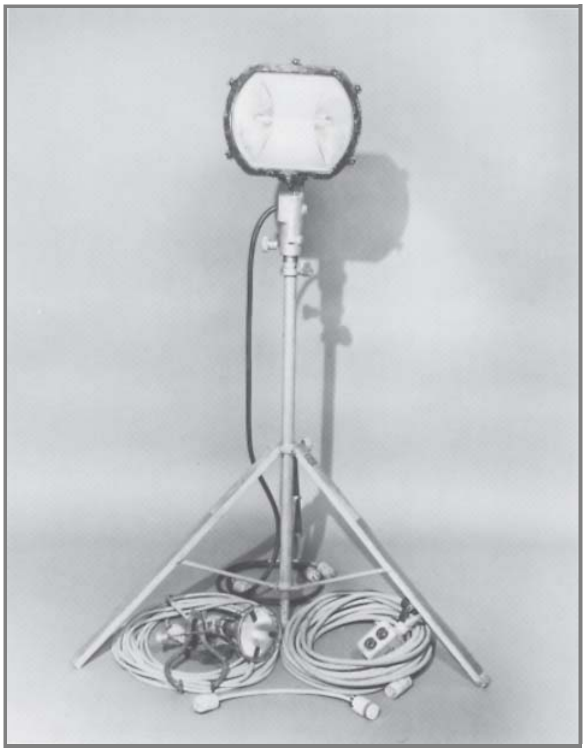
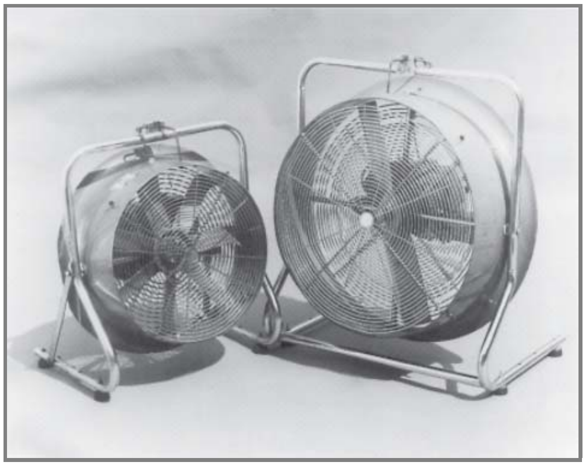


Figure 11.5(b) Ventilation Fans. (Update photo)



Statement of Problem and Substantiation for Public Input

The recommendation is to update this photo to a more modern style ventilation fan. These look more like a workshop fan.

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Public Input No. 115-NFPA 402-2015 [Section No. 12.2.1 [Excluding any Sub-Sections]]

It is reasonable for ARFF personnel responding to aircraft engine fires to expect that all of the following actions have probably been accomplished by the flight deck crew, where appropriate:

(1) Engine shut down

(2) Engine fire extinguishing system (if any) activated

(3) Electrical power to the affected engine(s) de-energized

(4) Fuel ~~and hydraulic fluid~~ supply to the affected engine(s) shut down

(5) Hydraulic Fluid

Statement of Problem and Substantiation for Public Input

Hydraulic fluid cannot be shut down in the same manner as fuel.

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Public Input No. 116-NFPA 402-2015 [Section No. 12.2.6]

~~**12.2.6**~~ –

~~Most jet engines are constructed with magnesium and titanium parts that, if ignited, are very difficult to extinguish. If these fires are contained within the nacelle, they should be permitted to burn themselves out as long as the following conditions exist:~~

(1) ~~There are no external vapors present that cannot be eliminated.~~

(2) ~~Sufficient foam or water spray is available to maintain the integrity of the nacelle and surrounding exposed aircraft components.~~

Statement of Problem and Substantiation for Public Input

Not a reasonable tactic

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Submittal Date: Wed Jun 24 23:26:17 EDT 2015

Public Input No. 117-NFPA 402-2015 [Section No. 12.9.3]

12.9.3

When a bomb threat involving an aircraft is declared an emergency, the aircraft should be evacuated without delay. ~~Passengers should be directed to leave their carry-on materials and depart the aircraft as quickly as possible.~~ The situation might dictate the use of the emergency evacuation slides or built-in stairs. Use of portable stairways might be the safest and most practical alternative.

Statement of Problem and Substantiation for Public Input

The recommendation is to delete the sentence from the paragraph. This is a function of the cockpit or cabin crew and not the ARFF responders.

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Public Input No. 118-NFPA 402-2015 [Section No. 12.11.2]

12.11.2

Hydraulic problems on landing aircraft can involve the brake systems, flaps, spoilers, and so forth. This has a tendency to lengthen the rollout after touchdown and can also affect the aircraft's directional control. As soon as the aircraft touches down and passes each ARFF vehicle that is standing by, that vehicle should immediately follow the aircraft and be ready to perform any necessary operation when it comes to a stop. ~~IT IS EXTREMELY IMPORTANT THAT ALL OTHER AIRPORT VEHICLES AND PERSONNEL REMAIN CLEAR OF THE AIRCRAFT, THUS PERMITTING ARFF VEHICLES AND PERSONNEL TO MANEUVER AND POSITION FOR EFFECTIVE RESCUE AND FIRE FIGHTING.~~

Statement of Problem and Substantiation for Public Input

The recommendation is to delete the sentence from the paragraph. This statement is applicable to every emergency response to an aircraft incident or accident. Why would the statement need to be expressed in BOLD for this type of emergency only?

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Public Input No. 119-NFPA 402-2015 [Section No. 13.3.2]

13.3.2

~~Removal of~~ Movement of fatalities remaining in or around an aircraft wreckage ~~after the fire has been extinguished should be done only by or under the direction of the AHJ.~~ wreckage can be done to minimize further hazard and preserve evidence . . Premature body removal can interfere with identification and destroy pathological evidence. If body removal is absolutely necessary, the original location and the body should be photographed, identified with a number, and reported to investigators. Consideration should be given to tactics involved in extinguishment, rescue operations, preservation of evidence and showing proper respect toward deceased prior to move confirmed fatality.

Statement of Problem and Substantiation for Public Input

In the wake of the unfortunate Asiana accident in San Francisco, it is important to make a statement in regards to removing victims from the vehicle operating area around the accident aircraft. Proper documentation of location (eg. Photos and location flags) should be considered. Scene and evidence preservation is critical to the accident investigation process however, proper respect for the deceased and prevention of further damage to the body has to be considered a crucial step in the response.

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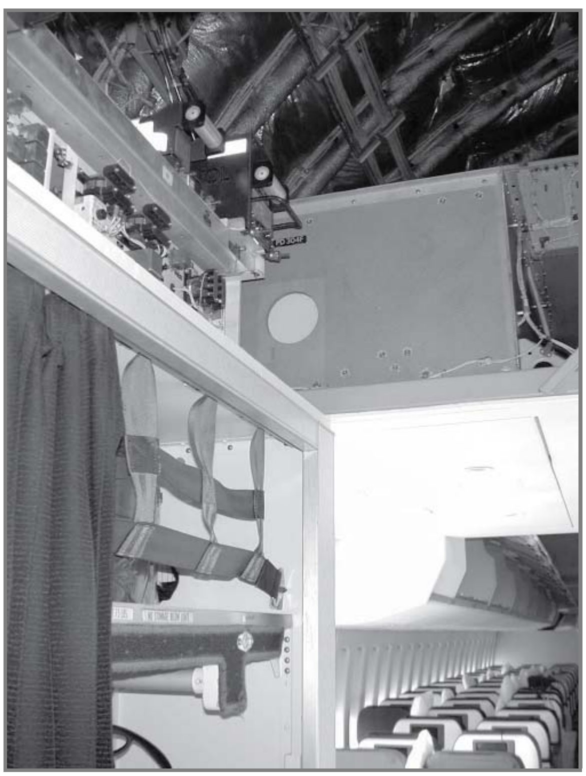
Public Input No. 121-NFPA 402-2015 [Section No. 13.5]

13.5 Flight Data and Cockpit Voice Recorders.

Flight data and cockpit voice recorders, as shown in Figure 13.5(a), are usually located in the aft fuselage area of most commercial aircraft, as shown in Figure 13.5(b), and are designed to be resistant to crash forces and fire. The outer surface is normally painted "International Orange." ARFF personnel should be able to recognize these recorders so that they can be protected from loss or damage until accident investigators assume responsibility. Although no attempt should be made to remove these recorders from the aircraft, as they could be damaged by such efforts, if failure to remove them will result in their total loss, recovery should be made.

Figure 13.5(a) Flight Data Recorder and Cockpit Voice Recorder.

Figure 13.5(b) Location of Flight Data Recorder and Cockpit Voice Recorder.
MOVE Figure - Move the figure in document to immediately following Figure 13.5(a)



Statement of Problem and Substantiation for Public Input

Editorial – In the print version of the document, this figure is in the middle of text of section 13.6 Defueling Accident Aircraft

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Public Input No. 120-NFPA 402-2015 [Section No. 13.6.2]

13.6.2

Defueling of aircraft should not take place until there has been full consultation between the ~~Airport Fire Service, Police, Airline, and Accident Investigation Authority~~ airport fire service, police, airline, and accident investigation authority . Aircraft should not be defueled during rescue operations. If there is fuel leakage, it should be dealt with in the same manner as any other fuel leak, regardless of the aircraft's attitude.

Statement of Problem and Substantiation for Public Input

Editorial – The words should not be capitalized as they are not formal names.

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Public Input No. 122-NFPA 402-2015 [Section No. 13.7.2]

13.7.2 (make to separate sections)

Prior to moving the wreckage, the interior of the aircraft should be well ventilated to ~~remove all flammable vapors.~~ insure a fire safe environment.

13.7.3 After removal of the aircraft, hard ground surfaces should be thoroughly cleaned to remove any flammable liquids or debris before permitting normal traffic to resume. Soft ground surfaces may be contaminated. Advice should be sought from the environmental agency as to whether removal of contaminated ground surfaces may be required.

Statement of Problem and Substantiation for Public Input

Two completely different points are being made here so the paragraph needs to be split. One issue is removal of vapors inside the fuselage and the other is ground contamination.

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Public Input No. 123-NFPA 402-2015 [Chapter 14]

Chapter 14 Structural Fire Department Operations at ARFF Incidents (Suggest Removing)

14.1 General.

Aircraft incidents can involve structures and structural fire departments.

14.1.1

A prerequisite for the application of information contained in this chapter is a thorough review of the preceding chapters. Recommended procedures using apparatus, equipment, and resources available to most structural fire departments are discussed, and emphasis is placed on rescue of aircraft occupants.

14.1.2

Fire control is often the means by which rescue and evacuation of aircraft occupants can be accomplished. Aircraft fuel fires require extinguishing agents and techniques common to Class B fires. Structural fire fighters, therefore, should be trained to effectively combat this type of fire utilizing available equipment and extinguishing agents. It is imperative that fire departments located near airports or aircraft flight paths be thoroughly familiar with the recommendations set forth in this guide.

14.1.3

The recommendations presented in this chapter should not be interpreted as an alternative for adequate airport-based rescue and fire-fighting services as outlined in NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*.

14.2 Pre-Incident Planning and Training.

14.2.1

Fire departments located near airports should make appropriate arrangements to participate in the airport/community emergency plan. The fire department's services should also be made available to the airport during any special events such as air shows or during periods of unusually heavy aircraft traffic. Because no community is immune to an aircraft accident, all fire departments should implement pre-incident planning and training for this type of incident.

14.2.2

At an aircraft accident, teamwork is so important that fire department officers should review pre-incident planning as the one absolutely indispensable element in aircraft rescue and fire fighting.

14.2.3

The psychological factors involved in aircraft rescue and fire fighting can be successfully overcome only by realistic pre-incident planning and training. Consideration should be given to conducting a critical incident stress debriefing for responding personnel. Each fire department should conduct realistic simulated aircraft fire drills using the types of extinguishing agents and equipment it expects to have available. One important training objective should be to learn the capabilities and limitations of the department's pre-incident plan procedures.

14.2.4

Live-fire training is essential in maintaining qualified and certified fire fighters. Traditionally, hydrocarbon fuel from various sources has been the fuel of choice used to conduct this training. However, with stricter environmental laws and improved technology, propane live-fire simulators are in use and fulfilling training needs of the fire fighter.

14.2.4.1

The size of the mock-up should come as close as possible to that of the aircraft utilizing the facility. Training should include interior, engine, wheel brake, exterior pool fire, running fuel, and three-dimensional scenarios. The propane-fired simulator should be equipped with the necessary automatic features to maximize fire fighter safety as recommended in FAA Advisory Circular 150/5220-17, *Aircraft Rescue and Firefighting Training Facilities*, Chapter 4, Mobile ARFF Training Devices.

14.2.4.2

An aggressive attack using hose lines with spray nozzles, employing pre-incident planned operating techniques, can help fire fighters develop the confidence necessary to handle these types of incidents successfully.

14.2.5

The volume of smoke, fire, and intense heat accompanying an aircraft fire can appear to be an overwhelming situation to untrained fire fighters. They might be reluctant to attack and control the fire with a limited water supply and conventional equipment for the amount of time required to complete rescue operations. Experience has proven that rescues can be accomplished even where large quantities of spilled aircraft fuel are burning.

14.2.6

Training coordination between military, civil airport, and structural fire departments is strongly recommended. Execution of mutual aid agreements between these agencies will help ensure well-coordinated plans for rescue and fire fighting. Military air base commanders are urged to make their training facilities available to nearby fire departments, particularly where those departments are likely to be called upon to assist in rescue and fire-fighting operations.

14.2.7

Structural fire department personnel should be thoroughly familiar with the most efficient response routes to the airport and the surrounding area. They should know all the airport's accesses and entrances and be familiar with all rules governing the operational area. This should include procedures to prevent runway incursions. A standard operating procedure for entering locked gates should be established. As a minimum, fire fighter training should include the information in 4.3.4 of this guide.

14.2.8

Aircraft familiarization is also an important part of aircraft rescue and fire-fighting pre-incident planning.

14.2.8.1

Structural fire departments should be provided aircraft familiarization training, including hands-on training, where possible. When inspecting the aircraft, the following should be noted:

(1) Location of fuel, hydraulic oil, and lubricating oils, and other storage locations and their capacities

(2) Seating arrangements

(3) Emergency exits and hatches and how to open them

(4) Fire departments should also be familiar with ballistic parachutes. *(See 7.5.11.4.)*

14.2.8.2

Also important are the locations of batteries, oxygen storage, and various system shutoffs. *(See also 4.3.3.)*

14.2.9

Fire departments should avail themselves of informational charts of all aircraft types using the airport. Airport fire departments as well as airlines and aircraft manufacturers can provide these charts, which depict most information pertinent to rescue and fire-fighting operations.

14.2.10

As a part of preplanning, fire departments should determine that their apparatus and equipment are compatible with the airport fire department. This would include necessary couplings and connections used in water fill and transfer.

14.2.11

Communication is critical to any mutual aid response and particularly so in the case of airport response because of the addition of operating aircraft around the scene. Preplanning should provide knowledge of the capabilities in this area.

14.3 Aircraft Accident Operations.

14.3.1

When fire departments receive a report that an aircraft is experiencing an in-flight emergency or that it is down in the vicinity, they should immediately alert the fire forces that could be affected. Fire and police units should coordinate their efforts. Use of a helicopter, if available, could help coordinate operations and serve as a communication link between the fire units and the control tower.

14.3.2

Size-up (risk assessment) begins with the fire department's first notification of an incident. Multiple calls from various sources in the vicinity of the airport should alert fire dispatchers of a possible major aircraft accident and warrant an immediate first-alarm response. A multi-unit response would ensure arrival at the scene of at least one unit despite the likelihood of blocked access due to debris and traffic. During the initial response, pre-incident plans should be activated, and all pertinent information should be transmitted to the responding units.

14.3.3

The following factors are among those that are important to the size-up (risk assessment) process:

(1) Occupant survival is generally limited to accidents where the fuselage is not severely broken up and a fire has not yet developed.

(2) Environmental and geographical factors have a major impact on response capability. An accident in a wooded area during a winter snowstorm presents different problems from a similar accident on a clear summer afternoon.

(3) Time of day is a factor. An aircraft accident that occurs in a shopping center parking lot has a different life hazard potential at 4:00 a.m. on Sunday from a similar event at 4:00 p.m. on Friday.

(4) The magnitude and nature of the aircraft accident should be considered. An aircraft accident in an open field can set off a major grass or brush fire, but an accident in a populated area can be more complex. If structures are involved, their occupancy, construction type, and stability need to be evaluated. In addition, an assessment of damage to public utilities and their possible effect on operations should be made. Because of the possibility that water supply from hydrants might not be available due to system damage, it is good practice to include water tanks in the first response.

(5) The nature of the aircraft operation at the time of the accident is of importance. If a crop-dusting aircraft accident occurs, steps need to be taken to protect emergency personnel and limit the spread of pesticide contamination.

(6) Aircraft accidents that occur on takeoff usually involve large amounts of fuel. In addition to the fire that could evolve, steps need to be taken to prevent a fire or fuel or fuel vapors from entering waterways, streets, and underground facilities.

14.3.4

An arriving fire department should be governed by established response protocols.

14.4 Basic Fire Control.

14.4.1

Specific implementation of basic aircraft fire control methods should depend upon the fire-fighting equipment and types of extinguishing agents available to individual fire departments.

14.4.2

Always assume that there are survivors of an aircraft accident until it is confirmed otherwise. In some instances, however, rescue of occupants cannot be accomplished because of the remoteness of the accident or the severity of the impact forces. In such instances, fire fighters should make a thorough search for survivors, protect any exposures, attack and extinguish the fire, and preserve the scene until the proper authorities arrive to assume responsibility.

14.4.3

Fire fighters should be aware that aircraft construction differs from most other structures in ways that make fires more dangerous for the occupants and for themselves. Aircraft occupants are enclosed in a thin shell and are surrounded by large amounts of fuel with tremendous heat potential. Large aircraft have hollow wall construction with the void filled with blanket-type insulation. Present-day aircraft are constructed using a large percentage of composite materials that present unique hazards peculiar to this type of construction. Fire walls and draft stops are nonexistent except for engine, galley, and cargo bay areas. These deterrents to fire spread are not comparable to fire barriers found in building construction.

14.4.4

In all large aircraft and in many smaller models, plumbing, electrical, heating, and cooling services are provided. Consequently there are aircraft equivalents of pipe chases, electrical load centers, busbars, and so forth. The aircraft electrical system should be treated with the same safety precautions as any other electrical installation.

14.4.5

Most aircraft contain pressure hydraulic reservoirs and liquid or gaseous oxygen lines constructed mostly of aluminum. These, as well as brake lines, will rupture quickly under fire conditions. Fuel tanks are interconnected, and fire can propagate through ventilation ducts or manifolds. Fire impingement on empty or near-empty fuel spaces often results in a violent rupture of tanks and wings.

14.4.6

Aircraft also differ from other structures in the critical aspect of stability. Most non-aircraft structures are cubical in shape and will collapse in place. Aircraft are cylindrical, conical, and usually on wheels. Therefore, movement such as tilting and rotation effects should be considered. Guy lines, chocks, air bags, and cribbing should be required when working around damaged aircraft. Modern aircraft can weigh 363,200 kg (800,000 lb) or more and have a height greater than a five-story building.

14.4.6.1

Experience has shown that cribbing and shoring material should be unpainted to avoid the inherent slipperiness of painted surfaces when wet and should be made of hard wood so as not to be easily compressed. It should be available and included as a resource in the airport’s emergency preparedness plan. It should be of appropriate thickness and length to accommodate the largest aircraft scheduled into the airport. Aircraft recovery manuals should be used to ascertain appropriate cribbing sizes.

14.4.6.2

It should be noted that the training of ARFF personnel to shore up unstable aircraft wreckage to facilitate rescue implies the provision of suitable materials. To be effective these materials must be constantly available for immediate deployment. To achieve this, the materials should be stored either in a palletized form (requiring ready access to appropriate lifting and transport equipment) or on a dedicated vehicle such as a trailer. In either case, a designated responder should be capable of deploying these supplies at all times under all conditions of weather, visibility, and adverse terrain.

14.4.6.3

As an alternative to the logistics of cribbing, consideration might also be given to the deployment of earth-moving or similar heavy-duty lifting equipment, designed for off-road performance and having the weight and flexibility of electrohydraulics to support or suspend any unstable elements of a damaged aircraft. Skilled operators should also be readily available if this type of equipment is to be used at an aircraft accident site.

14.4.6.4

Regardless of the method or equipment chosen for raising, shoring, or moving a damaged aircraft, guidance based on aircraft structural knowledge is required. It is important to understand that imposing loads at unsuitable locations on the aircraft could merely exacerbate the situation, promoting rather than preventing further disruption of the wreckage. It is advantageous for the task to be performed under the supervision of aircraft maintenance personnel, preferably those familiar with the specific type and model of aircraft involved.

14.5 Accidents Without Fire.

14.5.1

When an aircraft accident occurs without fire, the following fire prevention procedures should be initiated. Hose lines should always be laid out and charged. Any spilled fuel should be covered with foam. Ignition sources such as hot aircraft components or energized electrical circuits should be eliminated. When moving wreckage, care should be taken to avoid causing sparks.

14.5.2

When foam is not available, water spray can be used to cool hot aircraft components and to move fuel away from the fuselage. However, washing fuel away with water requires that special attention be given to exposures, low areas, and drains where fuel and vapors can flow. The fuel should be directed to an area of containment free from ignition sources where it can later be safely removed.

14.6 Accidents with Fire.

14.6.1

The location of survivors and the sources of heat or flame impingement against the aircraft will determine where hose streams should be applied first. Fire fighters should keep in mind that the heat input into the occupied portion will be reduced if the surfaces of the fuselage exposed to flame or heat can be kept wet. If the fire has penetrated the fuselage, a direct internal attack should be initiated. Care should be taken to see that water runoff does not cause the fire to spread.

14.6.2

Normally, hose streams should be directed along the fuselage and efforts concentrated on driving the flames outward, allowing occupants to escape and permitting entry by fire fighters for rescue operations. The fuselage and fuel tank areas should be kept cool. It might be necessary to create an escape path from an exit point by “sweeping” fire out of the area with spray streams. Once an escape path has been established, it should be maintained for evacuating occupants and fire fighters performing rescue.

14.6.3

All available hose lines should attack the fire from the same general direction. If crews are operating on opposite sides of the fuselage, they should be cautious not to push the fire toward each other. Because prompt action is necessary to effect rescue, the first hose line in operation should be advanced immediately to keep the fuselage cool.

14.6.4

For aircraft rescue and fire fighting, there are too many variables to establish hard-and-fast rules regarding use of equipment. Spray streams are normally more effective than straight streams in applying water or foam and afford much more personal protection.

14.6.5

The number and deployment of handlines will be determined by the availability of the water, equipment, and personnel. For example, immediately upon arrival, all deployed hose lines should be charged, regardless of the fire situation. However, if the apparatus is equipped with pre-connect master stream capability, the office may choose different tactics.

14.6.6

Fire fighters who engage in or are exposed to the hazard of proximity fire fighting should be protected in accordance with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

14.7 Fire Fighting with Water.

14.7.1

If an aircraft accident occurs in a remote area with limited water available on responding apparatus, a supplemental source of water should be established. The use of tank vehicles to shuttle water between the nearest water source and the accident site should be considered.

14.7.2

When using water to combat flammable liquid fires, nozzle pressure should be set at the nozzle manufacturer's recommended pressure and flow. Spray patterns, on initial approach to the fire, should be set at a wide angle momentarily to reduce the heat and flame and then be reduced to 30 degrees to attack the fire.

14.7.2.1

The best technique is to sweep the flame off the surface of the fuel by maintaining the lower portion of the spray pattern at the lowest level of the flame. This action also tends to cool the fuel surface and reduce vaporization. However, because there is no vapor seal provided, as when foam is used, chances for reignition remain, and fire fighters should take the necessary precautions to prevent reignition from occurring *(see Section 14.5).* Additional hose lines, used exclusively for the protection of rescue and fire-fighting personnel, are encouraged.

14.7.2.2

Figure 14.7.2.2 shows a variety of typical spray nozzles currently used by structural fire departments. All have the feature of adjustable spray patterns and straight stream settings. Some also have variable flow settings. Most fire chiefs agree that a nozzle setting of 30 degrees provides the best pattern for fighting flammable liquid fires with either water, AFFF, or FFFP solutions.

Figure 14.7.2.2 Typical Spray Nozzles.

14.7.3

Runoff from water streams can cause the spread of fire to exposures. Straight streams should be used when the heat is too intense to approach initially with spray streams or when the objective is to wash the burning liquid away from the fuselage to an area where there is no exposure.

14.7.4

Trained fire fighters employing proper operating techniques can accomplish a successful rescue operation at an aircraft accident with a limited amount of water if they concentrate all their efforts on establishing a fire-free evacuation path. Efforts to save the aircraft hull or exposures might have to be delayed until additional resources arrive.

14.7.5

Addition of a wetting agent might increase the effectiveness of available water; however, certain wet water additives can destroy some foams. Compatibility of the agents should be checked prior to their use.

14.7.6

Approved portable dry-chemical agents (effective on pressure-fed and running fuel line fires), foam (effective on wheel and brake fires), or halogenated agents (effective on engine and electrical fires and localized fires or areas not easily reached by hose streams) can be used as extinguishers to supplement the primary attack with hose streams. In some instances, bulk supplies of dry-chemical agent, foam, or halogenated agent are made available to fire departments on an emergency basis. This resource should be considered when pre-incident planning for aircraft accidents.

14.7.7

The technique of using multiple spray nozzles with overlapping 30-degree patterns creates a continuous curtain of water spray. The nozzles should be advanced directly to the aircraft, parallel to the fuselage, from either the nose or tail section, dependent on wind direction. This procedure will open an area for evacuation and rescue. If possible, hose lines should be advanced with the wind at the fire fighters' backs, as greater reach is possible with the spray streams and less heat is experienced. Progress and stream effectiveness can be monitored more easily from upwind with the smoke moving away. If there is an adequate water supply, a large spray nozzle attached to a deck gun or a portable deluge set can be used to keep the fuselage and fuel tank areas cool.

14.7.8

Protection of exposed property should be considered whether fire exists or not. In addition to structures, exposure protection plans should include drains, sewers, waterways, power lines, and other properties where a flowing fire or unignited fuel could cause fire extension or contamination. Public utility authorities should be notified of any involvement affecting facilities under their control. Master streams from deluge sets, deck guns, or ladder pipes can be used to protect exposures if water supplies are adequate.

14.8 Fire-Fighting Foam.

14.8.1

AFFF, FFFP, or protein foam concentrates properly proportioned into fresh water are more effective than just water on flammable liquid fires.

14.8.2

Techniques for the application of foam vary with the type used. Protein and fluoroprotein foam solutions should be applied with an aspirating foam nozzle at the nozzle manufacturer's recommended pressure and flow. A constant flow from the nozzle should be maintained to ensure an even pickup of the concentrate. The proper operating pressure should be maintained during the entire foam application for effective results. AFFF and FFFP can be applied using either an aspirating foam nozzle or a conventional spray nozzle operating at the nozzle manufacturer's recommended pressure and flow.

14.8.3

A foam-water solution using protein, fluoroprotein, or AFFF can be made up in the water tank of a structural fire-fighting apparatus for direct foam application through hose lines equipped with appropriate nozzles.

14.8.4

Some fire departments have purchased combined agent vehicles for special purposes such as vehicle accidents and flammable liquid spills. Such combined agent vehicles are a valuable tool for the initial response to an aircraft accident.

14.9 Vehicles.

Fire-fighting apparatus designed and intended for use on paved surfaces should not be used for cross-country travel. Extended hose lines from a position on a hard road surface should be used rather than risking immobilization. Once a vehicle has become immobilized, it could not be moved if it became endangered by a developing fire. It can also block or delay other emergency vehicles responding to the site.

14.10 Post-Accident Procedures.

Fire department personnel should be familiar with the information contained in Chapter 13 and Annex E of this guide.

Statement of Problem and Substantiation for Public Input

Repeated information of entire document summarized in 1 chapter.

For task group discussion… This entire chapter is a rewrite of the previous 13 chapters all collected under the title Structural Fire Department Operations at ARFF Incidents. Is it necessary to repeat this information or can it be deleted?

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A.3.3.19 Bogie. (Suggest Removing)

The bogie can swivel up and down so that all wheels follow the ground as the attitude of the aircraft changes or the ground surface changes.

Statement of Problem and Substantiation for Public Input

Removed from the document

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A.3.3.23 Composite Materials.

Composite materials do not present unusual fire-fighting problems, but products of their combustion should be considered ~~a~~ one of the respiratory ~~hazard~~ hazards to fire fighters arising from aircraft fire .

Statement of Problem and Substantiation for Public Input

Clarification of hazards

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Annex C _ Specialized Vehicles and Equipment

Add _ Rescue Air stairs/Stair Trucks

Statement of Problem and Substantiation for Public Input

Covered in other volumes and need to be added.

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~~**Annex D** – Driver's Enhanced Vision System (DEVS): A Technical Approach for Aircraft Rescue and Fire-Fighting Services~~ **(Suggest Removing)**

This annex is not a part of the recommendations of this NFPA document but is included for informational purposes only.

D.1 Introduction.

Several accidents have occurred in poor visibility conditions, and, with the proliferation of category IIIC landing systems, more requirements for fire fighting in low-visibility conditions can be expected. ARFF services currently have no reliable way to locate and navigate crash sites at airports under conditions of poor visibility.

D.2 Background.

ARFF services are required to demonstrate an ability to respond anywhere on the airport operational runway areas as part of earning their annual certificate. This response requirement is considered vital to the ability of ARFF services to gain control of a rapidly growing external post-crash fuel fire and their ability to protect the evacuating passengers from the aircraft fuselage. A response in 3 minutes is dependent on the vehicle's ability to accelerate rapidly from the rescue service's facilities and to maintain approximately a 80.5 km/h (50 mph) approach to the accident site. Operating this task under substandard visibility conditions, such as fog and rain, prevents the responding vehicles from reaching this speed.

There is a clear need to provide operational equipment in the rescue vehicles that maintains their response ability if low-visibility flight operations are to be conducted.

The problem of poor visibility response at airports for rescue and fire-fighting services can be broken down into the following three components:

(1) Locating the accident sites

(2) Navigating aircraft rescue and fire-fighting vehicles to crash sites

(3) Negotiating terrain and obstacles in low-visibility conditions

Airport fire services need a DEVS that addresses these three components.

Aircraft rescue and fire-fighting services should obtain an accurate position fix on the crash site within a time parameter that is comparable to their response time (under 3 minutes). The current system for locating crash sites that are not visible to ARFF services relies on visual observations, estimates, and verbal descriptions of airport landmarks provided by air traffic controllers. This system is prone to human error. The optimal solution to this problem is a system that automatically locates a crash site on a digital map of the airport and transmits this location to aircraft rescue and fire-fighting services.

Navigation of aircraft rescue and fire-fighting vehicles to crash sites is an issue that can be solved with today's technology. Sophisticated radio navigation systems such as the global positioning system (GPS) provide precise positioning capability. This position information, combined with digital maps of the airport area, can be displayed on a geographic map or heads-up display (HUD) to guide the crews.

Negotiating terrain and locating obstacles in low-visibility conditions is an important capability that ARFF services currently do not possess. The only aids that rescue services currently use for improving vision under poor visibility conditions are windshield wipers and headlights. These devices often do not improve visibility enough to allow rescue teams to drive safely at the high speeds necessary to reach a crash site within a reasonable time. One aid that would provide improvement is a forward looking infrared device (FLIR). FLIRs currently are used by the military to improve visibility at night and during severe weather conditions. The FLIR system needs to be fully functional as soon as the fire equipment departs the fire station facility. Exit time typically is under 30 seconds from the time of accident notification. On-line and operational equipment should in no way impede the ability of ARFF services to respond. Equipment is to be automated and is to necessitate little attention by the truck operator.

D.3 General Requirements.

A DEVS is required in an ARFF vehicle for airport emergency equipment. It facilitates faster and safer travel to emergency situations at night and in adverse weather conditions. It provides a substantial increase in the ability to locate people, other aircraft, vehicles, and debris at the emergency site. Its ability to allow the driver to see through flames, smoke, and fog during both the day and night provides ARFF vehicles with a significant increase in effectiveness in every phase of emergency operations.

The DEVS requires a transparent window display (TWD), which is often called a HUD, combined with a GPS and geographic information system (GIS), onboard sensors, a central data and command RF link (radio communications), and a FLIR sensor. These elements are to be integrated into a single functional system. A validation demonstration program is necessary to provide the quantitative information needed to justify the DEVS and refine it for the ARFF services application.

D.4 Operating Scenarios and Capabilities — Mission Description.

From the moment that an alert is received until the end of the emergency, the ARFF services mission is subject to stress and uncertainty. At any given moment, day or night, the equipment needs to be fully functional within a few seconds, regardless of adverse weather. Often vehicles and aircraft are positioned on the runways and taxiways in unusual or unexpected locations. In the event of an aircraft accident, victims and debris can be present anywhere on the airport. At the same time, the large size of modern airports, with multiple parallel runways and taxiways, places a priority on the ability to travel at high speed to the emergency site.

Once ARFF services have arrived at the location, the ability to assess the situation is crucial to carrying out the mission. The information available to the vehicle operator contributes directly to the level of performance of the ARFF mission. This information needs to be obtained without any increase in the workload. The DEVS reduces the impact of night conditions, adverse weather, fire, and smoke so that the operator's performance approaches that achieved during the optimum daylight scenario.

To achieve this goal, information is to be provided in an easily recognizable form, without the need for vehicle operator intervention. Rescue vehicle location, the location of the emergency, the location of other vehicles (ground and aircraft), the location of people, and the location of debris are the basic data needed (and normally available during the least difficult situations). The condition of the aircraft, location of victims, presence and location of spilled burning fuel, and location of other ARFF personnel are also crucial. In addition, the possible presence of toxic gases caused by spilled or burning cargo needs to be assessed to provide for a safe response to the situation. Finally, since multiple vehicles and ARFF crews are involved in most emergency situations, a centralized command and control system is needed to coordinate the activities of all elements of the emergency response team. The DEVS is one element of this command and control system.

D.5 Required Capabilities.

The DEVS increases the knowledge available to the emergency crew. The crew are able to see through fog, rain, sleet, and snow, as well as smoke and flames in and around the burning aircraft, to detect the position of evacuees and trapped passengers, to distinguish them among the debris, and to move into a position for fire fighting. They are able to apply extinguishing agents to the hottest areas of the burning fire more precisely. They also can track other fire fighters through the smoke and fire while rescue efforts are under way.

The FLIR device provides the ARFF operator with the ability to detect debris and other vehicles (stationary or moving) in the vicinity, as well as to detect passengers evacuating from the aircraft. The FLIR detector can illuminate humans in a smoke or fog environment where normal vision is inadequate. The FLIR stores information for normal driving conditions and uses the brighter-than-background standard runway and taxiway lights, which are detectable as it travels to the site.

D.6 System Elements.

The elements of the DEVS for the ARFF vehicle demonstration include a FLIR, a TWD or HUD, and a GPS with GIS or mapping.

D.7 Forward Looking Infrared Device (FLIR).

The FLIR is a high-resolution infrared detector. It is enhanced with wide dynamic range processing for increased penetration of smoke and fog. The FLIR contains a two-dimensional focal plane array using platinum silicide as the detector material. It operates at wavelengths from 8 μm to 12 μm and has a sensitivity of 0.1°C (32.2°F). An alternate FLIR of 3 μm to 5 μm with similar sensitivity also is implemented to establish whether the shorter wavelength provides significant benefits in the smoke environment. A key element in the use of the FLIR device for this application includes a total hands-off automation philosophy. Rapid cool-down is another function dictated by the nature of FLIR detectors. To achieve the best performance, these detectors should be cooled to very low temperatures [in the range of –270°C (–454°F)]. The cooling systems that have been developed have an operating life of about 2500 hours. Rapid cool-down or extended standby life cycle is considered essential to an ARFF application. Zero (0) or near-zero start-up time is an operational requirement for effectiveness.

D.8 Dynamic Range Issues.

To detect people and debris, the FLIR has a sensitivity of approximately 0.1°C (32.2°F). At the same time, the FLIR can be expected to deliver this sensitivity in the presence of flames that could reach temperatures of 1000°C (1832°F). In order to accomplish this, the FLIR operates over an instantaneous dynamic range of about 10,000:1.

D.9 Transparent Window Display (TWD).

The TWD system hardware consists of a projector, an optical element, and a symbol generator to provide information to an operational position. The symbol generator provides data to the projector by means of dedicated signal cables. The symbol generator has the capability to receive and to process data links from up to six video inputs and two serial inputs while formatting messages based on a control program. The control program uses the data's priority, refresh rate, and other site-specific criteria to implement the sequence and content of the information presentation.

D.10 Projector.

The DEVS projector is a high-brightness CRT, monochrome emitter that creates and projects a focused image onto the window of the ARFF vehicle. The projector is designed to be placed 152.4 cm to 182.9 cm (60 in. to 72 in.) from the window. There are optional mounting schemes that allow the projector to be mounted off-axis from the window to accommodate existing mechanical obstructions. The projector is to be equipped to accept standard signal inputs that include RS-170 to utilize the TWDs as a simple replacement of an existing heads-down display (HDD).

D.11 Optical Element.

The optical element is mounted to the window of the ARFF vehicle to act as a dynamic display surface within the truck cab. The optical element should be 38.7 cm^2 to 77.4 cm^2 (6 $in.^2$ to 12 $in.^2$) and affixed to a selected location on the window with room temperature vulcanizing material. The location should be predefined to reflect data in a uniform manner that is specified by both lateral and vertical angles perpendicular to the plane of the window. The viewing zone should offer a lateral reflection angle of 30 degrees and a vertical reflection angle of 15 degrees. The information is to be presented in a bright green color and is to be focused at the plane of the window. The DEVS is not to obstruct the view to the outside of the vehicle.

D.12 Symbol Generator.

The symbol generator is to be a microcomputer-based system designed for rack mounting in an equipment bay. This remote computer offers the capability to interface directly with a selected set of onboard data channels or discrete indicator inputs and is linked with a GPS tracker and a FLIR. The symbol generator is programmed with the mission-specific control scheme and operates in an automatic mode. There is a keyboard and monitor option that supports on-site changes of the data communications and control routines. The symbol generator formats data "pages" and routes this information to the appropriate projector based on priority or currency, or on demand. The symbol generator is capable of being configured to accept a variety of standard signal inputs including RS-232, RS-422, and RS-170.

D.13 Global Positioning System (GPS).

A GPS receiver is to be mounted on the ARFF vehicle and interfaced with the transparent window display system for display of position information. The GPS is to be a six-channel receiver capable of tracking up to eight satellites. The GPS receiver calculates new position data once every second. Position accuracy is specified at a maximum of 25 m (82 ft), with a typical accuracy of about 10 m to 15 m (32.8 ft to 49.2 ft). An additional ground-based differential transmitter on the airfield provides accuracy from 1 m to 3 m (3.3 ft to 9.8 ft).

D.14 Geographic Information System (GIS).

The airport mapping system by which the ARFF vehicle is navigated can be developed by several methods. One method being considered is the digital reconstructive method. This is accomplished by taking an aerial photograph of the airport and digitizing it so it then can be displayed on the computer screen for mapping. This method, as it is developed, could provide the increased local terrain and hazards definition needed by the ARFF vehicle to travel on and around the airfield. Additional mapping capability with definitions of 1.6 m, 4.8 m, and 16.1 m (1 mi, 3 mi, and 10 mi) provide for call-up mapping in the event of an accident in off-airport operational areas. Digital aerial mapping is an emerging technology that provides three-dimensional hazard definition of streams, swales, and drainage culverts, as well as other hazards that could impede the progress of the rescue.

D.15 Computer Information Enhancements.

Once an operational computer is placed in the ARFF vehicle, it provides a host of other fire-fighting capabilities. Fire fighters are able to have the airport's complete emergency plan available in the computer with menu-driven software. Toxic and hazardous material indexes can be provided, as well as complete instructions on emergency door and entryway door operations for every type of commercial aircraft.

D.16 Vehicle Electrical Upgrade.

Because of the need for better power sources, vehicles with new technology equipment need to undergo some modifications to the existing electrical systems. Computers and electronically controlled devices need smooth-filtered and stable voltage sources. The equipment targeted for installation is modified to operate in the voltage ranges used on the existing vehicles. This usually is 12 V or 24 V dc. Special power converters and voltage stabilizers should be considered. There also are requirements for the addition of 115 V ac in some cases. Power from portable generator power sources that might already exist on some of these vehicles does not, in most cases, provide the smooth, stabilized power sources needed by these new technologies. Transformer rectifiers and power converters do not provide a major challenge for the technological requirements of this upgrade. Low-cost portable battery back-up systems also should be considered to provide power for start-up of the vehicle as well as accidental shutoff of the vehicle system supply. The cost of implementing these required voltage sources is minimal when compared to the trouble-free environment that they provide for the electronic boards and computer systems.

D.17 Final Assessment.

The object of this assessment program is to provide information about the new computer-based equipment and vision enhancement devices that help the airport rescue services perform their assigned mission under suboptimal visibility conditions. The cost of installing this equipment can be justified by the need to operate aircraft under these poor visibility conditions. If operations are conducted that allow the aircraft to take off and land under poor visibility conditions, it is reasonable to expect that additional requirements for fire-fighting response under low-visibility conditions will be established.

The technology needed to perform the DEVS is available now. Although the equipment can be bought off the shelf, installation necessitates some additional research effort because ARFF mission requirements were not considered in the research efforts that produced this technology. In the case of each individual element of the DEVS, it was considered that the proposed system should require low operational workload by the operator. Each piece of the system endeavors to use existing technological equipment with some hardware and software modifications. Finally, the DEVS should be designed for easy installation and a maintenance-free duty life cycle or at the least a modular rack installation design allowing the removal and replacement of components by current maintenance personnel without adding to the personnel burden of a rescue and fire-fighting service.

Finally, the most important issue is cost. Historically, this technology has been expensive. Some of the reasons for these high costs were low production runs and the survivability conditions for which the equipment was originally designed. Equipment meeting the rigorous requirements necessary for military applications can add many thousands of dollars to the final purchase price. It is hoped that, with the careful redesign and unique adaptation of existing equipment designs and unit cost price decreases, the cost of using this technology in an aircraft rescue fire-fighting vehicle can be reduced substantially in the near future.

D.18 DEVS Guidelines.

D.18.1 DEVS Performance Characteristics.

The DEVS is an integrated system of sensors, computers, and navigational equipment designed to improve the response and operation of ARFF crews in low-visibility conditions. The DEVS consists of three components: a night- or low-visibility capability, a vehicle navigation capability, and a vehicle tracking capability, which are integrated using a digital radio data link.

To meet the DEVS requirements, systems need to integrate all three components cohesively. Each component should be integrated into the vehicle's normal operations through a systematic approach of understanding and adapting the technology to the needs of the fire-fighting population.

In the sections that follow, the base performance characteristics are detailed. It is important to note that technology development in the enhanced vision area is progressing rapidly; therefore, the criteria that follow should be considered minimal. Questions regarding specific production systems, new performance capabilities, or recommended systems should be directed to the FAA's airports office.

D.18.2 Low-Visibility Capability.

The intent of the low-visibility capability is to provide an enhanced picture of the environmental scene through the use of a chamber or other sensor system displayed inside the cab. For the immediate future, it appears that FLIR technology holds the most promise for aiding visibility in smoke, fog, and haze, and at night. The minimum recommended performance characteristics of the low-visibility system are provided in the following list:

(1) *General*	
(a) Expected worst-case visibility	0 ft range/0 ft ceiling
(b) Time to operational	≤30 sec
(c) Detection of humans	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 88.5 km/h (55 mph), clear conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 80.5 km/h (50 mph), light fog conditions
	121.9 m (400 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), heavy fog conditions
	121.9 m (400 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), smoke conditions
	91.4 m (300 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 56.3 km/h (35 mph), rain/snow conditions
(d) Detection of GA aircraft	762.0 m (2500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 88.5 km/h (55 mph), clear conditions
	304.8 m (1000 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 80.5 km/h (50 mph), light fog conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), heavy fog conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), smoke conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 56.3 km/h (35 mph), rain/snow conditions
(e) Detection of objects near fires	People, debris, wreckage, and equipment within 6.1 m (20 ft) of a 1.8 m (6 ft) diameter Jet A–fuel fire, from a range of 304.8 m (1000 ft)
(2) *FLIR Specific*	
(a) IR waveband	Long wave IR energy (8 µm to 12 µm)
(b) Video output	RS-170 or industry standard video
(c) Gain and level controls	Automatic
(d) Horizontal field of view	≥28 degrees (40 degrees preferred)
(e) Vertical field of view	>20 degrees, aspect ratio to match vertical
(f) Lens clearing capability	Windshield wiper, high-pressure air, or equivalent
(g) Temperature and humidity changes	Changes in ambient temperature and humidity should not result in condensation inside the FLIR housing or optics assembly
(h) Mounting	On top of vehicle with pan and tilt capability, remote-control equipped, line of sight aligned with driver's line of sight
(i) Video monitor	20.3 cm to 25.4 cm (8 in. to 10 in.) diagonal display mounted near driver's line of sight
	Alternative : Heads-up display with field-of-view to match FLIR

D.18.3 Navigation Capability.

The intent of the navigation capability is to allow for accurate positioning of the vehicle on or around the airport surface. The navigation capability should provide a depiction of the vehicle, notable landmarks, roadways, and other guidance aids. Information should be provided to the driver in a meaningful form appropriate to the needs of the fire response.

The navigation capability consists of three main components: a GPS receiver, a computer system containing supporting maps and navigation information, and a display/control system for driver information.

For full capability on the airport, the DEVS should incorporate both capabilities into the design. The performance characteristics of the components in the list in D.18.2 are as follows:

(1) *Position Availability*	Computed position within 30 sec/hr/day, 7 days/week
(2) *Accuracy*	Two-dimensional position within 4.6 m (15 ft)
(3) *Dead Reckoning*	Coasting capability when satellite track is lost due to shadowing
(4) *Position Update Rate*	< 1/sec
(5) *Initialization and Operation*	Fully automatic
(6) *Map*	
(a) Levels of detail	Level 1 — Airport operations area
	Level 2 — Airport property boundary
	Level 3 — 8 km (5 mi) radius of the airport center; either variable or fixed zooms within each level should be provided
(b) Orientation	North-up or heading-up, selectable (Note: Heading-up orientation is required for situational awareness in low-visibility conditions and unfamiliar areas)
(c) Visual orientation cues	Vehicle orientation, vehicle heading, direction of low-visibility coverage
(7) *Driving Cues*	Range/bearing indicator in line of sight (on FLIR display or separate)
(8) *Data Link*	
(a) Error checking	Standard error checking
(b) Frequency selection	Selectable to airport location
(9) *Display — Color*	≥ 256 colors

D.18.4 Tracking Capability.

The tracking capability components include the following:

(1) Differential GPS (DGPS) correction software

(2) Data link hardware/software

(3) Integrated display/control system for command center operations

The command center can be either fixed or mobile, depending on individual airport ARFF operations. This capability is intrinsically tied to the tracking capability, which allows for the monitoring of the positions of other vehicles, the crash site, identified victims, and other factors, as well as linkage to a centralized display for emergency coordination. The performance characteristics of the tracking capability function are as follows:

(1) *Map — Orientation*	North-up with dynamic zoom and pan
(2) *Data Link*	
(a) Error checking	Standard error checking
(b) Frequency selection	Selectable to airport location
(3) *Display — Color*	Large high-resolution monitor [>48.3 cm (>19 in.) diagonal color monitor, 1280 × 1024 resolution]

D.19 Glossary of Technical Terms.

D.19.1 Aircraft Rescue and Fire Fighting (ARFF).

Formerly known in the fire-fighting industry as crash, fire, and rescue.

D.19.2 Cool-Down in the Operational Environment of an Infrared Detector.

Term used to describe the period of time needed for the refrigeration unit of the optical sensor to cool the unit to approximately -270.2°C (-454°F). This cool-down mode provides the necessary sensitivity of 10,000:1 for infrared thermal detection.

D.19.3 Driver's Enhanced Vision System (DEVS).

A vision enhancement system utilizing several electronic and computer-based components that aids in improving sight as well as movement or navigation around the airport during reduced-visibility operational conditions.

D.19.4 Forward Looking Infrared (FLIR).

A thermal imaging system (camera), which can be vehicle-mounted, designed to detect thermal energy.

D.19.5 Geographic Information System (GIS).

A device that allows an aerial map of the airport to be displayed with markers that move along the image as the vehicle changes position.

D.19.6 Global Positioning System (GPS).

A device that picks up signals from orbiting satellites and determines positions of location on earth by reference to longitude and latitude.

D.19.7 Heads-Up Display (HUD).

The military name for a device that allows a person to look and operate a device while viewing through the cockpit window of an aircraft. This device displays information on the cockpit window.

D.19.8 Transparent Window Display (TWD).

An electronic device that projects an image on a special coated glass or plastic that also allows the viewer to see through the clearplate with a slight reduction in visibility.

Statement of Problem and Substantiation for Public Input

Remove, this is already covered in NFPA 414.

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Public Input No. 131-NFPA 402-2015 [Chapter E]

~~**Annex E**~~ – ~~Civil Aircraft Accident Investigation~~ _ (Consider removing or at least updating)

This annex is not a part of the recommendations of this NFPA document but is included for informational purposes only.

E.1 General.

In the United States, major aircraft accidents are investigated by the National Transportation Safety Board (NTSB), 800 Independence Avenue SW, Washington, DC 20591. In some instances responsibility for investigation is delegated by the Board to the Federal Aviation Administration (FAA).

RESCUE: The occupants.

GUARD: The wreckage — Allow no one inside the wreckage area other than those necessary for occupant removal, fire fighting, and the possible removal of mail and cargo where necessary to protect it from further damage. Items removed for protection must be retained locally for examination by a Federal Air Safety Investigator.

ADVISE: The county coroner/medical examiners — Fatally injured occupants of the aircraft should be held for possible pathological or toxicological examination or both prior to embalmment.

IDENTIFY: The position of fatalities — Prior to removing the remains of fatally injured occupants, tag or otherwise identify each body, and mark its location in the wreckage or on the ground (photograph in position, if possible).

PERMIT: News media coverage — Accredited news media can be permitted to enter and photograph the area as long as the wreckage is not disturbed.

NOTIFY: The local authorities, the Safety Board, FAA.

E.2 National Transportation Safety Board Rules.

(The following material is extracted from 49 CFR 175, Chapter VIII.)

Title 49 — Transportation

Chapter VIII — National Transportation Safety Board

Revised: March 20, 1985

Part 830 — Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

Subpart A — General.

Sec.

830.1 Applicability.

830.2 Definitions.

Subpart B — Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft.

830.5 Immediate notification.

830.6 Information to be given in notification.

Subpart C — Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

830.10 Preservation of aircraft wreckage, mail, cargo, and records.

Subpart D — Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft.

830.15 Reports and statement to be filed.

Authority: Title VII, Federal Aviation Act of 1958, as amended, 72 Stat. 781, as amended by 76 Stat. 921 (49 U.S.C. 1441 et seq.), and the Independent Safety Board Act of 1974, Pub. L. 93-633, 88 Stat. 2166 (49 U.S.C. 1901 et seq.).

Subpart A — General.

830.1 Applicability.

This part contains rules pertaining to:

(1) Notification and reporting aircraft accidents and incidents and certain other occurrences in the operation of aircraft when they involve civil aircraft of the United States wherever they occur, or foreign civil aircraft when such events occur in the United States, its territories, or possessions.

(2) Preservation of aircraft wreckage, mail, cargo, and records involving all civil aircraft in the United States, its territories or possessions.

830.2 Definitions.

As used in this part, the following words or phrases are defined as follows:

Aircraft accident means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.

Fatal injury means any injury which results in death within 30 days of the accident.

Incident means an occurrence other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operations.

Operator means any person who causes or authorizes the operation of an aircraft, such as the owner, lessee, or bailee of an aircraft.

Serious injury means any injury which:

(1) Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received

(2) Results in a fracture of any bone (except simple fractures of fingers, toes, or nose)

(3) Causes severe hemorrhages, nerve, muscle, or tendon damage

(4) Involves any internal organ

(5) Involves second or third degree burns, or any burns affecting more than 5 percent of the body surface

Substantial damage means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips, are not considered *substantial damage* for the purpose of this part.

Subpart B — Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft.

830.5 Immediate notification.

The operator of an aircraft shall immediately, and by the most expeditious means available, notify the nearest National Transportation Safety Board field office[1] when:

(1) An aircraft accident or any of the following listed incidents occur:

   (2) Flight control system malfunction or failure;

   (3) Inability of any required flight crewmember to perform normal flight duties as a result of injury or illness;

   (4) Failure of structural components of a turbine engine excluding compressor and turbine blades and vanes;

   (5) In-flight fire; or

   (6) Aircraft collide in flight.

(7) An aircraft is overdue and is believed to have been involved in an accident.

[1]The National Transportation Safety Board field offices are listed under U. S. Government in the telephone directories in the following cities: Anchorage, AK; Atlanta, GA; Chicago, IL; Denver, CO; Fort Worth, TX; Kansas City, MO; Los Angeles, CA; Miami, FL; New York, NY; Seattle, WA.

830.6 Information to be given in notification.

The notification required in section 830.5 shall contain the following information, if available:

(1) Type, nationality, and registration marks of the aircraft;

(2) Name of owner, and operator of the aircraft;

(3) Name of the pilot-in-command;

(4) Date and time of the accident;

(5) Last point of departure and point of intended landing of the aircraft;

(6) Position of the aircraft with reference to some easily defined geographical point;

(7) Number of persons aboard, number killed, and number seriously injured;

(8) Nature of the accident, the weather, and the extent of damage to the aircraft, so far as is known; and

(9) A description of any explosives, radioactive materials, or other dangerous articles carried.

Subpart C — Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

830.10 Preservation of aircraft wreckage, mail, cargo, and records.

(1) The operator of an aircraft involved in an accident or incident for which notification must be given is responsible for preserving to the extent possible any aircraft wreckage, cargo, and mail aboard the aircraft, and all records, including all recording mediums of flight, maintenance, and voice recorders, pertaining to the operation and maintenance of the aircraft and to the airmen until the Board takes custody thereof or a release is granted pursuant to Section 831.10(b).

(2) Prior to the time the Board or its authorized representative takes custody of aircraft wreckage, mail, or cargo, such wreckage, mail, or cargo may not be disturbed or moved except to the extent necessary:

   (3) To remove persons injured or trapped;

(4) To protect the wreckage from further damage; or

(5) Where it is necessary to move aircraft wreckage, mail, or cargo, sketches, descriptive notes, and photographs shall be made, if possible, of the original position and condition of the wreckage and any significant impact marks.

(6) The operator of an aircraft involved in an accident or incident shall retain all records, reports, internal documents, and memoranda dealing with the accident or incident, until authorized by the Board to the contrary.

Subpart D — Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft.

830-15 Reports and statements to be filed.

(1) *Reports.* The operator of an aircraft shall file a report on Board Form 6120.1 or Board Form 6120.2[2] within 10 days after an accident, or after 7 days if an overdue aircraft is still missing. A report on an incident for which notification is required by Section 830.5(a) shall be filed only as requested by an authorized representative of the Board.

(2) *Crewmember Statement.* Each crewmember, if physically able at the time the report is submitted, shall attach a statement setting forth the facts, conditions and circumstances relating to the accident or incident as they appear to him. If the crewmember is incapacitated, he shall submit the statement as soon as he is physically able.

(3) *Where to File the Reports.* The operator of an aircraft shall file any report with the field office of the Board nearest the accident or incident.

[2]Forms are obtainable from the Board field offices (see footnote 1), the National Transportation Safety Board, Washington, DC 20594, and the Federal Aviation Administration, Flight Standards District Office.

NOTE: The reporting and recordkeeping requirements contained herein have been approved by the Office of Management and Budget in accordance with the Federal Report Act of 1942.

Signed at Washington, DC, on September 4, 1980.

James B. King

Chairman

Statement of Problem and Substantiation for Public Input

Consider removing or at least updating

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub-Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Jun 25 00:03:38 EDT 2015

Public Input No. 3-NFPA 402-2014 [Chapter G]

Annex G Informational References

G.1 Referenced Publications.

The documents or portions thereof listed in this annex are referenced within the informational sections of this guide and are not advisory in nature unless also listed in Chapter 2 for other reasons.

G.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 407, *Standard for Aircraft Fuel Servicing*, ~~2012 edition~~ **2017** .

NFPA 410, *Standard on Aircraft Maintenance*, ~~2010 edition~~ **2015** .

NFPA 1561, *Standard on Emergency Services Incident Management System*, ~~2008 edition~~ **2014** .

Fire Protection Guide on Hazardous Materials, ~~13th edition, 2002~~ **2010** .

G.1.2 Other Publications.

G.1.2.1 IATA Publications.

International Air Transport Association Headquarters, IATA Building, 2000 Peel Street, Montreal, Canada H3A 2R4.

Restricted Articles Regulations.

G.1.2.2 ICAO Publications.

International Civil Aviation Organization, **999** ~~University St., Montreal~~ **Robert-Bourassa Boulevard, Montréal , Quebec H3C 5H7 , Canada** ~~H3C 5H7~~ .

Aircraft Accident and Incident Investigation (Annex 13), ~~8th~~ **10** th edition, July ~~1994, Reprinted 1999~~ **2010** .

DOC 9284 ~~AN/905~~ , Technical Instructions for the Safe Transport of Dangerous Goods by Air, ~~2012.~~

~~*Manual of Aircraft Accident Investigation* (Document 6920), 4th edition, 1970, Reprinted 1995.~~

2015-2016 .

Airport Service Manual, Part 5, Removal of Disabled Aircraft, ~~3rd~~ **4th** edition, ~~1996~~ **2009** .

G.1.2.3 U.S. Government Publications.

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, ~~1990~~ **6th edition, 2011** .

Title 44, Code of Federal Regulations, Part 151, "Reimbursement for Costs of Firefighting on Federal Property."

Title 49, Code of Federal Regulations, Part 175, "Transportation."

G.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not directly referenced in this guide.

G.2.1 ICAO Publications.

International standards and recommended practices are promulgated by the International Civil Aviation Organization, **999** ~~University St., Montreal~~ **Robert-Bourassa Boulevard, Montréal , Quebec** ~~PQ~~ **H3C 5H7 , Canada** ~~H3C 5H7~~ .

Aerodromes (Annex 14), ~~3rd~~ **6th** edition, July ~~1999~~ **2013** .

Airport Services Manual, Part 1: "Rescue and Fire Fighting," 3rd edition, 1990**, Reprinted 2004** .

Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods, ~~1st edition, March 2001-2002~~ **2015-2016** .

Technical Instructions for the Transport of Dangerous Goods by Air, Document 9284-AN/905, ~~March 2005~~ **2015-2016** .

G.2.2 U.S. Government Publications.

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

G.2.2.1

Federal Aviation Register Part 139. Part 139 is sold on a subscription basis by the Superintendent of Documents. Subscribers will receive changes to this part automatically.

G.2.2.2 Federal Aviation Administration Publications.

Available from Department of Transportation, Distribution Unit, M-494.3, Washington, DC 20590.

Advisory Circulars. This listing is limited to those free advisory circulars relating to aircraft rescue and fire-fighting services. For a complete listing of FAA advisory circulars, write to the address above and request a copy of the latest "Advisory Circular Checklist and Status of Other FAA Publications." This checklist is also published periodically in the Federal Register.

FAA AC 150/5200-12**C** ,~~First Responder~~ First Responders ' ~~s~~ Responsibility ~~in~~ for Protecting Evidence at the Scene *of an Aircraft Accident /Incident, 2009.* (AAS-100). Furnishes general guidance for airport employees, airport management, and other personnel responsible for fire-fighting and rescue operations, at the scene of an aircraft accident, on the proper presentation of evidence.

FAA AC 150/5200-18**C** , *Airport Safety Self-Inspection*, **2004** (AAS-310). Suggests functional responsibility, procedures, a checklist, and schedule for an airport safety self-inspection.

FAA AC 150/5210-6**D** , *Aircraft Fire Extinguishing Agents*, **2004** (AAS-100). Outlines scales of protection considered as the recommended level — compared with the minimum level in Federal Aviation Regulation Part 139.49 — and tells how these levels were established from test and experience data.

FAA AC 150/5210-13**C** , Airport *Water Rescue Plans* ~~, *Airport,*~~ *and Equipment*, **2010** (AAS-300). Suggests planning procedures, facilities, and equipment to effectively perform rescue operations when an aircraft lands in a body of water, swamp, or tidal area where normal aircraft fire-fighting and rescue service vehicles are unable to reach the accident scene.

FAA AC 150/5210-14**B** , *Airport* Rescue **Fire** ~~and Rescue Personnel Protective Clothing~~ **Fighting Equipment, Tools, and Clothing, 2008** (AAS-100). Developed to assist airport management in the development of local procurement specifications for an acceptable, cost-effective proximity suit for use in aircraft rescue and fire-fighting operations.

FAA AC 150/5210-15**A** , *Airport Rescue and Fire Fighting Station Building Design*, **2008** (AAS-100). Provides standards and guidance for planning, designing, and constructing an airport rescue and fire-fighting station.

FAA AC 150/5210-5**D** , *Painting, Marking, and Lighting of Vehicles Used on an Airport*, **2010** (AAA-120). Provides guidance, specifications, and standards — in the interest of airport personnel safety and operational efficiency — for painting, marking, and lighting of vehicles operating in the airport air operations areas.

FAA AC 150/5210-7**D** , ~~*Aircraft Fire and Rescue Communications*~~ - *Aircraft* **Rescue and Fire Fighting** *Communications* **, 2008.** (AAS-120). Provides guidance and information for planning and implementing an airport communications system for airport fire and rescue service.

(Cancelled 9-19-2011) FAA AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection* (AAS-120). Provides guidance for the water source selection and standards for a water distribution system designed to support aircraft rescue and fire-fighting (ARFF) service operations on airports.

FAA AC 150/5220-9**A** , *Aircraft Arresting Systems*, **2006** (AAS-300). Updates existing policy, and describes and illustrates the various types of military aircraft emergency arresting systems that are now installed at various joint civil/military airports. It also informs users of criteria concerning installations of such systems at joint civil/military airports.

FAA AC 150/5220-10**E** , *Guide Specification for Aircraft Rescue and Fire Fighting Vehicles* ~~(Consolidated reprint incorporates changes 1 and 2) (~~ **, 2011.** (AAS-100). Assists airport management in the development of local procurement specifications.

FAA AC 150/5230-4**B** , *Aircraft Fuel Storage, Handling, and Dispensing on Airports*, **2011.** (AAS-300). Provides information on aviation fuel deliveries to airport storage and the handling, cleaning, and dispensing of fuel into aircraft.

~~150/5230-4, Chg. 1.~~

~~150/5230-4, Chg. 2.~~

~~150/5280-1, Chg. 1.~~

~~150/~~ **FAA AC** 150/ 5340-1**L** , *Standards for Airport* **Markings , 2013** (AAS-200). Describes standards for marking paved runways, taxiways, closed and/or hazardous areas on airports.

FAA AC 150/5340-18**F** , *Standards for Airport Sign Systems*, **2010** (AAS-200). Contains the Federal Aviation Administration standards for use of sign systems on airports.

FAA AC 150/5370-2**F** , *Operational Safety on Airports During Construction***, 2011** (AAS-300). Concerns operational safety on airports — with special emphasis on safety during periods of construction activity — to assist airport operators in complying with *Part 139*.

FAA AC 150/~~5380~~ **5210** ~~-5, *Debris Hazards at Civil Airports* (AAS-100~~ **24** , **Airport Foreign Object Debis (FOD) Management, 2010. (Supersedes FAA AC 150/5380-5B)** (AAS- **300**). Discusses problems of debris at airports, gives information on foreign objects, and tells how to eliminate such objects from operational areas.

G.2.2.3 U.S. Military Publications.

Air Force: Technical Manual 00-105E-9, *Aircraft Emergency (Fire Protection Information)*, available from HQ WR-ALC (MMEOTD), Robbins AFB, GA 31093.

Navy and Marine: NAVAIR 00-80R-14, *Aircraft Fire Fighting and Rescue Manual for US Naval and Marine Air Stations and Facilities*, available from Naval Air Technical Services Facility, 700 Robins Avenue, Philadelphia, PA 19111.

Army: *Technical Manual 5-315*, available from Superintendent of Public Documents, Public Documents Department, U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

G.2.2.4 Other Publications.

Advanced Techniques in Impact Protection and Emergency Egress from Air Transport Aircraft, R.G. Snyder Report, HEARD-AG 221, National Transportation Safety Board Accident Reports.

G.3 References for Extracts in Informational Sections.

NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*, ~~2011 edition~~ **2017** .

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, ~~2010 edition~~ **2015** .

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2013 ~~edition~~ .

NFPA 921, *Guide for Fire and Explosion Investigations*, ~~2011 edition~~ **2017** .

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, ~~2007 edition~~ **2013** .

Statement of Problem and Substantiation for Public Input

Referenced current editions and FAA Circulars.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2-NFPA 402-2014 [Chapter 2]	Referenced current editions.

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk
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Submittal Date: Wed Jun 25 22:01:15 EDT 2014

Public Input No. 132-NFPA 402-2015 [Section No. G.1.2.2]

G.1.2.2 ICAO Publications.

International standards and recommendatioed practices are promulgated by the Civil Aviation Organization, 999 ~~University St.~~ Robert-Bourassa Boulevard , Montreal, Quebec PQ , Canada H3C 5H7.

~~*Aircraft Accident and Incident Investigation*~~
Aerodromes (Annex

~~13~~
14),

~~8th~~
3rd edition, July

~~1994, Reprinted~~
1999.

~~9284-AN/905,~~
(6 th edition 2013)

Airport Services Manual, Part 1: “Rescue and Fire Fighting,” 3rd edition, 1990. (4 th edition 2014)

Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods, 1st edition, March 2001-2002 (2011-2012)

Technical Instructions for the

~~Safe~~
Transport of Dangerous Goods by Air,

~~2012.~~

~~*Manual of Aircraft Accident Investigation* (Document 6920), 4th edition, 1970, Reprinted 1995.~~

~~*Airport Service Manual* , Part 5, Removal of Disabled Aircraft, 3rd edition, 1996.~~

Document 9284-AN/905, March 2005. (May 2015)

Statement of Problem and Substantiation for Public Input

Updated reference per ICAO

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Street Address:
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Submittal Date: Mon Jun 29 12:20:45 EDT 2015

Public Input No. 133-NFPA 402-2015 [Section No. G.1.2.3]

G.1.2.3 U.S. Government Publications.

U.S. Government Printing Office, Washington, DC 20402.

A Policy on Geometric Design of Highways and Streets, ~~American Association of State Highway and Transportation Officials, 1990~~ *6th Edition, 2011, commonly referred to as the "Green Book," contains the current design research and practices for highway and street geometric design* .

Title 44, Code of Federal Regulations, Part 151, "Reimbursement for Costs of Firefighting on Federal Property."

Title 49, Code of Federal Regulations, Part 175, "Transportation - Carriage by Aircraft ."

Statement of Problem and Substantiation for Public Input

Updated reference per FAA

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
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Submittal Date:	Mon Jun 29 12:31:21 EDT 2015

Public Input No. 134-NFPA 402-2015 [Section No. G.2.2.2]

G.2.2.2 Federal Aviation Administration Publications.

~~Available from Department of Transportation, Distribution Unit, M-494.3, Washington, DC 20590.~~

Advisory Circulars. This listing is limited to those free advisory circulars relating to aircraft rescue and fire-fighting services. ~~For a complete listing of FAA advisory circulars, write to the address above and request a copy of the latest "Advisory Circular Checklist and Status of Other FAA Publications." This checklist is also published periodically in the Federal Register.~~ Advisory Circulars are available for free download at: www.faa.gov.

150/5200-12, *First Responder's Responsibility in Protecting Evidence at the Scene of an Aircraft Accident* (AAS-100). Furnishes general guidance for airport employees, airport management, and other personnel responsible for fire-fighting and rescue operations, at the scene of an aircraft accident, on the proper presentation of evidence.

150/5200-18, *Airport Safety Self-Inspection* ~~(AAS-310)~~ . Suggests functional responsibility, procedures, a checklist, and schedule for an airport safety self-inspection.

150/5210-6, *Aircraft Fire Extinguishing Agents* ~~(AAS-100)~~ . Outlines scales of protection considered as the recommended level — compared with the minimum level in Federal Aviation Regulation Part 139.49 — and tells how these levels were established from test and experience data.

150/5210-13, *Water Rescue Plans, Airport, and Equipment* ~~(AAS-300)~~ . Suggests planning procedures, facilities, and equipment to effectively perform rescue operations when an aircraft lands in a body of water, swamp, or tidal area where normal aircraft fire-fighting and rescue service vehicles are unable to reach the accident scene.

150/5210-14, *Airport Fire and Rescue Personnel Protective Clothing* ~~(AAS-100)~~ . Developed to assist airport management in the development of local procurement specifications for an acceptable, cost-effective proximity suit for use in aircraft rescue and fire-fighting operations.

150/5210-15, *Airport Rescue and Fire Fighting Station Building Design* ~~(AAS-100)~~ . Provides standards and guidance for planning, designing, and constructing an airport rescue and fire-fighting station.

150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport* ~~(AAA-120)~~ . Provides guidance, specifications, and standards — in the interest of airport personnel safety and operational efficiency — for painting, marking, and lighting of vehicles operating in the airport air operations areas.

150/5210-7, *Aircraft Fire and Rescue Communications* ~~(AAS-120)~~ . Provides guidance and information for planning and implementing an airport communications system for airport fire and rescue service.

150/ 5210-23 - ARFF Vehicle and High Reach Extendable Turret (HRET) Operation, Training and Qualifications. Provides FAA standards and recommendations for the training of airport firefighting and rescue personnel in the proper operation and tactical use of Aircraft Rescue and Fire Fighting (ARFF) vehicles and ARFF vehicles equipped with High Reach Extendable Turret (HRETs)

150/ 5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection* ~~(AAS-120)~~ . Provides guidance for the water source selection and standards for a water distribution system designed to support aircraft rescue and fire-fighting (ARFF) service operations on airports.

150/5220-9, *Aircraft Arresting Systems* ~~(AAS-300)~~ . Updates existing policy, and describes and illustrates the various types of military aircraft emergency arresting systems that are now installed at various joint civil/military airports. It also informs users of criteria concerning installations of such systems at joint civil/military airports.

150/5220-10, *Guide Specification for Aircraft Rescue and Fire Fighting Vehicles* (Consolidated reprint incorporates changes 1 and 2) ~~(AAS-100)~~ . Assists airport management in the development of local procurement specifications of ARFF vehicles .

150/5230-4, *Aircraft Fuel Storage, Handling, and Dispensing on Airports* ~~(AAS-300)~~ . Provides information on aviation fuel deliveries to airport storage and the handling, cleaning, and dispensing of fuel into aircraft.

150/~~5230-4, Chg. 1.~~

~~150/5230-4, Chg. 2.~~

~~150/5280-1, Chg. 1.~~

~~150/~~ 5340-1, *Standards for Airport Markings* ~~(AAS-200)~~ . Describes standards for marking paved runways, taxiways, closed and/or hazardous areas on airports.

150/5340-18, *Standards for Airport Sign Systems* ~~(AAS-200)~~ . Contains the Federal Aviation Administration standards for use of sign systems on airports.

150/5370-2, *Operational Safety on Airports During Construction* ~~(AAS-300)~~ . Concerns operational safety on airports — with special emphasis on safety during periods of construction activity — to assist airport operators in complying with *Part 139*.

150/5380-5, *Debris Hazards at Civil Airports* ~~(AAS-100)~~ . Discusses problems of debris at airports, gives information on foreign objects, and tells how to eliminate such objects from operational areas.

Statement of Problem and Substantiation for Public Input

Updated references per FAA

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub-Commiittee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 29 12:37:05 EDT 2015

Public Input No. 135-NFPA 402-2015 [Section No. G.2.2.3]

G.2.2.3 U.S. Military Publications.

Air Force: Technical Manual 00-105E-9, *Aircraft Emergency (Fire Protection Information)*, available from HQ WR-ALC (MMEOTD), Robbins AFB, GA 31093.

Navy and Marine: NAVAIR 00-80R-14, *Aircraft Fire Fighting and Rescue Manual for US Naval and Marine Air Stations and Facilities*, available from ~~Naval Air Technical Services Facility, 700 Robins Avenue, Philadelphia, PA 19111.~~
Commanding Officer, PMA-251,47123 Buse Rd. Unit IPT, Bldg. 2272 Suite 348 Patuxent River, MD. 20670-1547

Army: *Technical Manual 5-315*, available from Superintendent of Public Documents, Public Documents Department, U.S. Government Printing Office, Washington, DC 20402.

Statement of Problem and Substantiation for Public Input

Updated reference per FAA

Submitter Information Verification

Submitter Full Name:	ROBERT MATHIS
Organization:	THE BOEING COMPANY
Affilliation:	NFPA 402 Sub-Commiittee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 29 12:46:57 EDT 2015

NFPA 405 Public Input

Public Input No. 9-NFPA 405-2017 [Section No. 1.2.1]

1.2.1

This standard addresses the development of productive and coordinated aircraft rescue and fire control operations with a ~~minimum exposure to~~ goal of reducing risk for participants and the environment.

Statement of Problem and Substantiation for Public Input

Change provides a goal

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jun 26 15:26:45 EDT 2017

Public Input No. 10-NFPA 405-2017 [Section No. 1.2.2]

1.2.2

Results of evaluations conducted in accordance with the requirements of this standard shall be recorded and maintained by ~~means of a documented management system~~ the AHJ .

Statement of Problem and Substantiation for Public Input

Standard should authorize the AHJ to manage records as it chooses.

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 26 15:29:39 EDT 2017

Public Input No. 11-NFPA 405-2017 [Section No. 1.2.3]

1.2.3

Continuous broad-based training is fundamental to maintaining a proficient ARFF ~~delivery system~~ services at airports.

Statement of Problem and Substantiation for Public Input

ARFF provides a service

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 26 15:31:51 EDT 2017

Public Input No. 13-NFPA 405-2017 [Section No. 1.2.4]

1.2.4

ARFF personnel at airports shall meet the requirements of NFPA 1003 prior to assignment and thereafter and shall receive necessary recurring training ~~that will~~ at least once every twelve (12) consecutive calendar months so as to enable them to consistently meet the requirements of this standard relative to each individual's role and tasks.

Statement of Problem and Substantiation for Public Input

Meets training standards established by US federal law.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jun 26 15:38:17 EDT 2017

Public Input No. 14-NFPA 405-2017 [Section No. 1.3.3]

1.3.3

~~Employers have a~~ The AHJ has the responsibility to ensure that ARFF personnel receive initial training in relation to each individual's role and expected tasks to enable them to perform competently. It is recognized that recurring proficiency training assists in the maintenance of competence through practice of initial skills and reinforcment of knowledge.

Statement of Problem and Substantiation for Public Input

Standardized us of AHJ language.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jun 26 15:43:00 EDT 2017

Public Input No. 15-NFPA 405-2017 [Section No. 2.3.1]

2.3.1 ICAO Publications.

International Civil Aviation Organization, 999 University Street, Montréal, Quebec H3C 5H7, Canada.

Annex 19 to the Convention on International Civil Aviation, International Standards and Recommended Practices, *Safety Management*, Amended First Edition, July ~~2013~~ 2016 .

Statement of Problem and Substantiation for Public Input

Updated ICAO document

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 26 16:10:14 EDT 2017

Public Input No. 4-NFPA 405-2017 [Section No. 3.3.6]

3.3.6 Personal Protective Equipment (PPE).

~~Consists~~ Multiple elements of ~~full personal~~ compliant protective clothing ~~, a self-contained breathing apparatus (SCBA), and a personal alert safety system (PASS) device~~ and equipment that when worn together provide protection from some risks, but not all risks, of emergency incident operations .

Statement of Problem and Substantiation for Public Input

Definition would be the same as NFPA 1851 and 1971. Maintains consistency between documents.

Submitter Information Verification

Submitter Full Name: Stephen Listerman

Organization: CincinnatiNorthern Kentucky I

Street Address:

City:

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Zip:

Submittal Date: Fri Jun 16 09:17:27 EDT 2017

Public Input No. 16-NFPA 405-2017 [Section No. 3.3.8]

3.3.8 Size-Up.

A mental process of evaluating the influencing factors at an incident prior to committing resources to a course of action. [**1670**, ~~2014~~ 2017]

Statement of Problem and Substantiation for Public Input

Document revision

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 26 16:19:41 EDT 2017

Public Input No. 5-NFPA 405-2017 [Section No. 3.3.8]

3.3.8 Size-Up (Risk Assessment) .

A mental process of evaluating the influencing factors at an incident prior to committing resources to a course of action. [**1670**, 2014]

Statement of Problem and Substantiation for Public Input

Consistent with NFPA 402, Definition is already standard to other documents.

Submitter Information Verification

Submitter Full Name: Stephen Listerman

Organization: CincinnatiNorthern Kentucky I

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 16 09:20:15 EDT 2017

Public Input No. 17-NFPA 405-2017 [Section No. 4.1.1]

4.1.1

Each evaluation of skills and knowledge required by this standard shall be conducted at regular intervals of at least ~~every 12 months~~ once every twelve (12) consecutive calendar months by a designated qualified evaluator(s) appointed by the authority having jurisdiction.

Statement of Problem and Substantiation for Public Input

Meets minimum training stipulated by the FAA

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jun 26 16:23:14 EDT 2017

Public Input No. 18-NFPA 405-2017 [Section No. 4.1.2]

4.1.2

All evaluations shall be performed in a competent manner as determined by the AHJ , and each objective shall be met in its entirety.

Statement of Problem and Substantiation for Public Input

Identifies AHJ as having authority over the training.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 26 16:25:33 EDT 2017

Public Input No. 19-NFPA 405-2017 [Section No. 4.3]

4.3 Record Keeping.

Records sections, including “general” individual training records, shall be maintained for each ARFF employee and shall include the following:

(1) Name of the individual

(2) Date of training

(3) Subject covered ~~and course methodology~~ , course methodology and training materials utilized

(4) Climatic conditions

(5) Duration of training

(6) Instructor comments

(7) Performance evaluation

(8) Name of instructor

(9) Signature of student

Statement of Problem and Substantiation for Public Input

Better defines expectations.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 26 16:27:34 EDT 2017

Public Input No. 20-NFPA 405-2017 [Section No. 5.2]

5.2 Competency.

ARFF personnel shall have a thorough knowledge of their airport and its immediate surrounding area under all operating conditions, which is fundamental in achieving a rapid response by ARFF personnel and equipment to the CRFFAA, with special emphasis to prevent runway incursions. The program should train ARFF personnel during both the hours of daylight and darkness and include airport-specific training.

Statement of Problem and Substantiation for Public Input

Requires training during varying levels of light.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jun 26 16:33:23 EDT 2017

Public Input No. 21-NFPA 405-2017 [Section No. 5.3]

5.3 Maps.

~~The~~ ARFF personnel, ~~given~~ when provided a map of the airport and vicinity, shall identify the following features:

(1) All runways, taxiways, and access roads with their designations and associated aircraft travel direction, and lengths and widths

- ~~Access roads~~
- ~~Taxiways and their designations~~
- ~~Aircraft ramps/parking areas~~
- ~~Frangible gate locations~~
- ~~Instrument landing system (ILS) critical areas~~
- ~~Designated aircraft isolation areas~~
- ~~Controlled access points~~
- ~~Predesignated staging areas~~

(2) Describe the airfield lighting system (i.e. center line, edge and threshold lights, etc.)

(3) Describe airfield pavement marking and signing systems, to include standard colors used in markings and signs (local training requirement)

(4) Identify the limits of the runway safety areas on the airport to include Engineered Materials Arresting Systems (EMAS) (local training requirement)

(5) Identify and locate the various aircraft navigation aids located on the airport and identify critical areas associated with navigation systems

(6) Cite airport rules and regulations on vehicle movement and access on the airport movement and non-movement areas and on communicating with the air traffic control tower (ATCT) for everything entering and exiting the movement area

(7). Cite procedures for communicating with the ATCT ; state the use of Common Traffic Advisory Frequency (CTAF)

(8) Cite rules and regulations governing airport security

(9) Given a grid map or other standard map used at the airport, identify key terrain features, installations, and potential hazards in both movement and non-movement areas

(10) Identify the probable direction of travel of fuel in a simulated leak in the fuel distribution system

(11) Demonstrate the operation of the emergency fuel shutoff to the fuel system and pumps to stop the flow of fuel within the system

(12) Identify hazardous materials (and their locations) that are frequently stored or used on the airport property.

(13) Aircraft ramps/parking areas, Airport facilities (terminals, hangars, etc.)

- ~~Water supplies~~
- ~~Other specialized equipment for low visibility operations~~
- ~~Any given point on a grid map or other standard maps used at the airport~~

(14) Frangible gate locations, predesignated staging areas, and controlled access points.

(15) Designated aircraft isolation areas

(16) Water supplies

Statement of Problem and Substantiation for Public Input

Increased required knowledge

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 26 16:41:22 EDT 2017

Public Input No. 22-NFPA 405-2017 [Section No. 5.4]

5.4 Scenarios.

Given a simulated incident or accident scenario, a radio, and a destination on the airport, ARFF personnel shall ~~cautiously perform~~ be competent in performing the following:

(1) Communicate with ATC on appropriate frequency

(2) Obtain all necessary clearances

(3) Select the shortest and safest response route to arrive at the designated point within specified times required by the authority having jurisdiction

(4) Communicate directly by radio with a flight crew regarding the aircraft emergency situation

(5) Indetfy and interpret light gun signals used by ATC

Statement of Problem and Substantiation for Public Input

Provides for a performance standard and adds requirement to know and understand communication technology.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jun 26 16:44:49 EDT 2017

Public Input No. 23-NFPA 405-2017 [Section No. 5.6]

5.6 Lighting.

ARFF personnel shall identify either the color code system or location, or both, for the following:

(1) Runway centerline and edge lighting

(2) Taxiway centerline and edge lighting

(3) Runway threshold lights

(4) Runway departure end lights

(5) Runway Distnace Remaining Signs

(6) Obstruction lighting

(7) Visual slope indicator lights

(8) Runway guard lights

(9) Stop bars

Statement of Problem and Substantiation for Public Input

Adds required runway lighting, not previously listed.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 26 16:48:32 EDT 2017

Public Input No. 25-NFPA 405-2017 [Section No. 6.2]

6.2 Competency.

ARFF personnel shall have a thorough knowledge of all types of aircraft utilizing the airport. It is specifically recommended that in addition to scheduled commercial aircraft, personnel should consider becoming familiar with general aviation and large business class aircraft that may make an emergency landing at your airport.

Statement of Problem and Substantiation for Public Input

Provides for responsibility to learn general aviation and business aircraft.

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jun 27 09:57:44 EDT 2017

Public Input No. 24-NFPA 405-2017 [Section No. 6.3]

6.3 Criteria.

ARFF personnel shall continuously demonstrate proficiency in the following behaviors pertinent to the types of aircraft regularly operating at the airport:

(1) Identify the various types and models of aircraft including the approximate number of passengers each is designed to carry

(2) Identify the categories of aircraft propulsion systems and their associated hazards

(3) Identify major aircraft structural components using the correct terms and nomenclature

(4) Describe materials used in aircraft construction and their effects on fire and rescue operations

(5) Demonstrate the correct use of an aircraft familiarization chart by identifying and describing important aircraft components

(6) Locate, identify, and have a working knowledge of the aircraft systems and components for aircraft typically operating at the airport.

(7) Estimated typical crew and passenger capacity

(8) Correct location and operation of normal ~~exit~~ entry door(s), emergency ~~openings~~ exit openings , evacuation slides and cargo compartment doors.

(9) Exits that have evacuation slides and the evacuation slide deployment that will be inhibited when accessed from the aircraft exterior

(10) Location of aircraft propulsion, auxiliary power unit (APU), ram air turbine (RAT) to include normal and emergency shutdown procedures fro each

(11) Major aircraft structural components

(12) Type, location, and isolation of batteries found on aircraft and their associated hazards

(13) Crew compartment locations and access

(14) Fuel used, location of fuel tanks, fuel line locations, and capacity of fuel tanks for a given aircraft

(15) ~~Normal and emergency shutdown procedures for aircraft engines and APU~~

(16) ~~Ram Air Turbine or equivalent~~

(17) Hydraulic reservoirs and hydraulic accumulators

(18) Oxygen cylinders and oxygen generators

(19) Brake and wheel systems

(20) Ground ventilations, outflow valve(s)

(21) Flight data recorder and cockpit voice recorder

(22) Various onboard fire protection warning and extinguishment systems

(23) Flight interphone system

(24) Access panels

(25) Any hazards unique to a particular aircrat

(26) Any hazards associated military aircraft such as ejection seats, armament, exotic metals, composite materials and specalized fuels

Statement of Problem and Substantiation for Public Input

General clean up and combining of several items for flow as well as addition of military aircraft

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jun 27 09:29:32 EDT 2017

Public Input No. 26-NFPA 405-2017 [Section No. 7.1]

7.1* Scope.

This chapter identifies the knowledge and skills necessary to ensure safety as it relates to ~~airport~~ ARFF personnel and safety management.

Statement of Problem and Substantiation for Public Input

language change to reflect focus on ARFF SMS

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 27 10:00:07 EDT 2017

Public Input No. 27-NFPA 405-2017 [Section No. 7.3]

7.3 Criteria.

ARFF personnel shall possess the knowledge to describe the following as each relates to the prevention of accidents or injuries:

(1) Hazards associated with aircraft rescue and firefighting

(2) Hazards to personnel associated with aircraft and aircraft systems.

(3) Common fireground accidents .

(4) Causes of injuries in specific incidents

(5) Correct lifting and equipment-handling techniques

~~Falls~~

(1) Trip and

~~trippingOverexertion~~

(1) fall hazards

(2) Dangers associated with cutting or striking stationary or moving objects

- ~~Hazards in the presence of aircraft~~

(1) Overexertion, on scene personnel rehabilitation and other physiological factors

(2) Correct donning , use and

~~wearing~~

(1) doffing of AHJ

~~-~~

(1) issued and approved protective clothing and equipment

~~and their limitations~~

(1) .

(2) The limitations protective clothing and equipment, the proper safety precautions to take while wearing personal protective equipment (PPE) specifically while operating power and hand-operated tools.

(3) The purpose, components, operation, and limitations of self-contained breathing apparatus (SCBA)

(4) The inspection process for an SCBA.

(5) Changing the air supply cylinder of a team member with an exhausted air supply cylinder.

(6) The proper donning a doffing of the SCBA;

(7) The actions to take when the following emergency situations occur: low air alarm, exhausted air supply, regulator malfunction(s), damaged or inoperable face piece, damaged or inoperable SCBA hose.

(8) Correct mounting, dismounting, and riding types of apparatus

(9) Basic driving skills

(10) Behavioral health and wellness programs , potential stress effects on emergency services personnel involved in a mass casualty situation

(11) Water rescue operations

(12) Correct use of tools and equipment

(13) Working from heights associated with ARFF fire-fighting

Statement of Problem and Substantiation for Public Input

Added several new safety initiatives.

NOTE: Changes in TerraView did not numerate correctly.

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jun 27 10:03:44 EDT 2017

Public Input No. 28-NFPA 405-2017 [Section No. 8.3]

8.3 Protective Clothing and Equipment.

ARFF personnel shall be able to articulate the correct wearing, maintenance, care and purpose of the following protective clothing and equipment:

(1) Boots

(2) Gloves

(3) Turnout coat

(4) Turnout pants

(5) Helmet

(6) Eye protection

(7) SCBA

(8) Protective hoods

(9) Specialized clothing as required by an incident

(10) Hearing protection

Statement of Problem and Substantiation for Public Input

Adds the element of PPE care as a responsibility and notes specialized PPE may be required specific to incident type.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 27 10:19:33 EDT 2017

Public Input No. 6-NFPA 405-2017 [Section No. 8.3]

8.3 Protective Clothing and Equipment.

ARFF personnel shall be able to articulate the correct wearing, daily inspection, maintenance, and purpose of the following protective clothing and equipment:

(1) Boots

(2) Gloves

(3) Turnout coat

(4) Turnout pants

(5) Helmet

(6) Eye protection

(7) SCBA

(8) Protective hoods

(9) Specialized clothing

(10) Hearing protection

Statement of Problem and Substantiation for Public Input

NFPA requires a daily PPE inspection which must be taught.

Submitter Information Verification

Submitter Full Name:	Stephen Listerman
Organization:	CincinnatiNorthern Kentucky I
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jun 16 09:56:10 EDT 2017

Public Input No. 29-NFPA 405-2017 [Section No. 8.4]

8.4 Breathing Apparatus.

ARFF personnel shall be able to demonstrate and articulate the various systems and their purpose relative to their assigned breathing apparatus, including the following:

(1) Physiology of respiration including the following:

(2) Respiratory system

(3) Need for respiratory protection

(4) ~~Threshold limit values~~

(5) ~~Short-term exposure limits~~

(6) Types of breathing apparatus ~~assigned~~ avaliable for use by ARFF personnel

(7) Breathing apparatus procedures including the following:

~~Donning~~

(a) Proper donning and doffing procedures

(8) ~~Safety precautions and emergency procedures~~

(9) ~~Decontamination/cleaning methods and procedures~~

(10) ~~Routine testing and maintenance~~

(a) Actions to take when the following situations occur:

(11) Cylinder low air alarm activation

(12) Cylinder air supply is exhausted

(13) Breathing regulator malfunction

(14) Face piece damage

(15) Low pressure hose damage (if equipped)

(16) High pressure hose damage

(b) Care and maintenance of

~~air cylinders~~

(17) ~~Breathing apparatus control procedures~~

(18) ~~Cylinder removal and replacement~~

(19) ~~Cylinder recharging~~

(a) the face piece and air cylinder to include daily inspection.

Statement of Problem and Substantiation for Public Input

Added specific requirements to demonstrate actions during emergency or failures of the SCBA to include daily operational inspections.

NOTE: Page did not numerate correctly

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jun 27 10:36:09 EDT 2017

Public Input No. 7-NFPA 405-2017 [Section No. 8.4]

8.4 Breathing Apparatus.

ARFF personnel shall be able to demonstrate and articulate the various systems and their purpose relative to their assigned breathing apparatus, including the following:

(1) Physiology of respiration including the following:

- (2) Respiratory system
- (3) Need for respiratory protection
- (4) Threshold limit values
- (5) Short-term exposure limits

(6) Types of breathing apparatus assigned

(7) Breathing apparatus procedures including the following:

- (8) Donning and doffing procedures
- (9) Daily inspection checklist
- (10) Safety precautions and emergency procedures
- (11) Decontamination/cleaning methods and procedures

~~Routine testing~~

- (a) Routine testing and maintenance
- (b) Care and maintenance of air cylinders
- (c) Breathing apparatus control procedures
- (d) Cylinder removal and replacement
- (e) Cylinder recharging

Statement of Problem and Substantiation for Public Input

NFPA requires a daily PPE inspection which must be taught.

Submitter Information Verification

Submitter Full Name: Stephen Listerman
Organization: CincinnatiNorthern Kentucky I
Street Address:
City:
State:
Zip:

Submittal Date: Fri Jun 16 09:58:59 EDT 2017

Public Input No. 30-NFPA 405-2017 [Section No. 9.3]

9.3 Criteria.

ARFF personnel shall demonstrate the following:

(1) Comprehensive knowledge of the airport's dangerous ~~cargo response~~ goods response plan

(2) Use of reference materials to identify dangerous goods and determine the applicable action to manage the incident

(3) Procedures for the identification, risk assessment, isolation, rescue, and evacuation requirements for a given dangerous goods incident

(4) Correct utilization of PPE and monitoring devices as they relate to the airport's dangerous goods response plan

Statement of Problem and Substantiation for Public Input

Change to reflect dangerous goods rather than cargo alone.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 10:59:38 EDT 2017

Public Input No. 31-NFPA 405-2017 [Section No. 9.4]

9.4 Decontamination.

ARFF personnel ~~shall~~ , ~~for a given~~ when given a hazardous materials or dangerous goods incident shall , at a minimum identify the tools available to assist in identifying the product or contaminant, baseline personnel safety procedures and decontamination procedures ~~required for~~ for personnel, equipment ~~,~~ and the incident site.

Statement of Problem and Substantiation for Public Input

Provides for requirements to identify chemical, implement safety procedures and decon personnel, equipment and the environment involved.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 27 11:03:07 EDT 2017

Public Input No. 32-NFPA 405-2017 [Section No. 10.3]

10.3 Criteria.

ARFF personnel shall maintain a proficiency and shall demonstrate the following:

(1) ~~Thorough~~ Complete knowledge of and ability to operate all ~~primary and alternate airport emergency communication systems that connect the fire department~~ ARFF radio systems and frequencies using prescribed procedures, discipline and protocol to communicate with the following entities/agencies :

(2) Control tower or flight service station

(3) Airport administrative offices

(4) Airlines

(5) Fixed-base operators

(6) Mutual aid agencies

(7) Airport service vehicles

(8) Airport fire service vehicles

(9) ~~Operating knowledge of the fire department's standby power source (or alternate communications system), its testing sequence, procedure, test recording, and routine maintenance~~

(10) ~~Working knowledge of the function of all emergency and backup alarm systems and their devices and the ability to reinstate all systems that have been activated~~

(11) Awareness of all possible ways of reporting emergencies and the steps required to ensure that complete notification occurs based on the airports FAA approved airport emergency plan.

(12) Thorough knowledge and application of the international phonetic alphabet and standard airport communications terminology

(13) Complete knowledge of and ability to operate all fire department, ground control, mutual aid, and airport radio frequencies using prescribed procedures, discipline, and protocol

(14) Ability to initiate and operate all communications features contained in the fire department alarm room, its emergency vehicles, and any vehicle dedicated for use as a communications or command unit

(15) Ability to communicate with flight deck personnel by means of an aircraft's interphone system, by control tower relay, by direct radio contact, and by use of standard international ground-to-aircraft hand signals

(16) Knowledge of location of the aircraft interphone system jack located on each aircraft type using the airport

(17) Ability to locate, for purposes of emergency use, vital telephone numbers so that calls can be directed to individuals and agencies as required

(18) Working knowledge of alternate means of communications; the location and use of special equipment such as cellular and hardwired field phones, power megaphones, and flashlights for hand signaling; and the ability to interpret light signals from the control tower

Statement of Problem and Substantiation for Public Input

Cleans up section for flow and information purposes.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jun 27 11:07:35 EDT 2017

Public Input No. 33-NFPA 405-2017 [Section No. 11.2.2]

11.2.2

ARFF personnel shall also be able to describe with complete accuracy the equipment found in storage location on each ARFF vehicle.

Statement of Problem and Substantiation for Public Input

Adds requirement to know the equipment in each compartment of each ARFF vehicle.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jun 27 11:26:08 EDT 2017

Public Input No. 34-NFPA 405-2017 [Section No. 11.4]

11.4 Operation of Equipment and Devices.

ARFF personnel shall be able to demonstrate that they have the knowledge and skills to operate the following systems ~~of~~ when assigned to an emergency vehicles:

(1) Communications equipment

(2) Pump operation

(3) Proportioning system

(4) Turret(s)

(5) Vehicle response tactics in positioning and maneuvering when responding

(6) Vehicle mounted Elevated devices (where provided) such as High Reach Extendable Turret (HRET) systems

(7) Skin penetrating tools (where provided)

(8) Various nozzles (types and applications)

(9) Lighting systems (for accident site)

(10) ~~Driver enhanced vision system~~ Vision enhancement systems such as Driver Enhanced Vision System (DEVS) and Forward Looking Infraed (FLIR) systems

(11) Rescue tools (forcible entry, cutting, lifting, etc.)

(12) Ladder evolutions

(13) Ventilation equipment

(14) Complementary agent system, operation, testing and replenishment

(15) Systems for replenishment of fire-fighting agent

(16) Backup systems for the production and application of fire-fighting agent (where applicable)

(17) Seat mounted SCBA (where provided) proper mounting, donning and doffing

Statement of Problem and Substantiation for Public Input

Added several pieces of operational equipment .

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 27 12:32:03 EDT 2017

Public Input No. 2-NFPA 405-2016 [New Section after 12.1]

TITLE OF NEW CONTENT

Type your content here ...Demonstrate proficiency in the use of all extinguishing agents required to meet the index at your airport during annual live fire training excercises.

Statement of Problem and Substantiation for Public Input

Currently there is no required standard for ARFF crew members to actually use all agent types during annual live fire training exercises.
The EPA has severely restricted if not outright eliminated the use of agents for training. We cannot expect our members to be proficient in the use of an extinguishing agent by reading/studying about them and viewing videos of their use. We can become proficient in their use only through effective live fire training scenarios which must be held annually at minimum. These fire training exercises must be of equal ore realistic scale in which we are expected to use them. (not small pan fires)
I've been an ARFF fireman since 2001 and have used Halotron only once in training and know many members who have been in the industry much longer than I whom have never used it. I have never trained with a hydrochem turret and have trained with a hydrochem handline only once and again, know many who have never trained on either.

Submitter Information Verification

Submitter Full Name: Dana Potter
Organization: Massport Fire Department, Boston Logan Int'l Airport
Street Address:
City:
State:
Zip:

Submittal Date: Wed Apr 27 11:14:21 EDT 2016

Public Input No. 36-NFPA 405-2017 [Section No. 12.2]

12.2 Selection and Application.

Given all the extinguishing agents used at the airport, ARFF personnel shall be able to describe the choice and application for the following types of fires:

(1) Aviation gasoline (AvGas)

(2) Jet fuel

(3) Interior aircraft combustibles

(4) ~~Magnesium~~ Exotic metals such as magnesium and titanium

(5) Electrically energized

(6) Composite materials

(7) Engine

(8) Cargo

(9) Wheel fires

(10) Avionics bay

(11) Auxiliary power unit (APU)

(12) Batteries with specific focus on composites and types of storage medium

Statement of Problem and Substantiation for Public Input

Addressed multiple exotic metals and added added responsibility for batteries and composite storage medium.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 27 12:44:18 EDT 2017

Public Input No. 37-NFPA 405-2017 [Section No. 12.3]

12.3 Descriptions of Effects.

Given all the extinguishing agents used at the airport, ARFF personnel shall be able to describe the effects, both positive and neagative, of agent application when the following conditions exist:

(1) Wind

(2) Rain

(3) Freezing weather

(4) Extreme heat

(5) Use of more than one agent (compatibility)

(6) Fuel-soaked sod and flowing fuel or pressurized fuel

(7) Cargo compartments and cargo containers

Statement of Problem and Substantiation for Public Input

Added condition of extreme heat and cargo container fires.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 12:47:37 EDT 2017

Public Input No. 38-NFPA 405-2017 [Section No. 12.4.1]

12.4.1

ARFF personnel shall ~~be able to describe how to minimize the environmental impacts of the~~ know where to find the Safety Data Sheets (SDS) for all extinguishing agents in use at their airport and shall be able to descirbe the required procedures to minimize the impact of these agents on tthe envioroment .

Statement of Problem and Substantiation for Public Input

Added requirement to know where SDS are located and how to use.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 12:55:28 EDT 2017

Public Input No. 35-NFPA 405-2017 [Section No. 13.2]

13.2 Criteria.

ARFF personnel shall be able to demonstrate a comprehensive knowledge of the following emergency evacuation systems and devices:

(1) Aircraft emergency exits

(2) Aircraft evacuation slides

(3) Military aircraft evacuation and ejection systems and canopy ejection systems, where applicable

(4) Aircraft interior access ~~vehicle~~ points

(5) Cut in/forcible entry areas to specifically include the hazards associated with cutting, forcing, prying or piercing the skin of an aircraft

(6) Exterior access equipment (e.g., ladders, aircraft interior access vehicles, aerostand)

(7) Passenger and crew seat restraint system and crew seat operation to include single and multiple point restraint systems and restraint installed ballistic air bags

(8) Cockpit ingress/egress

(9) Aircraft ballistic air bags and ballistic parachute systems

Statement of Problem and Substantiation for Public Input

Added criteria to reflect the hazards associated with cutting, forcing, prying or piercing the skin of an aircraft, single and multiple point restraint systems and restraint installed ballistic air bags, aircraft ballistic air bags and ballistic parachute systems.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 27 12:41:50 EDT 2017

Public Input No. 3-NFPA 405-2017 [Section No. 14.2]

14.2 Criteria.

Each ARFF personnel shall be

~~able to~~

involved in quarterly practical exercises involving simulated aircraft accidents with full deployment of their airport ARFF vehicle(s).

In addition to the repsonses training, these regular exercises shall be developed to test command of persons assigned command roles.

The simulations scenarios shall include a debriefing to enable responders to describe how each of the following items affects an emergency response:

(1) Nature of the emergency

(2) Type of aircraft

(3) Number of passengers and crew

(4) Amount of fuel on board

(5) Location of the accident

(6) Nature and location of cargo

(7) Wind direction and velocity

(8) Weather conditions and terrain

(9) ARFF vehicle status

(10) Time of day or night

Additional Proposed Changes

File Name	Description	Approved
NFPA_405_PC2.pdf	NFPA 405_PC2	

Statement of Problem and Substantiation for Public Input

NOTE: This Public Input appeared as “Reject but Hold” in Public Comment No. 2 of the (F2014) Second Draft Report

Due to the difficulty for some airports to provide on-site hot fire drills with their own equipment, putting more emphasis on regular simulated response using site specific equipment will contribute greatly in improving all elements of the response operation.

Submitter Information Verification

Submitter Full Name: Tc On Air-Aaa
Organization: NFPA
Affilliation: TC on Aircraft Rescue and Fire Fighting
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 24 14:16:05 EDT 2017

Public Comment No. 2-NFPA 405-2013 [Section No. 14.2]

14.2 Criteria.

Each ARFF personnel shall be

~~able to~~

involved in quaterly practical exercises involving simulated aircraft accidents with full deployment of their airport ARFFvehicle(s).

In addition to the response training, these regular exercises shall be developped to test command of persons assigned command roles.

The simulations scenarios shall include a debreifing to enable responders to describe how each of the following items affects an emergency response:

(1) Nature of the emergency

(2) Type of aircraft

(3) Number of passengers and crew

(4) Amount of fuel on board

(5) Location of the accident

(6) Nature and location of cargo

(7) Wind direction and velocity

(8) Weather conditions and terrain

(9) ARFF vehicle status

(10) Time of day or night

Statement of Problem and Substantiation for Public Comment

Due to the difficulty for some airports to provide on-site hot fire drills with their own equipment, putting more emphasis on regular simulated response using site specific equipment will contribute greatly in improving all elements of the response operation.

Submitter Information Verification

Submitter Full Name: BERNARD VALOIS
Organization: AUTOPYRO
Street Address:
City:
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Submittal Date: Tue Nov 12 11:40:08 EST 2013

Committee Statement

Committee Action:	Rejected but held
Resolution:	The committee has chosen to reject but hold this public comment as it introduces new material that the committee can't tie it back to material that was addressed in public input and first draft portion of the revision cycle. The committee would like to see this held for the next edition so they can address it at that time.

Public Input No. 39-NFPA 405-2017 [Section No. 14.2]

14.2 Criteria.

ARFF personnel shall be able to describe how each of the following items affects an emergency response:

(1) Nature of the emergency

(2) Type of aircraft

(3) Number of passengers and crew

(4) Amount of fuel on board

(5) <u>Expected runway to be used to include associated runway approach path areas</u>

(6) Location of the accident

(7) Nature and location of cargo

(8) Wind direction and velocity

(9) Weather conditions and terrain

(10) ARFF vehicle status

(11) Time of day or night

Statement of Problem and Substantiation for Public Input

Added criteria for expected runway to be used to include associated runway approach path areas

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 13:06:30 EDT 2017

Public Input No. 40-NFPA 405-2017 [Section No. 14.8]

14.8 Tactical Considerations.

ARFF personnel shall be able to define and prioritize the following tactical fire suppression categories:

(1) Rescue

(2) Exposure protection

(3) Fire confinement

(4) Ventilation

(5) Interior attack

(6) Fire extinguishment

(7) Overhaul

(8) Enviromental

Statement of Problem and Substantiation for Public Input

Added environmental concerns as a tactical consideration.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 13:12:49 EDT 2017

Public Input No. 41-NFPA 405-2017 [Section No. 14.12]

14.12 Structural Apparatus.

ARFF personnel shall be able to define the structural apparatus expected to respond to the airport ~~on mutual aid assignments~~ and how the vehicles and equipment are deployed.

Statement of Problem and Substantiation for Public Input

Responding structural equipment may not be operating exclusively under a mutual aid agreement.

Submitter Information Verification

Submitter Full Name: D Scott Lanter

Organization: Blue Grass Airport

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jun 27 13:14:31 EDT 2017

Public Input No. 8-NFPA 405-2017 [New Section after 14.15]

TITLE OF NEW CONTENT

Mass Casualty

1. Casualty Collection Point
2. Treatment Area
3. Transportation
4. Routing

Statement of Problem and Substantiation for Public Input

No where in the standard is mass casualty addressed as an issue for training during an aircraft incident.

Submitter Information Verification

Submitter Full Name:	Stephen Listerman
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State:	
Zip:	
Submittal Date:	Fri Jun 16 10:02:56 EDT 2017

Public Input No. 42-NFPA 405-2017 [Section No. 14.15]

14.15 Other Aircraft Accident Considerations.

ARFF personnel shall be able to explain other aircraft accident operations policy procedures established by their fire department as they relate to the following:

(1) Biological hazards or hazardous materials considerations

(2) Site security

(3) ~~Site~~ Evidence preservation with emphasis on site photographs and documentation

(4) Relocation of human and fragmented remains

(5) Movement of wreckage and preservation of accident evidence to include the marking or diagramming of wreckage moved from its original post accident location

Statement of Problem and Substantiation for Public Input

Added criteria to preserve evidence and allows for the movement of wreckage as long as it is marked or diagrammed.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 13:16:20 EDT 2017

Public Input No. 43-NFPA 405-2017 [New Section after 15.1]

15.1.4

Each ARFF personnel shall complete both recurrent, live spill fire and live-fire training within a twelve (12) consecutive calendar months (CCM) period.

Statement of Problem and Substantiation for Public Input

Adds requirement that each ARFF personnel shall complete both recurrent, live spill fire and live-fire training within a twelve (12) consecutive calendar months (CCM) period.

Submitter Information Verification

Submitter Full Name:	D Scott Lanter
Organization:	Blue Grass Airport
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jun 27 13:23:28 EDT 2017

Public Input No. 45-NFPA 405-2017 [New Section after 15.1]

15.3 High Reach Extendable Turret (HRET) Live Fire Training

ARFF personnel given appropriate PPE, a vehicle mounted HRET with piercing nozzle (if and when applicable), piped waterway and/or high pressure chemical agent line flowing the appropriate extinguishing agent shall be able to extinguish a fire using the proper techniques and demonstrate the ability to completely extinguish a fire in at least three of the following six aircraft emergencies:

(1) Interior fire

(2) Auxiliary power unit (APU) fire

(3) Engine fire

(4) Wheel wheel/brake fire

(5) Baggage or cargo hold fire

(6) Three-dimensional aircraft running fuel fire

Statement of Problem and Substantiation for Public Input

Adds requirement to utilize the High Reach Extendable Turret (HRET) for Live Fire Training

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 13:33:35 EDT 2017

Public Input No. 44-NFPA 405-2017 [Section No. 15.2.2]

15.2.2

ARFF personnel shall be able to extinguish a live fire, given appropriate PPE and a handline flowing the appropriate extinguishing agent using the proper technique, and demonstrate the ability to completely extinguish a fire in at least three of the following six aircraft emergencies:

(1) Interior fire

(2) Auxiliary power unit (APU) fire

(3) Engine fire

(4) Wheel well/brake fire

(5) Electronics and electrical (E and E) compartment fire

(6) Three-dimensional aircraft running fuel fire

(7) Aircraft accident debris fire

Statement of Problem and Substantiation for Public Input

Adds aircraft accident debris as an approved fire prop.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 13:27:25 EDT 2017

Public Input No. 46-NFPA 405-2017 [Section No. 16.3]

16.3 Incident Command.

For each emergency involving the fire department, ARFF personnel shall provide descriptions or identify the following:

(1) Describe the chain of command and command authority at incidents both on and off the airport

(2) Identify the personnel associated with each responsibility in the incident management system

(3) Describe the procedures for the change of command during any phase of the emergency

(4) Identify and describe other agencies involved ~~, including each individual~~ in the Unified Command System including the role, responsibility, and authority of each individual agency

(5) Describe in general various ARFF personnel duties and responsibilities under the plan

(6) Describe the incident management structure in use at the airport and how this interfaces with external mutual aid organizations

(7) Describe tactical differences between offensive and defensive ~~fire-fighting~~ ARFF operations

Statement of Problem and Substantiation for Public Input

Added responsibility to understand the Unified Command System and the tactical differences between offensive and defensive ARFF operations.

Submitter Information Verification

Submitter Full Name: D Scott Lanter
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City:
State:
Zip:
Submittal Date: Tue Jun 27 13:39:51 EDT 2017

NFPA 412 Public Input

Public Input No. 2-NFPA 412-2017 [Section No. 2.2]

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports,* 2014 edition.

NFPA 414, *Standard for Aircraft Rescue and Fire-Fighting Vehicles,* ~~2012~~ 2017 edition.

Statement of Problem and Substantiation for Public Input

Update per latest edition. This is a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name: Jason Shively
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City:
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Submittal Date: Mon Jun 26 16:18:10 EDT 2017

Public Input No. 3-NFPA 412-2017 [Section No. 2.4]

2.4 References for Extracts in Mandatory Sections.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* ~~2010~~ 2016 edition.

Statement of Problem and Substantiation for Public Input

Update per the latest edition. This is a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name:	Jason Shively
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Submittal Date:	Mon Jun 26 16:19:34 EDT 2017

Public Input No. 1-NFPA 412-2017 [Section No. 3.3.1]

3.3.1* Foam.

~~A stable~~ An aggregation of small bubbles ~~of lower density than oil or water. [**11,** 2010]~~ used to form an air-excluding, vapor-suppressing blanket over the surface of a flammable liquid fuel.

3.3.1.1* Alcohol-Resistant Foam Concentrate.

A concentrate used for fighting fires on water-soluble materials and other fuels destructive to regular, AFFF, or FFFP foams, as well as for fires involving hydrocarbons. [**11,** 2010]

3.3.1.2* Aqueous Film-Forming Foam Concentrate (AFFF) ~~Concentrate~~ .

A concentrate based on fluorinated surfactants plus foam stabilizers to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors and usually diluted with water to a 1 percent, 3 percent, or 6 percent solution. [**11,** 2010]

3.3.1.3* Film-Forming Fluoroprotein Foam Concentrate (FFFP) ~~Foam Concentrate~~ .

A protein-foam concentrate that uses fluorinated surfactants to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors. [**11,** 2010]

3.3.1.4 Fluoroprotein Foam (FP) ~~Foam.~~

A protein-based foam concentrate, with added fluorochemical surfactants, that forms a foam showing a measurable degree of compatibility with dry chemical extinguishing agents and an increase in tolerance to contamination by fuel.

3.3.1.5 Protein Foam (P) ~~Foam~~ .

A protein-based foam concentrate that is stabilized with metal salts to make a fire-resistant foam blanket.

Statement of Problem and Substantiation for Public Input

Recommend changing the definition and spellings to maintain consistency with NFPA 403.

Submitter Information Verification

Submitter Full Name: Stephen Listerman
Organization: CincinnatiNorthern Kentucky I
Street Address:
City:
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Zip:
Submittal Date: Fri Jun 16 09:37:16 EDT 2017

Public Input No. 4-NFPA 412-2017 [Section No. 3.3.1]

~~**3.3.1** * – Foam.~~

~~A stable aggregation of bubbles of lower density than oil or water. [**11,** 2010]~~

~~**3.3.1.1** * – Alcohol-Resistant Foam Concentrate.~~

~~A concentrate used for fighting fires on water-soluble materials and other fuels destructive to regular, AFFF, or FFFP foams, as well as for fires involving hydrocarbons. [**11,** 2010]~~

~~**3.3.1.2** * – Aqueous Film-Forming Foam (AFFF) Concentrate.~~

~~A concentrate based on fluorinated surfactants plus foam stabilizers to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors and usually diluted with water to a 1 percent, 3 percent, or 6 percent solution. [**11,** 2010]~~

~~**3.3.1.3** * – Film-Forming Fluoroprotein (FFFP) Foam Concentrate.~~

~~A protein-foam concentrate that uses fluorinated surfactants to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors. [**11,** 2010]~~

~~**3.3.1.4** – Fluoroprotein (FP) Foam.~~

~~A protein-based foam concentrate, with added fluorochemical surfactants, that forms a foam showing a measurable degree of compatibility with dry chemical extinguishing agents and an increase in tolerance to contamination by fuel.~~

~~**3.3.1.5** – Protein (P) Foam.~~

~~A protein-based foam concentrate that is stabilized with metal salts to make a fire-resistant foam blanket.~~

Use foam definiton from NFPA 403 2014 Edition

Additional Proposed Changes

File Name	Description	Approved
403_Foam_Def.pdf		

Statement of Problem and Substantiation for Public Input

Update definition to match the latest NFPA definition used in 403. This is a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name: Jason Shively
Organization: Oshkosh Corporation
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 26 16:20:43 EDT 2017

3.3.1 Foam. An aggregation of small bubbles used to form an air-excluding, vapor-suppressing blanket over the surface of a flammable liquid fuel.

3.3.1.1* ***Aqueous Film-Forming Foam Concentrate (AFFF).*** A concentrate based on fluorinated surfactants plus foam stabilizers to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors and usually diluted with water to a 1 percent, 3 percent, or 6 percent solution. [**11,** 2010]

3.3.1.2* ***Film-Forming Fluoroprotein Foam Concentrate (FFFP).*** A protein-foam concentrate that uses fluorinated surfactants to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors. [**11,** 2010]

3.3.1.3 ***Fluorine-Free Synthetic Foam.*** Foam concentrate based on a mixture of hydrocarbon surface active agents that are fluorine free.

3.3.1.4* ***Fluoroprotein Foam Concentrate.*** A concentrate very similar to protein-foam concentrate but with a synthetic fluorinated surfactant additive. [**11,** 2010]

3.3.1.5* ***Protein Foam Concentrate.*** Concentrate consisting primarily of products from a protein hydrolysate, plus stabilizing additives and inhibitors to protect against freezing, to prevent corrosion of equipment and containers, to resist bacterial decomposition, to control viscosity, and to otherwise ensure readiness for use under emergency conditions. [**11,** 2010]

Public Input No. 18-NFPA 412-2017 [New Section after 4.2.1]

4.2.2. FOAM PATTERN AND DISTANCE ALTERNATIVE

The use of a surrogate liquid instead of foam solution shall be permitted for the purpose of determining the discharge pattern and maximum range, provided that a proper conversion has been established between the required foam discharge and the corresponding surrogate liquid discharge.

Statement of Problem and Substantiation for Public Input

When using method C (Input-Based Testing), the standard allows for using a surrogate liquid to test the foam solution concentration, which greatly improves the ability for fire stations to comply with the standard AND with environmental restrictions. However, in the current edition the existing wording indicates that actual foam discharge is still required for the purpose of determining the discharge pattern and maximum range for the turret.

The proposed edit will allow for testing the pattern and maximum range without using foam solution, which will be in line with the standards policy of supporting testing without discharging foam, and this will further allow users to comply with the standard AND with their environmental restrictions.

The proposed edit recognizes that maximum range for a surrogate liquid may be slightly different from the maximum range of foam solution, using the same equipment and settings, and it requires a measure of correlation to be applied. For example, if an acceptance test shows a maximum distance with narrow stream and foam solution of 100 feet, and a repeated test with surrogate liquid shows a maximum distance of 105 feet, then the requirements for maximum distance with surrogate liquid should be increased with 5% relative to the requirements for foam solution.

Submitter Information Verification

Submitter Full Name: Kaare Holm

Organization: Nofoam Systems

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Zip:

Submittal Date: Wed Jun 28 21:07:40 EDT 2017

Public Input No. 5-NFPA 412-2017 [Section No. 5.1 [Excluding any Sub-Sections]]

Foams shall be tested as specified in 6.3.2 and 6.3.3 of this standard and meet at least the performance requirements specified in Table 5.1.

Table 5.1 Foam Quality Requirements

Foam Agents	**Minimum Expansion Ratio**	**Minimum Solution 25% Drainage Time in Minutes**	
		Test Method A	**Test Method B**
AFFF or FFFP air-aspirated	5:1	3	2.25
AFFF or FFFP non-air-aspirated	3:1	1	0.75
Protein	8:1	N/A	10
Fluoroprotein	6:1	N/A	10

Additional Proposed Changes

File Name	**Description**	**Approved**
Table_5.1.pdf		

Statement of Problem and Substantiation for Public Input

With revising the foam definition to add fluorine free foams, it was suggested the need to add its performance requirements to Table 5.1. Solberg was consulted on what performance the fluorine free foam could meet. There were a number of data points, but the minimum performance data aligned with AFFF/FFFP. This was a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name: Jason Shively
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Submittal Date: Mon Jun 26 16:36:51 EDT 2017

Table 5.1 Foam Quality Requirements

Foam Agents	**Minimum Expansion Ratio**	**Minimum Solution 25% Drainage Time in Minutes**	
		Test Method A	**Test Method** B
AFFF/FFFP/Fluorine-Free air-aspirated	5:1	3	2.25
AFFF/FFFP/Fluorine-Free non-air-aspirated	3:1	1	0.75
Protein	8:1	N/A	10
Fluoroprotein	6:1	N/A	10

Public Input No. 6-NFPA 412-2017 [Section No. 6.1]

6.1 Preparation for Testing.

The following general preparations shall be made prior to conducting concentration, expansion/drainage, and pattern testing:

(1) The vehicle water and foam systems shall be verified to be operational.

(2) The pressure and flow characteristics of each vehicle outlet shall be verified to be in accordance with NFPA 414.

(3) The piping systems shall be flushed.

(4) The foam tank of each vehicle shall be inspected for the presence of crystallization gelling, or sediment.

(5) * For output-based testing, a sample of foam concentrate from the vehicle concentrate tank shall be obtained to form the baseline for concentration determinations and to determine whether the agent concentrate in the vehicle has been contaminated.

(6) This sample shall be compared with a virgin sample of the same concentrate from a new foam container from the same manufacturer.

Statement of Problem and Substantiation for Public Input

It has been report that the presence crystallization could affect the performance of a vehicle's foam proportioner system. This is a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name: Jason Shively
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City:
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Submittal Date: Mon Jun 26 16:47:33 EDT 2017

Public Input No. 8-NFPA 412-2017 [Section No. 6.2.2.1]

6.2.2.1 Apparatus.

In preparing the calibration curve, the following apparatus shall be used:

(1) Three 3.381 fl oz (100 mL) ~~graduates~~ polypropylene or high-density polyethylene graduates

(2) One measuring pipette [0.338 fl oz (10 mL capacity)]

(3) One 3.381 fl oz (100 mL) ~~beaker~~ polypropylene o high-densty polyethylene beaker

(4) One 16.907 fl oz (500 mL) polypropylene or high-density polyethylene beaker

Statement of Problem and Substantiation for Public Input

A study was conducted where it is recommended that glass not be used for foam sampling as absorption could occur and cause cross contamination. http://www.newmoa.org/events/docs/228/PFAS_Sampling_Chiang_Aug2016.pdf This is a 412 task committee proposal.

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Submittal Date: Mon Jun 26 21:32:07 EDT 2017

Public Input No. 10-NFPA 412-2017 [Section No. 6.2.3.1]

6.2.3.1 * Apparatus.

The concentration determination shall be made using the following apparatus:

(1) Three clean ~~plastic or glass~~ polypropylene or high-density polyethylene containers

(2) One dropper or pipette

(3) A refractometer with a scale capable of reading the complete refractive index for the samples

Statement of Problem and Substantiation for Public Input

: A study was conducted where it is recommended that glass not be used for foam sampling as absorption could occur and cause cross contamination. http://www.newmoa.org/events/docs/228/PFAS_Sampling_Chiang_Aug2016.pdf. This is a 412 task committee proposal.

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Submittal Date: Mon Jun 26 21:41:26 EDT 2017

Public Input No. 7-NFPA 412-2017 [Section No. A.6.1(4)]

A.6.1 (4)

The presence of contaminnts inside a vehile's foam tank could affect the performance of a vehicle's foam proportioner system. If cystallization, gelling, or sediment are found, it is recommended to remove the contaminats in accordance to guidance provided by the foam concentrate manufacturer prior to conducting testing. Reference FAA Cert Alert 16-09 for additional informaton.

A.6.1(5)

To ensure that the foam concentrate from vehicle tank(s) has not been contaminated, a foam concentrate sample from the foam tank(s) should be compared to a new virgin sample of the same type and brand.

Any significant difference indicates possible water contamination of the foam concentrate in the vehicle. The methods used for concentrate comparison should be as described in Section 6.2.

Statement of Problem and Substantiation for Public Input

It has been report that the presence crystallization could affect the performance of a vehicle's foam proportioner system. Additional info is provided and referenced the FAA Cert Alert. This is a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name: Jason Shively
Organization: Oshkosh Corporation
Street Address:
City:
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Zip:
Submittal Date: Mon Jun 26 16:50:38 EDT 2017

Public Input No. 9-NFPA 412-2017 [New Section after A.6.2.2]

See attachd wording or 6.2.2.1

Additional Proposed Changes

File Name	Description	Approved
A.6.2.2.1.pdf		

Statement of Problem and Substantiation for Public Input

: A study was conducted where it is recommended that glass not be used for foam sampling as absorption could occur and cause cross contamination. http://www.newmoa.org/events/docs/228/PFAS_Sampling_Chiang_Aug2016.pdf. This is a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name: Jason Shively
Organization: Oshkosh Corporation
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 26 21:37:08 EDT 2017

A.6.2.2.1 (1) It has been found that chemicals from an AFFF concentrate can be absorbed into glass containers and possibly contaminate future samples that are collected using the same container. For this reason, it is recommended to use Polypropylene or High-density polyethylene containers

A.6.2.2.1 (3) It has been found that chemicals from an AFFF concentrate can be absorbed into glass containers and possibly contaminate future samples that are collected using the same container. For this reason, it is recommended to use Polypropylene or High-density polyethylene containers

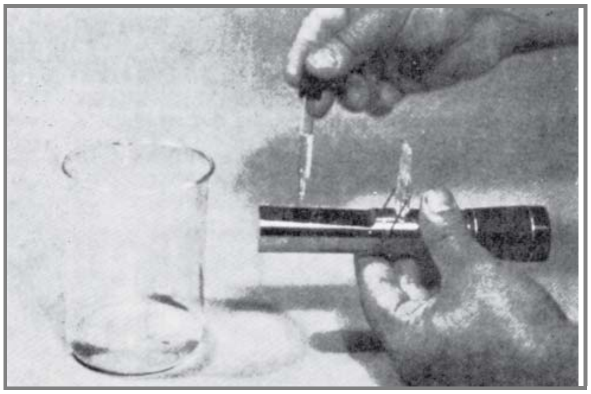
A.6.2.2.1 (4) It has been found that chemicals from an AFFF concentrate can be absorbed into glass containers and possibly contaminate future samples that are collected using the same container. For this reason, it is recommended to use Polypropylene or High-density polyethylene containers

Public Input No. 12-NFPA 412-2017 [Section No. A.6.2.2]

~~**A.6.2.2**~~

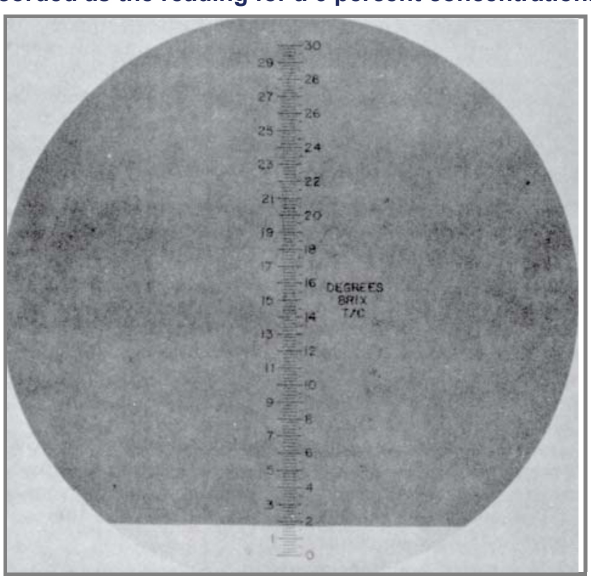
~~See Figure A.6.2.2(a) , Figure A.6.2.2(b) , and Figure A.6.2.2(c) .~~

~~**Figure A.6.2.2(a) Measuring the Index of Refraction by Placing a Few Drops of the Solution to Be Tested on the Prism of a Refractometer and Closing the Cover Plate. This is a typical refractometer suitable for this purpose.**~~



~~**Figure A.6.2.2(b) Holding this Type of Refractometer Up to a Light Source to Take a Reading Where the Dark Field Intersects the Numbered Scale.**~~

~~**Figure A.6.2.2(c) Illustrating the Field of View by Looking into the Refractometer Shown in Figures A.6.2.2(a) and A.6.2.2(b) Containing a 6 Percent AFFF Solution. The dark intersects the scale at 1.7, and this value is recorded as the reading for a 6 percent concentration.**~~



See attached document.

Additional Proposed Changes

File Name	Description	Approved
A.6.2.2_.pdf		

Statement of Problem and Substantiation for Public Input

Revised with new photos, added figures for digital refractometer and conductivity meter. These are more modern tools for measuring the index of reflection in foam solutions. This is a 412 task committee proposal.

Submitter Information Verification

Submitter Full Name: Jason Shively
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Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 26 21:52:45 EDT 2017

See Figure A.6.2.2(a), Figure A.6.2.2(b), ~~and~~ Figure A.6.2.2(c), and Figure A.6.2.2(d).

Replace photo in Figure A.6.2.2(a) with

FIGURE A.6.2.2(a) Visual refractometer. Measuring the Index of Refraction by Placing a Few Drops of the Solution to Be Tested on the Prism of a Refractometer and Closing the Cover Plate. ~~This is a typical refractometer suitable for this purpose.~~ Holding this Type of Refractometer Up to a Light Source to Take a Reading Where the Dark Field Intersects the Numbered Scale.

Rename Figure A.6.2.2 (c) in Figure A.6.2.2(b)

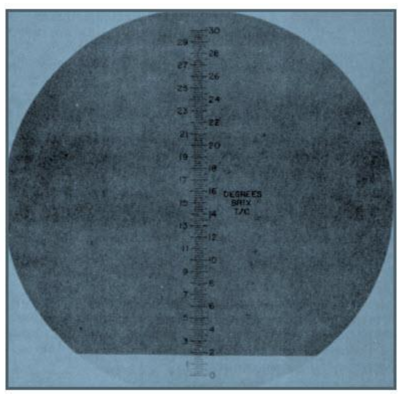


FIGURE A.6.2.2~~(c)~~ (b) Illustrating the Field of View by Looking into the Refractometer ~~Shown in Figures A.6.2.2(a) and A.6.2.2(b)~~ Containing a 6 Percent AFFF Solution. The dark intersects the scale at 1.7, and this value is recorded as the reading for a 6 percent concentration.

Replace photo in Figure A.6.2.2 9(c)

FIGURE A.6.2.2(c) ~~Illustrating the Field of View by Looking into the Refractometer Shown in Figures A.6.2.2(a) and A.6.2.2(b) Containing a 6 Percent AFFF Solution. The dark intersects the scale at 1.7, and this value is recorded as the reading for a 6 percent concentration.~~ Digital refractometer. Measuring the Index of Refraction by Placing a Few Drops of the Solution to Be Tested in the prism. Following the user instructions of the device for calibration and cleaning requirements.

Add

Figure A.6.2.2 (d) Conductivity meters are another device that can be used to measure the index of refraction. These devices are typically easy to use and have repeatable results. Following the user instructions of the device for calibration and cleaning requirements.

Public Input No. 13-NFPA 412-2017 [Section No. A.6.2.2]

A.6.2.2

See Figure A.6.2.2(a), Figure A.6.2.2(b), and Figure A.6.2.2(c).

Figure A.6.2.2(a) Measuring the Index of Refraction by Placing a Few Drops of the Solution to Be Tested on the Prism of a Refractometer and Closing the Cover Plate. This is a typical refractometer suitable for this purpose.

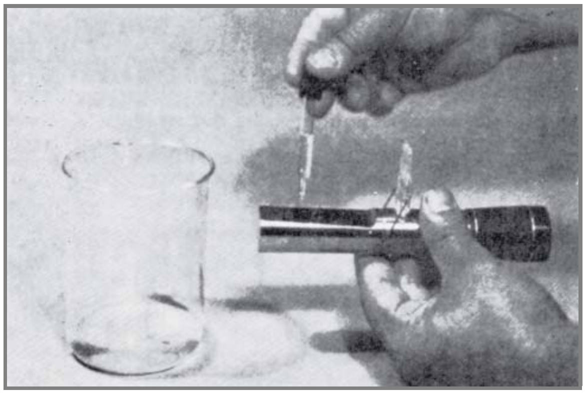
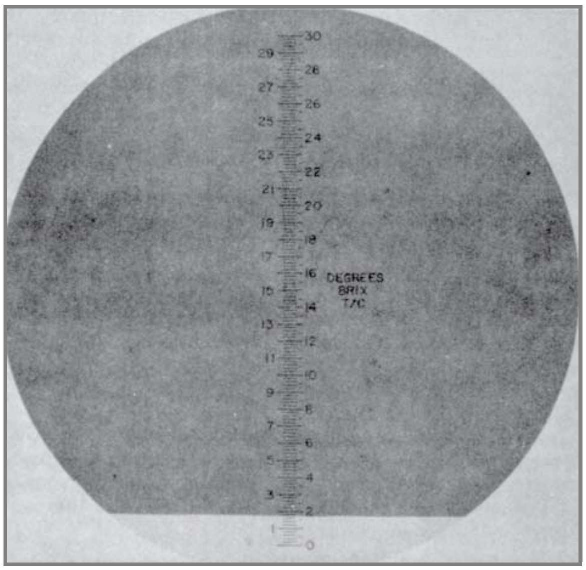


Figure A.6.2.2(b) Holding this Type of Refractometer Up to a Light Source to Take a Reading Where the Dark Field Intersects the Numbered Scale.

Figure A.6.2.2(c) Illustrating the Field of View by Looking into the Refractometer Shown in Figures A.6.2.2(a) and A.6.2.2(b) Containing a 6 Percent AFFF Solution. The dark intersects the scale at 1.7, and this value is recorded as the reading for a 6 percent concentration.



<u>Refractive index method. A refractometer is used to measure the refractive index of the foam solution samples. This method is not particularly accurate for AFFF or alcohol-resistant AFFF' since they typically exhibit very low refractive index readings. For this reason, the conductivity method might be preferred where these proucts are used.</u>

Statement of Problem and Substantiation for Public Input

This text was added to the addendum of NFPA 11 for reference, and is relevant to this document and testing methods. This is a 412 task committee proposal.

Submitter Information Verification

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Submittal Date: Mon Jun 26 21:57:49 EDT 2017

Public Input No. 11-NFPA 412-2017 [Section No. A.6.2.3.1]

A.6.2.3.1

However, low-range refractometers (e.g., 0–10 Brix) might not be able to provide a 100 percent concentration reading of the foam concentrate when using Method B. This is particularly true when using 1 percent and 3 percent foam concentrates.

It has been found that chemicals from an AFFF concentrate ca be absorbed into glass containers and possibly contanimate future samples that are collected using the same container. For this reason, it is recommended to use polypropylene or high-density polyetylene containers.

Statement of Problem and Substantiation for Public Input

: A study was conducted where it is recommended that glass not be used for foam sampling as absorption could occur and cause cross contamination. http://www.newmoa.org/events/docs/228/PFAS_Sampling_Chiang_Aug2016.pdf. This is a 412 task committee proposal.

Submitter Information Verification

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Public Input No. 14-NFPA 412-2017 [Section No. A.6.2.4]

A.6.2.4

Since foam is not discharged during input-based testing, Test Method C ~~should not~~ can only be used ~~as an acceptance test~~ to test and determine the foam solution concentration .

Statement of Problem and Substantiation for Public Input

There is a need to better define what Test Method C actually tests for so the user community know how and what it can be used. This is a 412 task committee proposal.

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Submittal Date: Mon Jun 26 22:02:56 EDT 2017

Public Input No. 15-NFPA 412-2017 [Section No. B.1.3.1]

B.1.3.1

The resistance of the foam blanket to the fire is important. Wind plays a big role in the determination of this property and repeat results are difficult to obtain with an outdoor test. Another factor, but one easier to control, is the size of the fire area at the start of re-ignition. Burnback performance requirements can be referenced using ~~Underwriters Laboratories Inc. Standard UL 162,~~ ~~*Standard for Foam Equipment and Liquid Concentrates*~~ ~~, or~~ U.S. Military Specification MIL-F-24385, *Fire Extinguishing Agent, Aqueous Film-Forming Foam (AFFF), Liquid Concentrate for Fresh and Sea Water*, or ICAO Airport Services Manual Doc 9137, Part 8, Level B .

Statement of Problem and Substantiation for Public Input

Align with the next revision of NFPA 403. This is a 412 task committee proposal.

Submitter Information Verification

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Submittal Date: Mon Jun 26 22:05:39 EDT 2017

Public Input No. 16-NFPA 412-2017 [Section No. C.1.1]

C.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2014 edition.

NFPA 414, *Standard for Aircraft Rescue and Fire-Fighting Vehicles*, ~~2012~~ 2017 edition.

Statement of Problem and Substantiation for Public Input

Update per latest edition. This is a 412 task committee proposal.

Submitter Information Verification

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Submittal Date:	Mon Jun 26 22:08:15 EDT 2017

Public Input No. 17-NFPA 412-2017 [Section No. C.3]

C.3 References for Extracts in Informational Sections.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*, ~~2010~~ 2016 edition.

Statement of Problem and Substantiation for Public Input

Update per the latest edition. This is a 412 task committee proposal.

Submitter Information Verification

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Submittal Date: Mon Jun 26 22:09:12 EDT 2017

NFPA 414 Public Input

Public Input No. 8-NFPA 414-2017 [Section No. 3.3.7]

3.3.7* Angle of Approach.

The

~~measure of the steepest ramp that a fully loaded vehicle can approach~~
smallest angle made between the road surface and a line drawn from the front point of ground contact of the front tire to any projection of the apparatus in front of the front axle .

Statement of Problem and Substantiation for Public Input

Definition as stated in 1900 series documents. Consistent with other apparatus definitions.

Submitter Information Verification

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Submittal Date: Fri Jun 16 09:24:09 EDT 2017

Public Input No. 9-NFPA 414-2017 [Section No. 3.3.8]

3.3.8* Angle of Departure.

The ~~measure of the steepest ramp from which the fully loaded vehicle can depart~~ smallest angle made between the road surface and a line drawn from the rear point of ground contact of the rear tire to any projection of the apparatus behind the rear axle .

Statement of Problem and Substantiation for Public Input

Definition used in 1900 series documents. Consistent with other apparatus definitions.

Submitter Information Verification

Submitter Full Name: Stephen Listerman
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City:
State:
Zip:
Submittal Date: Fri Jun 16 09:25:43 EDT 2017

Public Input No. 10-NFPA 414-2017 [Section No. 3.3.14]

3.3.14* Center of Gravity.

The point ~~within a vehicle~~ at which ~~all of its weight can be~~ the entire weight of the fire apparatus is considered to be concentrated so that, if supported at this point, the apparatus would remain in equilibrium in any position .

Statement of Problem and Substantiation for Public Input

Recommend using the definition from the 1900 series to maintain consistency.(1901, 2009)

Submitter Information Verification

Submitter Full Name: Stephen Listerman

Organization: CincinnatiNorthern Kentucky I

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State:

Zip:

Submittal Date: Fri Jun 16 09:27:21 EDT 2017

Public Input No. 12-NFPA 414-2017 [Section No. 3.3.15]

3.3.15* Complementary Extinguishing Agent.

~~Agents that provide unique extinguishing capability beyond the primary chosen~~ Refers to an extinguishing agent that has the compatibility to perform fire-suppression functions in support of a primary extinguishing agent and where extinguishment might not be achievable using only the primary agent.

Statement of Problem and Substantiation for Public Input

Recommend adding "extinguishing" to the word and change definition to be consistent with 402.

Submitter Information Verification

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Submittal Date: Fri Jun 16 09:34:09 EDT 2017

Public Input No. 1-NFPA 414-2017 [Section No. 3.3.25]

3.3.25 Foam Concentrate.

~~A concentrated liquid foaming agent as received from the manufacturer.~~

The definitions for Foam Concentrate and types of foam should be harmonized with those definitions of NFPA 403

Insert the text of

NFPA 403 3.3.14 and 3.3.13

Statement of Problem and Substantiation for Public Input

The vehicles specified to the 414 standard shall be able to produce foam effectively with all types of concentrates listed in NFPA 403

Submitter Information Verification

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Submittal Date: Fri Jun 02 09:45:42 EDT 2017

Public Input No. 11-NFPA 414-2017 [Section No. 3.3.33]

3.3.33 In-Service ~~Condition.~~

~~A state or condition of readiness for intended duty; usually an emergency vehicle properly serviced with all equipment properly loaded and ready for immediate response.~~

Fire Apparatus

Any fire apparatus, including reserve apparatus, that is available for use under emergency conditions to transport personnel and equipment and to support suppression of fires and mitigation of other hazardous conditions

Statement of Problem and Substantiation for Public Input

Recommend change to word and definition highlighted in red to be consistent with 1900 series. (1911, 2012)

Submitter Information Verification

Submitter Full Name: Stephen Listerman

Organization: CincinnatiNorthern Kentucky I

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State:

Zip:

Submittal Date: Fri Jun 16 09:28:51 EDT 2017

Public Input No. 46-NFPA 414-2017 [Section No. 3.3.38]

~~**3.3.38** – Lightweight Construction.~~

~~Lightweight materials or advanced engineering or both practices resulting in a weight saving without sacrifice of strength or efficiency.~~

Statement of Problem and Substantiation for Public Input

No technical definition/ too vague

Submitter Information Verification

Submitter Full Name:	Ronald Jones
Organization:	E-One Inc
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State:	
Zip:	
Submittal Date:	Tue Jun 27 21:32:25 EDT 2017

Public Input No. 7-NFPA 414-2017 [Section No. 3.3.38]

~~**3.3.38** – Lightweight Construction.~~

~~Lightweight materials or advanced engineering or both practices resulting in a weight saving without sacrifice of strength or efficiency.~~

Statement of Problem and Substantiation for Public Input

"Lightweight" is an arbitrary term for marketing. "Lightweight" is not defined as an exact weight or mass.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 5-NFPA 414-2017 [Section No. 4.19.7]	
Public Input No. 6-NFPA 414-2017 [Section No. A.4.19.7]	

Submitter Information Verification

Submitter Full Name: Danny Pierce
Organization: ARFF Solutions
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Submittal Date: Thu Jun 15 13:43:19 EDT 2017

Public Input No. 32-NFPA 414-2017 [Section No. 3.3.69.1]

3.3.69.1* Fully Loaded Vehicle.

Consists of the fully assembled vehicle, complete with a full complement of crew, fuel, equipment and fire-fighting agents.

Statement of Problem and Substantiation for Public Input

Substantiation: The compartment weight allowance must be considered in the fully loaded configuration.

Submitter Information Verification

Submitter Full Name: Ronald Jones

Organization: E-One Inc

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Submittal Date: Tue Jun 27 18:05:37 EDT 2017

Public Input No. 26-NFPA 414-2017 [Section No. 4.1.1]

4.1.1*

The design criteria for the standard vehicles described by this document consider temperature extremes ranging from 0°C to 43.3°C (32°F to 110°F). For cold weather operation where temperatures range from -40°C to 0°C (-40°F to 32°F) or lower, some type of winterization system shall be specified by the purchaser. Vehicles shall comply with Table 4.1.1(a), Table 4.1.1(b), Table 4.1.1(c), Table 4.1.1(d), and other requirements in this chapter.

Table 4.1.1(a) Fully Loaded Vehicle Performance Parameters (SI Units)

-	**Minimum Usable Capacity**		
Performance Parameters	**Vehicle Water Tank Capacity** **=454 to =1999 L**	**Vehicle Water Tank Capacity** **>1999 to =6000 L**	**Vehicle Water Tank Capacity** **>6000 L**
Side slope stability (degrees)	30	30	30
Dynamic balance (kph), minimum speed on a (30 m) radius circle	40	35.5	35.5
Angle of approach (degrees)	25	30	30
Angle of departure (degrees)	30	30	30
Interaxle clearance (degrees)	12	12	12
Underbody clearance (cm)	33	46	46
Underaxle clearance at differential housing bowl (cm)	26.7	33.0 (26.7)	33
Diagonal opposite wheel motion (cm)	25.4	36	36
Wall-to-wall turning diameter	<Three times the vehicle's overall length	<Three times the vehicle's overall length	<Three times the vehicle's overall length
Maximum acceleration time from 0 to 80.5 kph (sec)	30	25	35
Top speed (kph)	=113	=113	=113
Service brake: Stopping distance from 33 kph (m) from 64 kph (m) Percent grade holding of fully loaded vehicle: Ascending Descending	 =11 =40 m =50 percent =50 percent	 =11 =40 m =50 percent =50 percent	 =12 =49 m =50 percent =50 percent
Emergency brake stopping distance at 64 kph (m)	=88	=88	=88
Parking brake: Percent grade holding for the parking brake Ascending Descending	 =20 percent =20 percent	 =20 percent =20 percent	 =20 percent =20 percent
Evasive maneuver test, NATO Document AVTP 03-16W (kph)	40	40	40
"J" turn test at 46 m radius (kph)	48	48	48

Table 4.1.1(b) Fully Loaded Vehicle Performance Parameters (U.S. Customary Units)

-	**Minimum Usable Capacity**		

Performance Parameters	Vehicle Water Tank Capacity =120 to =528 gal	Vehicle Water Tank Capacity >528 to =1585 gal	Vehicle Water Tank Capacity >1585 gal
Side slope stability (degrees)	30	30	30
Dynamic balance (mph) minimum speed on a (100 ft) radius circle	25	22	22
Angle of approach (degrees)	25	30	30
Angle of departure (degrees)	30	30	30
Interaxle clearance (degrees)	9	12	12
Underbody clearance (in.)	13	18	18
Underaxle clearance at differential housing bowl (in.)	8.5	13 (10.5)	13
Diagonal opposite wheel motion (in.)	10	14	14
Wall-to-wall turning diameter	<Three times the vehicle's overall length	<Three times the vehicle's overall length	<Three times the vehicle's overall length
Maximum acceleration time from 0 to 50 mph (sec)	30	25	35
Top speed (mph)	=70	=70	=70
Service brake: Stopping distance from 20 mph (ft) from 40 mph (ft) Percent grade holding of fully loaded vehicle: Ascending Descending	 =35 =131 =50 percent =50 percent	 =35 =131 =50 percent =50 percent	 =40 =160 =50 percent =50 percent
Emergency brake stopping distance at 40 mph (ft)	=288	=288	=288
Parking brake: Percent grade holding for the parking brake Ascending Descending	 =20 percent =20 percent	 =20 percent =20 percent	 =20 percent =20 percent
Evasive maneuver test, NATO Document AVTP 03-16W (mph)	25	25	25
“J” turn test at 150 ft radius (mph)	30	30	30

Table 4.1.1(c) Agent System Performance Parameters (SI Units)

-	Minimum Usable Capacity		
Performance Parameters	Vehicle Water Tank Capacity =454 to =1999 L	Vehicle Water Tank Capacity >1999 to =6000 L	Vehicle Water Tank Capacity >6000 L
1. Water tank percent of deliverable water			
a. On level ground	100 percent	100 percent	100 percent
b. On 20 percent side slope	85 percent	85 percent	85 percent

- Performance Parameters	Minimum Usable Capacity Vehicle Water Tank Capacity =454 to =1999 L	Vehicle Water Tank Capacity >1999 to =6000 L	Vehicle Water Tank Capacity >6000 L
c. 30 percent ascending/descending grade	85 percent	85 percent	85 percent
2. Turret(s) discharge	Total flow rate can be achieved with handlines	Total flow rate can be achieved using a roof turret, extendable turret, bumper turret, or a combination thereof	Total flow rate can be achieved using a roof turret, extendable turret, bumper turret, or a combination thereof
2a. Roof turret:			
a. Total minimum flow rate (L/min) OR	=227	=2839	=4731
Individual flow rate of the roof turret, if used in combination with a bumper turret (L/min)	N/A	=1892	=3785
b. Stream pattern/distances:			
i. Straight/far point (m)	=46	=58	=70
ii. Dispersed/far point (m)	=15	=20	=21
iii. Dispersed/width (m)	=9	=11	=11
2b. Extendable turret:			
a. Individual flow rate of the extendable turret if used in combination with a bumper turret (L/min)	N/A	=1892	=3785
b. Stream pattern/distances:			
i. Straight/far point (m)	N/A	=58	=58
ii. Dispersed/far point (m)	N/A	=20	=21
iii. Dispersed/width (m)	N/A	=11	=11
2c. Bumper turret:	Can be used as the primary turret and must follow roof turret flows and ranges	Can be used as the primary turret and must follow roof turret flows and ranges	Can be used as the primary turret and must follow roof turret flows and ranges
a. Flow rate (L/min)	=227	=946	=946
b. Straight stream distance (m)	=46	=46	=46
c. Dispersed pattern distances:			
i. Far point (m)	=15	=15	=15
ii. Width (m)	=9	=9	=9
iii. Near point (m)	Within 9 m of front bumper	Within 9 m of front bumper	Within 9 m of front bumper
2d. Ground sweep nozzle:	Where specified	Where specified	Where specified
a. Flow rate (L/min)	N/A	=378 to =1135	=378 to =1135
b. Dispersed pattern distances:			
i. Far point (m)	N/A	=9	=9
ii. Width (m)	N/A	=3.5	=3.5
2e. Undertruck nozzle flow rate (L/min)	Where specified >57	Where specified >57	Where specified >57

- Performance Parameters	Minimum Usable Capacity		
	Vehicle Water Tank Capacity =454 to =1999 L	Vehicle Water Tank Capacity >1999 to =6000 L	Vehicle Water Tank Capacity >6000 L
2f. Piercing nozzle flow rate (L/min)	Where specified =946	Where specified =946	Where specified =946
3. Number of water-foam handlines required per vehicle (select from following)	1	2	2
3a. Woven jacket water-foam handline:			
a. Nozzle flow rate (L/min)	=360	=360	=360
b. Straight stream distance (m)	=20	=20	=20
c. Dispersed stream pattern:			
i. Range (m)	=6	=6	=6
ii. Width (m)	=4.5	=4.5	=4.5
d. Hose inside diameter (mm)	=38	=38	=38
e. Hose length (m)	=46	=46	=46
3b. Reeled water-foam handline:			
a. Nozzle flow rate (L/min)	360 (=227 for dual agent lines)	360 (=227 for dual agent lines)	360 (=227 for dual agent lines)
b. Straight stream distance (m)	=20	=20	=20
c. Dispersed stream pattern:			
i. Range (m)	=6	=6	=6
ii. Width (m)	=4.5	=4.5	=4.5
d. Hose length (m)	=46 (=30 for dual agent lines)	=46 (=30 for dual agent lines)	=46 (=30 for dual agent lines)
4. Complementary agent			
a. Capacity (kg)	=45	=45	=45
4a. Dry chemical handline:	Where specified	Where specified	Where specified
a. Discharge rate (kg/sec)	=2.3	=2.3	=2.3
b. Range (m)	=7.5	=7.5	=7.5
c. Hose length (m)	=30	=30	=30
4b. Dry chemical turret:	Where specified	Where specified	Where specified
a. Discharge rate (kg/sec)	=7 and =10	=7 and =10	=7 and =10
b. Range (m)	=30	=30	=30
c. Width (m)	=5	=5	=5
4c. Dry chemical extendable turret	Where specified	Where specified	Where specified
a. Discharge rate (kg/sec)	=5.5	=5.5 and =10	=5.5 and =10
b. Range (m)	=30	=30	=30
c. Width (m)	=5	=5	=5
4d. Halogenated agent handline:	Where specified	Where specified	Where specified
a. Discharge rate (kg/sec)	=2.3	=2.3	=2.3
b. Range (m)	=7.5	=7.5	=7.5

- Performance Parameters	Minimum Usable Capacity Vehicle Water Tank Capacity =454 to =1999 L	Vehicle Water Tank Capacity >1999 to =6000 L	Vehicle Water Tank Capacity >6000 L
c. Hose inside diameter (mm)	=25.4	=25.4	=25.4
d. Hose length (m)	=30	=30	=30

Table 4.1.1(d) Agent System Performance Parameters (U.S. Customary Units)

- Performance Parameters	Minimum Usable Capacity Vehicle Water Tank Capacity =120 to =528 gal	Vehicle Water Tank Capacity >528 to =1585 gal	Vehicle Water Tank Capacity >1585 gal
1. Water tank percent of deliverable water			
a. On level ground	100 percent	100 percent	100 percent
b. On 20 percent side slope	85 percent	85 percent	85 percent
c. 30 percent ascending/descending grade	85 percent	85 percent	85 percent
2. Turret(s) discharge	Total flow rate can be achieved with handlines	Total flow rate can be achieved using a roof turret, extendable turret, bumper turret, or a combination thereof	Total flow rate can be achieved using a roof turret, extendable turret, bumper turret, or a combination thereof
2a. Roof turret:			
a. Total minimum flow rate (gpm) OR	=60	=750	=1250
Individual flow rate of the roof turret, if used in combination with a bumper turret (gpm)	N/A	=500	=1000
b. Stream pattern/distances:			
i. Straight/far point (ft)	=65	=190	=230
ii. Dispersed/far point (ft)	=20	=65	=70
iii. Dispersed/width (ft)	=15	=35	=35
2b. Extendable turret:			
a. Individual flow rate of the extendable turret if used in combination with a bumper turret (gpm)	N/A	=500	=1000
b. Stream pattern/distances:			
i. Straight/far point (ft)	N/A	=190	=190
ii. Dispersed/far point (ft)	N/A	=65	=70
iii. Dispersed/width (ft)	N/A	=35	=35
2c. Bumper turret:	Can be used as the primary turret and must follow roof turret flows and ranges	Can be used as the primary turret and must follow roof turret flows and ranges	Can be used as the primary turret and must follow roof turret flows and ranges
a. Flow rate (gpm)	=60	=250	=250
b. Straight stream distance (ft)	=65	=150	=150
c. Dispersed pattern distances:			

- Performance Parameters	Minimum Usable Capacity		
	Vehicle Water Tank Capacity =120 to =528 gal	Vehicle Water Tank Capacity >528 to =1585 gal	Vehicle Water Tank Capacity >1585 gal
i. Far point (ft)	=20	=50	=50
ii. Width (ft)	=15	=30	=30
iii. Near point (ft)	Within 30 ft of front bumper	Within 30 ft of front bumper	Within 30 ft of front bumper
2d. Ground sweep nozzle:	Where specified	Where specified	Where specified
a. Flow rate (gpm)	N/A	=100 to =300	=100 to =300
b. Dispersed pattern distances:			
i. Far point (ft)	N/A	=30	=30
ii. Width (ft)	N/A	=12	=12
2e. Undertruck nozzle flow rate (gpm)	Where specified >15	Where specified >15	Where specified >15
2f. Piercing nozzle flow rate (gpm)	Where specified =250	Where specified =250	Where specified =250
3. Number of water-foam handlines required per vehicle (select from following)	1	2	2
3a. Woven jacket water-foam handline:			
a. Nozzle flow rate (gpm)	=95	=95	=95
b. Straight stream distance (ft)	=65	=65	=65
c. Dispersed stream pattern:			
i. Range (ft)	=20	=20	=20
ii. Width (ft)	=15	=15	=15
d. Hose inside diameter (in.)	=1.50	=1.50	=1.50
e. Hose length (ft)	=150	=150	=150
3b. Reeled water-foam handline:			
a. Nozzle flow rate (gpm)	95 (=60 for dual agent lines)	95 (=60 for dual agent lines)	95 (=60 for dual agent lines)
b. Straight stream distance (ft)	=65	=65	=65
c. Dispersed stream pattern:			
i. Range (ft)	=20	=20	=20
ii. Width (ft)	=15	=15	=15
d. Hose length (ft)	=150 (=100 for dual agent lines)	=150 (=100 for dual agent lines)	=150 (=100 for dual agent lines)
4. Complementary agent			
a. Capacity (lb)	=100	=100	=100
4a. Dry chemical handline:	Where specified	Where specified	Where specified
a. Discharge rate (lb/sec)	=5	=5	=5
b. Range (ft)	=25	=25	=25
c. Hose length (ft)	=100	=100	=100
4b. Dry chemical turret:	Where specified	Where specified	Where specified
a. Discharge rate (lb/sec)	=16 and =22 (>7)	=16 and =22	=16 and =22

- Performance Parameters	Minimum Usable Capacity		
	Vehicle Water Tank Capacity =120 to =528 gal	Vehicle Water Tank Capacity >528 to =1585 gal	Vehicle Water Tank Capacity >1585 gal
b. Range (ft)	=100	=100	=100
c. Width (ft)	=17	=17	=17
4c. Dry chemical extendable turret:	Where specified	Where specified	Where specified
a. Discharge rate (lb/sec)	=12	=12 and =22	=12 and =22
b. Range (ft)	=100	=100	=100
c. Width (ft)	=17	=17	=17
4d. Halogenated agent handline:	Where specified	Where specified	Where specified
a. Discharge rate (lb/sec)	=5	=5	=5
b. Range (ft)	=25	=25	=25
c. Hose inside diameter (in.)	=1.00	=1.00	=1.00
d. Hose length (ft)	=100	=100	=100

Additional Proposed Changes

File Name	Description	Approved
Table_4.1.pdf		

Statement of Problem and Substantiation for Public Input

The current nozzles on the market that entrain dry chemical into the water stream only use round water dispersed patterns. The round shape surrounds the powder to get it to properly mix in the water. A flat dispersed pattern does not entrain the powder into the water stream. There has been questions from the user community on the width requirement, if the number in the table is for the powder or water. These proposed changes clarify these requirements.

Submitter Information Verification

Submitter Full Name: Jason Shively
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Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 26 16:03:39 EDT 2017

Table 4.1.1(c)

4b. Dry chemical turret	≥454- ≤1999 L	>1999-≤6000 L	above >6000 L
a. Powder Discharge rate (kg/sec)	≥7 - ≤10	≥7-≤10	≥7-≤10
b. Powder Range(m)	≥30	≥30	≥30
c. Powder Width (m)	≥5	≥5	≥5
d. Stream Range (m)	See 2a/2c	See 2a/2c	See 2a/2c
e. Stream Width (m)	≥5	≥5	≥5

Table 4.1.1(d)

4b. Dry chemical turret	≥120- ≤528 gallon	>528-≤1585 gallon	above >1585 gallon
a. Powder Discharge rate (lb/sec)	≥16 - ≤22 (>7)	≥16-≤22	≥16-≤22
b. Powder Range(ft)	≥100	≥100	≥100
c. Powder Width (ft)	≥17	≥17	≥17
d. Stream Range (ft)	See 2a/2c	See 2a/2c	See 2a/2c
e. Stream Width (ft)	≥17	≥17	≥17

Public Input No. 45-NFPA 414-2017 [Section No. 4.2.4]

4.2.4 Lettering, Numbering, and Striping.

4.2.4.1

Vehicle numbering, lettering, and minimum 0.2 m (8 in.) wide reflective striping shall be provided in accordance with ASTM D4956.

4.2.4.2

Striping shall be placed horizontally on the sides of the vehicle below the body centerline.

4.2.4.3

Vehicles shall display an identification number on each side and roof.

4.2.4.3.1

Side numbers shall be a minimum of 0.4 m (16 in.) in height.

4.2.4.3.2

Primary numbers shall be a minimum of 0.6 m (24 in.) in height and affixed with their base toward the front of the vehicle.

4.2.4.4

Numbering, lettering, and striping shall be in sharp contrast to the vehicle color.

More specific requirements for the retroreflective material used for striping apparatus have been added, and striping on the rear of the apparatus has been changed to require retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees.

15.9.3* Reflective Striping.

15.9.3.1* A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the apparatus.

15.9.3.1.1 The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

15.9.3.1.2 The 4 in. (100 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

15.9.3.1.3 A graphic design shall be permitted to replace all or part of the required striping material if the design or combination thereof covers at least the same perimeter length(s) required by 15.9.3.1.

15.9.3.2 At least 50 percent of the rear-facing vertical surfaces, visible from the rear of the apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees.

15.9.3.2.1 Each stripe in the chevron shall be a single color alternating between red and either yellow, fluorescent yellow, or fluorescent yellow-green.

15.9.3.2.2 Each stripe shall be 6 in. (150 mm) in width.

15.9.3.3 All retroreflective materials required by 15.9.3.1 and 15.9.3.2 shall conform to the requirements of ASTM D 4956, Standard Specification for Retroreflective Sheeting for Traffic Control, Section 6.1.1 for Type I Sheeting.

15.9.3.3.1 All retroreflective materials used to satisfy the requirements of 15.9.3.1 that are colors not listed in ASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retroreflection of 10 with observation angle of 0.2 degrees and entrance angle of −4 degrees.

15.9.3.3.2 Fluorescent yellow and fluorescent yellow-green retroreflective materials used to meet the requirements of 15.9.3.2 shall conform to the minimum requirements specified for yellow Type I Sheeting in ASTM D 4956, Section 6.1.1.

15.9.3.3.3 Any printed or processed retroreflective film construction used to meet the requirements of 15.9.3.1 and

15.9.3.2 shall conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.

19.18.11Where the design of the aerial device incorporates a knuckle, the knuckle shall be as follows:

(1) Painted with reflective paint or provided with retroreflective striping

A.1.3.1 The requirements of this standard apply to fire apparatus that have a GVWR of 10,000 lb (4500 kg) or greater. While the standard was not written specifically to cover vehicles below that size, fire departments should consider using those portions of this standard that address safety issues with smaller emergency vehicles. This would apply particularly to the restraint of equipment in the driving and crew areas and to providing adequate optical warning devices and reflective striping to increase the visibility of the vehicle.

A.15.9.3.1 If the purchaser specifies roll-up doors, consideration should be given to affixing a strip of reflective material to the rail area below the door. If the purchaser specifies vertically hinged compartment doors, consideration should be given to affixing 4 in. (100 mm) minimum width reflective stripes or chevron-type reflective stripes on the inside of the doors.

Statement of Problem and Substantiation for Public Input

Additional visibility

Submitter Information Verification

Submitter Full Name: Ronald Jones
Organization: E-One Inc
Street Address:
City:
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Submittal Date: Tue Jun 27 19:09:25 EDT 2017

Public Input No. 25-NFPA 414-2017 [Section No. 4.4.2.3.1]

4.4.2.3.1

The cooling system shall be designed so that the stabilized engine coolant temperature remains within the engine manufacturer's prescribed limits under all operational conditions and at all ambient temperatures identified in 4.1.1 that may be encountered at the operational airport.

Statement of Problem and Substantiation for Public Input

Referring back to 4.1.1 provides more specific temperature ranges that are already considered standard in the document

Submitter Information Verification

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Submittal Date: Sat Jun 24 08:29:23 EDT 2017

Public Input No. 39-NFPA 414-2017 [Section No. 4.5.1.1 [Excluding any Sub-Sections]]

Any low-voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load and shall meet the specific requirements of this section. [**1901:**13.1]

These items had related appendices in referenced 1901 but not in 414

*****4.5.1.1** Any low-voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load and shall meet the specific requirements of this section. [**1901:** 13.1]

Statement of Problem and Substantiation for Public Input

These items had related appendices in referenced 1901 but not in 414

Submitter Information Verification

Submitter Full Name: Ronald Jones
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Street Address:
City:
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Submittal Date: Tue Jun 27 18:57:20 EDT 2017

Public Input No. 40-NFPA 414-2017 [Section No. 4.5.1.1.2]

4.5.1.1.2

The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected. [**1901:**13.2.1]

***4.5.1.1.2** The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected.

[**1901:** 13.2.1]

Statement of Problem and Substantiation for Public Input

These items had related appendices in referenced 1901 but not in 414

Submitter Information Verification

Submitter Full Name: Ronald Jones
Organization: E-One Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 27 18:59:22 EDT 2017

Public Input No. 42-NFPA 414-2017 [Section No. 4.5.1.1.15]

4.5.1.1.15

All ungrounded electrical terminals shall have protective covers, enclosures, or a means to protect from accidental shorting. [**1901:**13.2.4.2]

***4.5.1.1.15** All ungrounded electrical terminals shall have protective covers, enclosures, or a means to protect from accidental shorting. [**1901:** 13.2.4.2]

Statement of Problem and Substantiation for Public Input

These items had related appendices in referenced 1901 but not in 414

Submitter Information Verification

Submitter Full Name: Ronald Jones

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Submittal Date: Tue Jun 27 19:02:09 EDT 2017

Public Input No. 41-NFPA 414-2017 [Section No. 4.5.1.1.18]

4.5.1.1.18

Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram. *[See NFPA 1901.]* [**1901:**13.2.6]

***4.5.1.1.18** Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram. *[See NFPA 1901.]* [**1901:** 13.2.6]

Statement of Problem and Substantiation for Public Input

These items had related appendices in referenced 1901 but not in 414

Submitter Information Verification

Submitter Full Name: Ronald Jones
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Street Address:
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Submittal Date: Tue Jun 27 19:00:48 EDT 2017

Public Input No. 30-NFPA 414-2017 [New Section after 4.12.4.8]

FLIR

4.12.4.9 The FLIR sensor must be able to detect long wave (8-12 μm) infrared (IR) energy.

4.12.4.10 The sensor array resolution must be a minimum of 640 horizontal by 480 vertical pixels.

4.12.4.11 The camera shall have a high contrast filter that will show low contrast objects in a dynamic thermal scene.

4.12.4.12 The camera must provide an industry standard composite (with automatic gain and level control) or digital video output.

4.12.4.13 The camera must have a minimum Horizontal (HFOV) and Vertical Field of View (VFOV) of 27° (± 4°) and 18° (± 4°), respectively.

Substantiation : In order to increase the performance requirements of the FLIR cameras based on the findings in the FAA report DOT/FAA/TC-17/27 the cross reference to chapter 11 of AC 150/5210-19A had to be removed and the individual requirements listed out separately. This research program proves the benefit of a higher resolution camera with a high contrast filter.

Statement of Problem and Substantiation for Public Input

In order to increase the performance requirements of the FLIR cameras based on the findings in the FAA report DOT/FAA/TC-17/27 the cross reference to chapter 11 of AC 150/5210-19A had to be removed and the individual requirements listed out separately. This research program proves the benefit of a higher resolution camera with a high contrast filter.

Submitter Information Verification

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Submittal Date: Tue Jun 27 17:59:01 EDT 2017

Public Input No. 29-NFPA 414-2017 [Section No. 4.12.4.8]

4.12.4.8*

A low-visibility enhanced vision system shall be installed in the vehicle consisting of an FLIR system that meets or exceeds the following requirements as outlined in FAA Advisory Circular No. 150/5210-19A:

(1) Chapter 1, Section 2, Subsection b, Part (1) Vision Enhancement

(2) Chapter 2, Full Sections 6, 7, 10, ~~11,~~ and 12

Statement of Problem and Substantiation for Public Input

In order to increase the performance requirements of the FLIR cameras based on the findings in the FAA report DOT/FAA/TC-17/27 the cross reference to chapter 11 of AC 150/5210-19A had to be removed and the individual requirements listed out separately. This research program proves the benefit of a higher resolution camera with a high contrast filter.

Submitter Information Verification

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Submittal Date: Tue Jun 27 17:53:50 EDT 2017

Public Input No. 48-NFPA 414-2017 [Section No. 4.12.5.1]

4.12.5.1

The following equipment shall be provided in or on the cab, as applicable:

(1) Heater/defroster

(2) Driver's suspension seat with vertical, fore, and aft adjustment, with seat belt [The use of a nonsuspension driver's seat shall be permitted where recommended by the manufacturer; the vertical adjustment shall not apply to commercial vehicles with a capacity of <1999 L (528 gal).]

(3) Crew seats with individual retractable seat belts

(4) Windshield washers ~~appropriate~~ for removing foam

(5) Windshield wipers ~~appropriate~~ for removing foam

(6) Siren

(7) Horn

(8) A means or provision that is designed to protect driver and crew from overhead glare and light from the sun

(9) Outside rearview mirrors, as specified in 4.3.2.3

(10) Interior lighting

(11) Provisions for mounting at each crew seat position self-contained breathing apparatus (SCBA) of the type specified by the purchaser

(12) Low-visibility FLIR meeting suggested specifications contained in Section D.4 or equivalent

Statement of Problem and Substantiation for Public Input

Too vague

Submitter Information Verification

Submitter Full Name: Ronald Jones
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Street Address:
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Submittal Date: Tue Jun 27 21:36:48 EDT 2017

Public Input No. 31-NFPA 414-2017 [Section No. 4.12.7 [Excluding any Sub-Sections]]

Where specified, a monitoring and data acquisition system (MADAS) shall be installed for the collection of various performance measurements to monitor, as a minimum, the following:

(1) Vehicle speed

(2) Vehicle heading

(3) Lateral acceleration

(4) Vertical acceleration

(5) Longitudinal acceleration and deceleration

(6) Engine rpm

(7) Throttle position

(8) Steering input

(9) Vehicle braking input (pedal position and brake pressure)

(10) Date, time, and location for all data collected

(11) HRET/ASPN position data

(12) Fire fighting system operation

Statement of Problem and Substantiation for Public Input

Substantiation: Research has shown that current vehicle communication technologies are capable of collecting this data. The positioning of the HRET and fire fighting system operation in post-incident forensics would be helpful in the investigation process.

Submitter Information Verification

Submitter Full Name: Ronald Jones
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City:
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Submittal Date: Tue Jun 27 18:03:04 EDT 2017

Public Input No. 37-NFPA 414-2017 [Section No. 4.12.7 [Excluding any Sub-Sections]]

Where specified, a monitoring and data acquisition system (MADAS) shall be installed for the collection of various performance measurements to monitor, as a minimum, the following:

(1) Vehicle speed

(2) Vehicle heading

(3) Lateral acceleration

(4) Vertical acceleration

(5) Longitudinal acceleration and deceleration

(6) Engine rpm

(7) Throttle position

(8) Steering input

(9) Vehicle braking input (pedal position and brake pressure)

(10) Date, time, and location for all data collected

(11)

Extendable Turret Position Measurement

A.4.12.7 (11) The measurements defining the position of an extendable turret shall include, but not be limited to, the specifications of **4.19.6.14.1** . Any current or future extendable turret designs or technologies for which any of the specified position measurements are not applicable, shall not be required to record the respective measurement(s) through the MADAS.

Statement of Problem and Substantiation for Public Input

Substantiation: Current vehicle technologies are capable of providing such information. The inclusion of this information will aid in the post-incident investigation process, providing investigators with additional information on ARFF vehicle status at the time of the incident.

Submitter Information Verification

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Submittal Date: Tue Jun 27 18:28:51 EDT 2017

Public Input No. 49-NFPA 414-2017 [Section No. 4.13.8]

4.13.8

Vehicle numbering, lettering, and minimum 20.3 cm (8 in.) wide reflective striping shall be provided in accordance with ASTM D4956.

4.13.8.1

A graphic design meeting the reflectivity requirements of this subsection shall be permitted to replace all or part of the required striping, provided the design or combination thereof covers a minimum of the same perimeter length required in 4.13.8.

4.13.8.2

Striping shall be placed on at least 60 percent of the perimeter length of each side, width, and rear.

4.13.8.3

At least 40 percent of the perimeter width of the front of the vehicle shall have reflective striping.

Should these reflective striping and graphics requirements be moved under 4.2.4?

Statement of Problem and Substantiation for Public Input

These requirements should fall under the requirements of 4.2.4

Submitter Information Verification

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Submittal Date: Tue Jun 27 21:39:40 EDT 2017

Public Input No. 2-NFPA 414-2017 [Section No. 4.17.4.1]

4.17.4.1

* The foam concentrate proportioning system shall provide a means of controlling the ratio of end user specified foam ~~concentrate to~~ concentrate to the quantity of water in the foam solution being discharged from all orifices used for aircraft fire-fighting operations.

Add the following text in guidance material

* Some synthetic foam concentrates are more viscous than the AFFF. If the ARFF vehicle is to carry foam concentrates of higher viscosity foams the purchaser should obtain the specified ranges from their foam manufacturer/supplier

Statement of Problem and Substantiation for Public Input

It is important that end users specify during early stages of the purchasing process the types of foam that their operation is using or may be using during the life cycle of their new vehicle.
In many countries, foams containing fluor will likely be prohibited in favor of cleaner fluorine free foams that are generally more viscous. Using a different concentrate will require expensive modifications to the standard proportioning systems, so if an airport is planning on changing product during the life cycle of their vehicle(s), it is more economical to specify the optional proportioning system.

Manufacturers have the capability to provide systems that are self adjusting for various foam concentrates.

Submitter Information Verification

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Submittal Date: Fri Jun 02 09:56:03 EDT 2017

Public Input No. 50-NFPA 414-2017 [New Section after 4.19.6]

TITLE OF NEW CONTENT

The piercing tool shall be designed to penetrate the fuselage of an aircraft at any point within a 180 degree radius of the vertical centerline of the fuselage of an aircraft.

Statement of Problem and Substantiation for Public Input

Additional language should be added to the documents to update requirements. Requiring the penetrator to be capable of 180 degree rotation and be capable of infinite penetration locations within the 180 degree arc.

Submitter Information Verification

Submitter Full Name: John Huffman

Organization: Rosenbauer

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 28 11:27:55 EDT 2017

Public Input No. 51-NFPA 414-2017 [New Section after 4.19.6]

TITLE OF NEW CONTENT

The penetration device shall be designed to allow penetrations on a flat level surface up to a ten (10) degree slope.

Statement of Problem and Substantiation for Public Input

Additional language to define the range of operation for the penetrating device. Penetrations to the aircraft may be needed when the aircraft is not on a flat level surface. 10 degrees of slope is fairly steep and could represent the angle needed by the penetrator to make a successful penetration based on the position an aircraft involved in an incident could come to rest in.

Submitter Information Verification

Submitter Full Name:	John Huffman
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Submittal Date:	Wed Jun 28 11:43:57 EDT 2017

Public Input No. 52-NFPA 414-2017 [New Section after 4.19.6]

HRET Vehicle Requirements

Installation of HRETs shall be limited to Class V vehicles (6X6 or 8X8) with a water tank size of 3000 gallons (11,356 liters) and above.

Statement of Problem and Substantiation for Public Input

Current standard allows for HRET installation on Class IV vehicles. 4X4 vehicles should not be equipped with HRETs because of the following reasons:
1. Class IV vehicles (4X4/1500 gallon typical) vehicles are designed to be rapid intervention vehicles and as such are limited in their agent carrying capacity. Thus, a 1500 gallon vehicle does not have the firefighting agent needed to make an initial attack, and deploy and use an HRET without the possibility that prior to deployment of the HRET the water supply may be depleted requiring the ARFF vehicle to be resupplied.
2. HRETs by nature, are not designed as an initial attack appliance and are usually deployed after the ground fire is out and evacuation of the aircraft has taken place. The tactical considerations for deploying the HRET lends to the notion that the appliance would not be deployed until later in the incident and a 1500 gallon vehicle could possibly be depleted of agent.
3. Class IV vehicles are inherently unstable when equipped with HRETs (typical weight of an HRET being in the 4500 pound plus range) and despite manufacturers claims or documentation of passing current testing standards a possibly dangerous situation could be created for firefighters responding at a high rate of speed and attempting aggressive maneuvering of the ARFF vehicle during response. Additionally, many 4X4 HRET equipped vehicles purchased are for Index B or lower airports where there may not be dedicated fire service personnel with the training resources needed to assure proficiency in driving or operating these complex tools (these airports typically have "fire brigade" type arrangement with firefighting not being the primary function of the employees). They may not have the intensive training or discipline needed to respond safely and adding 4000 or greater pounds to a small vehicle like this can create an unsafe situation.
4. Class V vehicles, by nature, have several advantages to their smaller Class IV cousins including greater agent carrying capacity that allows not only for initial attack, but extended operation where the HRET could be deployed and used without the need for possible resupply. The 6X6 or 8X8 by design are a more stable platform that exhibit handling characteristics more suited to mounting an HRET.
5. Agent availability, vehicle stability and firefighter safety are the primary reasons for limiting this type of device to only Class V vehicles. If an airport that requires such a tool and desires to purchase one then the vehicle supplied underneath needs the characteristics described above.

Submitter Information Verification

Submitter Full Name: John Huffman
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Street Address:
City:
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Submittal Date: Wed Jun 28 12:10:37 EDT 2017

Public Input No. 36-NFPA 414-2017 [Section No. 4.19.6 [Excluding any Sub-Sections]]

If the primary turret is of the extendable type, it shall meet the following design and functional requirements:

(1) The primary turret shall meet the requirements of 4.3.1.3 and 4.3.1.5 while in the stowed position.

(2) The vehicle shall achieve a 20 percent side slope, with the extendable turret fully elevated and the nozzle rotated uphill at maximum horizontal rotation while discharging at maximum flow rate.

(3) The vehicle shall be provided with an interlock or warning system and placards in full view of the driver/operator to provide the operational limitations during all phases of operation.

(4) Flow rates shall be in accordance with Table 4.1.1(c) and Table 4.1.1(d) for major vehicles.

(5) The primary turret shall meet the primary water-foam agent turret discharge requirements of Table 4.1.1(c) and Table 4.1.1(d) for the applicable vehicle class while in the bedded position.

(6) The primary turret shall meet the foam-quality standard of NFPA 412 for the applicable foam applicator and foam type.

(7) The primary turret shall function during ARFF operations without the need for outriggers or other ground contact stabilizers that would render the vehicle immobile or hinder its maneuverability.

(8) The primary turret shall have a deployment time from the bedded position to the maximum height and start the application of agent within 30 seconds.

(9) The high rise, telescoping, and/or articulating movement of the boom/tower shall be accomplished with not more than two adjacent lever controls and be permitted to be manual or automated for preselected positioning of the elevation and reach.

(10) If automated, these functions shall be provided with a manual override positioning capability.

(11) The primary turret shall be capable of applying agent to any interior area of the most current wide-body jet, so as not to impede evacuation and for safety considerations of the vehicle operator.

(12) The device shall be capable of positioning the nozzle within 0.6 m (2 ft) of ground level in front of the vehicle and be capable of applying agent to the interior of the aircraft through cargo bay door openings, passenger doorways, and emergency exits on the type of aircraft being protected while the aircraft is in either the gear-up or gear-down landing position.

(13) The primary turret shall have a range of motion so as to permit positioning of the nozzle to direct a fire-fighting agent stream at least 90 degrees to the longitudinal axis of the fuselage for interior fire extinguishment.

(14) The turret/boom mechanism shall be capable of providing for horizontal movement along the aircraft of at least 30 degrees left and right of the vehicle centerline so as not to require repositioning or movement of the ARFF vehicle.

(15) This horizontal rotation shall be accomplished without the deployment of stabilizers or outriggers that might cause a delay in positioning or emergency movement of the rescue vehicle.

(16) The primary turret shall have backup systems to allow for override of the single-lever boom control and hydraulic system (or other power source) if the primary system becomes disabled.

(17) The driver/operator shall be able to see the boom, as it is rising to its maximum height, from a seated position by means of a camera or direct line of sight.

(18)

<u>A means of visually identifying the length of boom extension available shall be provided either by an external marking on the boom or a display in the cab visible to the vehicle operator.</u>

Photo of a simple marking system: 

Statement of Problem and Substantiation for Public Input

Substantiation: Testing conducted by the FAA Technical Center showed a benefit to the vehicle operator situational awareness in positioning the HRET for penetration operations by providing a visual reference for how much length of extension was available when positioning the HRET.

Submitter Information Verification

Submitter Full Name: Ronald Jones
Organization: E-One Inc
Street Address:
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Submittal Date: Tue Jun 27 18:24:51 EDT 2017

Public Input No. 38-NFPA 414-2017 [New Section after 4.19.6.13]

Extendable Turret Position

NEW 4.19.6.14* Extendable turret position measurements (as configured/selected by operator) shall be accessible and/or displayed automatically to the driver/operator during extendable turret use.

4.19.6.14.1 Extendable turret position measurements shall include, but not be limited to, the following:

(1) Lower Boom Position

(2) Upper boom Position

(3) Extendable Turret Rotation Position

(4) Boom Extension Remaining

(5) Primary Turret Position

(6) Auxiliary Nozzle Position

(7) Elevation measurement relative to ground of highest point in current position

(8) Measurement of most forward point on extendable turret relative to vehicle's cab

4.19.6.14.2 Extendable turret position measurements shall be displayed in a common location within the driver/operators field of view

4.19.6.14.3 Extendable turret position measurements shall be displayed either graphically or numerically

4.19.6.14.4 Extendable turret position limitations shall be displayed with the associated real time position measurements

4.19.6.14.5 Where specified, extendable turrets comprised of multiple articulated segments shall provide an indication of complete base segment deployment where positioning accuracy may be affected.

A.4.19.6.14. Most extendable turrets currently produced include a monitor and control system to facilitate its operation. The implementation of such system requires the presence of sensors to detect and calculate the current position of an extendable turret. Typically, such systems are accessible through the ARFF vehicle system's central communication network and able to be viewed via the use of a specialized tool. When these types of systems are present, the extendable turret position is already being measured and monitored in real time, but not typically available to the driver/operator. Research has shown that providing the driver/operator access to the information specified in 4.19.6.14.1 will improve proficiency and provide additional guidance on positioning during extendable turret operations.

Task Group

Statement of Problem and Substantiation for Public Input

Substantiation: Most currently produced ARFF vehicles with extendable turrets already have the sensors capable of obtaining such measurements installed. Additionally, current vehicle based networking and communication systems are integrated in such a way that specific system information is accessible through a common and central interface, although a specialized tool is required to view it. For these reasons, the display of such information will result in minimal alterations to current vehicle designs. Research has shown that the availability of this information would improve driver/operator proficiency and result in safer and more efficient extendable turret operations. Such information will also provide the driver/operator additional guidance in low visibility conditions, reduce the time to realize an ARFF vehicle requires repositioning, and aid in the determination of if a full depth penetration is possible prior to an attempt.

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Submittal Date: Tue Jun 27 18:31:53 EDT 2017

Public Input No. 47-NFPA 414-2017 [Section No. 4.19.7]

4.19.7*

~~Lightweight~~ Single axis boom-mounted turrets shall be permitted as primary turrets. These turrets shall meet the following design and functional requirements:

(1) They shall meet the requirements of 4.3.1.3 and 4.3.1.5 while in the stowed position.

(2) They shall achieve a 20 percent side slope with the boom turret fully elevated and the nozzle fully rotated uphill at maximum horizontal rotation while discharging at maximum flow rate.

(3) Flow rates shall be in accordance with Table 4.1.1(c) and Table 4.1.1(d) for major vehicles.

(4) They shall meet the primary water-foam agent turret discharge requirements of Table 4.1.1(c) and Table 4.1.1(d) for the applicable vehicle class while in the bedded condition.

(5) They shall meet the foam quality standard of NFPA 412, Chapter 5.

(6) They shall function during ARFF operations without the need for outriggers or other ground contact stabilizers that could render the vehicle immobile or hinder its maneuverability.

(7) The primary turret shall have a deployment time from the bedded position to maximum height and start the application of agent within 30 seconds.

(8) They shall be capable of applying agent through passenger doorways, to interior areas of the type of aircraft being protected.

(9) The device shall permit the operator to position the nozzle assembly so as to be able to discharge the agent in front of the vehicle at a level that permits the operator to see over the turret discharge.

(10) They shall have a range of motion so as to permit positioning of the nozzle to direct a fire-fighting agent stream along the longitudinal axis of the fuselage or up to 90 degrees to the longitudinal axis for interior fire extinguishments.

Statement of Problem and Substantiation for Public Input

Light weight is too vague of a description

Submitter Information Verification

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State:
Zip:
Submittal Date: Tue Jun 27 21:34:22 EDT 2017

Public Input No. 5-NFPA 414-2017 [Section No. 4.19.7]

4.19.7*

~~Lightweight~~ Single axis boom-mounted turrets shall be permitted as primary turrets. These turrets shall meet the following design and functional requirements:

(1) They shall meet the requirements of 4.3.1.3 and 4.3.1.5 while in the stowed position.

(2) They shall achieve a 20 percent side slope with the boom turret fully elevated and the nozzle fully rotated uphill at maximum horizontal rotation while discharging at maximum flow rate.

(3) Flow rates shall be in accordance with Table 4.1.1(c) and Table 4.1.1(d) for major vehicles.

(4) They shall meet the primary water-foam agent turret discharge requirements of Table 4.1.1(c) and Table 4.1.1(d) for the applicable vehicle class while in the bedded condition.

(5) They shall meet the foam quality standard of NFPA 412, Chapter 5.

(6) They shall function during ARFF operations without the need for outriggers or other ground contact stabilizers that could render the vehicle immobile or hinder its maneuverability.

(7) The primary turret shall have a deployment time from the bedded position to maximum height and start the application of agent within 30 seconds.

(8) They shall be capable of applying agent through passenger doorways, to interior areas of the type of aircraft being protected.

(9) The device shall permit the operator to position the nozzle assembly so as to be able to discharge the agent in front of the vehicle at a level that permits the operator to see over the turret discharge.

(10) They shall have a range of motion so as to permit positioning of the nozzle to direct a fire-fighting agent stream along the longitudinal axis of the fuselage or up to 90 degrees to the longitudinal axis for interior fire extinguishments.

Statement of Problem and Substantiation for Public Input

"Lightweight" is a marketing term not defining weight or mass. Boom function is explained in A.3.3.62.2.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 7-NFPA 414-2017 [Section No. 3.3.38]	Definition
Public Input No. 6-NFPA 414-2017 [Section No. A.4.19.7]	

Submitter Information Verification

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Submittal Date: Fri Jun 09 15:55:27 EDT 2017

Public Input No. 53-NFPA 414-2017 [Section No. 4.21.3]

4.21.3

~~Where specified, undertruck~~ Undertruck nozzles shall be mounted under the truck and controlled from the cab to protect the bottom of the vehicle and the inner sides of the wheels and tires with foam solution discharged in a spray pattern.

Statement of Problem and Substantiation for Public Input

Remove wording "Where specified". Under truck nozzles should be a mandatory item on ARFF vehicles to provide for firefighter safety.

Submitter Information Verification

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Submittal Date: Wed Jun 28 13:32:41 EDT 2017

Public Input No. 28-NFPA 414-2017 [Section No. 4.24.1 [Excluding any Sub-Sections]]

Where specified, a turret shall have an auxiliary agent discharge mounted parallel to the foam solution discharge, or entrained within the foam solution discharge stream and controlled the same way ~~and with the same travel requirements~~ as the turret.

Statement of Problem and Substantiation for Public Input

To help ensure that the performance of an entrained style nozzle and its related pattern are better understood

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Submittal Date: Tue Jun 27 09:02:37 EDT 2017

Public Input No. 27-NFPA 414-2017 [Section No. 4.24.1.1]

4.24.1.1

The dry chemical turret performance shall be in accordance with Table 4.1.1(c) and Table 4.1.1(d), Section # 4 'Complementary Agent' . Where entrained dry chemical discharge is specified for water tank capacity under 1999 L (528 gal), the dry chemical flow rate shown in parentheses in Table 4.1.1(c) and Table 4.1.1(d) shall be used. Further, for any entrained dry chemical discharge, Section #4 'Complementary Agent' shall apply in terms of defining overall turret/nozzle/system discharge performance.

Statement of Problem and Substantiation for Public Input

To help better illustrate upfront, that when an entrained style nozzle is selected, that the performance of the entrained style nozzle/system dispersement is different (and better in my opinion) than found with a traditional nozzle/system pattern.

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Submittal Date: Tue Jun 27 08:56:38 EDT 2017

Public Input No. 16-NFPA 414-2017 [Section No. 5.2.1.10]

5.2.1.10

~~Each door shall be equipped with a restraint device(s) to prevent the door from being sprung open by wind or jet blast.~~

Statement of Problem and Substantiation for Public Input

Delete requirement as standard chassis have sufficient door dampers and the integration of additional restraint devices may cause difficulties with the standard chassis manufacturer.

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Submittal Date:	Sat Jun 24 07:56:26 EDT 2017

Public Input No. 17-NFPA 414-2017 [Section No. 5.2.1.11.5]

5.2.1.11.5

~~Where equipped with a primary turret having manual controls above the cab roof, the cab roof shall be designed with a quick access to the primary turret(s).~~

Statement of Problem and Substantiation for Public Input

Roof turrets should not be considered on an AIAV as the place most likely is occupied by the stored platform. If a turret is considered, this should be a bumper type.

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Submittal Date:	Sat Jun 24 07:59:22 EDT 2017

Public Input No. 43-NFPA 414-2017 [Section No. 5.2.1.12.6]

5.2.1.12.6

Cabs on apparatus with a GVWR greater than 11,800 kg (26,000 lb) shall meet the requirements of one of the following sets of standards:

(1) SAE J2420, *COE Frontal Strength Evaluation — Dynamic Loading Heavy Trucks, and SAE J2422, Cab Roof Strength Evaluation — Quasi-Static Loading Heavy Trucks*

(2) ECE Regulation number 29, *Uniform Provisions Concerning the Approval of Vehicles with Regard to the Protection of the Occupants of the Cab of a Commercial Vehicle*

[**1901:** 14.3.2]

***5.2.1.12.6** Cabs on apparatus with a GVWR greater than 11,800 kg (26,000 lb) shall meet the requirements of one of the following sets of standards:

(1) SAE J2420, *COE Frontal Strength Evaluation — Dynamic Loading Heavy Trucks, and SAE J2422, Cab Roof Strength Evaluation — Quasi-Static Loading Heavy Trucks*

(2) ECE Regulation number 29, *Uniform Provisions Concerning the Approval of Vehicles with Regard to the Protection of the Occupants of the Cab of a Commercial Vehicle*

[**1901:** 14.3.2]

Statement of Problem and Substantiation for Public Input

These items had related appendices in referenced 1901 but not in 414

Submitter Information Verification

Submitter Full Name: Ronald Jones
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Submittal Date: Tue Jun 27 19:03:38 EDT 2017

Public Input No. 18-NFPA 414-2017 [Section No. 5.2.2]

5.2.2 Equipment.

The following equipment shall be provided in or on the cab, as applicable:

(1) Heater/defroster

(2) Driver's suspension seat with vertical, fore, and aft adjustment, with seat belt [The use of a nonsuspension driver's seat shall be permitted where recommended by the manufacturer; the vertical adjustment shall not apply to commercial vehicles with a capacity of <1999 L (<528 gal).]

(3) Crew seats with individual retractable seat belts

(4) Windshield washers appropriate for removing foam

(5) Windshield wipers appropriate for removing foam

(6) Siren

(7) Horn

(8) A means or provision that is designed to protect driver and crew from overhead glare and light from the sun

(9) Outside rearview mirrors, as specified in 4.3.2.3

(10) Interior lighting

(11) Provisions for mounting at each crew seat position self-contained breathing apparatus (SCBA) of the type specified by the purchaser. Driver's seat should not have an integrated SCBA crew seat.

Statement of Problem and Substantiation for Public Input

Change #11 by adding the last sentence. Integration of SCBA seats on driver's side causes problems with standard chassis manufacturer as this would mean a new type approval (ECE) for the seat / seat mounting.

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Submittal Date: Sat Jun 24 08:01:21 EDT 2017

Public Input No. 44-NFPA 414-2017 [Section No. 5.2.3]

5.2.3 SCBA Mounting.

Where SCBA holders are mounted within a driving or crew compartment, they shall comply with the following:

(1) The SCBA holder shall retain a pack and bottle combination for the published weight rating of the holder when subjected to the dynamic force pulse per SAE J2418, *Occupant Restraint System Evaluation — Frontal Impact Component-Level Heavy Trucks*.

(2) If the SCBA unit is mounted in a seatback, the release mechanism shall be accessible to the user while seated.

(3) Brackets that lock automatically either in the event of impact or when the parking brake is released, but are not locked at other times, shall be permitted.

(4) * The SCBA holder shall retain the bottle when subjected to the deceleration pulse at 0, 30, 90, and 180 degrees with respect to the direction of bottle extraction and in the horizontal plane.

(5) The SCBA holder shall retain the bottle when subjected to a deceleration pulse that exceeds 2 g for at least 60 ms in the vertical direction.

(6) The deceleration pulse shall meet the SAE J2418 deceleration profile with an accuracy of ±10 percent within the 35 to 95 ms range.

(7) The deceleration pulse shall be measured on a rigid portion of the base of the test fixture.

(8) The test component shall be retained in the holder during and after the dynamic test.

(9) The force required to extract the bottle after each test shall be no more than 125 percent of the initial extraction force.

(10) The SCBA holder shall be attached to the fixture in the same manner that it will be fastened to the seat or vehicle.

(11) The test bottle shall not move more than 3 in. relative to the frame of the holder during each test.

(12) The test fixture shall not allow the holder frame to move more than 3 in. relative to the base of the test sled.

(13) Each holder shall bear a label affixed by the holder manufacturer certifying compliance to these specifications.

[**1901:**14.1.9.1]

*** **5.2.3** SCBA Mounting. Where SCBA holders are mounted within a driving or crew compartment, they shall comply with the following: (in 414 appendices from vehicle section but not AIAV)

Statement of Problem and Substantiation for Public Input

These items had related appendices in referenced 1901 but not in 414

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Submittal Date: Tue Jun 27 19:04:55 EDT 2017

Public Input No. 20-NFPA 414-2017 [Section No. 5.4.8]

5.4.8

Stepping surfaces of access ramps/stairs shall be slip resistant and have the following characteristics:

(1) Be nonskid both wet and dry

(2) Have a ~~coefficient of friction not less than 0.5~~ friction class R11 acc. EN 12312-1

(3) Be resistant to the collection of water and snow

(4) Allow water and snow that does collect to be easily removed

(5) Be resistant to the catching of narrow shoe heels on small contact areas

(6) Be resistant to deformation by narrow shoe heels on small contact areas

[SAE AIR 6133, 6.2.1]

Statement of Problem and Substantiation for Public Input

Friction coefficient is always depending on a pair of materials (e.g. rubber shoe sole on steel) should be clearly identified.

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Submittal Date: Sat Jun 24 08:07:47 EDT 2017

Public Input No. 21-NFPA 414-2017 [Section No. 5.5.1]

5.5.1* General.

The docking platform of the vehicle shall be sized to allow ~~a Type A aircraft door~~ all types of aircraft doors to be fully opened and stored , allowing fire fighters and their equipment access to the aircraft.

5.5.1.1

The vehicle shall have a horizontal gap control of at least 10 degrees to either side of the leading edge of the docking platform.

5.5.1.2

The docking platform floor strength shall be designed to support 140 kg (308 lb) at any point.**[SAE AIR 6133, 6.1, Table 5]**

5.5.1.3

The docking platform and lift system shall be designed for a bearing load of 317 kg/m^2 (65 lb/ft^2).**[SAE AIR 6133, 6.1, Table 5]**

Statement of Problem and Substantiation for Public Input

should work with all aircraft doors and allow the door to be fully opened and closed.

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Submittal Date: Sat Jun 24 08:12:07 EDT 2017

Public Input No. 15-NFPA 414-2017 [Section No. 5.5.1 [Excluding any Sub-Sections]]

The docking platform of the vehicle shall be sized to allow a Type A aircraft door to be fully opened, allowing fire fighters and their equipment access to the aircraft. Docking process itself shall be done with the platform and not by means of chassis driving forward into the aircraft, which may cause damage to the vehicle or the fuselage.

Statement of Problem and Substantiation for Public Input

For safety of vehicle operator and aircraft occupants, including potential damage to aircraft and vehicle, the final docking should not be accomplished by driving the vehicle against the aircraft.

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Submittal Date: Sat Jun 24 07:52:30 EDT 2017

Public Input No. 22-NFPA 414-2017 [Section No. 5.7.3]

5.7.3 GVW.

The actual gross vehicle weight of a fully staffed ~~, loaded,~~ and equipped vehicle ready for service shall not exceed the manufacturer's tested weight rating as recorded on the vehicle information data plate.

Statement of Problem and Substantiation for Public Input

"Loaded" can be misleading as to the weight allowed on the steps and platform.

Submitter Information Verification

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Submittal Date: Sat Jun 24 08:16:55 EDT 2017

Public Input No. 23-NFPA 414-2017 [Section No. 5.8.1.5]

5.8.1.5

Obstacles within the 90 degree horizontal line of vision to the right or left shall not create an obstruction of more than ~~5~~ 7 degrees per obstruction.

Statement of Problem and Substantiation for Public Input

Refers to 4.3.2.2 which states 7° not 5°. Not sure which one is correct but they should match up.

Submitter Information Verification

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Submittal Date:	Sat Jun 24 08:26:26 EDT 2017

Public Input No. 24-NFPA 414-2017 [Section No. 6.2.2]

6.2.2

The cooling system shall be certified by the ~~vehicle~~ engine manufacturer to satisfy all operational conditions at all ambient temperatures encountered at the operational airport for both the engine and the transmission.

Statement of Problem and Substantiation for Public Input

engine manufacturer is responsible for certifying the cooling system

Submitter Information Verification

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Submittal Date: Sat Jun 24 08:28:17 EDT 2017

Public Input No. 35-NFPA 414-2017 [Section No. 6.3 [Excluding any Sub-Sections]]

6.3 Prototype Vehicle Tests.

Changes to a vehicle design which qualify the vehicle for prototype testing include:

(1) Changes in engine horsepower

(2) Changes in drive train (e.g. transmission, power divider, engine(s))

(3) Chassis/Suspension

(4) Water Pump

(5) Primary fire fighting system

Where the vehicle is fitted with an extendable turret, the test shall be conducted with the extendable turret in the stowed position.

Statement of Problem and Substantiation for Public Input

Substantiation: The current definition for prototype vehicle being a “first vehicle of a unique vehicle configuration…” is too vague and unmeasurable. This proposal aims to identify exactly which changes in a vehicle design would constitute the need for prototype testing.

Submitter Information Verification

Submitter Full Name: Ronald Jones

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Submittal Date: Tue Jun 27 18:14:33 EDT 2017

Public Input No. 34-NFPA 414-2017 [Section No. 6.4.1.2.1]

6.4.1.2.1

A ballast securely fastened in each seat _ shall be used in place of the crew for safety.

Statement of Problem and Substantiation for Public Input

Substantiation: By requiring the ballast to be fastened into the seat it ensures the proper weight distributions in the cab of the vehicle. This will eliminate sand bags being placed on the floor or in step wells affecting the CG of the vehicle. The requirement to properly secure the weight to the seat will eliminate the potential for damaging equipment in the cab should the ballast shift during the higher angles of the tilt table test.

Submitter Information Verification

Submitter Full Name: Ronald Jones

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Submittal Date: Tue Jun 27 18:10:08 EDT 2017

Public Input No. 33-NFPA 414-2017 [Section No. 6.4.2.2.1]

6.4.2.2.1

Ballast shall be used for the crew, agent and equipment as necessary.

Statement of Problem and Substantiation for Public Input

Substantiation: The fire fighting agent weight allowance must be considered. This also draws this requirement in line with the definition of fully loaded vehicle.

Submitter Information Verification

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Submittal Date:	Tue Jun 27 18:08:39 EDT 2017

Public Input No. 54-NFPA 414-2017 [Section No. A.4.11.3]

A.4.11.3

A rear-wheel steering (RWS) system can be used on vehicles to improve the vehicle clearance circle radius and reduce tire wear.

Statement of Problem and Substantiation for Public Input

language correction to introduce further definition

Submitter Information Verification

Submitter Full Name:	John Huffman
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State:	
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Submittal Date:	Wed Jun 28 13:45:00 EDT 2017

Public Input No. 6-NFPA 414-2017 [Section No. A.4.19.7]

A.4.19.7

A ~~lightweight~~ single axis boom-mounted turret is a primary turret mounted on a ~~lightweight~~ boom that is capable of being elevated and depressed on a vertical axis only, to apply agent ~~to aircraft engines, doorways, and emergency exits~~ . ~~Lightweight boom-mounted turrets differ from extendable turrets in that they do not need turntables. Responsive vehicle suspension, steering systems, and drive systems are used to locate the turret more directly and more rapidly.~~

Statement of Problem and Substantiation for Public Input

"Lightweight" is a marketing term not defining weight or mass. Boom function is identified in A.3.3.62.2.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 5-NFPA 414-2017 [Section No. 4.19.7]	
Public Input No. 7-NFPA 414-2017 [Section No. 3.3.38]	

Submitter Information Verification

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Submittal Date: Fri Jun 09 15:58:28 EDT 2017

Public Input No. 14-NFPA 414-2017 [Section No. A.5.4.2]

A.5.4.2

Other means than a ladder (i.e., ramp or stairway) is more easily traversed by ARFFs in full PPE carrying equipment and/or an incapacitated victim.

Steps should be horizontal within a tolerance of +/- 5° and height of steps should be equal, within 140mm and 210mm. A mechanical (form fit) lock should also be incorporated to keep the staircase in position.

-

–

Statement of Problem and Substantiation for Public Input

provides additional clarification to this section

Submitter Information Verification

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Submittal Date: Sat Jun 24 07:43:53 EDT 2017

Public Input No. 13-NFPA 414-2017 [Section No. E.1.2.3]

E.1.2.3 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 498, *Standard for Safety Attachment Plugs and Receptacles*, ~~2001~~ 2012 , Revised ~~2012~~ 2016 .

UL 153, *Standard for Portable Electric Luminaires,* ~~2005, with revisions through 2011~~ 2017 .

UL 1598, *Luminaires,* ~~2004, with revisions through 2012~~ 2012 .

Statement of Problem and Substantiation for Public Input

Up date Standards

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