



# FISC Bulletin Board

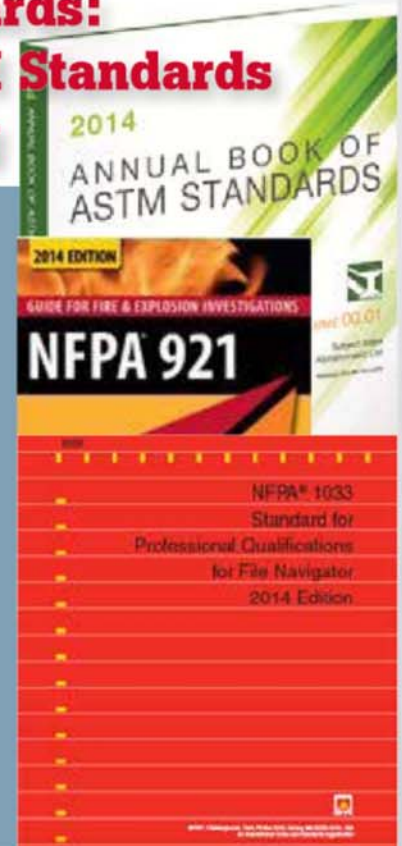
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## Renewed Focus on Industry Standards: The Growing Implications of ASTM Standards for Fire Investigations in the Offing

### 1. Introduction

Big changes are on the horizon in the field of fire investigations. In part, these changes are driven by revisions in the 2014 editions of NFPA 1033 Standard for Professional Qualifications for Fire Investigator and NFPA 921 Guide for Fire and Explosion Investigations.<sup>1</sup> An even greater force in driving these changes is the report published by the National Academy of Sciences, *Strengthening Forensic Science in the United States: A Path Forward* (the “NAS Report”). This article predicts that more weight will be given to industry standards for fire investigators, including standards issued by ASTM International, formerly known as the American Society for Testing and Materials (ASTM). The main purposes of this article are to explain the reasons that the author predicts a growing prominence for industry standards in litigation, and to motivate our readers to learn more about ASTM standards for fire investigations.



This article is divided into two parts. **Part I** begins with a brief refresher on the significance of authoritative documents such as industry standards for fire experts involved in litigation. Next, we summarize a few reasons why *NFPA 1033* and *NFPA 921* are particularly meaningful in this context, and how they act as a crucial link to ASTM standards. The implications of the *NAS Report* are discussed in the fire investigation context and international perspectives are shared.

**Part II** of this article familiarizes the reader with ASTM International and its standards. It also provides an overview of some of the most prominent ASTM standards from a fire investigator’s viewpoint, those to which the 2014 editions of *NFPA 1033* and *NFPA 921* refer. In an effort to prepare our readers for the possible use of these standards in litigation, in this column the author has expressed a number of opinions and made several predictions. These views are those of the author alone, and do not reflect the opinions or positions of the IAAI, the IAAI Fire Investigation Standards Committee, or the NFPA.

### 2. The Relevance of Industry Standards in Evaluating Expert Witnesses in Litigation

In the litigation context, it is important for fire investigators who may offer expert testimony to be intimately familiar with all industry standards that apply to the qualifications of fire investigators and to the conduct of investigations. Even if investigators have good reason to deviate from the standards

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in the field, they should be prepared to explain the reasons for the deviations and to offer other authoritative references to support their decisions. Below are brief highlights of the reasons to be conversant with relevant industry standards.

### 2.1 Expert Qualifications

Every jurisdiction in the United States, Canada, and other common law countries, requires expert witnesses to establish that they are qualified as experts in their fields. In support of their qualifications, many will rely on any certifications they have obtained, such as the IAAI's Certified Fire Investigator credential (IAAI-CFI®). Likewise, investigators typically list their education and training to substantiate their qualifications as experts. Certification programs offered by organizations such as the IAAI and the National Association of Fire Investigators (NAFI), use *NFPA 1033* and *NFPA 921* as foundations for their certification programs.<sup>2</sup> Similarly, these two documents are the basis of many of the seminars investigators complete to maintain or improve investigators' qualifications.

Every certified fire investigator who uses their certification as evidence of their qualifications as an expert should be prepared to defend their qualifications if placed in the hot seat by an opposing lawyer. This may require experts to demonstrate in court that they possess the knowledge and skills required by their certification program(s) and explain how they applied these in a given fire case. Good trial lawyers are prepared to draw the curtain, to look behind the credentials that certifications purport to offer. This means delving into the authoritative publications on which the certifications are based and testing an investigator's knowledge level. Front and center in this regard are *NFPA 1033* and *NFPA 921*. This means that to the extent investigators are offering a fire investigation certification as evidence that they are qualified as expert witnesses, investigators should prepare to be grilled on *NFPA 1033* and *NFPA 921* in court proceedings.

### 2.2 Reliability and Weight of Expert Testimony

In most jurisdictions in the United States and in Canada, in addition to having their qualifications evaluated in litigation, investigators may also have to establish that their methods are reliable and that they properly applied these methods to their investigations. Sometimes a court considers the reliability of an expert's opinions as a precursor to allowing the expert to testify. Even when the court permits an expert to

testify, counsel can attack the reliability of an expert's opinion, thereby challenging what weight the opinion should be given. One way to do this is through cross-examination. One of the pillars of cross-examination is to measure the investigator's conduct of the investigation by how it accords with authoritative publications in the field. Since *NFPA 1033* and *NFPA 921* are underpinnings for certification and training programs, it is usually not too difficult for a lawyer to establish the authoritative nature of these works through skillful examination of the investigator, or through testimony from another expert. From there the doors of cross-examination can swing open.

### 3. ASTM Standards in Litigation

Most fire investigators are aware of how experts can use *NFPA 921* and *NFPA 1033* in litigation to support their opinions, or how opposing experts or lawyers can use these documents against investigators to challenge their opinions. There is less discussion about the use of ASTM standards in litigation. Essentially, if a lawyer can establish the authoritativeness of relevant ASTM standards and their relevance in a given case, it usually opens the door for their use in court in the same way that *NFPA 921* or *NFPA 1033* can be used to support or challenge experts. One way to show that ASTM standards are authoritative is by disclosing the extensive references to them in *NFPA 1033* and *NFPA 921*.

To summarize, one way to evaluate an expert's qualifications or the conduct of an investigation is to measure it by the authoritative documents at the heart of the expert's certifications and other trainings. Two such documents are *NFPA 1033* and *NFPA 921*. ASTM standards are heavily referenced in both *NFPA 1033* and *NFPA 921*; thus to the extent an ASTM standard is referenced in a relevant part of *NFPA 1033* or *NFPA 921* compliance with that ASTM standard may be helpful in determining the admissibility or weight of an expert's testimony.

In this context, it is noteworthy that the 2014 edition of *NFPA 1033* places an increased emphasis on using relevant ASTM Standards. Such standards now liberally pepper the annexes, citing them as sources of information on the knowledge and skills required by *NFPA 1033*. The fact that *NFPA 1033*'s informational references are limited, referring to few publications other than *NFPA 921* and ASTM standards as the resources for information on its requirements, reinforces their importance.

As for *NFPA 921*, the 2014 edition lists over 30 ASTM standards in Chapter 2 "Referenced Publications." The opening section to this chapter incorporates these

ASTM standards as part of NFPA 921, where it provides:

**2.1 General.** The documents or portions thereof listed in this chapter are referenced within this guide *and shall be considered part of the requirements of this document.*<sup>3</sup> [Emphasis added.]

The effect of the above paragraph is to incorporate by reference the listed ASTM standards into *NFPA 921*. The legal definition of incorporation by reference is, “A method of making a secondary document part of a primary document by including in the primary document a statement that the secondary document should be treated as if it were contained within the primary one.”<sup>4</sup> In short, in the author’s opinion this means that these ASTM standards are as much a part of *NFPA 921* as if they were published in their entirety as part of the main text of *NFPA 921*.

*NFPA 921* also makes explicit reference to ASTM standards in several other chapters. The 2014 edition of *NFPA 921* updated all of these references to the latest editions of the ASTM standards (which, like *NFPA 921* and *NFPA 1033* undergo regular cycles of review and revision.)

#### 4. The NAS Report on Forensic Sciences (“A Path Forward”) Heightening the Role of Industry Standards

In addition to the emphasis the 2014 editions of *NFPA 1033* and *NFPA 921* place on ASTM standards, investigators should be aware of the National Academy of Sciences report, *Strengthening Forensic Science in the United States: A Path Forward* (the “NAS Report”). The *NAS Report* is another factor that is driving the forensic science community, including fire investigators, to be accountable by living up to relevant industry standards.

By way of background, in 2005 Congress funded the National Academy of Sciences (NAS) to undertake what would become a groundbreaking study on forensic sciences.<sup>5</sup> This study, the *NAS Report*, was published in 2009, took more than two years to prepare, and is over 300 pages in length. It contains a general overview of issues relating to forensic sciences and the law, as well as specific analyses of individual disciplines. The field of fire investigations is among the disciplines addressed. The *NAS Report* concluded that, “the scientific practices underlying many forensics disciplines are in many respects wanting.”<sup>6</sup> It went on to provide “a number

of recommendations on how to improve the scientific foundations of the [forensic sciences], which are so important to its ongoing and future credibility.”<sup>7</sup>

The co-chair of the committee that authored the *NAS Report*, the Honorable Judge Harry T. Edwards, stated the *Report’s* principal findings, a few of which are particularly relevant here:

There are scores of talented and dedicated people in the forensic science community, and the work that they perform is very important. However, the quality of practice in forensic disciplines varies greatly. And this work often suffers greatly, because of:

- the paucity of scientific research to confirm the validity and reliability of forensic disciplines and establish quantifiable measures of uncertainty in the conclusions of forensic analyses;
- the paucity of research programs on human observer bias and sources of human error in forensic examinations;
- the absence of rigorous, mandatory certification requirements for practitioners;
- the failure to adhere to robust performance standards;
- the failure of forensic experts to use standard terminology in reporting on and testifying about the results of forensic science investigations; [Emphasis in the original.]<sup>8</sup>

The *NAS Report* makes 11 recommendations, which include these three:

- 1). a requirement that terminology and minimum requirements for information used “in reporting and testifying about the results of forensic science investigations be standardized,”<sup>9</sup>
- 2). that “. . . individual certification of forensic science practitioners should be mandatory,”<sup>10</sup> and,

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- 3). That practitioners comply with industry standards that reflect the best practices in their fields.<sup>11</sup>

Following the publication of the NAS Report, the United States Supreme Court in its decision in *Melendez-Diaz v. Massachusetts*,<sup>12</sup> flagged the *NAS Report* as the harbinger of the overhauls necessary for forensic science evidence, saying:

*"The forensic science system, encompassing both research and practice, has serious problems that can only be addressed by a national commitment to overhaul the current structure that supports the forensic science community in this country."<sup>13</sup> National Academy Report P-1 [Emphasis in the original NAS Report.] (Footnote omitted.)*

This statement,<sup>14</sup> coming as it does from the country's highest court, has given the *NAS Report* great impetus. Space limitations prevent this article from delving in detail into the implications of the *NAS Report*, but suffice it to say it has received an overwhelming amount of attention from the forensic science community, the legal community, and government in the U.S. and internationally. For those who want to read more about this report and other forces that the author believes are combining to change the future of fire investigations, see *A Perfect Storm Brewing for Fire Investigators in Court*<sup>15</sup> (available for free download).

Action on the *NAS Report* has begun. In January 2014, members of a new "National Commission on Forensic Science" (the Commission) were appointed. This Commission, a collaborative effort of the U.S. Department of Justice (USDOJ) and the National Institute of Standards and Technology (NIST), was created as part of an initiative to strengthen and enhance the practice of forensic science.<sup>16</sup> The Commission is part of a "framework for coordination across forensic disciplines under federal leadership, with state and local participation."<sup>17</sup> The Commission will focus on policy issues.

Practice-related overhauls in the forensic sciences are being spearheaded by NIST. NIST is putting together scientific guidance groups under a new infrastructure implemented in early 2014 under the name "Organization of Scientific Area Committees" (OSAC).<sup>18</sup> The overall objectives of NIST's OSAC

are, "To create a sustainable infrastructure that produces *best practices, guidelines, and standards* to improve quality and consistency of work in the forensic science community." [Emphasis added.]<sup>19</sup>

One of the Scientific Area Subcommittees designated within OSAC is the "Fire Scene and Explosives Subcommittee."<sup>20</sup> The OSAC plan states that the target is to balance each subcommittee with a distribution of individuals across a variety of roles within each field. The committees will be composed of "70% practitioners (20% federal, 30% state & local, 20% civil or other), 20% researchers (including, where appropriate, statisticians and accreditation and certification specialists), and 10% research and development (R&D) technology partners and providers. A practitioner is defined as someone actively doing or managing casework in a forensic laboratory."<sup>21</sup> [Emphasis in original.] Since most of the subcommittees deal with laboratory sciences, the plan for the subcommittees is worded with a view to forensic laboratory professionals. As the Fire Scene and Explosives Subcommittee deals with scene, not laboratory professionals, it is not clear how OSAC will define some of these categories, such as the "practitioners," "R&D technology partners" or "researchers." Time will tell. At the time of writing this column in May 2014, NIST has said that it expects to announce subcommittee membership in September of 2014.

It is too early to know what the changes OSAC will implement for the forensic sciences community generally, or what changes the Fire Scene and Explosives Subcommittee will instigate specifically for fire and explosion investigations. However, it is not difficult to make an educated prediction. Based on studies of the recommendations for improving fire investigations that have resulted from other forensic sciences reports,<sup>22</sup> and the recommendations in the *NAS Report*, highlighted above, the author expects that more pressure will be brought to bear on fire investigators to:

- 1). Obtain relevant certifications. For fire investigators, these include certifications from an accredited program<sup>23</sup> such as IAAI-CFI® (Certified Fire Investigator),<sup>24</sup> IAAI-ECT® (Evidence Collection Technician), or IAAI-FIT® (Fire Investigation Technician).<sup>25</sup>

- 2). Maintain the knowledge and skill base required by the certifications, which for fire investigators is outlined in *NFPA 1033* as supplemented in *NFPA 921* and the ASTM standards cited.
- 3). Demonstrate compliance “with industry standards that reflect the best practices in their fields,” as recommended in the *NAS Report* and underscored by NIST’s OSAC objectives. For the fire investigations field, these industry standards<sup>26</sup> are the relevant publications from NFPA’s *Fire Codes*<sup>®</sup> including *NFPA 1033* and *NFPA 921*, as well as relevant ASTM standards, which *NFPA 1033* and *NFPA 921* so helpfully identify.
- 4). Prepare for a heightened scrutiny of their qualifications and methodology in both civil and criminal legal proceedings, as measured by the foundations of their certifications (*i.e.* *NFPA 1033* and *NFPA 921*), and by the industry standards and best practices in their field (*i.e.* *NFPA 1033*, *NFPA 921*, and ASTM standards).

So that American investigators are not blind-sided by changes that are bound to occur with the momentum growing from the *NAS Report*, we encourage our readers to track developments. To stay abreast of developments, check out NIST’s OSAC pages at <http://www.nist.gov/forensics/osac.cfm>.

### 5. International Perspectives

Although the *NAS Report* is a study conducted of the state of forensic sciences including fire investigations in the United States, its findings are relevant in other countries. The United States does not stand alone in its efforts to overhaul forensic sciences including crime scene investigations, by requiring better quality control. For example, for over a decade Canada has conducted ongoing and comprehensive investigations into the causes of wrongful convictions. It has published two comprehensive reports on preventing miscarriages of justice; an initial report in 2005 and a follow-up report in 2011.<sup>27</sup> One aspect of these investigations explored problems caused by forensics and expert evidence. Canada considered various solutions to the wrongful conviction problem and in so doing, referenced the *NAS Report*. It also addressed

upcoming changes expected across the pond, summarized below:

In the United Kingdom, a number of cases over the last few decades have brought to the fore numerous issues relating to weaknesses within the forensic science community and its interface with the criminal justice system. The Home Office recognized the need for a central authority to establish common quality standards in the provision of forensic science services to the police and to the wider criminal justice system. Since 2007, this function has been discharged by the newly created Forensic Science Regulator, operating within the Home Office and accountable to the Home Secretary: “By establishing, and enforcing, quality standards for forensic science used in the investigation and prosecution of crime, the Regulator will reduce the risk of quality failings impeding or preventing the identification, prosecution and conviction of offenders. This will contribute to the Home Office objective of preventing, detecting and deterring crime and improving public confidence in the police and other CJS agencies.” [Citing <https://www.gov.uk/government/organisations/forensic-science-regulator>.] The Regulator is advised and supported by the Forensic Science Advisory Council (“FSAC”), a multi-disciplinary group that includes, among others, professionals within the forensic science community, a member of the judiciary, crown prosecutors, defence counsel, and the police.<sup>28</sup>

Confirming the changes coming soon in the U.K., our IAAI President and FISC member, Peter Mansi, recently stated:

Although the *NAS Report* relates to the U.S., the principles discussed apply globally. Certainly in the UK now, and I am sure in Australia, New Zealand, South Africa and other Chapters’ countries, attaining, maintaining and demonstrating competencies through qualifications, certifications, training and education applies to forensic fire investigators around the world.<sup>29</sup>

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Another FISC member, CFI Program Manager for Australia, Ross Brogan, agrees. With respect to the trends towards quality control and standardization that are occurring in Australia and New Zealand, he observes:

*NFPA 921 and NFPA 1033 are gaining more and more in popularity amongst the fire investigators and the court system where qualifications are playing a more important part in deciding who is believed when cases go to court, in both criminal and civil matters. I know of several cases recently, in both Australia and New Zealand that are focused on whether the fire investigation was robust and will withstand scrutiny in court; this is also applicable to the scrutiny placed on the fire investigators who conducted the investigation.”*<sup>30</sup>

Ross Brogan goes on to indicate a growing interest on the part of investigators in those countries to obtain certifications such as IAAI-FIT and IAAI-CFI. Further, he notes that Charles Sturt University offers university degree courses in fire investigation, all based on *NFPA 921* and *NFPA 1033*, with the emphasis towards investigators gaining qualifications and using the recommended methodology and practices.<sup>31</sup>

In summary, though this article emphasizes the forces that are pushing certification and standardization, driven in the U.S. largely by the *NAS Report*, it is likely that there will be a ripple effect internationally. It is worth noting that the *NAS Report* is not the first publication identifying the need for mandatory certification and compliance with national standards. For the fire investigation field, the need for heightened certification requirements based on standards such as those published by the NFPA is not a new concept. This need was identified as far back as 1995 by FISC member, Dr. Angelo L. Pisani, Jr., in a paper he presented at the *International Symposium on the Forensic Aspects of Arson Investigations* hosted by the U.S. Department of Justice and the FBI.<sup>32</sup> Subsequent reports investigating problems with wrongful convictions have reiterated the urgent need to emphasize certifications and standardization for fire investigators.<sup>33</sup> One hopes the fallout from the *NAS Report* will finally provide the traction required for the implementation of such quality controls.

### 6. Conclusion to Part I

This concludes the first Part of this article. In this Part, we have addressed some of the main reasons that of authoritative documents such as industry standards are important for fire experts involved in litigation. We reviewed the reasons why *NFPA 1033* and *NFPA 921* are meaningful in this context, as well as the way the *NFPA 1033* and *NFPA 921* act as a conduit for the ASTM standards relevant for investigations. Finally, we talked about the implications of the *NAS Report* both in the U.S. and internationally. In Part II of this article, we introduce ASTM International and some of the ASTM standards with which fire investigators should be conversant.

1 Terry-Dawn Hewitt, *Overview of Changes: NFPA 1033 and NFPA 921, 2014 Editions*. (March 26, 2014). Proceedings of the Federation of Defense and Corporate Counsel 2014 Winter Meeting (FDCC, March 2014). Available at SSRN: <http://ssrn.com/abstract=2416536>

2 See IAAI Position Statement available at <http://firearson.com/nfpa-921/1033> (last visited May 22, 2014):

*On January 12, 2013, the Board of Directors unanimously adopted the following statement as the official position of the IAAI:*

It is the position of the International Association of Arson Investigators that **National Fire Protection Association (NFPA) Document 921** is widely recognized as an authoritative guide for the fire investigation profession. In addition, *NFPA 921* is an important reference manual, and sets forth guidance and methodology regarding the determination of the origin and cause of fires. This Association uses *NFPA 921*, along with other documents including *NFPA 1033*, as a foundation for its training and certification programs. The statement reaffirms the IAAI's long standing recognition of the importance of *NFPA 921* to the knowledge and methodology of fire investigation. "Authoritative" means the guide is an accepted source of information, and known to be accurate and reliable. By its own terms the

document is not a "standard," and is subject to revision and updating on a periodic basis to allow it to remain current with the expanding scientific and technical knowledge in the fire investigation field.

3 National Fire Protection Ass'n Technical Committee on Fire Investigations, *NFPA 921 Guide for Fire and Explosion Investigations* (2014 ed.) 921-1, p. 2.1.

4 BLACK'S LAW DICTIONARY (9th ed. 2009), available at Westlaw BLACKS (search for "incorporation by reference").

5 COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY. *ET AL.*, NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009), available at <https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf> [hereinafter *NAS REPORT*].

6 NAT'L SCI. AND TECH. COUNCIL, CHARTER OF THE SUBCOMM. ON FORENSIC SCI. COMM. ON SCI. § B, available at <http://www.whitehouse.gov/sites/default/files/microsites/ostp/forensic-science-subcommittee-charter.pdf> (last visited July 18, 2012) ("In 2006, the National Institute of Justice (NIJ) issued a grant to the National Research Council (NRC) of the National Academies to establish a Forensic Science Committee to study the forensic sciences and their application throughout the Nation.").

7 NAT'L SCI. AND TECH. COUNCIL, CHARTER OF THE SUBCOMM. ON FORENSIC SCI. COMM. ON SCI. § B, available at <http://www.whitehouse.gov/sites/default/files/microsites/ostp/forensic-science-subcommittee-charter.pdf> (last visited July 18, 2012) ("In 2006, the National Institute of Justice (NIJ) issued a grant to the National Research Council (NRC) of the National Academies to establish a Forensic Science Committee to study the forensic sciences and their application throughout the Nation.")

8 Hon. Harry T. Edwards, J., *Solving the Problems That Plague the Forensic Science Community*, 50 JURIMETRICS J. 5, 19 (2009).

9 NAS REPORT, *supra* note 5, at 21-22.

10 NAS REPORT, *supra* note 5, at 25.

11 NAS REPORT, *supra* note 5, at 23-25.

12 557 U.S. 305 (2009).

13 *Id.*

14 *Id.* The comments by the Court respecting the *NAS Report*, *supra* note 5, were obiter dictum, which Black's Law Dictionary defines as, "A judicial comment made while delivering a judicial opinion, but one that is unnecessary to the decision in the case and therefore not precedential (although it may be considered persuasive).—Often shortened to dictum or, less commonly, obiter." *Obiter dictum Definition*, BLACK'S LAW DICTIONARY (9th ed. 2009), available at Westlaw BLACKS. While this statement quoting from the heart of the *NAS Report* was incidental to the Court's ruling, it has been oft-quoted and is seen as a good indication of the momentousness of the *Report's* findings and recommendations.

15 Terry-Dawn Hewitt & Wayne J. McKenna, *A Perfect Storm Brewing for Fire Investigators in Court* (2014, 79 pgs.), available for free download from the Legal Scholarship Network: <http://ssrn.com/abstract=2381519>.

16 Department of Justice and National Institute of Standards and Technology Announce Launch of National Commission on Forensic Science, NIST LAW ENFORCEMENT STANDARDS OFFICE (Feb. 15, 2013) <http://www.nist.gov/oles/doj-nist-forensic-science021513.cfm>.

17 *Id.*

18 NIST, *Updated Summary of the NIST Proposed Plan for the Organization of Scientific Area Committees*, March 18 2014, available at <http://www.nist.gov/forensics/osac.cfm> (last visited May 25, 2014).

19 *Id.*

20 NIST, *Organization of Scientific Area Committees Roles and Responsibilities*, April 11, 2014, available at <http://www.nist.gov/forensics/osacroles.cfm#SB> (last visited May 25, 2014).

21 NIST, *Updated Summary of the NIST Proposed Plan for the Organization of Scientific Area Committees*, March 18 2014, available at <http://www.nist.gov/forensics/osac.cfm> (last visited May 25, 2014).

22 A detailed review of these reports and their recommendations are provided in Hewitt & McKenna, *A Perfect Storm Brewing for Fire Investigators in Court*, available at <http://ssrn.com/abstract=2381519>.

23 The IAAI-CFI certification program is accredited by the National Board of Fire Service Professional Qualifications (PRO BOARD) [www.theProBoard.org](http://www.theProBoard.org).

24 One does not have to be an IAAI member to become certified as an IAAI-CFI.

25 For more information on each of these certifications, see the International Association of Arson Investigators, [www.firearson.com](http://www.firearson.com), click on the "Professional Development" link, and then click on the links to "Certified Fire Investigator," "Evidence Collection Technician," and "Fire Investigation Technician," last visited May 25, 2014.

26 See ANSI's NSSN (National Resource for Global Standards), which is a search engine administered by ANSI, which allows users to search for ANSI standards. Go to NSSN at <http://www.nssn.org/search/IntelSearch.aspx> and enter the search phrase "NFPA 921" to find the editions of NFPA 921 that are in ANSI's standards database. Repeat the search with the phrase "NFPA 1033" to find the editions of NFPA 1033 are ANSI standards. Note that just because NFPA documents qualify as ANSI standards, does not change the NFPA's definition of the documents. While NFPA 921 is an industry standard, it is not a mandatory standard (as is NFPA 1033), and NFPA 921 is still defined by NFPA as a "guide." Whether defined as NFPA as "guides," "recommended practices," "standards," or "codes," all of NFPA's Fire Codes are industry standards because they have been developed or revised through the NFPA standards development process, which is ANSI approved. An example of an authoritative NFPA publication that is not an industry standard is the NFPA FIRE PROTECTION HANDBOOK.

27 Public Prosecution Service of Canada, PATH TO JUSTICE: PREVENTING WRONGFUL CONVICTIONS, 2011, available at <http://www.ppsc.gc.ca/Eng/pub/ptj-spi/index.html> (last visited May 29, 2014).

28 Public Prosecution Service of Canada, PATH TO JUSTICE: PREVENTING WRONGFUL CONVICTIONS, Chapter 9—Forensic Evidence and Expert Testimony, IV. International Developments, 2011, available at <http://www.ppsc.gc.ca/Eng/pub/ptj-spi/ch9.html#fnb289> (last visited May 29, 2014).

29 Email from Peter Mansi to Terry-Dawn Hewitt and FISC members dated May 28, 2014 (copy on file with the author.)

30 Email from Ross Brogan to Terry-Dawn Hewitt and FISC members dated May 28, 2014 (copy on file with the author.)

31 *Id.*

32 Angelo L. Pisani, Jr., *Historical Perspective on Arson Evidence*, in PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON THE FORENSIC ASPECTS OF ARSON INVESTIGATIONS, U.S. Dept. of Justice, 1995, at p. 3.

33 See Terry-Dawn Hewitt & Wayne J. McKenna, *A Perfect Storm Brewing for Fire Investigators in Court*, 2014 at pp. 11-20, available for free download from the Legal Scholarship Network: <http://ssrn.com/abstract=2381519>.

## 1. Introduction to Part II

Part II of this article familiarizes the reader with ASTM International and its standards. It also provides an overview of some of the most prominent ASTM standards from a fire investigator's viewpoint, those to which the 2014 editions of NFPA 1033 and NFPA 921 refer. In an effort to prepare our readers for the possible use of these standards in litigation, in this column the author has expressed a number of opinions and made several predictions. These views are those of the author alone, and do not reflect the opinions or positions of the IAAI, the IAAI Fire Investigation Standards Committee, or the NFPA.

Now having summarized in Part I, the reasons the author predicts a renewed focus on industry standards for fire investigators is in the offing, we next introduce ASTM and some of the ASTM standards with which fire investigators should be conversant.

## 2. Introducing ASTM International and Its Role in Creating Standards for Fire Investigators

ASTM International (ASTM), formerly known as the American Society for Testing and Materials, is a non-profit organization founded in 1898 for "the development and publication of international voluntary consensus standards for materials, products, systems and services."<sup>3</sup> ASTM develops its standards using an open voluntary consensus system approved by the American National Standards Institute (ANSI). A scientific and technical organization, it is composed of over 30,000 technical experts from around the world. Over 140 standards-making committees are responsible for more than 12,000 ASTM standards covering standard test methods, specifications, practices, guides, classifications terminology, homeland security, and more.<sup>5</sup>

Of ASTM's numerous technical committees, Committee E-30 on Forensic Sciences is one that carries on activities of particular interest to fire investigators. Below is an introduction to the E-30 Committee:<sup>6</sup>

ASTM Committee E30 on Forensic Sciences was formed in 1970. E30 meets once a year,

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in February, with about 125 members attending two days of meetings. The Committee, with a current membership of approximately 685, has jurisdiction of 51 standards, published in the Annual Book of ASTM Standards, Volume 14.02. E30 has 10 technical subcommittees that maintain jurisdiction over these standards. . . . These standards have and continue to play a preeminent role in all aspects to forensic sciences, including criminalistics, questioned documents, forensic engineering, fire debris analysis, drug testing analysis, and collection and preservation of physical evidence.

More information about E-30, its scope, approved standards, and work items under construction are available from its web page at <http://www.astm.org/COMMITTEE/E30.htm>.<sup>7</sup>

There is coordination of the activities relating to fire investigations between ASTM's E-30 Committee on Forensic Sciences and the *NFPA 921* Technical Committee on Fire Investigations. This is accomplished through the NFPA's decision to appoint to its *NFPA 921* Technical Committee, a representative of the ASTM E-30 Committee. The *NFPA 921* principal committee member representing E-30 is John Lentini, chair of the E-30 subcommittee on Criminalistics. John Lentini has been on the *NFPA 921* Committee since 1996. His alternate is Jeff Morrill.<sup>8</sup>

There are a number of ASTM standards applicable to fire investigations. There are several categories of such standards including: a) Standards for Laboratory Analysis, b) Standards for Sample Preparation, c) Standards for Testing, and d) General Practice Standards for Forensic Experts. Standards that govern laboratory examination and testing are listed and briefly described in *NFPA 921*, 2014 ed., Chapter 17 "Physical Evidence", section 17.10, which deals with "Examination and Testing of Physical Evidence." ASTM testing standards are also mentioned liberally throughout *NFPA 921*, including Chapter 6 "Fire Patterns, Chapter 7 "Building Systems," Chapter 10 "Building Fuel Gas Systems," Chapter 13 "Safety," Chapter 14 "Sources of Information, Chapter 22 "Failure Analysis and Analytical Tools, and Chapter 27 "Motor Vehicle Fires."

For those investigators interested in civil or criminal litigation, ASTM standards that relate to litigation (the general practice standards for forensic experts) are mentioned in Chapter 12 "Legal Considerations," and Chapter 29 "Management of Complex Litigation." Over

30 ASTM Standards with which fire investigators should be familiar are listed and incorporated into *NFPA 921* by reference in Chapter 2 "Referenced Publications," section 2.3.5, and are further referenced in Annex A "Explanatory Material," Annex B "Bibliography," and Annex C "Informational References." Note that those listed in Chapter 2 "shall be considered part of the requirements" of *NFPA 921*.<sup>9</sup> If you have an electronic copy of *NFPA 921*, 2011 edition, just do a search of "ASTM" and if you have never focused on this issue, you may be astounded how many references to ASTM standards are included in *NFPA 921*.

Some of the Standards developed by the E-30 Committee relevant to fire investigations are the general practice standards for forensic experts listed in the table at the end of this column. An asterisk beside the standard name indicates that the standard is considered part of the requirements of *NFPA 921* pursuant to Chapter 2, paragraph 2.1. The title, date, overview, and scope of each standard listed in Appendix A to this article are quoted directly from ASTM's website.<sup>10</sup>

All of the standards written by the E-30 Committee, including those in Appendix at the end of this article, are in ASTM Volume 14.02 of ASTM's Annual Book of Standards, available for purchase through [www.astm.org](http://www.astm.org). Be aware that ASTM standards are regularly reviewed and updated as necessary. Check the ASTM website to track revision cycles and ensure you are dealing with the most current version of any relevant standard.

It would be prudent for fire investigators wanting to meet the *NFPA 1033* Standard and the *NFPA 921* guidelines to heed this advice:

- Obtain copies of each ASTM standard in *NFPA 1033*, as well as the ASTM standards referenced in those chapters of *NFPA 921* that pertain to your investigations. Read these standards and be prepared to address them in the course of litigation.
- Ensure that the opinions of any other expert whose opinion is related to yours, follows applicable ASTM standards. For example, select a laboratory that follows the ASTM standards. Ensure that any fire tests that are governed by ASTM test methods comply with such methods, or be prepared to provide a reasonable explanation why not.



- Just as you would introduce relevant NFPA Fire Codes such as *NFPA 921* and *NFPA 1033* to an attorney handling one of your cases, also draw the attorney's attention to relevant ASTM standards.

Investigators who fail to follow relevant ASTM standards relating to evidence collection, laboratory analysis, or fire testing, leave their conclusions subject to attack, notwithstanding how carefully the other aspects of their fire investigations were conducted. Further, be aware that lawyers may question investigators (whether they are technical or expert witnesses) about ASTM standards in court. The ASTM standards have potential for use in direct and cross-examination. Just as *NFPA 921* and *NFPA 1033* can be effective tools either for or against an investigator or other fire experts in the hands of learned counsel in the courtroom forum, so can ASTM standards. The same applies to other experts on one's team in any particular case. Like a house of cards, if the opinion of one expert crumples in the face of cross-examination using ASTM standards, the whole house could fall and the case could be lost. On a happier note, compared to *NFPA 921*, the ASTM standards are very short!

**c) The amount of preparation and level of experience by the lawyers on all sides of the case, and (needless to say);**

**d) The judge!!**

**In closing, we recommend that you obtain copies of all relevant ASTM standards, as referenced in *NFPA 1033* and *NFPA 921*—and then read them. Even if you have reason to deviate from them in the course of your investigations, be prepared to explain why and how you did so. Finally, be grateful that you do not have to reinvent the wheel for each fire investigation. As previous FISC Bulletin Board columns have demonstrated, you can have a say in every NFPA and ASTM industry standard that affects your work. Explore the websites of these organizations to learn how!**

### 3. Conclusion

**This article covers a lot of ground. For investigators, we hope it provides some insights into the impact that the NAS Report is bound to have on our field. Further, it is always good to be reminded of the value of authoritative documents such as *NFPA 1033*, *NFPA 921*, and ASTM standards in court. Whether an investigator will be held to these industry standards will depend on several factors, including:**

- a) How adept the investigator is at articulating his or her opinion and justifying it in light of the authoritative publications in the field,**
- b) The degree to which opposing experts effectively demonstrate the significance of relevant industry standards to a given investigation,**

### Acknowledgements

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*See pages 32-37 for Appendix A: Table of Selected ASTM Standards<sup>11</sup>*

**Appendix A: Table of Selected ASTM Standards<sup>11</sup>**

The table below lists all of the ASTM standards referenced in *NFPA 1033*, plus additional ones identified by *NFPA 921* as particularly important to evidence collection and avoiding spoliation. The first column states the ASTM standard title and current edition (as of May 2014), together with the places in *NFPA 1033* or *NFPA 921* that reference each standard. The “Significance and Scope” column quotes information directly from the [www.ASTM.org](http://www.ASTM.org) website. We have made no editorial corrections and have printed the information exactly as posted by ASTM. Note that this table identifies only six ASTM standards. *NFPA 921* lists over 30 ASTM standards in its Chapter 2, thereby incorporating these additional standards as part of *NFPA 921*, as explained earlier.

<p><b>TITLE OF STANDARD &amp; NFPA 1033 &amp; NFPA 921 CROSS- REFERENCES</b></p>	<p><b>SIGNIFICANCE AND SCOPE</b></p>
<p><b>ASTM E620-11:</b> Standard Practice for Reporting Opinions of Scientific or Technical Experts</p> <p><b>NFPA 1033:</b> A.4.7.1 (re: Report Preparation)</p> <p><b>NFPA 921:</b> A.4.3.6 (re: Basic Methodology - Testing the Hypothesis)</p>	<p><b>Significance and Use</b></p> <p>This practice establishes those elements of the expert's opinion report which will make the report understandable to the intended recipient and focus on the technical aspects germane to the purpose for which the opinion is rendered.</p> <p>1. Scope</p> <p>1.1 This practice covers the scope of information to be contained in formal written technical reports which express the opinions of the scientific or technical expert with respect to the study of items that are or may reasonably be expected to be the subject of criminal or civil litigation.</p> <p>1.2 If compliance with this standard is claimed, the justifications for any deviations from this standard must be documented.</p> <p>1.3 This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.</p>

**TITLE OF STANDARD  
& NFPA 1033 &  
NFPA 921 CROSS-  
REFERENCES**

**SIGNIFICANCE AND SCOPE**

**ASTM E678 – 07  
(2013):** Standard  
Practice for Evaluation  
of Scientific or  
Technical Data

**NFPA 1033:**  
A.4.2.1.(re: Basic  
Methodology &  
hypothesis testing &  
evaluation methods)  
A.4.6.5 (re:  
Formulating an opinion  
on cause, origin, or  
responsibility)  
A.4.7.1 (re: Report  
Preparation)

**NFPA 921:**  
A.3.3.5.1 (re: Empirical  
Data)  
A.4.3.4. (re: Basic  
Methodology – Analyze  
the Data)  
A.4.3.6 (re: Basic  
Methodology – Testing  
the Hypothesis)

**Significance and Use**

3.1 Persons engaged in forensic investigations are responsible for identifying significant data. They then analyze and correlate the data and report conclusions and opinions. These opinions should be supported by the data, reported in a form that is understandable to a layman familiar with the incident, and capable of being evaluated by knowledgeable scientists, engineers, or investigators.

3.2 This practice is intended to serve as a guideline for the scientific or technical expert in conducting an investigation, which includes analyzing and evaluating facts. In addition, this practice may assist others in understanding and evaluating the work performed. Refer to Practice [E1188](#) for guidance pertaining to the actual collection of information and physical evidence, and Practice [E1020](#) for guidance regarding the initial reporting of the incident.

1. Scope

1.1 This practice establishes criteria for evaluating scientific and technical data, and other relevant considerations, which constitute acceptable bases for forming scientific or technical expert opinions.

1.2 This practice recommends generally acceptable professional practice, although the facts and issues of each situation require specific consideration, and may involve matters not expressly dealt with herein. Deviations from this practice are not necessarily wrong or inferior, but should be documented and justifiable, if compliance with this standard is claimed. Not all aspects of this practice may be applicable in all circumstances.

1.3 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*  
[Emphasis on ASTM.org website.]

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<p><b>TITLE OF STANDARD &amp; NFPA 1033 &amp; NFPA 921 CROSS- REFERENCES</b></p>	<p><b>SIGNIFICANCE AND SCOPE</b></p>
<p><b>*ASTM E860 – 07 (2013):</b> Standard Practice for Examining And Preparing Items That Are Or May Become Involved In Criminal or Civil Litigation</p> <p><b>NFPA 1033:</b> A.4.4.2 (re: evidence collection)</p> <p><b>NFPA 921:</b> 12.3.5.7 (re: Notification Prior to Destructive Testing) 17.7.3 (re: Evidence List) 17.10.1.6.2 (re: notifying interested parties of testing) 29.3.1 (re: Notice to Interested Parties) A.17.1 (re: Documenting Physical Evidence) A.17.2.2 (re: deciding what physical evidence to collect) A.17.5.2.1 (re: documenting physical evidence)</p>	<p><b>Significance and Use</b></p> <p>4.1 This practice establishes procedures to be followed to document the nature, state, or condition of items of evidence. It also describes specific actions that are required if planned testing, examination, disassembly, or other actions are likely to alter the nature, state, or condition of the evidence so as to preclude or adversely limit additional examination or testing.</p> <p>1. Scope</p> <p>1.1 This practice sets forth guidelines for the examination and testing of actual items or systems (hereinafter termed evidence) that may have been involved in a specific incident that are or may be reasonably expected to be the subject of civil or criminal litigation. This practice is intended to become applicable when it is determined that examination or testing of evidence is required, and such examination is likely to change the nature, state or condition of the evidence.</p> <p>1.2 This practice recommends generally acceptable professional practice, although the facts and issues of each situation may require specific considerations not expressly addressed herein. Deviations from this practice are not necessarily wrong or inferior, but such deviations should be justified and documented.</p> <p>1.3 <i>This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education, training, or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances.</i> [Emphasis on ASTM.org website.]</p> <p>1.4 <i>This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.</i> [Emphasis on ASTM.org website.]</p>

**TITLE OF STANDARD  
& NFPA 1033 &  
NFPA 921 CROSS-  
REFERENCES**

## **SIGNIFICANCE AND SCOPE**

**\*ASTM E1188 – 11:**  
Standard Practice for  
Collection and  
Preservation of  
Information and  
Physical Items by a  
Technical Investigator

**NFPA 1033:**  
A.4.4.2 (re: evidence  
collection &  
preservation)

**NFPA 921:**  
Ch. 2 (Referenced  
Documents)  
12.3.5.7 (re:  
Notification Prior to  
Destructive Testing)  
17.7 (re: Identification  
of Physical Evidence)  
17.7.3 (re: Evidence  
List)  
A.17.1 (re:  
Documenting Physical  
Evidence)  
A.17.2.2 (re: deciding  
what physical evidence  
to collect)  
A.17.5.2.1 (re:  
documenting physical  
evidence)

### **Significance and Use**

This practice is intended for use by any technical investigator when investigating an incident that can be reasonably expected to be the subject of litigation. The intent is to obtain sufficient information and physical items to discover evidence associated with the incident and to preserve it for analysis.

The quality of evidence may change with time, therefore, special effort should be taken to capture and preserve evidence in an expeditious manner. This practice sets forth guidelines for the collection and preservation of evidence for further analysis.

Evidence that has been collected and preserved shall be identified with, and be traceable to, the incident. This practice sets forth guidelines for such procedures.

#### **1. Scope**

1.1 This practice covers guidelines for the collection and preservation of information and physical items by any technical investigator pertaining to an incident that can be reasonably expected to be the subject of litigation.

1.2 This practice recommends generally accepted professional principles and operations, although the facts and issues of each situation require consideration, and frequently involve matters not expressly dealt with herein. Deviations from this practice should be based on specific articulable circumstances.

1.3 This practice offers a set of instructions for performing one or more specific operations. This standard cannot replace knowledge, skill or ability acquired through appropriate education, training, and experience and should be used in conjunction with sound professional judgment.

1.4 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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on page 36

<p><b>TITLE OF STANDARD &amp; NFPA 1033 &amp; NFPA 921 CROSS- REFERENCES</b></p>	<p><b>SIGNIFICANCE AND SCOPE</b></p>
<p>*ASTM E1459 – 13 Standard Guide for Physical Evidence Labeling and Related Documentation</p> <p><b>NFPA 921:</b> Ch. 2 (Referenced Documents) 12.3.5.7 (re: Notification Prior to Destructive Testing) 17.7 (re: Identification of Physical Evidence) 17.7.3 (re: Evidence List) A.17.1 (re: Documenting Physical Evidence) A.17.2.2 (re: deciding what physical evidence to collect) A.17.5.2.1 (re: documenting physical evidence)</p>	<p><b>Significance and Use</b></p> <p>4.1 By following the procedures specified in this guide, any item of physical evidence will have a traceable audit trail by which the origin, past history, treatment, and analysis of the item can be determined.</p> <p>4.2 By following these procedures, the chain of custody of any item of physical evidence will be maintained and documented.</p> <p>1. Scope</p> <p>1.1 This guide describes methods to be used for labeling physical evidence collected during field investigations; received in a forensic laboratory; or isolated, generated, or prepared from items submitted for laboratory examination.</p> <p>1.2 Many types of physical evidence may be hazardous. It is assumed that personnel assigned to the collection, packaging, storing, or analysis of physical evidence will take precautions as appropriate to the evidence.</p> <p>1.3 This guide offers a set of instructions for performing one or more specific operations. This standard cannot replace knowledge, skill, or ability acquired through appropriate education, training, and experience and should be used in conjunction with sound professional judgment.</p> <p>1.4 <i>This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.</i> [Emphasis on ASTM.org website.]</p>

TITLE OF STANDARD & NFPA 1033 & NFPA 921 CROSS- REFERENCES	SIGNIFICANCE AND SCOPE
<p><b>ASTM E1492 – 11:</b> Standard Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory</p> <p><b>NFPA 921:</b> 17.7.3 (re: Evidence List) A.17.2.2 (re: deciding what physical evidence to collect) A.17.5.2.1 (re: documenting physical evidence)</p>	<p><b>Significance and Use</b></p> <p>Prior to being presented in court, a foundation must be established showing how evidence was collected, who collected the evidence, where it was collected, who has had custody of the evidence, how the evidence has been processed, and when changes of custody have occurred.</p> <p>If the procedures outlined in this practice are followed, the chain of custody with respect to the evidence while it is in the custody of the forensic laboratory will be protected.</p> <p>1. Scope</p> <p>1.1 This practice describes procedures and techniques for protecting and documenting the integrity of physical evidence with respect to suitability for scientific testing, and admissibility as evidence in criminal or civil litigation.</p>

<sup>1</sup>Terry-Dawn Hewitt, *Overview of Changes: NFPA 1033 and NFPA 921, 2014 Editions*.

(March 26, 2014). Proceedings of the Federation of Defense and Corporate Counsel 2014 Winter Meeting (FDCC, March 2014). Available at SSRN: <http://ssrn.com/abstract=2416536>

<sup>2</sup>See ASTM Charter, available at: [www.astm.org/COMMIT/BOD-Charter.pdf](http://www.astm.org/COMMIT/BOD-Charter.pdf) (last visited May 23, 2014).

<sup>3</sup>ASTM Fact Sheet, available at: <http://www.astm.org/ABOUT/factsheet.html> (last visited May 23, 2014).

<sup>4</sup>NFPA is also accredited by ANSI as an American Standards Making Organization and both NFPA 921.

<sup>5</sup>ASTM.org Website, ASTM Overview page, available at: [http://www.astm.org/ABOUT/full\\_overview.html](http://www.astm.org/ABOUT/full_overview.html) (last visited May 23, 2014).

<sup>6</sup>E-30's Committee page, available at: <http://www.astm.org/COMMIT/COMMITTEE/E30.htm> (last visited May 23, 2014).

<sup>7</sup>*Id.*

<sup>8</sup>See NFPA's list of Fire Investigations Technical Committee Members, at NFPA.org, NFPA 921 Document Pages, available at <http://www.nfpa.org/codes-and-standards/document-information-pages/popup-page?mode=members&code=921&id=88> (last visited May 23, 2014).

<sup>9</sup>National Fire Protection Ass'n Technical Committee on Fire Investigations, NFPA 921 Guide for Fire and Explosion Investigations (2014 ed.) 921-1, p. 2.1.

<sup>10</sup>All information in this table comes from ASTM's official website available at: [www.ASTM.org](http://www.ASTM.org); click on the "Standards" link, then enter the document number in the "search" field (last visited May 24, 2014).

<sup>11</sup>*Id.*