EXHIBIT 81

Organizational Membership Directory

Second Opinion

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AHAM association of home appliance manufacturers

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- AAA ENVIRONMENTAL

- AAEE BVBA COMBICONSULT

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- ACWAPIPE-ARABIAN CO FOR WATER PIPE INDUSTRY
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- AEROSPORTS TRAMPOLINE PARKS, LLC

- AESCULAP AG & CO KG

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- AOV TESTING SHENZHEN TECHNOLOGY CO LTD
- APPLIED PROCESS INC.
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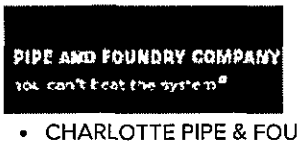

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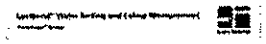

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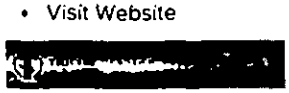

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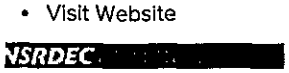

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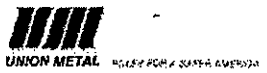

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EXHIBIT 82
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EXHIBIT 83
(FILED UNDER SEAL)

EXHIBIT 84
(FILED UNDER SEAL)

EXHIBIT 85
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EXHIBIT 86
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EXHIBIT 87
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EXHIBIT 89
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EXHIBIT 91
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EXHIBIT 92
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EXHIBIT 93
(FILED UNDER SEAL)

EXHIBIT 94
(FILED UNDER SEAL)

EXHIBIT 95

STANDARDS WRITING 101

NEW STANDARDS

/by Felicia Quinzi/

YOUR INDUSTRY OR SERVICE SECTOR NEEDS A NEW STANDARD, BUT WHERE DO YOU BEGIN TO GET IT WRITTEN AND APPROVED?

READ ON.

Writing a new standard can seem a daunting task, especially if you have never before thought of yourself as an author. However, ASTM, a consensus organization that wholly promotes collaborative efforts, offers many tools to get you started and see you through until the end or, at least, until someone votes negative.

ToolBox

"Search for Individual Standards" Page: To find out if a standard is already developed in the area you want, go to **www.astm.org** (click on ASTM Store, then on Search for Individual Standards and do a keyword search).

"Request for the Development of a New Standard" Form: Go to **www.astm.org** (click on Technical Committees/Membership, then on Standards Development Tools) or contact your staff manager.

Form and Style for ASTM Standards: Go to **www.astm.org** (click on Technical Committees/Membership, then on Standards Development Tools) or contact your staff manager.

Interactive Standards Development Forums: To develop standards online, see the ASTM Forums Web page **(http://astmforums20.micronexx.com)**.

WHAT YOU WILL NEED:

- New Standard Development request form (Figure 1, see page 22);
- *Form and Style for ASTM Standards*, a.k.a. the "Blue Book";
- Input from other experts;
- Access to the Internet (optional);
- Instructions for establishing an interactive forum on the ASTM Web site (optional);
- Your staff manager;
- A No. 2 pencil or a PC;
- A comfortable chair;
- Patience.

HOW GOOD IS MY IDEA?

The first step is to introduce the idea for a new standard to the appropriate subcommittee. The concept must fall under the subcommittee's scope, first and foremost. The subcommittee should agree that the proposed activity is worthwhile, feasible, and needed. More importantly, verify that the standard you hope to write does not already exist under the jurisdiction of another committee or organization. Avoid duplication of effort and jurisdictional disputes!

To do this, do a keyword search of all approved ASTM standards on the ASTM Web site (see "Search for Individual Standards" in the ToolBox). If a standard turns up that sounds similar to the one you are about to write, contact your staff manager for further information. In addition, your staff manager can assist in finding out whether your or another committee has a work in progress on a similar or related subject by searching draft standards under development in ASTM.

NEW STANDARD DEVELOPMENT FORM

The best way to ensure that an activity is appropriate is to complete the "Request for the Development of a New Standard" form (see ToolBox).

The best way to ensure that an activity is appropriate is to complete the "Request for the Development of a New Standard" form.

The subcommittee having jurisdiction over the proposed project should approve the development of the activity and the subcommittee chairman should subsequently sign the form. If you are between meetings, the chairman may sign the form on the assumption that there will be approval of the activity at the next meeting.

Filling out the form will trigger the crucial steps to be taken, such as (1) establishing a well-defined scope or objective; (2) identifying those who have expertise in a given area; (3) identifying those who need to be made aware of, or invited to participate in, a given activity; (4) identifying the end users; (5) creating a task group representing all interests; (6) enabling the subcommittee to track a task group's efforts; and (7) publicity.

Ideally, the task group would be formed under the subcommittee with a manageable number of members (approximately four to six) representing a balance of interests. Should this task group need to look outside of the ASTM subcommittee or committee for expertise, other members or individuals should be invited to participate.

NOTE—Task group members are not required to be members of ASTM.

JOINT TASK GROUPS

Coordination and cooperation are two of the most important ele-

(CONTINUED ON PAGE 23)

REQUEST FOR THE DEVELOPMENT OF A NEW STANDARD

(COMPLETION OF THIS FORM IS REQUIRED FOR THE FORMATION OF A TASK GROUP TO DEVELOP A NEW STANDARD. SOME OF THE INFORMATION MAY NOT BE NECESSARY OR APPROPRIATE AS DETERMINED BY YOUR SUBCOMMITTEE.)

SUBCOMMITTEE DESIGNATION (e.g. A01.22): _____ DATE: _____

TASK GROUP CHAIRMAN: _____

PHONE: (_____) _____ EMAIL: _____

ADDRESS (* only if non-ASTM member): _____

_____

PROPOSED DRAFT DOCUMENT TITLE: _____

_____

PROPOSED SCOPE: _____

_____

_____

_____

IMPORTANT KEYWORDS that are not included above: _____

PROJECTED TARGET DATE for first subcommittee ballot: _____

EXPLAIN why the standard is needed and how it will be used (i.e. adopted by government agency, procurement, quality assurance): _____

_____

_____

List other ASTM Committees or key outside organizations that you feel should be informed of this activity: _____

_____

LIST TASK GROUP MEMBERS ALONG WITH THEIR AFFILIATIONS:

NAME	AFFILIATION	NAME	AFFILIATION
1		6	
2		7	
3		8	
4		9	
5		10	

Are you interested in utilizing the **ASTM Web-Based Interactive Standards Development Forums?** (please check one) ☐ Yes ☐ No

APPROVED AT SUBCOMMITTEE MEETING ON: _____ **(date)**

OR

APPROVED BY SUBCOMMITTEE CHAIRMAN ON: _____ **(date)**

NOTE: If approved by the chairman between meetings, the task group will be approved by the subcommittee at their next meeting.

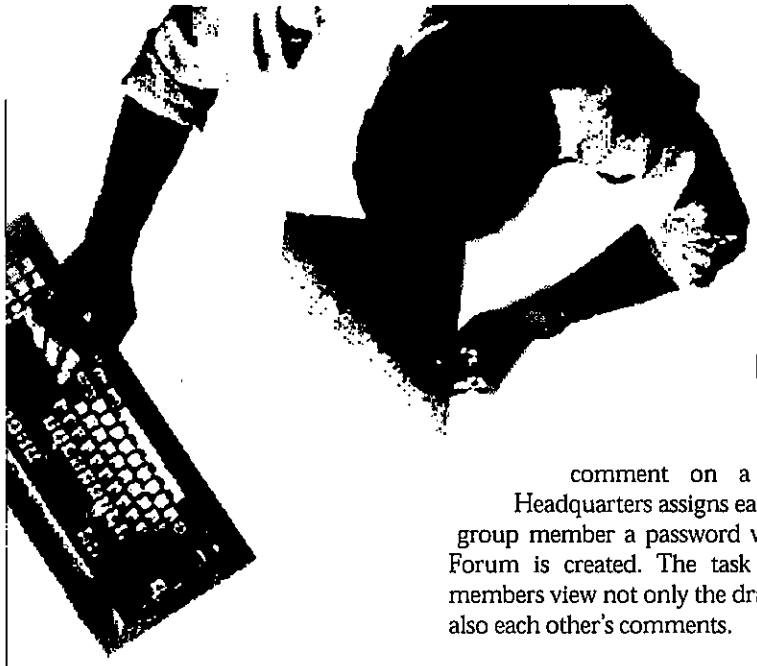
SIGNATURE OF SUBCOMMITTEE CHAIRMAN: _____

By completing this form, the task group chairman acknowledges that all copyrights to this document, as a draft and as an approved ASTM standard, are the sole and exclusive property of ASTM, in accordance with the Intellectual Property policies of the Society.

SIGNATURE OF TASK GROUP CHAIRMAN: _____

FORWARD COMPLETED FORM TO YOUR COMMITTEE STAFF MANAGER

10/99



ments of standards development and maintenance. By coordinating openly with other members, a task group can bring together key stakeholders and receive input at the start of a project, rather than later on when much time and energy has been expended.

Furthermore, when a subcommittee identifies other subcommittees that should be represented on the task group, the subcommittee chairman should inform his or her staff manager. The manager will initiate coordination between the two or more subcommittees. Then, additional members will join the task group to represent the interests of the committees to which they belong. We call this a "joint task group." This could also be the case for representatives from organizations other than ASTM. The joint task group is a vehicle for individuals to communicate their interests.

PUBLICIZE!

If you are uncertain as to whether another committee or organization is interested in or may be impacted by your activity, publicize! Your staff manager can assist you with contacting the ASTM Corporate Communications Department.

HOW WILL THE STANDARD BE USED?

Doing the research up front will save time and energy. Ask questions of your subcommittee, such as: "Is it possible that the standard will be cited in a building code?" "Will a government agency or regulatory body adopt the standard?"

START WRITING

Start by writing "Draft #1" at the top of your first page. It is likely that there will be more than one or two drafts of the document and it is always interesting to keep track.

WHAT KIND OF STANDARD AM I?

Now is the time to reach for your Blue Book (*Form and Style for ASTM Standards*) and dust it off, or download the latest version (October 1999) from the Web site (see ToolBox). Review the definitions of test method, specification, practice, guide and classification. By determining which type of standard you are writing, you will know which mandatory sections must be included in your document.

Once you know which sections you need, you can start with an outline, such as (in the case of a test method):

- Title;
- Scope—purpose of the standard, general information;
- Significance and Use—how the standard is to be applied, specific information;
- Apparatus;
- Materials;
- Procedure;
- Keywords for indexing purposes.

The draft will have become a consensus document created, refined, and agreed upon by the experts in the industry.

USING THE INTERNET

ASTM encourages the use of the Interactive Standards Development Forums, a Web-based standards development tool to which you have access 24 hours a day, seven days a week (see ToolBox). Through the Forums, a task group chairman can designate who has the ability to review and comment on a draft. Headquarters assigns each task group member a password when a Forum is created. The task group members view not only the draft, but also each other's comments.

YOUR FIRST DRAFT GOES TO BALLOT

A first draft typically goes to a subcommittee ballot and receives its first round of comments and negatives. This is actually very positive and productive for the task group.

If, as mentioned above, a joint task group is working on the draft because another subcommittee needs to be involved, an "informational ballot" is an option. In addition to balloting within the subcommittee with jurisdiction, a different subcommittee may receive an informational ballot. Comments received on the informational ballot are handled in the same manner as a negative or comment on the official ballot.

A STANDARD IS BORN

Maybe it seemed as though there were a few obstacles. Perhaps you thought there was too much paperwork. However, the draft is approved and published as an ASTM standard. The draft will have become a consensus document created, refined, and agreed upon by the experts in the industry. The standard can be used worldwide in the international marketplace and adopted by countries in places where you have never been. We think that it's worth it. //

Felicia Quinzi is a manager in the Technical Committee Operations Division.

EXHIBIT 96

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

AMERICAN SOCIETY FOR TESTING AND MATERIALS d/b/a ASTM INTERNATIONAL; NATIONAL FIRE PROTECTION ASSOCIATION, INC.; and AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS, INC., Plaintiffs/Counter-defendants, v. PUBLIC.RESOURCE.ORG, INC., Defendant/Counterclaimant.	Case No. 1:13-cv-01215-TSC-DAR

EXPERT REPORT OF JAMES R. FRUCHTERMAN

Table of Contents

Introduction

As an expert in accessibility of written materials for people who have disabilities that affect using standard print (people who are print disabled), I have been retained by Public.Resource.Org to evaluate the accessibility of certain online content available on the websites of the plaintiffs and the defendant in this case. As someone dedicated to improving accessibility for the benefit of people with disabilities and in the public interest, I agreed to evaluate the accessibility to people who are blind of specific commonly used standard documents located on different websites.

This expert report is a summary of certain opinions that I intend to give, if asked, at trial regarding the accessibility of documents on various websites to people who are blind. This report also states the bases for my opinions, and it discloses the data or other information considered in forming those opinions. I reserve the right to change or supplement this report if additional evidence comes to my attention, and to prepare demonstratives and/or exhibits to illustrate or explain my opinions, as appropriate.

A copy of my curriculum vitae, including a list of my publications and presentations, is **Exhibit A** to this report. I provide my expertise in this case pro bono, and I am not receiving compensation for my time researching, writing this report, or testifying. I previously served as an expert in *The Authors Guild, Inc. et al. v. HathiTrust, et al.*, Case No. 1:11-cv-06351-HB (S.D.N.Y.) (case filed September 12, 2011), although I did not testify in that case. I have not given deposition or trial testimony in the past four years.

Background and Qualifications

I serve as Founder and Chief Executive Officer of Benetech, a nonprofit dedicated to creating new technology solutions that serve humanity and empower people to improve their lives. In 1980 I earned a B.S. in Engineering and an M.S. in Applied Physics from California Institute of Technology. I co-founded Calera Recognition Systems in 1982. Calera developed optical character recognition (OCR) technology that allowed computers to read virtually all printed text.

In 1989, I founded Arkenstone, a nonprofit social enterprise, which produced reading machines for the print disabled community based on the Calera technology, and was at one time the largest maker of affordable reading systems for the blind. The Arkenstone product line was sold in 2000 and the resulting capital funded the next phase of Arkenstone under its new name, Benetech. I have been the CEO of Benetech/Arkenstone since 1989.

I have served on three U.S. federal government advisory committees for disability issues: the Section 255 Telecommunications Access Advisory Committee, the Section 508 Electronic Information and Technology Access Advisory Committee, and the Advisory Commission on Accessible Instructional Materials in Postsecondary Education for Students with Disabilities. I have received numerous other awards and recognition for my work making print materials accessible to people who are blind or otherwise print disabled. In 2006 I received a MacArthur Fellowship. I was named an Outstanding Social Entrepreneur in 2003 by the Schwab Foundation and have frequently participated in the World Economic Forum Annual Meetings in Davos, Switzerland. Benetech received the Skoll Award for Social Entrepreneurship under my leadership. I also received the Migel Medal from the American Foundation for the Blind, the Robert F. Bray Award from the American Council of the Blind, and the American Library

Association's Francis Joseph Campbell Award in recognition of my successful efforts to make literary works more accessible to people who are blind or visually impaired.

What Does Accessibility Mean for a Blind Person?

Accessibility is usually defined in a functional way: can a person with a disability independently access the same information and perform the same tasks as a person without a disability? When it comes to accessing materials traditionally available as print, such as standards, there are many groups of print disabilities. The most severe is blindness, where a person cannot perceive the printed text at all. The next is vision impairment, where a person generally cannot perceive the text directly or with corrective lens, but may be able to use magnifiers of different types to read the text. Another group is learning disabilities that interfere with reading, such as dyslexia. A closely related group of disabilities involve brain injuries that affect reading or the retention of material read. Another group is physical disabilities that interfere with the holding or seeing of books or the turning of pages.

In this report, I focused on the accessibility challenges that would be experienced by blind people, because they are generally the most severe print disabilities. The other groups of people with print disabilities use similar technologies to access print (such as having it read aloud), and experience similar challenges as blind people. In the accessibility field, it is generally understood that if you make information accessible to a blind person, it will probably also meet the accessibility needs of the great majority of people with other print disabilities.

The most common technology used by a blind person for accessibility is called a screen reader. As the name suggests, a screen reader is a program that runs on a personal computer or a smartphone that reads the information on the screen aloud (using a computer-synthesized voice)

to a blind person. The screen reader runs "on top of" other programs, figuring out not only what text is on the screen, but also the controls that are displayed: items such as buttons, menus, text-entry boxes and the like. Because of the amount of information on a complete screen, and its complexity, blind people need to be able to focus on the most important information so that they do not waste time listening to everything on the screen.

For the purpose of this report, measuring the accessibility of standards, I am assuming that the blind user is using a screen reader on top of a web browser on a personal computer. Based on the information the screen reader can glean from the web pages displayed on the screen, can a blind person locate the standard and read it?

The accessibility tasks I tested were designed to assess whether a blind user with basic assistive technology skills could perform the same kind of tasks one might expect a user without a disability to perform in accessing a given standard, without requiring the intervention of a third party. This functional approach is the most common method of assessing accessibility.

The specific tasks I investigated were:

- Could a blind user with basic assistive technology skills independently access a specific standard of interest?
- Could a blind user independently read the entire standard using assistive technology?
- Could a blind user independently navigate to a specific place in the standard and read the content in that place?
- Could a blind user independently do a full text search and find specific mentions of terms of interest?

I conducted these tests on a number of the same standards available on the Public.Resource.Org website and in the free reading sections of the websites of the National Fire Protection

Association (NFPA), the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), and the American Society for Testing and Materials (ASTM). I primarily used the Window-Eyes screen reading software to perform my tests, but I also confirmed some of my observations with the JAWS screen reading program (these are the two most commonly-used screen reading programs by people who are print disabled). In order to further confirm my observations, I was assisted by an engineer who is blind and who is a skilled daily user of screen reader software. This engineer used the JAWS screen reader to confirm that as an individual who is print disabled and a regular user of a screen reader program, he was unable to access the website and several specific standards that I had found to be inaccessible to people who are print disabled.

Overview and Summary of Opinions

Having reviewed the accessibility of the same standards content rendered by Public.Resource.Org and those of the free access options provided by the NFPA, ASHRAE and ASTM, it is my opinion that Public.Resource.Org currently provides the only accessible option for people/citizens with print disabilities to access these standards.

Based on my extensive experience with content accessibility, approaches for "free access" that make it impossible to copy text generally make it impossible for the assistive technology used by people with print disabilities, especially blind people, to read the text aloud, present it visually in more accessible manners, or make the text available in braille. Technological mechanisms that are designed to stop copying generally have the unfortunate side effect of locking out people with print disabilities from the ability to read the material.

The versions of the standards on the NFPA, ASHRAE, and ASTM free reading websites are not available in a way that is accessible to blind users. First, the NFPA and ASTM websites require registration before a user can access free standards on their websites. Although a blind user may be able to register on the ASTM website, a person who is blind would not be able to independently gain access to the NFPA standards because the NFPA website uses a registration process that employs buttons without proper markings for the blind to perceive them with accessibility software. Second, the free reading websites for NFPA, ASHRAE, and ASTM each display their standards in separate windows that prevent assistive technology from perceiving the words in those windows, meaning that that blind people would not be able to tell the difference between the standards and a blank window. These websites do not allow the text of the standard to be read aloud by a screen reader; the navigation controls do not work with a screen reader, so blind people are unable to navigate to a specific location in the standard; and the text search function does not work with a screen reader.

In contrast, the versions of the standards on the Public.Resource.Org website are available in a way that is accessible to blind users. Firstly, the Public.Resource.Org website does not require a registration process before a user can access the files containing the standards; the files are directly available to users. Secondly, many of the standards on the Public.Resource.Org website are available in well-structured HTML, a highly accessible format that allows blind users similar quality of access as that enjoyed by a person without a disability accessing a print version of the standard (or a locked digital version). Although some standards are available only in PDF format on the Public.Resource.Org website, those documents are accessible through extra steps such as optical character recognition. To summarize, it is my opinion that the standards on the Public.Resource.Org website are accessible to the blind through screen reader software, whereas

the standards on the free reading portions of the NFPA, ASHRAE, and ASTM websites are not accessible to the blind through screen reader software. Furthermore, it is my opinion that people with other print disabilities, such as vision impairment, dyslexia, brain injury and physical disabilities, would find the standards on the Public.Resource.Org accessible with screen readers and other assistive technology, whereas the standards on the free reading portions of the NFPA, ASHRAE, and ASTM websites would not be accessible to the great majority of people with these types of print disabilities.

Testing the National Fire Protection Association Website's Accessibility

I performed my test of the NFPA, ASHRAE, and ASTM websites in two phases. The first phase was an investigation of whether a blind or visually impaired person can gain access to a standard on the NFPA website by going through a process of obtaining free access while using a screen reading program. On the NFPA website it appears that users must register and agree to terms of use before accessing any of the free standards on the website. The results of the test are that a blind user would not be able to independently sign up for a free account on the NFPA website because the registration process involves elements that cannot be perceived by screen reading software.

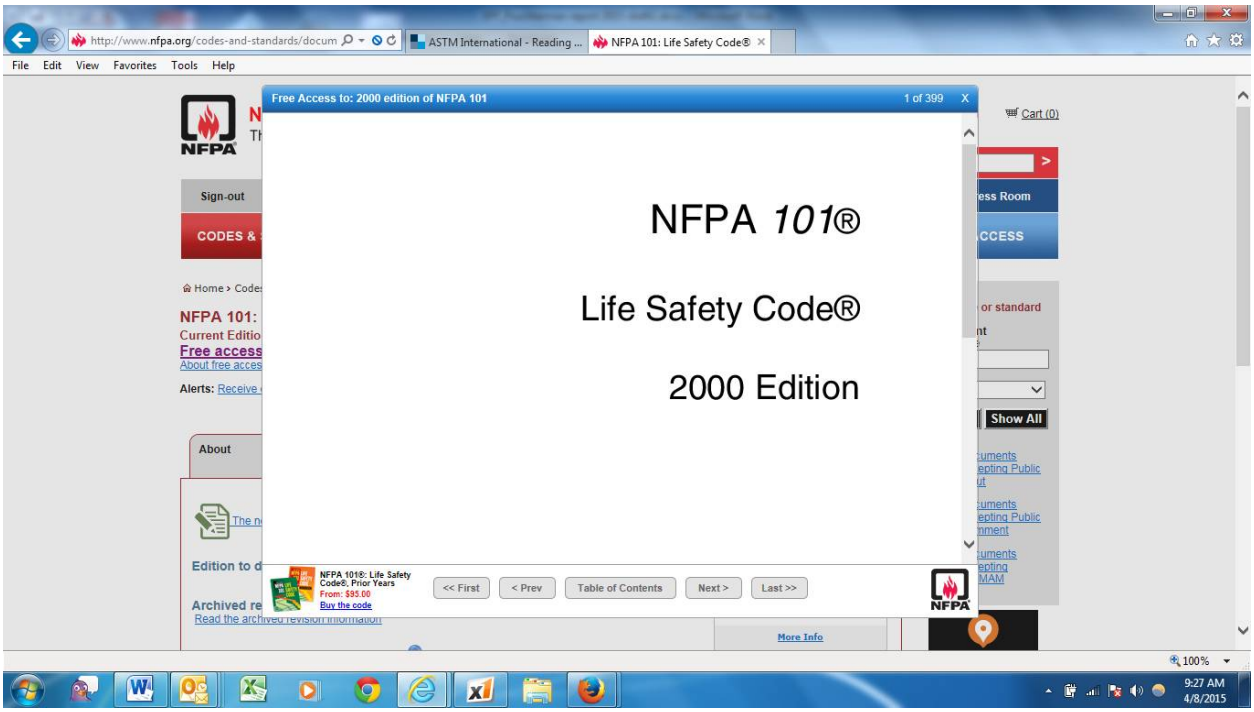
The accessibility standard in common use for websites is the Web Content Accessibility Guidelines (WCAG), published by the World Wide Web Consortium, the main standards body for technology related to the Web. A copy of the WCAG is **Exhibit C**. (As with other World Wide Web Consortium standards, the WCAG standard is freely available at no cost on the World Wide Web Consortium website, in HTML, as stated in the World Wide Web Consortium Document License, **Exhibit D**). The very first element in the WCAG standard specifies that

"information and user interface components must be presentable to users in ways they can perceive." The key recommendation for how to address this need is to "provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language." The two easiest ways to meet this requirement are to present textual content as text and to add text labels to non-text content. For example, the text in a regular web page is highly accessible: the screen reader software can simply grab each word, sentence and paragraph and read it aloud (or make it larger, or provide it to a braille device). Screen readers understand web page structure, so links and headers are identified as such when they are read aloud. A visual button on a page can easily have a text label as part of the web page that identifies its function (for example, "I agree"). A screen reader encountering such a button on a web page would simply say aloud "Button, I agree," and the screen reader provides a blind person with a way to activate the button using the keyboard (because blind people avoid using mice for obvious reasons).

These fundamental requirements for accessibility are the ones that the NFPA website fails to meet. Rather than cataloging the many parts of the WCAG accessibility standards the NFPA website fails to meet, I will focus on two key items. The first is that a blind person trying to sign up for a free access account needs the assistance of a sighted person to sign up. This is because, for instance, the NFPA website uses a visual button for the "I Agree" function on its registration page, and this visual button fails to have a text label, meaning that a blind person using a screen reader would not know what the button is for. A blind person who arrived at the point where he or she needed to assent to the terms and conditions after some effort would not be able to tell what to do, or which button to push, because there is no text equivalent attached to the "I AGREE" button. On the NFPA website, the screen reader knows that there are buttons but

can't tell what they do because there are no text labels on them, and the letters "I AGREE" are shown only as a picture of those words, which is not perceptible to a blind person.

The second phase of my test was to perform the functional tests on a specific standard, NPFA 101-2000. In this second phase of the test is also where the NFPA free access website fails to make the text accessible, and fails to meet the WCAG accessibility standard mentioned above. Rather than presenting the text in a standard webpage, which is the typical way to present information in a web browser, the NFPA site opens an image-only window. Rather than presenting the text of the standard as HTML text, it presents it as a picture of the text. See the screen shot below.

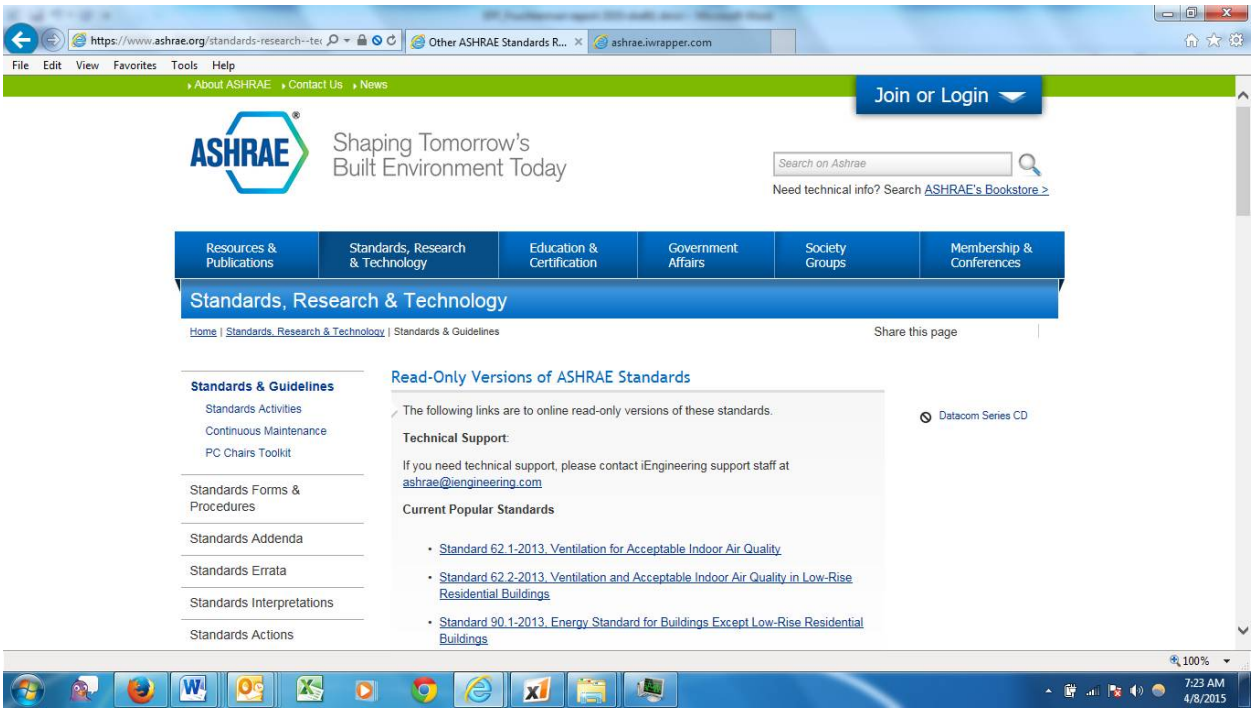


To a sighted person, both the text in a standard webpage and the text in an image-only window looks pretty similar: the words are visible. But, "under the hood," so to speak, the use of an image prevents the browser from presenting the text on the screen as text. A browser ordinarily transmits text to a screen reader in a way that facilitates access for the visually

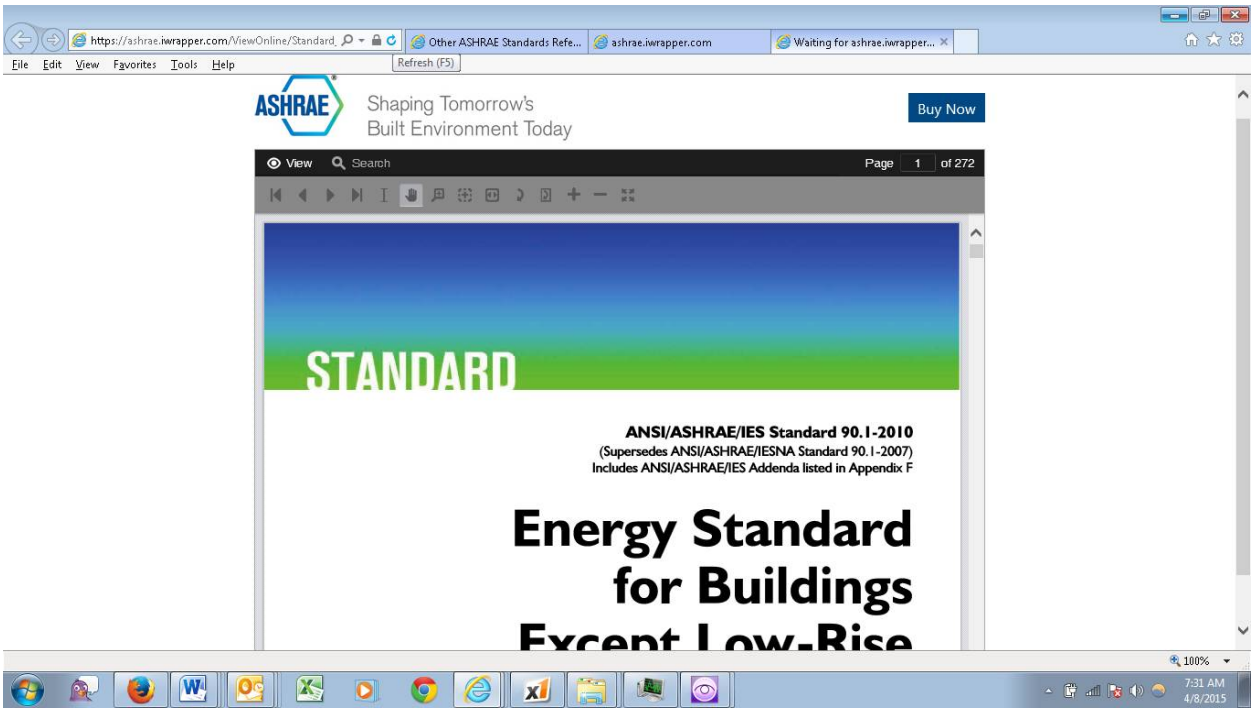
impaired. Instead, when NFPA's website presents text only within an image, the web browser processes it as an image, as if someone took a picture of a page and sent it as a photo rather than sending a text file. The screen reader cannot perceive the text in an image; all the screen reader can perceive is that there is a big picture on the screen. A screen reader stops working at this point: it does not know what is in the picture. And so even if a blind person were able to open a specific standard on the NFPA website, such as NFPA 101, he or she will not be able to perceive any of the content in the standard because the page appears blank to him or her. This means that on the NFPA free reading website a blind person cannot independently read the standard, go to a specific page within it, or search it for terms of interest.

Testing the American Society of Heating, Refrigerating and Air-Conditioning Engineers Website's Accessibility

Counsel suggested I investigate the accessibility of ASHRAE Standard 90.1-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings (I-P). ASHRAE's website does not require a visitor to sign up for a free account before viewing certain standards, and so a blind user should be able to navigate to the place where online read-only versions of the standards reside, and then identify specific standards by number and description. Thus, the first of the four tasks, navigating to a specific standard, is a task that a blind person can perform independently on the ASHRAE website. See the screen shot below of this portion of the ASHRAE website with the listing of links to different standards.



However, once a specific standard is chosen, the standard is not perceptible to a blind person, for the same reason that I discussed earlier with respect to the NFPA website. See the screen shot below of the ASHRAE 90.1-2010 standard as displayed on the website. The text of the standard is inaccessible to a blind person, and therefore a blind person is unable to perform the functional accessibility tasks. First, the ASHRAE website presents the standard in a window that prevents screen reader software from reading aloud the text of the standard. Second, the navigation controls on the standards-display portion of the ASHRAE website do not work with a screen reader, so a blind person would be unable to navigate to a specific location in the standard. Lastly, although there is a text search function that works for a sighted person, I was unable to get that functionality to work with a screen reader. And, even if I could get the search function to work with a screen reader, a screen reader would still be unable to read aloud the actual content of the standard at that point, and so the exercise would be pointless for a blind person.

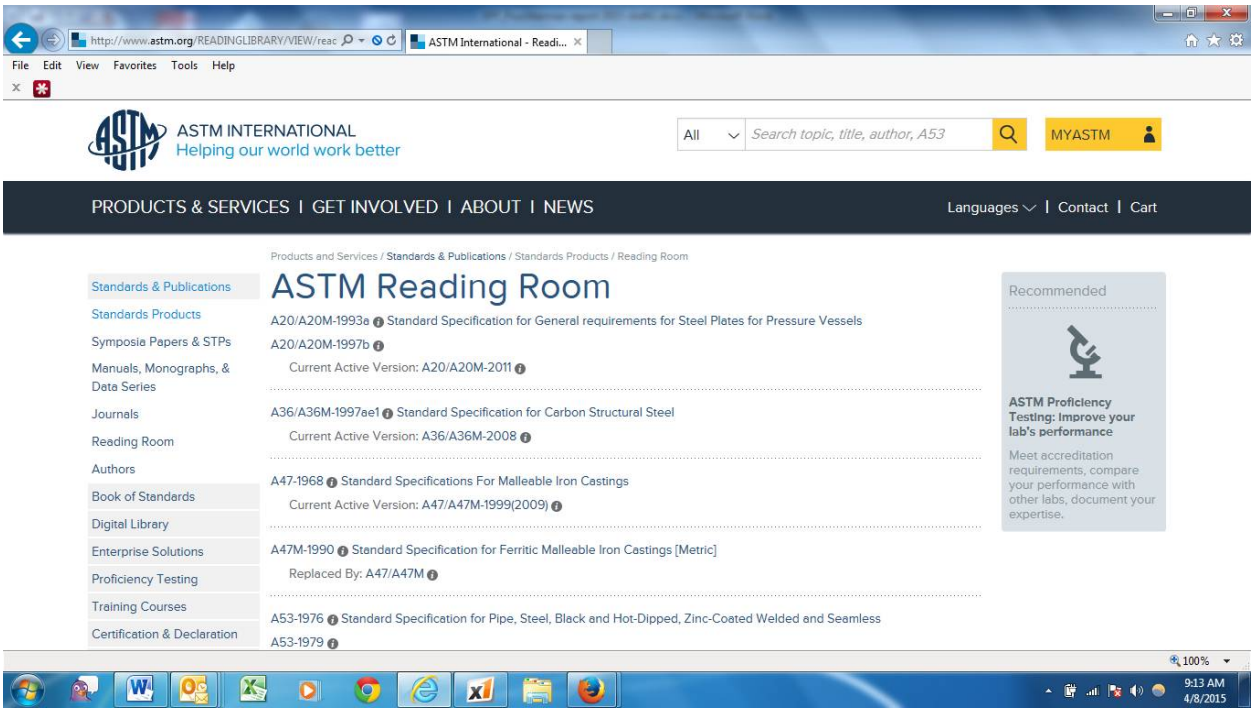


Because the ASHRAE website provides the content of the standard as an image, it is inaccessible to a blind person. As I mentioned above, the WCAG accessibility standard requires the text to be provided for any information delivered as an image, and the ASHRAE website fails to do so for the standard I tested. I also tested five other ASHRAE standards (ASHRAE 62.1-2013, 62.2-2013, 90.1-2013 (I-P), 90.2-2007, and 189.1-2014) on the ASHRAE website, and they all presented the same image-based interface to the standards, and are therefore inaccessible to blind people.

Testing the American Society for Testing and Materials Website's Accessibility

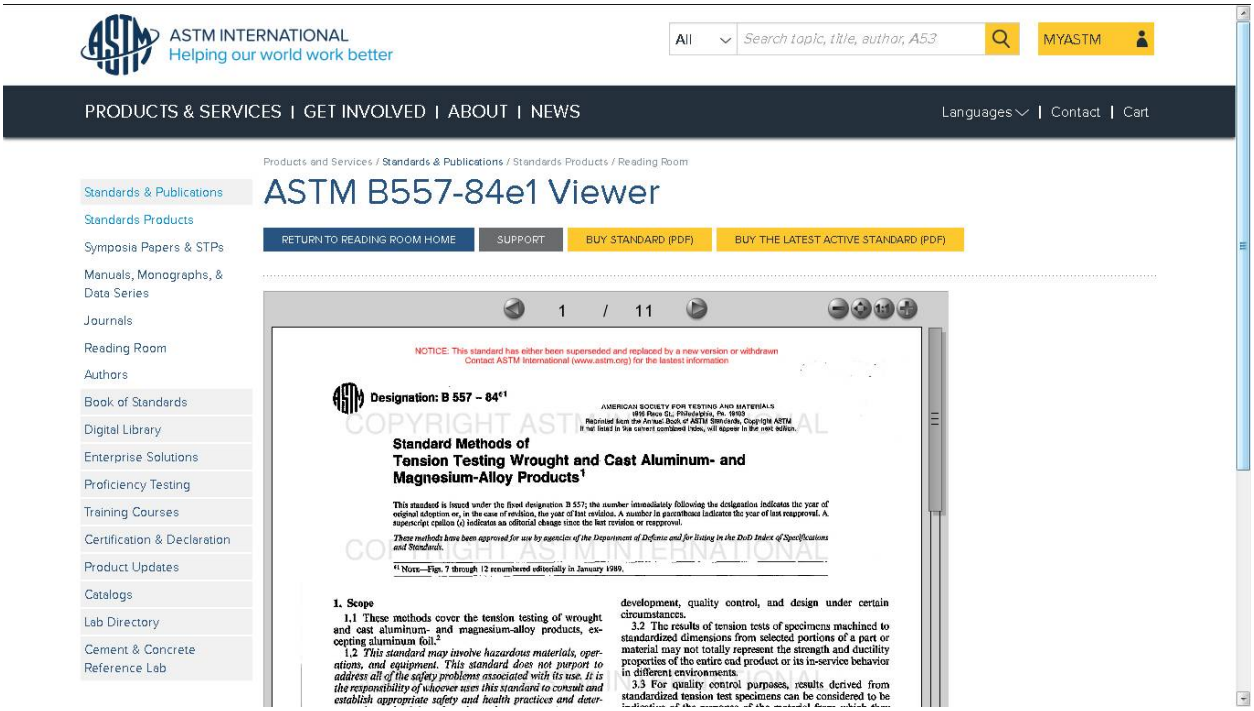
Counsel suggested I investigate the accessibility of Standard B557-84 Wrought and Cast Aluminum- and Magnesium-Alloy Products. The ASTM website requires visitors to sign up for a free account before viewing certain standards. The process of setting up a free account is accessible, and therefore a blind person should be able to independently gain access to the

ASTM Reading Room, where the standards are located. A blind user could navigate to the place where online read-only versions of the standards reside, and could identify specific standards by number and description. Thus the first of the four tasks, navigating to a specific standard, was a task that a blind person could perform independently. See the screen shot below of this portion of the ASTM website with the listing of links to different standards.



I was able to locate a version of the standard ASTM B557-84e1. When one selects the standard, a new window appears with an image-only viewer of the standard. For the same reason as I described earlier with respect to the NFPA and ASHRAE websites, this standard on the ASTM website is not perceptible to a blind person. First, the ASTM website presents the standard in a window that prevents screen reader software from reading aloud the text of the standard. Second, the navigation controls on the standards-displaying portion of the ASTM website do not work with a screen reader, so a blind person would be unable to navigate to a specific location in

the standard. I was not able to locate a text-searching function on the ASTM standard I examined.



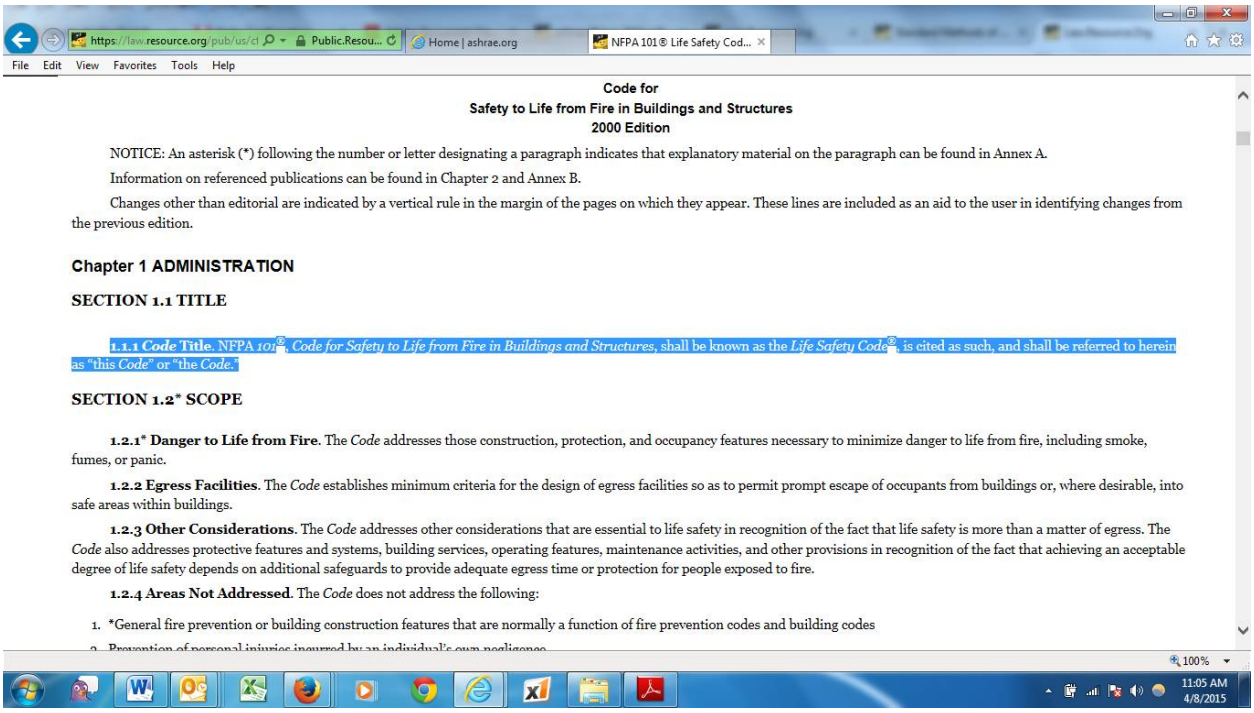
Because the content of the ASTM standard appears as an image in the ASTM Reading Room, it is inaccessible to the blind person. As I mentioned above, the WCAG accessibility standard requires the text to be provided for any information delivered as an image, and the ASTM website fails to do that for the standard I tested. I also tested the first standard listed on the website, ASTM A20/A20M-93a, and it presented the same image-based inaccessible interface to the standard, meaning that a blind person would not be able to perceive it.

Testing the Public.Resource.Org Website's Accessibility

After unsuccessfully trying to access the NFPA 101-2000, ASHRAE 90.1-2010 and ASTM B557-84 standards on the websites of the three standards organization as a blind user would, I went to the same standards on the Public.Resource.Org website and tried the same

tasks. I was able to successfully complete all of the accessibility tasks on all three of the standards on the Public.Resource.Org website.

The Public.Resource.Org website has no required sign-up procedure, so I did not need to test the accessibility of that process. It is possible to go directly to a specific standard either by using a direct weblink or by navigating the text-oriented website. For example, searching on the terms "NFPA 101 resource.org" shows the standard available directly from Google's search engine in the top few links, in both PDF and HTML form. HTML is generally more accessible, so I selected that link and it directly opened up in my browser. The entire text of the standard was available, and I was able to read the standard using screen reading software, navigate to a specific place in the document using screen reading software, and search for key terms using screen reading software. My test therefore indicated that a blind person using a screen reader would be able to perform all of the functional tasks: reading the entire standard, navigating to a specific place in the standard, or searching on key terms. Because the text is provided as standard HTML, a blind person is able to listen to the text, or access it using a digital braille device. This kind of HTML content is also highly accessible to people with other print disabilities and the assistive technology they use to access print. For example, people with low vision or with dyslexia often use a screen reader to read text aloud.

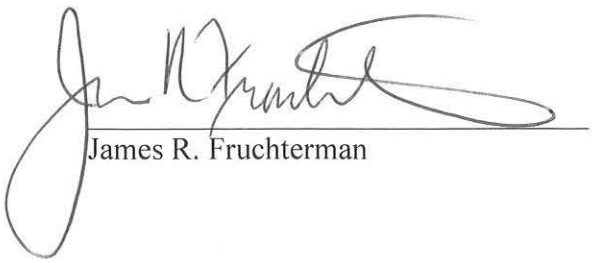


I also found a version of the ASTM B557-84 standard on the Public.Resource.Org website as an HTML file. It was well-structured and highly accessible. Like the NPFA 101-2000 standard on the Public.Resource.Org website, this standard could be readily located and accessed by a blind person using a screen reader, and could then be perceived in its entirety using the screen reader.

I then examined the accessibility of more recent versions of the NFPA 101 standard located on the Public.Resource.Org website. These were available only in PDF formats, not HTML. I accessed the 2012 version of the NPFA 101 standard, and found that it was an image-based PDF. I also searched for the ASHRAE 90.1-2010 standard and found it in PDF form on the Public.Resource.Org website without needing to login to access it. It was also an image-based PDF. Image-based PDFs are generally not accessible to blind people. However, these files both came with the underlying text associated with the page images. It was possible for me to open the PDFs in a browser or Adobe Reader, do a Select All command (Control A on a PC),

a Copy command (Control C on a PC) and then switch to a text-oriented word processing program (Microsoft Word) and paste the text of the entire standard into a file there. The text appeared to be an automatic optical character recognition version of the standard, which meant there were some errors in the transcription. But, generally the accuracy was sufficient to perform the functional tasks: reading the entire standard, navigating to a specific place in the standard, or searching on key terms. It should be noted that this approach would not likely occur to a blind person opening an image PDF file, because the Adobe software does not announce that the underlying text was present. It is also possible for a blind person to independently perform optical character recognition on image-based PDFs themselves and access the text that way, and many advanced computer users that are blind would be aware that this is possible. Although performing optical character recognition on a PDF is not as optimal as having HTML text available to read immediately without conversion, this method by which PDFs can be made perceptible to the blind is still better than having no access, which is effectively what the NFPA, ASHRAE, and ASTM websites offer.

Dated: April 13, 2015



James R. Fruchterman

Exhibit A

James R. Fruchterman

Founder and CEO

Benetech

Education

- California Institute of Technology
  B.S. Engineering, 1976-80
  M.S. Applied Physics, 1978-80
- Stanford University, 1980-81
  Ph.D. Studies in Electrical Engineering

Professional Experience

- CEO and Founder, 2015-present
  President, CEO, Chairman, Founder, 2000-2014
  Benetech (name changed from Arkenstone in 2000)
  Palo Alto, California
- President, CEO, Chairman, Founder, 1989-2000
  Arkenstone, Inc.
  Moffett Field, California
- Director, 1989-present
  Vice President Finance, CFO, 1989-2004
  President & CEO, Founder, 1989-95
  RAF Technology, Inc.
  Palo Alto, California and Redmond, Washington
- Vice President, Marketing, 1987-89
  Founder, Vice President, Finance, 1982-88
  Calera Recognition Systems, Inc.
  Santa Clara, California
- Prior engineering positions with:
  - Phoenix Engineering, Inc.
  - G.C.H., Inc.
  - IBM T.J. Watson Research Center
  - General Motors Company
  - NASA — Jet Propulsion Laboratory
  - Fermi National Accelerator Laboratory

Publications

- Technology Serving Humanity (chapter). In Schultz, R. (editor) *Creating Good Work*, Palgrave Macmillan, February 2013
- Guest Editor's Page, AFB Journal of Visual Impairment & Blindness, October-November 2012
- An Interview With Technology Guru George Kerscher, AFB Journal of Visual Impairment & Blindness, October-November 2012
- For Love or Lucre, Stanford Social Innovation Review, Spring 2011
- Developing Information Technology to Meet Social Needs. In *Innovations*, MIT Press, 2008
- Accessing Books and Documents, a chapter in the book, Assistive Technology for Vision-Impaired and Blind People, Springer Verlag 2008
- Everyone Deserves Access to Technology, OpEd in *The Sacramento Bee* by Jim Fruchterman and Gregg Vanderheiden, June 17, 2007
- Document Recognition Serving People With Disabilities, *Proc. SPIE 6500*, International Society for Optics and Photonics, 2007
- Pattern Recognition Technology Helps Disabled People Access Books, *SPIE Newsroom*, International Society for Optics and Photonics, May 14, 2007
- Nothing Ventured Nothing Gained, Addressing the Critical Gaps in Risk-Taking Capital for Social Enterprise, by Jed Emerson, Tim Freundlich and Jim Fruchterman, published by Oxford Said Business School, 2006
- Build Great Companies, Then Help Build a Great World, OpEd in *The San Jose Mercury News*, November 13, 2006
- Comments on Accessibility of Google Print and Google's Library Project, white paper, February 2005
- Technology Benefiting Humanity, published in the Association for Computing Machines *Ubiquity* magazine, March 2004
- The Power of Technology Social Enterprises, published in the N-TEN forecast series, February 2004
- In the Palm of Your Hand: A Vision of the Future of Technology for People with Visual Impairments, published in the American Foundation for the Blind's *Journal of Vision Impairment and Blindness*, October 2003
- The Chafee Amendment: Improving Access to Information, published in *Information Technology and Disabilities*, a journal published by Equal Access to Software and Information (EASI), co-authored with Bookshare Senior Product Manager Alison Lingane, October 2003
- The Soundproof Book: Exploration of Rights Conflict and Access to Commercial EBooks for People with Disabilities, published in *First Monday*, co-authored with George Kerscher, the International Project Manager of the DAISY Consortium, May 2002
- Bookshare, Books without Barriers, at the Closing the Gap conference, Minneapolis, MN, October 2001

- Two presentations given at the IT Accessibility 2001 Conference, May 2001 at the National Institute of Standards and Technology
  - I Dream of Software
  - The Business Case for Adaptive Technology
- Humanizing the Voice of the Machine, with Prof. Mari Ostendorf (University of Washington), Annual Meeting of the American Association for the Advancement of the Machine, Boston, MA, February 2000
- The Many Facets of Open Book: Ruby Edition, California State University, Northridge (CSUN), 15th Technology and Persons with Disabilities Conference, March 2000
- Corporate Responsibility for Adaptive Technology, California State University, Northridge (CSUN), 14th Technology and Persons with Disabilities Conference, March 1999
- Developing Partnerships for Assistive and Universally Designed Technology for Persons with Disabilities, Testimony before United States House of Representatives, Committee on Science, Subcommittee on Technology, August 4, 1998
- Access to Maps and Location Information through Virtual Reality Techniques and GPS Satellite Receivers, 3rd International Technical Aids Seminar, Tokyo, Japan, July 1994

Invited Talks

- "*Innovation in America: The Role of Technology*," August 1, 2013, Testimony before U.S. House of Representatives, Judiciary Committee's Subcommittee on Courts, Intellectual Property, and the Internet.
- "Social Change at Scale – That's Innovation!" May 2012, TEDxSanJoseCA 2012, San Jose, CA.
- *"The Power of Failure, People and Karma Banking," May 20, 2012,* Commencement speech, St. Mary's College, Moraga, CA.
- *"Raising the Floor," October, 2011, Keynote Speech,* Association for Education and Rehabilitation of the Blind and Visually Impaired Conference, Cleveland OH.
- *Keynote speech, IEEE Sections Congress, August 2011, San Francisco, CA.*
- "Making the Book Truly Accessible," Tools of Change Conference, New York, NY, 2011 Keynote Speech
- UBS-Ashoka Visionaris Award, Keynote Speech, Social Entrepreneur of the Year Award, Mexico City, Mexico, September, 2010
- A series of three invited speeches on Bookshare and accessible books, in Tokyo, Shizuoka and Osaka, Japan, February, 2009
- Keynote Speech, Social Enterprise World Forum, Edinburgh, Scotland, September, 2008
- "Raising the Floor: Providing Accessible Technology and Content to Every Person with a Disability on the Planet," International Conference on Computers Helping People with Special Needs, Linz, Austria, July, 2008 Keynote Speech
- "Raising the Floor," CSUN Conference on Technology and Persons with Disabilities, March, 2008 Keynote Speech

- Extensive speaking engagements to students about technology serving people with disabilities. Have done invited talks at:
  - Stanford University
  - University of California at Berkeley
  - Brigham Young University
  - University of the Pacific
  - Santa Clara University
  - California Institute of Technology
  - San Jose State
  - University of California at Santa Cruz
  - University of California at Davis
  - Loyola Marymount University
  - Pepperdine University
  - University of Washington
  - Columbia University
  - Harvard University
  - University of Geneva
  - Oxford University
- Inflection Point Opportunities in Social Investment, Closing Keynote for the UBS Philanthropy Forum, Lisbon, Portugal, July 2007
- It's Not Rocket Science: Building Social Enterprises, Keynote for the 7th Gathering of the Social Enterprise Alliance, Atlanta, Georgia, March 2006
- Opening Keynote for the Global Social Venture Competition, New York, April, 2006
- Keynote for the 7th IAPR Workshop on Document Analysis Systems, Nelson, New Zealand, February 2006
- Building a Global Library for People with Print Disabilities, a speech for the World Summit on the Information Society, Tunis, Tunisia, November 2005
- Innovating Information Technologies to Protect Human Rights, a speech for the World Affairs Council of Northern California, February 2004
- Setting the 2004 Agenda: Technology, speaker at the World Economic Forum, Davos, Switzerland, January 2004
- Seizing Market Failure as an Investment Opportunity, Keynote for the Business for Social Responsibility Annual Conference, Los Angeles, November 2003.
- In the Palm of Your Hand, Keynote for the World Blind Union Asia Pacific conference, Singapore, November, 2003
- Technology and Human Rights, University of Peradeniya, Sri Lanka, November, 2003
- When Markets Fail, Who Responds? Discussion Leader at the World Economic Forum, Davos, Switzerland, January 2003
- Technology for Nonprofits, with Michael Gilbert, National Gathering for Social Entrepreneurs, Minneapolis, MN, December, 2002
- Bookshare: Large Scale, Web-Based Accessible Books, TechShare conference organized by

the Royal National Institute of the Blind, Birmingham, UK, November 2002

- Putting Technology to Work for Development, speech at the United Nations to the joint meeting of the World Technology Network and UNOPS, July 2002
- Bookshare: The Project for Creating Accessible Books through Computers, at the General Session of the National Federation of the Blind 2002 Annual Convention, July 2002
- Stanford Social Entrepreneurship Conference, January 2002
- The Once and Future Web: Tenth Anniversary of the First U.S. Web Page at the Stanford Linear Accelerator Laboratory, December 2001
- NetImpact Annual Conference at Kenan-Flagler Business School, November 2001
- American Council of the Blind Annual Convention, July 2001
- Bringing Socially Beneficial Technology into the Service of Humanity, EE380 at Stanford University, April 2001
- Information Technology in the Service of Human Rights at the Computers, Freedom and Privacy Conference, March 2001
- Rank Prize Fund Symposium, Grasmere, England
- Guest Lecturer for CSUN program in disability leadership

Professional Associations

- Association for Computing Machinery
- Institute of Electrical and Electronics Engineers
- American Association for the Advancement of Science
- Social Enterprise Alliance

Awards and Public Service

- Head of Benetech Delegation, Diplomatic Conference to Conclude a Treaty to Facilitate Access to Published Works by Visually Impaired Persons and Persons with Print Disabilities, World Intellectual Property Organization, Marrakesh, Morocco (2013)
- Member, Global Agenda Council on Measuring Sustainability, World Economic Forum (2012-2014)
- Member of the Board of Directors, ZeroDivide, foundation investing in community enterprises that leverage technology to benefit people in low-income and other underserved communities (2007-2013)
- Commissioner, Federal Advisory Commission on Accessible Instructional Materials in Postsecondary Education for Students with Disabilities, 2010-2011
- Duke University, CASE Award for Enterprising Social Innovation, 2011
- Brigham Young University, Center for Economic Self-Reliance Social Innovator of the Year, 2009
- AT&T Technology Innovation Award from the Alliance for Technology Access, March

2008

- Strache Leadership Award from the California State University, Northridge, 2007
- John D. and Catherine T. MacArthur Foundation Fellowship, 2006
- Technical Advisory Committee Member, National Instructional Materials Accessibility Standard, U.S. Department of Education (2005-2008)
- Advisory Committee Member, National Instructional Materials Accessibility Center, U.S. Department of Education (2006-present)
- Skoll Award for Social Entrepreneurship, 2004 and 2006
- Fast Company Social Capitalist Award: Top 20 Groups Changing the World, 2004
- Laureate, The 2003 and 2001 Tech Museum Awards
- American Library Association Francis Joseph Campbell Award, 2003
- Schwab Foundation Outstanding Social Entrepreneur of 2003 Award
- Member, the Community Partnership Committee, which oversees a diversity and disability agreement with SBC, Inc.
- Runner-up, Yale-Goldman Sachs National Nonprofit Business Plan Competition, 2003
- American Foundation for the Blind Access Award, 2003
- Robert S. Bray Award, The American Council of the Blind
- Winner, Education Category, 2002 Stockholm Challenge
- Fast 50 Champion of Innovation 2002
- Judge, 2002 National Social Venture Competition
- Member, Board of Directors of the Social Enterprise Alliance (2000-2010, chair 2008-2010)
- Member of the Advisory Board, Telecommunications Access Rehabilitation Engineering Research Center, a joint effort of the Trace R&D Center of the University of Wisconsin-Madison and the Technology Access Program of Gallaudet University, 2001
- Panelist, National Science Foundation Small Business Innovation Research Program, 1998, 2000, 2003
- Participant, 1998 NSF Workshop for Discussing Research Priorities and Evaluation Strategies in Speech Synthesis, August, 1998
- Member, Electronic Information and Technology Access Advisory Committee, a federal advisory committee responsible for drafting federal acquisition standards for accessibility under Section 508, 1998-1999
- Member, Telecommunications Access Advisory Committee, a federal advisory committee responsible for making recommendations to the U.S. Access Board and Federal Communications Commission on implementing portions of the 1996 Telecommunications Act, 1996-1997
- U.S. Patent Number 5,470,223: System and Method for Tracking a Pedestrian

- Finalist, 1996 Discover Magazine Awards for Technological Innovation
- 1996 Access Award, American Foundation for the Blind

Major Works and Areas of Expertise

- Founder and CEO of Benetech, a highly innovative nonprofit company focused on using the power of technology to address social needs in areas such as disability, literacy, human rights and the environment.
- Founder of Arkenstone, Inc., a leading nonprofit organization providing adaptive technology for education and employment for people with disabilities and the largest maker of reading systems for people with blindness, vision impairment and learning disabilities. Developer of the Arkenstone Reader, the first affordable reading system for the blind. Designer of Open Book, the first talking Windows program for the blind. Co-inventor of Atlas Speaks, the first accessible map software for the blind, and of Strider, a talking GPS locator for the blind.
- Cofounder of RAF Technology, Inc., the nation's leading company in optical character recognition technology for processing forms in postal and medical applications. RAF's software is used to route the United States mail.
- Cofounder of Calera Recognition Systems, Inc., the first company to develop omnifont optical character recognition that works without user training.

Exhibit B

Documents, Facts, or Data Considered in Forming My Opinions:

- The ASHRAE website, at www.ashrae.org
- The ASTM website, at www.astm.org
- The NFPA website, at www.nfpa.org
- The Public.Resource.Org website, at www.public.resource.org
- World Wide Web Consortium's Web Content Accessibility Guidelines (WCAG) 2.0, at http://www.w3.org/TR/WCAG20/
- Window-Eyes screen reader software
- JAWS screen reader software
- I also consulted with a blind engineer (and skilled daily user of screen reader technology) to confirm the specific accessibility challenges I found in my tests

Exhibit C

W3C Recommendation

[contents]

Web Content Accessibility Guidelines (WCAG) 2.0

W3C Recommendation 11 December 2008

This version:
http://www.w3.org/TR/2008/REC-WCAG20-20081211/
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Editors:
Ben Caldwell, Trace R&D Center, University of Wisconsin-Madison
Michael Cooper, W3C
Loretta Guarino Reid, Google, Inc.
Gregg Vanderheiden, Trace R&D Center, University of Wisconsin-Madison
Previous Editors:
Wendy Chisholm (until July 2006 while at W3C)
John Slatin (until June 2006 while at Accessibility Institute, University of Texas at Austin)
Jason White (until June 2005 while at University of Melbourne)

Please refer to the **errata** for this document, which may include normative corrections.

See also **translations**.

This document is also available in non-normative formats, available from Alternate Versions of Web Content Accessibility Guidelines 2.0.

Abstract

Web Content Accessibility Guidelines (WCAG) 2.0 covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these. Following these guidelines will also often make your Web content more usable to users in general.

WCAG 2.0 success criteria are written as testable statements that are not technology-specific. Guidance about satisfying the success criteria in specific technologies, as well as general information about interpreting the success criteria, is provided in separate documents. See Web Content Accessibility Guidelines (WCAG) Overview for an introduction and links to WCAG technical and educational material.

WCAG 2.0 succeeds Web Content Accessibility Guidelines 1.0 [WCAG10], which was published as a W3C Recommendation May 1999. Although it is possible to conform either to WCAG 1.0 or to WCAG 2.0 (or both), the W3C recommends that new and updated content use WCAG 2.0. The W3C also recommends that Web accessibility policies reference WCAG 2.0.

Status of this Document

This section describes the status of this document at the time of its publication. Other documents may supersede this

document. A list of current W3C publications and the latest revision of this technical report can be found in the W3C technical reports index at http://www.w3.org/TR/.

This is the Web Content Accessibility Guidelines (WCAG) 2.0 W3C Recommendation from the Web Content Accessibility Guidelines Working Group.

This document has been reviewed by W3C Members, by software developers, and by other W3C groups and interested parties, and is endorsed by the Director as a W3C Recommendation. It is a stable document and may be used as reference material or cited from another document. W3C's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the functionality and interoperability of the Web.

WCAG 2.0 is supported by the associated non-normative documents, Understanding WCAG 2.0 and Techniques for WCAG 2.0. Although those documents do not have the formal status that WCAG 2.0 itself has, they provide information important to understanding and implementing WCAG.

The Working Group requests that any comments be made using the provided online comment form. If this is not possible, comments can also be sent to public-comments-wcag20@w3.org. The archives for the public comments list are publicly available. Comments received on the WCAG 2.0 Recommendation cannot result in changes to this version of the guidelines, but may be addressed in errata or future versions of WCAG. The Working Group does not plan to make formal responses to comments. Archives of the WCAG WG mailing list discussions are publicly available, and future work undertaken by the Working Group may address comments received on this document.

This document has been produced as part of the W3C Web Accessibility Initiative (WAI). The goals of the WCAG Working Group are discussed in the WCAG Working Group charter. The WCAG Working Group is part of the WAI Technical Activity.

This document was produced by a group operating under the 5 February 2004 W3C Patent Policy. W3C maintains a public list of any patent disclosures made in connection with the deliverables of the group; that page also includes instructions for disclosing a patent. An individual who has actual knowledge of a patent which the individual believes contains Essential Claim(s) must disclose the information in accordance with section 6 of the W3C Patent Policy.

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Appendices

Introduction

This section is informative.

Web Content Accessibility Guidelines (WCAG) 2.0 defines how to make Web content more accessible to people with disabilities. Accessibility involves a wide range of disabilities, including visual, auditory, physical, speech, cognitive, language, learning, and neurological disabilities. Although these guidelines cover a wide range of issues, they are not able to address the needs of people with all types, degrees, and combinations of disability. These guidelines also make Web content more usable by older individuals with changing abilities due to aging and often improve usability for users in general.

WCAG 2.0 is developed through the W3C process in cooperation with individuals and organizations around the world, with a goal of providing a shared standard for Web content accessibility that meets the needs of individuals, organizations, and governments internationally. WCAG 2.0 builds on WCAG 1.0 [WCAG10] and is designed to apply broadly to different Web technologies now and in the future, and to be testable with a combination of automated testing and human evaluation. For an introduction to WCAG, see the Web Content Accessibility Guidelines (WCAG) Overview.

Web accessibility depends not only on accessible content but also on accessible Web browsers and other user agents. Authoring tools also have an important role in Web accessibility. For an overview of how these components of Web development and interaction work together, see:

- **Essential Components of Web Accessibility**
- **User Agent Accessibility Guidelines (UAAG) Overview**
- **Authoring Tool Accessibility Guidelines (ATAG) Overview**

WCAG 2.0 Layers of Guidance

The individuals and organizations that use WCAG vary widely and include Web designers and developers, policy makers, purchasing agents, teachers, and students. In order to meet the varying needs of this audience, several layers of guidance are provided including overall *principles*, general *guidelines*, testable *success criteria* and a rich collection of *sufficient techniques, advisory techniques*, and *documented common failures* with examples, resource links and code.

- **Principles** - At the top are four principles that provide the foundation for Web accessibility: *perceivable, operable, understandable, and robust*. See also Understanding the Four Principles of Accessibility.
- **Guidelines** - Under the principles are guidelines. The 12 guidelines provide the basic goals that authors should work toward in order to make content more accessible to users with different disabilities. The guidelines are not testable, but provide the framework and overall objectives to help authors understand the success criteria and better implement the techniques.
- **Success Criteria** - For each guideline, testable success criteria are provided to allow WCAG 2.0 to be used where requirements and conformance testing are necessary such as in design specification, purchasing, regulation, and contractual agreements. In order to meet the needs of different groups and different situations, three levels of conformance are defined: A (lowest), AA, and AAA (highest). Additional information on WCAG levels can be found in Understanding Levels of Conformance.
- **Sufficient and Advisory Techniques** - For each of the *guidelines* and *success criteria* in the WCAG 2.0 document itself, the working group has also documented a wide variety of *techniques*. The techniques are informative and fall into two categories: those that are *sufficient* for meeting the success criteria and those that are *advisory*. The advisory techniques go beyond what is required by the individual success criteria and allow authors to better address the guidelines. Some advisory techniques address accessibility barriers that are not covered by the testable success criteria. Where common failures are known, these are also documented. See also Sufficient and Advisory

Techniques in Understanding WCAG 2.0.

All of these layers of guidance (principles, guidelines, success criteria, and sufficient and advisory techniques) work together to provide guidance on how to make content more accessible. Authors are encouraged to view and apply all layers that they are able to, including the advisory techniques, in order to best address the needs of the widest possible range of users.

Note that even content that conforms at the highest level (AAA) will not be accessible to individuals with all types, degrees, or combinations of disability, particularly in the cognitive language and learning areas. Authors are encouraged to consider the full range of techniques, including the advisory techniques, as well as to seek relevant advice about current best practice to ensure that Web content is accessible, as far as possible, to this community. Metadata may assist users in finding content most suitable for their needs.

WCAG 2.0 Supporting Documents

The WCAG 2.0 document is designed to meet the needs of those who need a stable, referenceable technical standard. Other documents, called supporting documents, are based on the WCAG 2.0 document and address other important purposes, including the ability to be updated to describe how WCAG would be applied with new technologies. Supporting documents include:

1. **How to Meet WCAG 2.0** - A customizable quick reference to WCAG 2.0 that includes all of the guidelines, success criteria, and techniques for authors to use as they are developing and evaluating Web content.
2. **Understanding WCAG 2.0** - A guide to understanding and implementing WCAG 2.0. There is a short "Understanding" document for each guideline and success criterion in WCAG 2.0 as well as key topics.
3. **Techniques for WCAG 2.0** - A collection of techniques and common failures, each in a separate document that includes a description, examples, code and tests.
4. **The WCAG 2.0 Documents** - A diagram and description of how the technical documents are related and linked.

See Web Content Accessibility Guidelines (WCAG) Overview for a description of the WCAG 2.0 supporting material, including education resources related to WCAG 2.0. Additional resources covering topics such as the business case for Web accessibility, planning implementation to improve the accessibility of Web sites, and accessibility policies are listed in WAI Resources.

Important Terms in WCAG 2.0

WCAG 2.0 includes three important terms that are different from WCAG 1.0. Each of these is introduced briefly below and defined more fully in the glossary.

Web Page

It is important to note that, in this standard, the term "Web page" includes much more than static HTML pages. It also includes the increasingly dynamic Web pages that are emerging on the Web, including "pages" that can present entire virtual interactive communities. For example, the term "Web page" includes an immersive, interactive movie-like experience found at a single URI. For more information, see Understanding "Web Page".

Programmatically Determined

Several success criteria require that content (or certain aspects of content) can be "programmatically determined." This means that the content is delivered in such a way that user agents, including assistive technologies, can extract and present this information to users in different modalities. For more information, see Understanding Programmatically Determined.

Accessibility Supported

Using a technology in a way that is accessibility supported means that it works with assistive technologies (AT) and the accessibility features of operating systems, browsers, and other user agents. Technology features can only be relied upon to conform to WCAG 2.0 success criteria if they are used in a way that is "accessibility supported". Technology features can be used in ways that are not accessibility supported (do not work with assistive technologies, etc.) as long as they are not relied upon to conform to any success criterion (i.e., the same information or functionality is also available another way that is supported).
The definition of "accessibility supported" is provided in the Appendix A: Glossary section of these guidelines. For more information, see Understanding Accessibility Support.

WCAG 2.0 Guidelines

This section is normative.

Principle 1: Perceivable - Information and user interface components must be presentable to users in ways they can perceive.

Guideline 1.1 Text Alternatives: Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language.

Understanding Guideline 1.1

1.1.1 Non-text Content: All non-text content that is presented to the user has a text alternative that serves the equivalent purpose, except for the situations listed below. (Level A)

How to Meet 1.1.1
Understanding 1.1.1

- **Controls, Input:** If non-text content is a control or accepts user input, then it has a name that describes its purpose. (Refer to Guideline 4.1 for additional requirements for controls and content that accepts user input.)
- **Time-Based Media:** If non-text content is time-based media, then text alternatives at least provide descriptive identification of the non-text content. (Refer to Guideline 1.2 for additional requirements for media.)
- **Test:** If non-text content is a test or exercise that would be invalid if presented in text, then text alternatives at least provide descriptive identification of the non-text content.
- **Sensory:** If non-text content is primarily intended to create a specific sensory experience, then text alternatives at least provide descriptive identification of the non-text content.
- **CAPTCHA:** If the purpose of non-text content is to confirm that content is being accessed by a person rather than a computer, then text alternatives that identify and describe the purpose of the non-text content are provided, and alternative forms of CAPTCHA using output modes for different types of sensory perception are provided to accommodate different disabilities.
- **Decoration, Formatting, Invisible:** If non-text content is pure decoration, is used only for visual formatting, or is not presented to users, then it is implemented in a way that it can be ignored by assistive technology.

Guideline 1.2 Time-based Media: Provide alternatives for time-based media.

Understanding Guideline 1.2

1.2.1 Audio-only and Video-only (Prerecorded): For prerecorded audio-only and prerecorded video-only media, the following are true, except when the audio or video is a media alternative for text and is clearly labeled as such: (Level A)

- **Prerecorded Audio-only:** An alternative for time-based media is provided that presents equivalent information for prerecorded audio-only content.
- **Prerecorded Video-only:** Either an alternative for time-based media or an audio track is provided that presents equivalent information for prerecorded video-only content.

How to Meet 1.2.1
Understanding 1.2.1

1.2.2 Captions (Prerecorded): Captions are provided for all prerecorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labeled as such. (Level A)

How to Meet 1.2.2
Understanding 1.2.2

1.2.3 Audio Description or Media Alternative (Prerecorded): An alternative for time-based media or audio description of the prerecorded video content is provided for synchronized media, except when the media is a media alternative for text and is clearly labeled as such. (Level A)

How to Meet 1.2.3
Understanding 1.2.3

1.2.4 Captions (Live): Captions are provided for all live audio content in synchronized media. (Level AA)

How to Meet 1.2.4
Understanding 1.2.4

1.2.5 Audio Description (Prerecorded): Audio description is provided for all prerecorded video content in synchronized media. (Level AA)

How to Meet 1.2.5
Understanding 1.2.5

1.2.6 Sign Language (Prerecorded): Sign language interpretation is provided for all prerecorded audio content in synchronized media. (Level AAA)

How to Meet 1.2.6
Understanding 1.2.6

1.2.7 Extended Audio Description (Prerecorded): Where pauses in foreground audio are insufficient to allow audio descriptions to convey the sense of the video, extended audio description is provided for all prerecorded video content in synchronized media. (Level AAA)

How to Meet 1.2.7
Understanding 1.2.7

1.2.8 Media Alternative (Prerecorded): An alternative for time-based media is provided for all prerecorded synchronized media and for all prerecorded video-only media. (Level AAA)

How to Meet 1.2.8
Understanding 1.2.8

1.2.9 Audio-only (Live): An alternative for time-based media that presents equivalent information for live audio-only content is provided. (Level AAA)

How to Meet 1.2.9
Understanding 1.2.9

Guideline 1.3 Adaptable: Create content that can be presented in different ways (for example simpler layout) without losing information or structure.

Understanding Guideline 1.3

1.3.1 Info and Relationships: Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text. (Level A)

How to Meet 1.3.1
Understanding 1.3.1

1.3.2 Meaningful Sequence: When the sequence in which content is presented affects its meaning, a correct reading sequence can be programmatically determined. (Level A)

How to Meet 1.3.2
Understanding 1.3.2

1.3.3 Sensory Characteristics: Instructions provided for understanding and operating content do not rely solely on sensory characteristics of components such as shape, size, visual location, orientation, or sound. (Level A)

Note: For requirements related to color, refer to Guideline 1.4.

How to Meet 1.3.3
Understanding 1.3.3

Guideline 1.4 Distinguishable: Make it easier for users to see and hear content including separating foreground from background.

Understanding Guideline 1.4

1.4.1 Use of Color: Color is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element. (Level A)

Note: This success criterion addresses color perception specifically. Other forms of perception are covered in Guideline 1.3 including programmatic access to color and other visual presentation coding.

How to Meet 1.4.1
Understanding 1.4.1

1.4.2 Audio Control: If any audio on a Web page plays automatically for more than 3 seconds, either a mechanism is available to pause or stop the audio, or a mechanism is available to control audio volume independently from the overall system volume level. (Level A)

Note: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether or not it is used to meet other success criteria) must meet this success criterion. See Conformance Requirement 5: Non-Interference.

How to Meet 1.4.2
Understanding 1.4.2

1.4.3 Contrast (Minimum): The visual presentation of text and images of text has a contrast ratio of at least 4.5:1, except for the following: (Level AA)

- **Large Text:** Large-scale text and images of large-scale text have a contrast ratio of at least 3:1;
- **Incidental:** Text or images of text that are part of an inactive user interface component, that are pure decoration, that are not visible to anyone, or that are part of a picture that contains significant other visual content, have no contrast requirement.
- **Logotypes:** Text that is part of a logo or brand name has no minimum contrast requirement.

How to Meet 1.4.3
Understanding 1.4.3

1.4.4 Resize text: Except for captions and images of text, text can be resized without assistive technology up to 200 percent without loss of content or functionality. (Level AA)

How to Meet 1.4.4
Understanding 1.4.4

1.4.5 Images of Text: If the technologies being used can achieve the visual presentation, text is used to convey information rather than images of text except for the following: (Level AA)

- **Customizable:** The image of text can be visually customized to the user's requirements;
- **Essential:** A particular presentation of text is essential to the information being conveyed.

Note: Logotypes (text that is part of a logo or brand name) are considered essential.

How to Meet 1.4.5
Understanding 1.4.5

1.4.6 Contrast (Enhanced): The visual presentation of text and images of text has a contrast ratio of at least 7:1, except for the following: (Level AAA)

How to Meet 1.4.6
Understanding 1.4.6

- **Large Text:** Large-scale text and images of large-scale text have a contrast ratio of at least 4.5:1;
- **Incidental:** Text or images of text that are part of an inactive user interface component, that are pure decoration, that are not visible to anyone, or that are part of a picture that contains significant other visual content, have no contrast requirement.
- **Logotypes:** Text that is part of a logo or brand name has no minimum contrast requirement.

1.4.7 Low or No Background Audio: For prerecorded audio-only content that (1) contains primarily speech in the foreground, (2) is not an audio CAPTCHA or audio logo, and (3) is not vocalization intended to be primarily musical expression such as singing or rapping, at least one of the following is true: (Level AAA)

How to Meet 1.4.7
Understanding 1.4.7

- **No Background:** The audio does not contain background sounds.
- **Turn Off:** The background sounds can be turned off.
- **20 dB:** The background sounds are at least 20 decibels lower than the foreground speech content, with the exception of occasional sounds that last for only one or two seconds.

  Note: Per the definition of "decibel," background sound that meets this requirement will be approximately four times quieter than the foreground speech content.

1.4.8 Visual Presentation: For the visual presentation of blocks of text, a mechanism is available to achieve the following: (Level AAA)

How to Meet 1.4.8
Understanding 1.4.8

1. Foreground and background colors can be selected by the user.
2. Width is no more than 80 characters or glyphs (40 if CJK).
3. Text is not justified (aligned to both the left and the right margins).
4. Line spacing (leading) is at least space-and-a-half within paragraphs, and paragraph spacing is at least 1.5 times larger than the line spacing.
5. Text can be resized without assistive technology up to 200 percent in a way that does not require the user to scroll horizontally to read a line of text on a full-screen window.

1.4.9 Images of Text (No Exception): Images of text are only used for pure decoration or where a particular presentation of text is essential to the information being conveyed. (Level AAA)

How to Meet 1.4.9
Understanding 1.4.9

Note: Logotypes (text that is part of a logo or brand name) are considered essential.

Principle 2: Operable - User interface components and navigation must be operable.

Guideline 2.1 Keyboard Accessible: Make all functionality available from a keyboard.

Understanding Guideline 2.1

2.1.1 Keyboard: All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes, except where the underlying function requires input that depends on the path of the user's movement and not just the endpoints. (Level A)

How to Meet 2.1.1
Understanding 2.1.1

Note 1: This exception relates to the underlying function, not the input technique. For example, if using handwriting to enter text, the input technique (handwriting) requires path-dependent input but the underlying function (text input) does not.

Note 2: This does not forbid and should not discourage providing mouse input or other input methods in addition to keyboard operation.

2.1.2 No Keyboard Trap: If keyboard focus can be moved to a component of the page using a keyboard interface, then focus can be moved away from that component using only a keyboard interface, and, if it requires more than unmodified arrow or tab keys or other standard exit methods, the user is advised of the method for moving focus away. (Level A)

Note: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion. See Conformance Requirement 5: Non-Interference.

How to Meet 2.1.2
Understanding 2.1.2

2.1.3 Keyboard (No Exception): All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes. (Level AAA)

How to Meet 2.1.3
Understanding 2.1.3

Guideline 2.2 Enough Time: Provide users enough time to read and use content.

Understanding Guideline 2.2

2.2.1 Timing Adjustable: For each time limit that is set by the content, at least one of the following is true: (Level A)

- **Turn off:** The user is allowed to turn off the time limit before encountering it; or
- **Adjust:** The user is allowed to adjust the time limit before encountering it over a wide range that is at least ten times the length of the default setting; or
- **Extend:** The user is warned before time expires and given at least 20 seconds to extend the time limit with a simple action (for example, "press the space bar"), and the user is allowed to extend the time limit at least ten times; or
- **Real-time Exception:** The time limit is a required part of a real-time event (for example, an auction), and no alternative to the time limit is possible; or
- **Essential Exception:** The time limit is essential and extending it would invalidate the activity; or
- **20 Hour Exception:** The time limit is longer than 20 hours.

Note: This success criterion helps ensure that users can complete tasks without unexpected changes in content or context that are a result of a time limit. This success criterion should be considered in conjunction with Success Criterion 3.2.1, which puts limits on changes of content or context as a result of user action.

How to Meet 2.2.1
Understanding 2.2.1

2.2.2 Pause, Stop, Hide: For moving, blinking, scrolling, or auto-updating information, all of the following are true: (Level A)

- **Moving, blinking, scrolling:** For any moving, blinking or scrolling information that (1) starts automatically, (2) lasts more than five seconds, and (3) is presented in parallel with other content, there is a mechanism for the user to pause, stop, or hide it unless the movement, blinking, or scrolling is part of an activity where it is essential; and
- **Auto-updating:** For any auto-updating information that (1) starts automatically and (2) is presented in parallel with other content, there is a mechanism for the user to pause, stop, or hide it or to control the frequency of the update unless the auto-updating is part of an activity where it is essential.

Note 1: For requirements related to flickering or flashing content, refer to Guideline 2.3.

Note 2: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion. See Conformance Requirement 5: Non-Interference.

Note 3: Content that is updated periodically by software or that is streamed to the user agent is not required to preserve or present information that is generated or received between the initiation of the pause and resuming presentation, as this may not be technically possible, and in many situations could be misleading to do so.

How to Meet 2.2.2
Understanding 2.2.2

Note 4: An animation that occurs as part of a preload phase or similar situation can be considered essential if interaction cannot occur during that phase for all users and if not indicating progress could confuse users or cause them to think that content was frozen or broken.

2.2.3 No Timing: Timing is not an essential part of the event or activity presented by the content, except for non-interactive synchronized media and real-time events. (Level AAA)

How to Meet 2.2.3
Understanding 2.2.3

2.2.4 Interruptions: Interruptions can be postponed or suppressed by the user, except interruptions involving an emergency. (Level AAA)

How to Meet 2.2.4
Understanding 2.2.4

2.2.5 Re-authenticating: When an authenticated session expires, the user can continue the activity without loss of data after re-authenticating. (Level AAA)

How to Meet 2.2.5
Understanding 2.2.5

Guideline 2.3 Seizures: Do not design content in a way that is known to cause seizures.

Understanding Guideline 2.3

2.3.1 Three Flashes or Below Threshold: Web pages do not contain anything that flashes more than three times in any one second period, or the flash is below the general flash and red flash thresholds. (Level A)

How to Meet 2.3.1
Understanding 2.3.1

Note: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion. See Conformance Requirement 5: Non-Interference.

2.3.2 Three Flashes: Web pages do not contain anything that flashes more than three times in any one second period. (Level AAA)

How to Meet 2.3.2
Understanding 2.3.2

Guideline 2.4 Navigable: Provide ways to help users navigate, find content, and determine where they are.

Understanding Guideline 2.4

2.4.1 Bypass Blocks: A mechanism is available to bypass blocks of content that are repeated on multiple Web pages. (Level A)

How to Meet 2.4.1
Understanding 2.4.1

2.4.2 Page Titled: Web pages have titles that describe topic or purpose. (Level A)

How to Meet 2.4.2
Understanding 2.4.2

2.4.3 Focus Order: If a Web page can be navigated sequentially and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves meaning and operability. (Level A)

How to Meet 2.4.3
Understanding 2.4.3

2.4.4 Link Purpose (In Context): The purpose of each link can be determined from the link text alone or from the link text together with its programmatically determined link context, except where the purpose of the link would be ambiguous to users in general. (Level A)

How to Meet 2.4.4
Understanding 2.4.4

2.4.5 Multiple Ways: More than one way is available to locate a Web page within a set of Web pages except where the Web Page is the result of, or a step in, a process. (Level AA)

How to Meet 2.4.5
Understanding 2.4.5

2.4.6 Headings and Labels: Headings and labels describe topic or purpose. (Level AA)

How to Meet 2.4.6
Understanding 2.4.6

2.4.7 Focus Visible: Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible. (Level AA)

How to Meet 2.4.7
Understanding 2.4.7

2.4.8 Location: Information about the user's location within a set of Web pages is available. (Level AAA)

How to Meet 2.4.8
Understanding 2.4.8

2.4.9 Link Purpose (Link Only): A mechanism is available to allow the purpose of each link to be identified from link text alone, except where the purpose of the link would be ambiguous to users in general. (Level AAA)

How to Meet 2.4.9
Understanding 2.4.9

2.4.10 Section Headings: Section headings are used to organize the content. (Level AAA)

How to Meet 2.4.10
Understanding 2.4.10

Note 1: "Heading" is used in its general sense and includes titles and other ways to add a heading to different types of content.

Note 2: This success criterion covers sections within writing, not user interface components. User Interface components are covered under Success Criterion 4.1.2.

Principle 3: Understandable - Information and the operation of user interface must be understandable.

Guideline 3.1 Readable: Make text content readable and understandable.

Understanding Guideline 3.1

3.1.1 Language of Page: The default human language of each Web page can be programmatically determined. (Level A)

How to Meet 3.1.1
Understanding 3.1.1

3.1.2 Language of Parts: The human language of each passage or phrase in the content can be programmatically determined except for proper names, technical terms, words of indeterminate language, and words or phrases that have become part of the vernacular of the immediately surrounding text. (Level AA)

How to Meet 3.1.2
Understanding 3.1.2

3.1.3 Unusual Words: A mechanism is available for identifying specific definitions of words or phrases used in an unusual or restricted way, including idioms and jargon. (Level AAA)

How to Meet 3.1.3
Understanding 3.1.3

3.1.4 Abbreviations: A mechanism for identifying the expanded form or meaning of abbreviations is available. (Level AAA)

How to Meet 3.1.4
Understanding 3.1.4

3.1.5 Reading Level: When text requires reading ability more advanced than the lower secondary education level after removal of proper names and titles, supplemental content, or a version that does not require reading ability more advanced than the lower secondary education level, is available. (Level AAA)

How to Meet 3.1.5
Understanding 3.1.5

3.1.6 Pronunciation: A mechanism is available for identifying specific pronunciation of words where meaning of the words, in context, is ambiguous without knowing the pronunciation. (Level AAA)

How to Meet 3.1.6
Understanding 3.1.6

Guideline 3.2 Predictable: Make Web pages appear and operate in predictable ways.

3.2.1 On Focus: When any component receives focus, it does not initiate a change of context. (Level A)

How to Meet 3.2.1
Understanding 3.2.1

3.2.2 On Input: Changing the setting of any user interface component does not automatically cause a change of context unless the user has been advised of the behavior before using the component. (Level A)

How to Meet 3.2.2
Understanding 3.2.2

3.2.3 Consistent Navigation: Navigational mechanisms that are repeated on multiple Web pages within a set of Web pages occur in the same relative order each time they are repeated, unless a change is initiated by the user. (Level AA)

How to Meet 3.2.3
Understanding 3.2.3

3.2.4 Consistent Identification: Components that have the same functionality within a set of Web pages are identified consistently. (Level AA)

How to Meet 3.2.4
Understanding 3.2.4

3.2.5 Change on Request: Changes of context are initiated only by user request or a mechanism is available to turn off such changes. (Level AAA)

How to Meet 3.2.5
Understanding 3.2.5

Guideline 3.3 Input Assistance: Help users avoid and correct mistakes.

Understanding Guideline 3.3

3.3.1 Error Identification: If an input error is automatically detected, the item that is in error is identified and the error is described to the user in text. (Level A)

How to Meet 3.3.1
Understanding 3.3.1

3.3.2 Labels or Instructions: Labels or instructions are provided when content requires user input. (Level A)

How to Meet 3.3.2
Understanding 3.3.2

3.3.3 Error Suggestion: If an input error is automatically detected and suggestions for correction are known, then the suggestions are provided to the user, unless it would jeopardize the security or purpose of the content. (Level AA)

How to Meet 3.3.3
Understanding 3.3.3

3.3.4 Error Prevention (Legal, Financial, Data): For Web pages that cause legal commitments or financial transactions for the user to occur, that modify or delete user-controllable data in data storage systems, or that submit user test responses, at least one of the following is true: (Level AA)

How to Meet 3.3.4
Understanding 3.3.4

1. **Reversible:** Submissions are reversible.
2. **Checked:** Data entered by the user is checked for input errors and the user is provided an opportunity to correct them.
3. **Confirmed:** A mechanism is available for reviewing, confirming, and correcting information before finalizing the submission.

3.3.5 Help: Context-sensitive help is available. (Level AAA)

How to Meet 3.3.5
Understanding 3.3.5

3.3.6 Error Prevention (All): For Web pages that require the user to submit information, at least one of the following is true: (Level AAA)

How to Meet 3.3.6
Understanding 3.3.6

1. **Reversible:** Submissions are reversible.

2. **Checked:** Data entered by the user is checked for input errors and the user is provided an opportunity to correct them.
3. **Confirmed:** A mechanism is available for reviewing, confirming, and correcting information before finalizing the submission.

Principle 4: Robust - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

Guideline 4.1 Compatible: Maximize compatibility with current and future user agents, including assistive technologies.

Understanding Guideline 4.1

4.1.1 Parsing: In content implemented using markup languages, elements have complete start and end tags, elements are nested according to their specifications, elements do not contain duplicate attributes, and any IDs are unique, except where the specifications allow these features. (Level A)

How to Meet 4.1.1
Understanding 4.1.1

Note: Start and end tags that are missing a critical character in their formation, such as a closing angle bracket or a mismatched attribute value quotation mark are not complete.

4.1.2 Name, Role, Value: For all user interface components (including but not limited to: form elements, links and components generated by scripts), the name and role can be programmatically determined; states, properties, and values that can be set by the user can be programmatically set; and notification of changes to these items is available to user agents, including assistive technologies. (Level A)

How to Meet 4.1.2
Understanding 4.1.2

Note: This success criterion is primarily for Web authors who develop or script their own user interface components. For example, standard HTML controls already meet this success criterion when used according to specification.

Conformance

This section is normative.

This section lists requirements for conformance to WCAG 2.0. It also gives information about how to make conformance claims, which are optional. Finally, it describes what it means to be accessibility supported, since only accessibility-supported ways of using technologies can be relied upon for conformance. Understanding Conformance includes further explanation of the accessibility-supported concept.

Conformance Requirements

In order for a Web page to conform to WCAG 2.0, all of the following conformance requirements must be satisfied:

1. Conformance Level: One of the following levels of conformance is met in full.

- **Level A:** For Level A conformance (the minimum level of conformance), the Web page satisfies all the Level A Success Criteria, or a conforming alternate version is provided.
- **Level AA:** For Level AA conformance, the Web page satisfies all the Level A and Level AA Success Criteria, or a Level AA conforming alternate version is provided.
- **Level AAA:** For Level AAA conformance, the Web page satisfies all the Level A, Level AA and Level AAA Success Criteria, or a Level AAA conforming alternate version is provided.

Note 1: Although conformance can only be achieved at the stated levels, authors are encouraged to report (in their claim) any progress toward meeting success criteria from all levels beyond the achieved level of conformance.

Note 2: It is not recommended that Level AAA conformance be required as a general policy for entire sites because it is not possible to satisfy all Level AAA Success Criteria for some content.

2. Full pages: Conformance (and conformance level) is for full Web page(s) only, and cannot be achieved if part of a Web page is excluded.

Note 1: For the purpose of determining conformance, alternatives to part of a page's content are considered part of the page when the alternatives can be obtained directly from the page, e.g., a long description or an alternative presentation of a video.

Note 2: Authors of Web pages that cannot conform due to content outside of the author's control may consider a Statement of Partial Conformance.

3. Complete processes: When a Web page is one of a series of Web pages presenting a process (i.e., a sequence of steps that need to be completed in order to accomplish an activity), all Web pages in the process conform at the specified level or better. (Conformance is not possible at a particular level if any page in the process does not conform at that level or better.)

Example: An online store has a series of pages that are used to select and purchase products. All pages in the series from start to finish (checkout) conform in order for any page that is part of the process to conform.

4. Only Accessibility-Supported Ways of Using Technologies: Only accessibility-supported ways of using technologies are relied upon to satisfy the success criteria. Any information or functionality that is provided in a way that is not accessibility supported is also available in a way that is accessibility supported. (See Understanding accessibility support.)

5. Non-Interference: If technologies are used in a way that is not accessibility supported, or if they are used in a non-conforming way, then they do not block the ability of users to access the rest of the page. In addition, the Web page as a whole continues to meet the conformance requirements under each of the following conditions:

1. when any technology that is not relied upon is turned on in a user agent,
2. when any technology that is not relied upon is turned off in a user agent, and
3. when any technology that is not relied upon is not supported by a user agent

In addition, the following success criteria apply to all content on the page, including content that is not otherwise relied upon to meet conformance, because failure to meet them could interfere with any use of the page:

- **1.4.2 - Audio Control**,
- **2.1.2 - No Keyboard Trap**,
- **2.3.1 - Three Flashes or Below Threshold**, and
- **2.2.2 - Pause, Stop, Hide**.

Note: If a page cannot conform (for example, a conformance test page or an example page), it cannot be included in the scope of conformance or in a conformance claim.

For more information, including examples, see Understanding Conformance Requirements.

Conformance Claims (Optional)

Conformance is defined only for Web pages. However, a conformance claim may be made to cover one page, a series of pages, or multiple related Web pages.

Required Components of a Conformance Claim

Conformance claims are **not required**. Authors can conform to WCAG 2.0 without making a claim. However, if a conformance claim is made, then the conformance claim **must** include the following information:

1. **Date** of the claim
2. **Guidelines title, version and URI** "Web Content Accessibility Guidelines 2.0 at http://www.w3.org/TR/2008/REC-WCAG20-20081211/"
3. **Conformance level** satisfied: (Level A, AA or AAA)
4. **A concise description of the Web pages**, such as a list of URIs for which the claim is made, including whether subdomains are included in the claim.

   Note 1: The Web pages may be described by list or by an expression that describes all of the URIs included in the claim.

   Note 2: Web-based products that do not have a URI prior to installation on the customer's Web site may have a statement that the product would conform when installed.

5. A list of the **Web content technologies relied upon**.

Note: If a conformance logo is used, it would constitute a claim and must be accompanied by the required components of a conformance claim listed above.

Optional Components of a Conformance Claim

In addition to the required components of a conformance claim above, consider providing additional information to assist users. Recommended additional information includes:

- A list of success criteria beyond the level of conformance claimed that have been met. This information should be provided in a form that users can use, preferably machine-readable metadata.
- A list of the specific technologies that are "*used but not relied upon*."
- A list of user agents, including assistive technologies that were used to test the content.
- Information about any additional steps taken that go beyond the success criteria to enhance accessibility.
- A machine-readable metadata version of the list of specific technologies that are relied upon.
- A machine-readable metadata version of the conformance claim.

Note 1: Refer to Understanding Conformance Claims for more information and example conformance claims.

Note 2: Refer to Understanding Metadata for more information about the use of metadata in conformance claims.

Statement of Partial Conformance - Third Party Content

Sometimes, Web pages are created that will later have additional content added to them. For example, an email program, a blog, an article that allows users to add comments, or applications supporting user-contributed content. Another example would be a page, such as a portal or news site, composed of content aggregated from multiple contributors, or sites that automatically insert content from other sources over time, such as when advertisements are inserted dynamically.

In these cases, it is not possible to know at the time of original posting what the uncontrolled content of the pages will be. It is important to note that the uncontrolled content can affect the accessibility of the controlled content as well. Two options are available:

1. A determination of conformance can be made based on best knowledge. If a page of this type is monitored and repaired (non-conforming content is removed or brought into conformance) within two business days, then a determination or claim of conformance can be made since, except for errors in externally contributed content which are corrected or removed when encountered, the page conforms. No conformance claim can be made if it is not possible to monitor or correct non-conforming content;
   OR
2. A "statement of partial conformance" may be made that the page does not conform, but could conform if certain parts were removed. The form of that statement would be, "This page does not conform, but would conform to WCAG 2.0 at level X if the following parts from uncontrolled sources were removed." In addition, the following would also be true of uncontrolled content that is described in the statement of partial conformance:
   a. It is not content that is under the author's control.
   b. It is described in a way that users can identify (e.g., they cannot be described as "all parts that we do not control" unless they are clearly marked as such.)

Statement of Partial Conformance - Language

A "statement of partial conformance due to language" may be made when the page does not conform, but would conform if accessibility support existed for (all of) the language(s) used on the page. The form of that statement would be, "This page does not conform, but would conform to WCAG 2.0 at level X if accessibility support existed for the following language(s):"

Appendix A: Glossary

This section is normative.

abbreviation

shortened form of a word, phrase, or name where the abbreviation has not become part of the language

Note 1: This includes initialisms and acronyms where:

1. **initialisms** are shortened forms of a name or phrase made from the initial letters of words or syllables contained in that name or phrase

Note 1: Not defined in all languages.

Example 1: SNCF is a French initialism that contains the initial letters of the Société Nationale des Chemins de Fer, the French national railroad.

Example 2: ESP is an initialism for extrasensory perception.

2. **acronyms** are abbreviated forms made from the initial letters or parts of other words (in a name or phrase) which may be pronounced as a word

   Example: NOAA is an acronym made from the initial letters of the National Oceanic and Atmospheric Administration in the United States.

Note 2: Some companies have adopted what used to be an initialism as their company name. In these cases, the new name of the company is the letters (for example, Ecma) and the word is no longer considered an abbreviation.

accessibility supported

supported by users' assistive technologies as well as the accessibility features in browsers and other user agents To qualify as an accessibility-supported use of a Web content technology (or feature of a technology), both 1 and 2 must be satisfied for a Web content technology (or feature):

1. **The way that the Web content technology is used must be supported by users' assistive technology (AT).** This means that the way that the technology is used has been tested for interoperability with users' assistive technology in the human language(s) of the content,
   AND
2. **The Web content technology must have accessibility-supported user agents that are available to users.** This means that at least one of the following four statements is true:
   a. The technology is supported natively in widely-distributed user agents that are also accessibility supported (such as HTML and CSS);
      OR
   b. The technology is supported in a widely-distributed plug-in that is also accessibility supported;
      OR
   c. The content is available in a closed environment, such as a university or corporate network, where the user agent required by the technology and used by the organization is also accessibility supported;
      OR
   d. The user agent(s) that support the technology are accessibility supported and are available for download or purchase in a way that:
      - does not cost a person with a disability any more than a person without a disability **and**
      - is as easy to find and obtain for a person with a disability as it is for a person without disabilities.

Note 1: The WCAG Working group and the W3C do not specify which or how much support by assistive technologies there must be for a particular use of a Web technology in order for it to be classified as accessibility supported. (See Level of Assistive Technology Support Needed for "Accessibility Support".)

Note 2: Web technologies can be used in ways that are not accessibility supported as long as they are not relied upon and the page as a whole meets the conformance requirements, including Conformance Requirement 4: Only Accessibility-Supported Ways of Using Technologies and Conformance Requirement 5: Non-Interference, are met.

Note 3: When a Web Technology is used in a way that is "accessibility supported," it does not imply that the entire technology or all uses of the technology are supported. Most technologies, including HTML, lack support for at least one feature or use. Pages conform to WCAG only if the uses of the technology that are accessibility supported can be relied upon to meet WCAG requirements.

Note 4: When citing Web content technologies that have multiple versions, the version(s) supported should be specified.

Note 5: One way for authors to locate uses of a technology that are accessibility supported would be to consult compilations of uses that are documented to be accessibility supported. (See Understanding Accessibility-Supported Web Technology Uses.) Authors, companies, technology vendors, or others may document accessibility-supported ways of using Web content technologies. However, all ways of using technologies in the documentation would need to meet the definition of accessibility-supported Web content technologies above.

alternative for time-based media

document including correctly sequenced text descriptions of time-based visual and auditory information and providing a means for achieving the outcomes of any time-based interaction

Note: A screenplay used to create the synchronized media content would meet this definition only if it was corrected

to accurately represent the final synchronized media after editing.

ambiguous to users in general

the purpose cannot be determined from the link and all information of the Web page presented to the user simultaneously with the link (i.e., readers without disabilities would not know what a link would do until they activated it)

Example: The word guava in the following sentence "One of the notable exports is guava" is a link. The link could lead to a definition of guava, a chart listing the quantity of guava exported or a photograph of people harvesting guava. Until the link is activated, all readers are unsure and the person with a disability is not at any disadvantage.

ASCII art

picture created by a spatial arrangement of characters or glyphs (typically from the 95 printable characters defined by ASCII).

assistive technology (as used in this document)

hardware and/or software that acts as a user agent, or along with a mainstream user agent, to provide functionality to meet the requirements of users with disabilities that go beyond those offered by mainstream user agents

Note 1: functionality provided by assistive technology includes alternative presentations (e.g., as synthesized speech or magnified content), alternative input methods (e.g., voice), additional navigation or orientation mechanisms, and content transformations (e.g., to make tables more accessible).

Note 2: Assistive technologies often communicate data and messages with mainstream user agents by using and monitoring APIs.

Note 3: The distinction between mainstream user agents and assistive technologies is not absolute. Many mainstream user agents provide some features to assist individuals with disabilities. The basic difference is that mainstream user agents target broad and diverse audiences that usually include people with and without disabilities. Assistive technologies target narrowly defined populations of users with specific disabilities. The assistance provided by an assistive technology is more specific and appropriate to the needs of its target users. The mainstream user agent may provide important functionality to assistive technologies like retrieving Web content from program objects or parsing markup into identifiable bundles.

Example: Assistive technologies that are important in the context of this document include the following:

- screen magnifiers, and other visual reading assistants, which are used by people with visual, perceptual and physical print disabilities to change text font, size, spacing, color, synchronization with speech, etc. in order to improve the visual readability of rendered text and images;
- screen readers, which are used by people who are blind to read textual information through synthesized speech or braille;
- text-to-speech software, which is used by some people with cognitive, language, and learning disabilities to convert text into synthetic speech;
- speech recognition software, which may be used by people who have some physical disabilities;
- alternative keyboards, which are used by people with certain physical disabilities to simulate the keyboard (including alternate keyboards that use head pointers, single switches, sip/puff and other special input devices.);
- alternative pointing devices, which are used by people with certain physical disabilities to simulate mouse pointing and button activations.

audio

the technology of sound reproduction

Note: Audio can be created synthetically (including speech synthesis), recorded from real world sounds, or both.

audio description

narration added to the soundtrack to describe important visual details that cannot be understood from the main soundtrack alone

Note 1: Audio description of video provides information about actions, characters, scene changes, on-screen text, and other visual content.

Note 2: In standard audio description, narration is added during existing pauses in dialogue. (See also extended audio description.)

Note 3: Where all of the video information is already provided in existing audio, no additional audio description is necessary.

Note 4: Also called "video description" and "descriptive narration."

audio-only
a time-based presentation that contains only audio (no video and no interaction)

blinking
switch back and forth between two visual states in a way that is meant to draw attention

Note: See also flash. It is possible for something to be large enough and blink brightly enough at the right frequency to be also classified as a flash.

blocks of text
more than one sentence of text

CAPTCHA
initialism for "Completely Automated Public Turing test to tell Computers and Humans Apart"

Note 1: CAPTCHA tests often involve asking the user to type in text that is displayed in an obscured image or audio file.

Note 2: A Turing test is any system of tests designed to differentiate a human from a computer. It is named after famed computer scientist Alan Turing. The term was coined by researchers at Carnegie Mellon University. [CAPTCHA]

captions
synchronized visual and/or text alternative for both speech and non-speech audio information needed to understand the media content

Note 1: Captions are similar to dialogue-only subtitles except captions convey not only the content of spoken dialogue, but also equivalents for non-dialogue audio information needed to understand the program content, including sound effects, music, laughter, speaker identification and location.

Note 2: Closed Captions are equivalents that can be turned on and off with some players.

Note 3: Open Captions are any captions that cannot be turned off. For example, if the captions are visual equivalent images of text embedded in video.

Note 4: Captions should not obscure or obstruct relevant information in the video.

Note 5: In some countries, captions are called subtitles.

Note 6: Audio descriptions can be, but do not need to be, captioned since they are descriptions of information that is already presented visually.

changes of context
major changes in the content of the Web page that, if made without user awareness, can disorient users who are not able to view the entire page simultaneously
Changes in context include changes of:

1. user agent;
2. viewport;
3. focus;
4. content that changes the meaning of the Web page.

Note: A change of content is not always a change of context. Changes in content, such as an expanding outline, dynamic menu, or a tab control do not necessarily change the context, unless they also change one of the above (e.g., focus).

Example: Opening a new window, moving focus to a different component, going to a new page (including anything that would look to a user as if they had moved to a new page) or significantly re-arranging the content of a page are examples of changes of context.

conformance
satisfying all the requirements of a given standard, guideline or specification

conforming alternate version
version that

1. conforms at the designated level, and
2. provides all of the same information and functionality in the same human language, and
3. is as up to date as the non-conforming content, and

4. for which at least one of the following is true:
    a. the conforming version can be reached from the non-conforming page via an accessibility-supported mechanism, or
    b. the non-conforming version can only be reached from the conforming version, or
    c. the non-conforming version can only be reached from a conforming page that also provides a mechanism to reach the conforming version

Note 1: In this definition, "can only be reached" means that there is some mechanism, such as a conditional redirect, that prevents a user from "reaching" (loading) the non-conforming page unless the user had just come from the conforming version.

Note 2: The alternate version does not need to be matched page for page with the original (e.g., the conforming alternate version may consist of multiple pages).

Note 3: If multiple language versions are available, then conforming alternate versions are required for each language offered.

Note 4: Alternate versions may be provided to accommodate different technology environments or user groups. Each version should be as conformant as possible. One version would need to be fully conformant in order to meet conformance requirement 1.

Note 5: The conforming alternative version does not need to reside within the scope of conformance, or even on the same Web site, as long as it is as freely available as the non-conforming version.

Note 6: Alternate versions should not be confused with supplementary content, which support the original page and enhance comprehension.

Note 7: Setting user preferences within the content to produce a conforming version is an acceptable mechanism for reaching another version as long as the method used to set the preferences is accessibility supported.

See Understanding Conforming Alternate Versions

content (Web content)

information and sensory experience to be communicated to the user by means of a user agent, including code or markup that defines the content's structure, presentation, and interactions

context-sensitive help

help text that provides information related to the function currently being performed

Note: Clear labels can act as context-sensitive help.

contrast ratio

(L1 + 0.05) / (L2 + 0.05), where

- L1 is the relative luminance of the lighter of the colors, and
- L2 is the relative luminance of the darker of the colors.

Note 1: Contrast ratios can range from 1 to 21 (commonly written 1:1 to 21:1).

Note 2: Because authors do not have control over user settings as to how text is rendered (for example font smoothing or anti-aliasing), the contrast ratio for text can be evaluated with anti-aliasing turned off.

Note 3: For the purpose of Success Criteria 1.4.3 and 1.4.6, contrast is measured with respect to the specified background over which the text is rendered in normal usage. If no background color is specified, then white is assumed.

Note 4: Background color is the specified color of content over which the text is to be rendered in normal usage. It is a failure if no background color is specified when the text color is specified, because the user's default background color is unknown and cannot be evaluated for sufficient contrast. For the same reason, it is a failure if no text color is specified when a background color is specified.

Note 5: When there is a border around the letter, the border can add contrast and would be used in calculating the contrast between the letter and its background. A narrow border around the letter would be used as the letter. A wide border around the letter that fills in the inner details of the letters acts as a halo and would be considered background.

Note 6: WCAG conformance should be evaluated for color pairs specified in the content that an author would expect to appear adjacent in typical presentation. Authors need not consider unusual presentations, such as color changes made by the user agent, except where caused by authors' code.

correct reading sequence

any sequence where words and paragraphs are presented in an order that does not change the meaning of the

content

emergency
a sudden, unexpected situation or occurrence that requires immediate action to preserve health, safety, or property

essential
if removed, would fundamentally change the information or functionality of the content, **and** information and functionality cannot be achieved in another way that would conform

extended audio description
audio description that is added to an audiovisual presentation by pausing the video so that there is time to add additional description

Note: This technique is only used when the sense of the video would be lost without the additional audio description and the pauses between dialogue/narration are too short.

flash
a pair of opposing changes in relative luminance that can cause seizures in some people if it is large enough and in the right frequency range

Note 1: See general flash and red flash thresholds for information about types of flash that are not allowed.

Note 2: See also blinking.

functionality
processes and outcomes achievable through user action

general flash and red flash thresholds
a flash or rapidly changing image sequence is below the threshold (i.e., content **passes**) if any of the following are true:

1. there are no more than three **general flashes** and / or no more than three **red flashes** within any one-second period; or
2. the combined area of flashes occurring concurrently occupies no more than a total of .006 steradians within any 10 degree visual field on the screen (25% of any 10 degree visual field on the screen) at typical viewing distance

where:

- A **general flash** is defined as a pair of opposing changes in relative luminance of 10% or more of the maximum relative luminance where the relative luminance of the darker image is below 0.80; and where "a pair of opposing changes" is an increase followed by a decrease, or a decrease followed by an increase, and
- A **red flash** is defined as any pair of opposing transitions involving a saturated red.

Exception: Flashing that is a fine, balanced, pattern such as white noise or an alternating checkerboard pattern with "squares" smaller than 0.1 degree (of visual field at typical viewing distance) on a side does not violate the thresholds.

Note 1: For general software or Web content, using a 341 x 256 pixel rectangle anywhere on the displayed screen area when the content is viewed at 1024 x 768 pixels will provide a good estimate of a 10 degree visual field for standard screen sizes and viewing distances (e.g., 15-17 inch screen at 22-26 inches). (Higher resolutions displays showing the same rendering of the content yield smaller and safer images so it is lower resolutions that are used to define the thresholds.)

Note 2: A transition is the change in relative luminance (or relative luminance/color for red flashing) between adjacent peaks and valleys in a plot of relative luminance (or relative luminance/color for red flashing) measurement against time. A flash consists of two opposing transitions.

Note 3: The current working definition in the field for **"pair of opposing transitions involving a saturated red"** is where, for either or both states involved in each transition, R/(R+ G + B) >= 0.8, and the change in the value of (R-G-B)x320 is > 20 (negative values of (R-G-B)x320 are set to zero) for both transitions. R, G, B values range from 0-1 as specified in “relative luminance” definition. [HARDING-BINNIE]

Note 4: Tools are available that will carry out analysis from video screen capture. However, no tool is necessary to evaluate for this condition if flashing is less than or equal to 3 flashes in any one second. Content automatically passes (see #1 and #2 above).

human language
language that is spoken, written or signed (through visual or tactile means) to communicate with humans

Note: See also sign language.

idiom

phrase whose meaning cannot be deduced from the meaning of the individual words and the specific words cannot be changed without losing the meaning

Note: idioms cannot be translated directly, word for word, without losing their (cultural or language-dependent) meaning.

Example 1: In English, "spilling the beans" means "revealing a secret." However, "knocking over the beans" or "spilling the vegetables" does not mean the same thing.

Example 2: In Japanese, the phrase "さじを投げる" literally translates into "he throws a spoon," but it means that there is nothing he can do and finally he gives up.

Example 3: In Dutch, "Hij ging met de kippen op stok" literally translates into "He went to roost with the chickens," but it means that he went to bed early.

image of text

text that has been rendered in a non-text form (e.g., an image) in order to achieve a particular visual effect

Note: This does not include text that is part of a picture that contains significant other visual content.

Example: A person's name on a nametag in a photograph.

informative

for information purposes and not required for conformance

Note: Content required for conformance is referred to as "normative."

input error

information provided by the user that is not accepted

Note: This includes:

1. Information that is required by the Web page but omitted by the user
2. Information that is provided by the user but that falls outside the required data format or values

jargon

words used in a particular way by people in a particular field

Example: The word StickyKeys is jargon from the field of assistive technology/accessibility.

keyboard interface

interface used by software to obtain keystroke input

Note 1: A keyboard interface allows users to provide keystroke input to programs even if the native technology does not contain a keyboard.

Example: A touchscreen PDA has a keyboard interface built into its operating system as well as a connector for external keyboards. Applications on the PDA can use the interface to obtain keyboard input either from an external keyboard or from other applications that provide simulated keyboard output, such as handwriting interpreters or speech-to-text applications with "keyboard emulation" functionality.

Note 2: Operation of the application (or parts of the application) through a keyboard-operated mouse emulator, such as MouseKeys, does not qualify as operation through a keyboard interface because operation of the program is through its pointing device interface, not through its keyboard interface.

label

text or other component with a text alternative that is presented to a user to identify a component within Web content

Note 1: A label is presented to all users whereas the name may be hidden and only exposed by assistive technology. In many (but not all) cases the name and the label are the same.

Note 2: The term label is not limited to the label element in HTML.

large scale (text)

with at least 18 point or 14 point bold or font size that would yield equivalent size for Chinese, Japanese and Korean (CJK) fonts

Note 1: Fonts with extraordinarily thin strokes or unusual features and characteristics that reduce the familiarity of their letter forms are harder to read, especially at lower contrast levels.

Note 2: Font size is the size when the content is delivered. It does not include resizing that may be done by a user.

Note 3: The actual size of the character that a user sees is dependent both on the author-defined size and the user's display or user-agent settings. For many mainstream body text fonts, 14 and 18 point is roughly equivalent to 1.2 and

1.5 em or to 120% or 150% of the default size for body text (assuming that the body font is 100%), but authors would need to check this for the particular fonts in use. When fonts are defined in relative units, the actual point size is calculated by the user agent for display. The point size should be obtained from the user agent, or calculated based on font metrics as the user agent does, when evaluating this success criterion. Users who have low vision would be responsible for choosing appropriate settings.

Note 4: When using text without specifying the font size, the smallest font size used on major browsers for unspecified text would be a reasonable size to assume for the font. If a level 1 heading is rendered in 14pt bold or higher on major browsers, then it would be reasonable to assume it is large text. Relative scaling can be calculated from the default sizes in a similar fashion.

Note 5: The 18 and 14 point sizes for roman texts are taken from the minimum size for large print (14pt) and the larger standard font size (18pt). For other fonts such as CJK languages, the "equivalent" sizes would be the minimum large print size used for those languages and the next larger standard large print size.

legal commitments

transactions where the person incurs a legally binding obligation or benefit

Example: A marriage license, a stock trade (financial and legal), a will, a loan, adoption, signing up for the army, a contract of any type, etc.

link purpose

nature of the result obtained by activating a hyperlink

live

information captured from a real-world event and transmitted to the receiver with no more than a broadcast delay

Note 1: A broadcast delay is a short (usually automated) delay, for example used in order to give the broadcaster time to queue or censor the audio (or video) feed, but not sufficient to allow significant editing.

Note 2: If information is completely computer generated, it is not live.

lower secondary education level

the two or three year period of education that begins after completion of six years of school and ends nine years after the beginning of primary education

Note: This definition is based on the International Standard Classification of Education [UNESCO].

mechanism

process or technique for achieving a result

Note 1: The mechanism may be explicitly provided in the content, or may be relied upon to be provided by either the platform or by user agents, including assistive technologies.

Note 2: The mechanism needs to meet all success criteria for the conformance level claimed.

media alternative for text

media that presents no more information than is already presented in text (directly or via text alternatives)

Note: A media alternative for text is provided for those who benefit from alternate representations of text. Media alternatives for text may be audio-only, video-only (including sign-language video), or audio-video.

name

text by which software can identify a component within Web content to the user

Note 1: The name may be hidden and only exposed by assistive technology, whereas a label is presented to all users. In many (but not all) cases, the label and the name are the same.

Note 2: This is unrelated to the name attribute in HTML.

navigated sequentially

navigated in the order defined for advancing focus (from one element to the next) using a keyboard interface

non-text content

any content that is not a sequence of characters that can be programmatically determined or where the sequence is not expressing something in human language

Note: This includes ASCII Art (which is a pattern of characters), emoticons, leetspeak (which uses character substitution), and images representing text

normative

required for conformance

Note 1: One may conform in a variety of well-defined ways to this document.

Note 2: Content identified as "informative" or "non-normative" is never required for conformance.

on a full-screen window

on the most common sized desktop/laptop display with the viewport maximized

Note: Since people generally keep their computers for several years, it is best not to rely on the latest desktop/laptop display resolutions but to consider the common desktop/laptop display resolutions over the course of several years when making this evaluation.

paused

stopped by user request and not resumed until requested by user

prerecorded

information that is not live

presentation

rendering of the content in a form to be perceived by users

primary education level

six year time period that begins between the ages of five and seven, possibly without any previous education

Note: This definition is based on the International Standard Classification of Education [UNESCO].

process

series of user actions where each action is required in order to complete an activity

Example 1: Successful use of a series of Web pages on a shopping site requires users to view alternative products, prices and offers, select products, submit an order, provide shipping information and provide payment information.

Example 2: An account registration page requires successful completion of a Turing test before the registration form can be accessed.

programmatically determined (programmatically determinable)

determined by software from author-supplied data provided in a way that different user agents, including assistive technologies, can extract and present this information to users in different modalities

Example 1: Determined in a markup language from elements and attributes that are accessed directly by commonly available assistive technology.

Example 2: Determined from technology-specific data structures in a non-markup language and exposed to assistive technology via an accessibility API that is supported by commonly available assistive technology.

programmatically determined link context

additional information that can be programmatically determined from relationships with a link, combined with the link text, and presented to users in different modalities

Example: In HTML, information that is programmatically determinable from a link in English includes text that is in the same paragraph, list, or table cell as the link or in a table header cell that is associated with the table cell that contains the link.

Note: Since screen readers interpret punctuation, they can also provide the context from the current sentence, when the focus is on a link in that sentence.

programmatically set

set by software using methods that are supported by user agents, including assistive technologies

pure decoration

serving only an aesthetic purpose, providing no information, and having no functionality

Note: Text is only purely decorative if the words can be rearranged or substituted without changing their purpose.

Example: The cover page of a dictionary has random words in very light text in the background.

real-time event

event that a) occurs at the same time as the viewing and b) is not completely generated by the content

Example 1: A Webcast of a live performance (occurs at the same time as the viewing and is not prerecorded).

Example 2: An on-line auction with people bidding (occurs at the same time as the viewing).

Example 3: Live humans interacting in a virtual world using avatars (is not completely generated by the content and occurs at the same time as the viewing).

relationships
meaningful associations between distinct pieces of content

relative luminance
the relative brightness of any point in a colorspace, normalized to 0 for darkest black and 1 for lightest white

Note 1: For the sRGB colorspace, the relative luminance of a color is defined as L = 0.2126 * **R** + 0.7152 * **G** + 0.0722 * **B** where **R**, **G** and **B** are defined as:

- if R_{sRGB} <= 0.03928 then **R** = R_{sRGB}/12.92 else **R** = ((R_{sRGB}+0.055)/1.055) ^ 2.4
- if G_{sRGB} <= 0.03928 then **G** = G_{sRGB}/12.92 else **G** = ((G_{sRGB}+0.055)/1.055) ^ 2.4
- if B_{sRGB} <= 0.03928 then **B** = B_{sRGB}/12.92 else **B** = ((B_{sRGB}+0.055)/1.055) ^ 2.4

and R_{sRGB}, G_{sRGB}, and B_{sRGB} are defined as:

- R_{sRGB} = R_{8bit}/255
- G_{sRGB} = G_{8bit}/255
- B_{sRGB} = B_{8bit}/255

The "^" character is the exponentiation operator. (Formula taken from [sRGB] and [IEC-4WD]).

Note 2: Almost all systems used today to view Web content assume sRGB encoding. Unless it is known that another color space will be used to process and display the content, authors should evaluate using sRGB colorspace. If using other color spaces, see Understanding Success Criterion 1.4.3.

Note 3: If dithering occurs after delivery, then the source color value is used. For colors that are dithered at the source, the average values of the colors that are dithered should be used (average R, average G, and average B).

Note 4: Tools are available that automatically do the calculations when testing contrast and flash.

Note 5: A MathML version of the relative luminance definition is available.

relied upon (technologies that are)
the content would not conform if that technology is turned off or is not supported

role
text or number by which software can identify the function of a component within Web content

Example: A number that indicates whether an image functions as a hyperlink, command button, or check box.

same functionality
same result when used

Example: A submit "search" button on one Web page and a "find" button on another Web page may both have a field to enter a term and list topics in the Web site related to the term submitted. In this case, they would have the same functionality but would not be labeled consistently.

same relative order
same position relative to other items

Note: Items are considered to be in the same relative order even if other items are inserted or removed from the original order. For example, expanding navigation menus may insert an additional level of detail or a secondary navigation section may be inserted into the reading order.

satisfies a success criterion
the success criterion does not evaluate to 'false' when applied to the page

section
A self-contained portion of written content that deals with one or more related topics or thoughts

Note: A section may consist of one or more paragraphs and include graphics, tables, lists and sub-sections.

set of Web pages
collection of Web pages that share a common purpose and that are created by the same author, group or organization

Note: Different language versions would be considered different sets of Web pages.

sign language
a language using combinations of movements of the hands and arms, facial expressions, or body positions to convey meaning

sign language interpretation

translation of one language, generally a spoken language, into a sign language

Note: True sign languages are independent languages that are unrelated to the spoken language(s) of the same country or region.

specific sensory experience

a sensory experience that is not purely decorative and does not primarily convey important information or perform a function

Example: Examples include a performance of a flute solo, works of visual art etc.

structure

1. The way the parts of a Web page are organized in relation to each other; and
2. The way a collection of Web pages is organized

supplemental content

additional content that illustrates or clarifies the primary content

Example 1: An audio version of a Web page.

Example 2: An illustration of a complex process.

Example 3: A paragraph summarizing the major outcomes and recommendations made in a research study.

synchronized media

audio or video synchronized with another format for presenting information and/or with time-based interactive components, unless the media is a media alternative for text that is clearly labeled as such

technology (Web content)

mechanism for encoding instructions to be rendered, played or executed by user agents

Note 1: As used in these guidelines "Web Technology" and the word "technology" (when used alone) both refer to Web Content Technologies.

Note 2: Web content technologies may include markup languages, data formats, or programming languages that authors may use alone or in combination to create end-user experiences that range from static Web pages to synchronized media presentations to dynamic Web applications.

Example: Some common examples of Web content technologies include HTML, CSS, SVG, PNG, PDF, Flash, and JavaScript.

text

sequence of characters that can be programmatically determined, where the sequence is expressing something in human language

text alternative

Text that is programmatically associated with non-text content or referred to from text that is programmatically associated with non-text content. Programmatically associated text is text whose location can be programmatically determined from the non-text content.

Example: An image of a chart is described in text in the paragraph after the chart. The short text alternative for the chart indicates that a description follows.

Note: Refer to Understanding Text Alternatives for more information.

used in an unusual or restricted way

words used in such a way that requires users to know exactly which definition to apply in order to understand the content correctly

Example: The term "gig" means something different if it occurs in a discussion of music concerts than it does in article about computer hard drive space, but the appropriate definition can be determined from context. By contrast, the word "text" is used in a very specific way in WCAG 2.0, so a definition is supplied in the glossary.

user agent

any software that retrieves and presents Web content for users

Example: Web browsers, media players, plug-ins, and other programs — including assistive technologies — that help in retrieving, rendering, and interacting with Web content.

user-controllable

data that is intended to be accessed by users

Note: This does not refer to such things as Internet logs and search engine monitoring data.

Example: Name and address fields for a user's account.

user interface component

a part of the content that is perceived by users as a single control for a distinct function

Note 1: Multiple user interface components may be implemented as a single programmatic element. Components here is not tied to programming techniques, but rather to what the user perceives as separate controls.

Note 2: User interface components include form elements and links as well as components generated by scripts.

Example: An applet has a "control" that can be used to move through content by line or page or random access. Since each of these would need to have a name and be settable independently, they would each be a "user interface component."

video

the technology of moving or sequenced pictures or images

Note: Video can be made up of animated or photographic images, or both.

video-only

a time-based presentation that contains only video (no audio and no interaction)

viewport

object in which the user agent presents content

Note 1: The user agent presents content through one or more viewports. Viewports include windows, frames, loudspeakers, and virtual magnifying glasses. A viewport may contain another viewport (e.g., nested frames). Interface components created by the user agent such as prompts, menus, and alerts are not viewports.

Note 2: This definition is based on User Agent Accessibility Guidelines 1.0 Glossary.

visually customized

the font, size, color, and background can be set

Web page

a non-embedded resource obtained from a single URI using HTTP plus any other resources that are used in the rendering or intended to be rendered together with it by a user agent

Note 1: Although any "other resources" would be rendered together with the primary resource, they would not necessarily be rendered simultaneously with each other.

Note 2: For the purposes of conformance with these guidelines, a resource must be "non-embedded" within the scope of conformance to be considered a Web page.

Example 1: A Web resource including all embedded images and media.

Example 2: A Web mail program built using Asynchronous JavaScript and XML (AJAX). The program lives entirely at http://example.com/mail, but includes an inbox, a contacts area and a calendar. Links or buttons are provided that cause the inbox, contacts, or calendar to display, but do not change the URI of the page as a whole.

Example 3: A customizable portal site, where users can choose content to display from a set of different content modules.

Example 4: When you enter "http://shopping.example.com/" in your browser, you enter a movie-like interactive shopping environment where you visually move around in a store dragging products off of the shelves around you and into a visual shopping cart in front of you. Clicking on a product causes it to be demonstrated with a specification sheet floating alongside. This might be a single-page Web site or just one page within a Web site.

Appendix B: Acknowledgments

This section is informative.

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Additional information about participation in the Web Content Accessibility Guidelines Working Group (WCAG WG) can be found on the Working Group home page.

Participants active in the WCAG WG at the time of publication

- Bruce Bailey (U.S. Access Board)
- Frederick Boland (NIST)
- Ben Caldwell (Trace R&D Center, University of Wisconsin)
- Sofia Celic (W3C Invited Expert)
- Michael Cooper (W3C)
- Roberto Ellero (International Webmasters Association / HTML Writers Guild)
- Bengt Farre (Rigab)
- Loretta Guarino Reid (Google)
- Katie Haritos-Shea
- Andrew Kirkpatrick (Adobe)
- Drew LaHart (IBM)
- Alex Li (SAP AG)
- David MacDonald (E-Ramp Inc.)
- Roberto Scano (International Webmasters Association / HTML Writers Guild)
- Cynthia Shelly (Microsoft)
- Andi Snow-Weaver (IBM)
- Christophe Strobbe (DocArch, K.U.Leuven)
- Gregg Vanderheiden (Trace R&D Center, University of Wisconsin)

Other previously active WCAG WG participants and other contributors to WCAG 2.0

Shadi Abou-Zahra, Jim Allan, Jenae Andershonis, Avi Arditti, Aries Arditi, Mike Barta, Sandy Bartell, Kynn Bartlett, Marco Bertoni, Harvey Bingham, Chris Blouch, Paul Bohman, Patrice Bourlon, Judy Brewer, Andy Brown, Dick Brown, Doyle Burnett, Raven Calais, Tomas Caspers, Roberto Castaldo, Sambhavi Chandrashekar, Mike Cherim, Jonathan Chetwynd, Wendy Chisholm, Alan Chuter, David M Clark, Joe Clark, James Coltham, James Craig, Tom Croucher, Nir Dagan, Daniel Dardailler, Geoff Deering, Pete DeVasto, Don Evans, Neal Ewers, Steve Faulkner, Lainey Feingold, Alan J. Flavell, Nikolaos Floratos, Kentarou Fukuda, Miguel Garcia, P.J. Gardner, Greg Gay, Becky Gibson, Al Gilman, Kerstin Goldsmith, Michael Grade, Jon Gunderson, Emmanuelle Gutiérrez y Restrepo, Brian Hardy, Eric Hansen, Sean Hayes, Shawn Henry, Hans Hillen, Donovan Hipke, Bjoern Hoehrmann, Chris Hofstader, Yvette Hoitink, Carlos Iglesias, Ian Jacobs, Phill Jenkins, Jyotsna Kaki, Leonard R. Kasday, Kazuhito Kidachi, Ken Kipness, Marja-Riitta Koivunen, Preety Kumar, Gez Lemon, Chuck Letourneau, Scott Luebking, Tim Lacy, Jim Ley, William Loughborough, Greg Lowney, Luca Mascaro, Liam McGee, Jens Meiert, Niqui Merret, Alessandro Miele, Mathew J Mirabella, Charles McCathieNevile , Matt May, Marti McCuller, Sorcha Moore, Charles F. Munat, Robert Neff, Bruno von Niman, Tim Noonan, Sebastiano Nutarelli, Graham Oliver, Sean B. Palmer, Sailesh Panchang, Nigel Peck, Anne Pemberton, David Poehlman, Adam Victor Reed, Chris Ridpath, Lee Roberts, Gregory J. Rosmaita, Matthew Ross, Sharron Rush, Gian Sampson-Wild, Joel Sanda, Gordon Schantz, Lisa Seeman, John Slatin, Becky Smith, Jared Smith, Neil Soiffer, Jeanne Spellman, Mike Squillace, Michael Stenitzer, Jim Thatcher, Terry Thompson, Justin Thorp, Makoto Ueki, Eric Velleman, Dena Wainwright, Paul Walsch, Takayuki Watanabe, Jason White.

Appendix C: References

This section is informative.

CAPTCHA
The CAPTCHA Project, Carnegie Mellon University. The project is online at http://www.captcha.net.

HARDING-BINNIE
Harding G. F. A. and Binnie, C.D., Independent Analysis of the ITC Photosensitive Epilepsy Calibration Test Tape. 2002.

IEC-4WD
IEC/4WD 61966-2-1: Colour Measurement and Management in Multimedia Systems and Equipment - Part 2.1: Default Colour Space - sRGB. May 5, 1998.

sRGB
"A Standard Default Color Space for the Internet - sRGB," M. Stokes, M. Anderson, S. Chandrasekar, R. Motta, eds., Version 1.10, November 5, 1996. A copy of this paper is available at http://www.w3.org/Graphics/Color/sRGB.html.

UNESCO

International Standard Classification of Education, 1997. A copy of the standard is available at http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm.

WCAG10

Web Content Accessibility Guidelines 1.0, G. Vanderheiden, W. Chisholm, I. Jacobs, Editors, W3C Recommendation, 5 May 1999, http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/. The latest version of WCAG 1.0 is available at http://www.w3.org/TR/WAI-WEBCONTENT/.

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No.	Edition	Title	Superseded by:
ASTM A106 / A106 M	2004b	Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service	A106/A106M-15
ASTM A184	1979	Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement	A184/A184M - 06(2011)
ASTM A185	1979	Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement	ASTM A185/A185M-07
ASTM A203 / A203M	1997	Standard Specification for Pressure Vessel Plates, Alloy Steel, Nickel	A203/A203M - 12
ASTM A242	1979	Standard Specification for High-Strength Low-Alloy Structural Steel	A242/A242M - 13
ASTM A285	1978	Standard Specification for Pressure Vessel Plates, Carbon Steel, Low- and Intermediate- Tensile Strength	A285/A285M - 12
ASTM A307	1978e	Standard Specification for Carbon Steel Externally Threaded Standard Fasteners	A307 - 14
ASTM A325	1979	Standard Specification for High-Strength Bolts for Structural Steel Joints	A325 - 14
ASTM A333 / A333M	1994	Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service	A333/A333M - 13

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM A36	1977ae	Standard Specification for Structural Steel	A36/A36M - 14
ASTM A36 / A36M	1997ae1	Standard Specification for Carbon Structural Steel	A36/A36M - 14
ASTM A369 / A369M	1992	Standard Specification for Carbon and Ferritic Alloy Steel Forged and Bored Pipe for High- Temperature Service	A369/A369M - 11
ASTM A370	1977e 2	Standard Methods and Definitions for Mechanical Testing of Steel Products	A370 - 15
ASTM A441	1979	Standard Specification for High-Strength Low-Alloy Structural Manganese Vanadium Steel	ASTM D441 - 07(2012)
ASTM A449	1978a	Standard Specification for Quenched and Tempered Steel Bolts and Studs	A449 - 14
ASTM A475	1978 (1984) e 1	Standard Specification for Zinc-Coated Steel Wire Strand	A475 - 03(2014)
ASTM A490	1979	Standard Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints	A490 - 14a
ASTM A496	1978	Standard Specification for Deformed Steel Wire for Concrete Reinforcement	ASTM A496/A496M-07

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM A497	1979	Standard Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement	ASTM A497/A497M-07
ASTM A500	1978	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes	A500/A500M - 13
ASTM A501	1976	Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing	A501/A501M - 14
ASTM A502	1976	Standard Specification for Steel Structural Rivets	A502 - 03(2015)
ASTM A514	1977	Standard Specification for High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding	A514/A514M - 14
ASTM A516 / A516M	1990 (1996) e1	Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate and Lower- Temperature Service	A516/A516M - 10(2015)
ASTM A520	1972 (1985)	Standard Specification for Supplementary Requirements for Seamless and Electric-Resistance-Welded Carbon Steel Tubular Products for High-Temperature Service Conforming to ISO Recommendations For Boiler Construction	Withdrawn Standard: ASTM A520-97 | Developed by Subcommittee: A01.09 WITHDRAWN, NO REPLACEMENT

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM A522 / A522M	1995b	Standard Specification forForged or Rolled 8 and 9 % Nickel Alloy Steel Flanges, Fittings, Valves, and Parts for Low-Temperature Service	A522/A522M - 14
ASTM A529	1975	Standard Specification for Structural Steel with 42,000PSI (290 Mpa) Minimum Yield Point (1/2 in. (12.7 mm) Maximum Thickness	A529/A529M - 14
ASTM A539	1990a	Standard Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines	Withdrawn Standard: ASTM A539-99 | Developed by Subcommittee: A01.09 D28WITHDRAWN, NO REPLACEMENT
ASTM A570	1979	Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality	Withdrawn Standard: ASTM A570/A570M-98 | Developed by Subcommittee: A01.19 WITHDRAWN, REPLACED BY A1011/A1011M
ASTM A572	1979	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality	A572/A572M - 15
ASTM A588	1979a	Standard Specification for High-Strength Low-Alloy Structural Steel with 50, 000 psi Minimum Yield Point to 4 in. Thick	A588/A588M - 15

ASTM Editions Incorporated by Reference

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ASTM A611	1972 (1979)	Standard Specification for Steel, Cold-Rolled Sheet, Carbon, Structural	Withdrawn Standard: ASTM A611-97 | Developed by Subcommittee: A01.19 WITHDRAWN, REPLACED BY A1008/A1008M
ASTM A615	1979	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement	A615/A615M - 15ae1
ASTM A616	1979	Standard Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement	Withdrawn Standard: ASTM A616/A616M-96a | Developed by Subcommittee: A01.05 WITHDRAWN, REPLACED BY A996/A996M
ASTM A617	1979	Standard Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement	Withdrawn Standard: ASTM A617/A617M-96a | Developed by Subcommittee: A01.05 WITHDRAWN, REPLACED BY A996/A996M
ASTM A618	1974	Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing	A618/A618M - 04(2015)
ASTM A633	1979a	Standard Specification for Normalized High-Strength Low Alloy Structural Steel	A633/A633M - 13

ASTM Editions Incorporated by Reference

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ASTM A82	1979	Standard Specification for Cold-Drawn Steel Wire for Concrete Reinforcement	Withdrawn Standard: ASTM A82/A82M-07 | Developed by Subcommittee: A01.05WITHDRAWN, REPLACED BY A1064/A1064M
ASTM B111	1995	Standard Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock	B111/B111M - 11
ASTM B122 / B 122M	1995	Standard Specification for Copper-Nickel-Tin Alloy, Copper-Nickel-Zinc Alloy (Nickel Silver), and Copper-Nickel Alloy Plate, Sheet, Strip and Rolled Bar	B122/B122M - 11
ASTM B124	1996	Standard Specification for Copper and Copper-Alloy Forging Rod, Bar, and Shapes	B124/B124M - 15
ASTM B152	1997a	Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar	B152/B152M - 13
ASTM B16	1992	Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines	ASTM B16 / B16M - 10(2015)
ASTM B193	1987	Standard Test Method for Resistivity of Electrical Conductor Materials	B193 - 02(2014)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM B209	1996	Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate	B209 - 14
ASTM B21	1996	Standard Specification for Naval Brass Rod, Bar, and Shapes	ASTM B21 / B21M - 14
ASTM B21	1983b	Standard Specification for Naval Brass Rod, Bar, and Shapes	ASTM B21 / B21M - 14
ASTM B224	1980e 1	Standard Classification of Coppers	B224 - 15
ASTM B280	1997	Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service	B280 - 13
ASTM B283	1996	Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)	B283/B283M - 14a
ASTM B315	1993	Standard Specification for Seamless Copper Alloy Pipe and Tube	B315 - 12
ASTM B42	1996	Standard Specification for Seamless Copper Pipe, Standard Sizes	B42 - 15a
ASTM B557	1984	Standard Methods of Tension Testing Wrought and Cast Aluminum and Magnesium-Alloy Products	B557 - 15
ASTM B580	1979	Standard Specification for Anodized Oxide Coatings on Aluminum	B580 - 79(2014)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM B68	1995	Standard Specification for Seamless Copper Tube, Bright Annealed	B68/B68M - 11
ASTM B694	1986	Standard Specification for Copper, Copper Alloy, and Copper-Clad Stainless Steel Sheet and Strip for Electrical Cable Shielding	B694 - 13
ASTM B75	1997	Standard Specification for Seamless Copper Tube	B75/B75M - 11
ASTM B85	1984	Standard Specification for Aluminum-Alloy Die Castings	B85/B85M - 14
ASTM B858	1995	Standard Test Method for Determination of Susceptibility to Stress Corrosion Cracking in Copper Alloys Using an Ammonia Vapor Test	B858 - 06(2012)
ASTM B88	1996	Standard Specification for Seamless Copper Water Tube	B88 - 14
ASTM B96	1993	Standard Specification for Copper-Silicon Alloy Plate, Sheet, Strip, and Rolled Bar for General Purposes and Pressure Vessels	B96/B96M - 11
ASTM C150	1999a	Standard Specification for Portland Cement	C150/C150M - 15

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM C177	1997	Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot-Plate Apparatus	C177 - 13
ASTM C236	1989 (1993) e 1	Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box	Withdrawn Standard: ASTM C236-89(1993)e1 | Developed by Subcommittee: C16.30 WITHDRAWN, REPLACED BY C1363
ASTM C330	1999	Standard Specification for Lightweight Aggregates for Structural Concrete	C330/C330M - 14
ASTM C5	1979 (1997)	Standard Specification for Quicklime for Structural Purposes	C5 - 10
ASTM C509	1984	Standard Specification for Cellular Elastomeric Preformed Gasket and Sealing Material	C509 - 06(2011)
ASTM C516	1980 (1996) e 1	Standard Specification for Vermiculite Loose Fill Thermal Insulation	C516 - 08(2013)e1
ASTM C518	1991	Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus	C518 - 15

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM C549	1981 (1995) e 1	Standard Specification for Perlite Loose Fill Insulation	C549 - 06(2012)
ASTM C564	1970 (1982)	Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings	C564 - 14
ASTM C720	1989 (1994) e 1	Standard Specification for Spray Applied Fibrous Insulation for Elevated Temperature	Withdrawn Standard: ASTM C720-89(1994)e1 | Developed by Subcommittee: C16.23 WITHDRAWN, NO REPLACEMENT
ASTM D1072	1990 (1994) e 1	Standard Test Method for Total Sulfur in Fuel Gases	D1072 - 06(2012)
ASTM D1193	1977 (1983)	Standard Specification for Reagent Water	D1193 - 06(2011)
ASTM D1217	1993 (1998)	Standard Test Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer	D1217 - 12
ASTM D1246	1995 (1999)	Standard Test Method for Bromide Ion in Water	D1246 - 10
ASTM D1253	1986 (1996)	Standard Test Method for Residual Chlorine in Water	D1253 - 14
ASTM D1266	1998	Standard Test Method for Sulfur in Petroleum Products (Lamp Method)	D1266 - 13

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D129	1995	Standard Test Method for Sulfur in Petroleum Products (General Bomb Method)	D129 - 13
ASTM D1298	1999	Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method	D1298 - 12b
ASTM D1335	1967 (1972)	Standard Method of Test for Tuft Bind of Pile Floor Coverings	D1335 - 12
ASTM D1412	1993 (1997)	Standard Test Method for Equilibrium Moisture of Coal at 96 to 97 Percent Relative Humidity and 30 Degrees Celsius	D1412/D1412M - 15
ASTM D1415	1988 (1994)	Standard Practice for Rubber Property-International Hardness	D1415 - 06(2012)
ASTM D1480	1993 (1997)	Standard Test Method for Density and Relative Density (Specific Gravity) of Viscous Materials by Bingham Pycnometer	D1480 - 12
ASTM D1481	1993 (1997)	Standard Test Method for Density and Relative Density (Specific Gravity) of Viscous Materials by Lipkin Bicapillary Pycnometer	D1481 - 12
ASTM D1518	1985 (1998) e1	Standard Test Method for Thermal Transmittance of Textile Materials	D1518 - 14

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D1535	1989	Standard Test Method for Specifying Color by the Munsell System	D1535 - 14
ASTM D1552	1995	Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method)	D1552 - 15
ASTM D1687	1992 (1996)	Standard Test Methods for Chromium in Water	D1687 - 12
ASTM D1688	1995	Standard Test Methods for Copper in Water	D1688 - 12
ASTM D1785	1986	Standard Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe, Schedules 40, 80, and 120	D1785 - 15
ASTM D1835	1997	Standard Specification for Liquefied Petroleum (LP) Gases	D1835 - 13
ASTM D1890	1996	Standard Test Method for Beta Particle Radioactivity of Water	D1890 - 15
ASTM D1943	1996	Standard Test Method for Alpha Particle Radioactivity of Water	D1943 - 05(2012)
ASTM D1945	1996	Standard Test Method for Analysis of Natural Gas By Gas Chromatography	D1945 - 14
ASTM D1946	1990 (1994) e1	Standard Practice for Analysis of Reformed Gas by Gas Chromatography	D1946 - 90(2011)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D2013	1986 (1994)	Standard Method of Preparing Coal Samples for Analysis	D2013/D2013M - 12
ASTM D2015	1996	Standard Test Method for Gross Calorific Value of Coal and Coke by the Adiabatic Bomb Calorimeter	Withdrawn Standard: ASTM D2015-00 | Developed by Subcommittee: D05.21 WITHDRAWN, NO REPLACEMENT
ASTM D2036	1998	Standard Test Method for Cyanides in Water	D2036 - 09(2015)
ASTM D2163	1991 (1996)	Standard Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propane Concentrates by Gas Chromatography	D2163 - 14e1
ASTM D2216	1998	Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass	D2216 - 10
ASTM D2234	1998	Standard Practice for Collection of a Gross Sample of Coal	D2234/D2234M - 10
ASTM D2247	1968 (1973)	Standard Method for Testing Coated Metal Specimans at 100 Percent Relative Humidity	D2247 - 11
ASTM D2460	1997	Standard Test Method for Alpha-Particle-Emitting Isotopes of Radium in Water	D2460 - 07(2013)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D2502	1992 (1996)	Standard Test Method for Estimation of Molecular Weight (Relative Molecular Mass) of Petroleum Oils from Viscosity Measurements	D2502 - 14
ASTM D2503	1992 (1997)	Standard Test Method for Relative Molecular Mass (Molecular Weight) of Hydrocarbons by Thermoelectric Measurement of Vapor Pressure	D2503 - 92(2012)
ASTM D2505	1988 (1998)	Standard Test Method for Ethylene, Other Hydrocarbons, and Carbon Dioxide in High-Purity Ethylene by Gas Chromatography	D2505 - 88(2015)
ASTM D257	1991	Standard Test Method for DC Resistance of Conductance of Insulating Materials	D257 - 14
ASTM D2597	1994 (1999)	Standard Test Method for Analysis of Demethanized Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon Dioxide by Gas Chromatography	D2597 - 10
ASTM D2622	1998	Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry	D2622 - 10
ASTM D2724	1987 (1995)	Standard Test Methods for Bonded, Fused, and Laminated Apparel Fabrics	D2724 - 07(2015)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D2777	1998	Standard Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D-19 on Water	D2777 - 13
ASTM D287	1992 (1995)	Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)	D287 - 12b
ASTM D2879	1997	Standard Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope	D2879 - 10
ASTM D2908	1974	Standard Recommended Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography	D2908 - 91(2011)
ASTM D2986	1995a (1999)	Standard Practice for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test	Withdrawn Standard: ASTM D2986-95a(1999) | Developed by Subcommittee: D22.01 WITHDRAWN, NO REPLACEMENT
ASTM D3120	1996	Standard Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry	D3120 - 08(2014)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D3173	1987 (1996)	Standard Test Method for Moisture in the Analysis Sample of Coal and Coke	D3173 - 11
ASTM D3176	1989 (1997)	Standard Practice for Ultimate Analysis of Coal and Coke	D3176 - 15
ASTM D3177	1989 (1997)	Standard Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke	Withdrawn Standard: ASTM D3177-02(2007) | Developed by Subcommittee: D05.21WITHDRAWN, REPLACED BY D4239
ASTM D3178	1989 (1997)	Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke	Withdrawn Standard: ASTM D3178-89(2002) | Developed by Subcommittee: D05.21 WITHDRAWN, REPLACED BY D5373
ASTM D323	1958 (1968)	Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)	D323 - 15a
ASTM D3236	1988 (1999)	Standard Test Method for Apparent Viscosity of Hot Melt Adhesives and Coating Materials	D3236 - 15
ASTM D3246	1996	Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry	D3246 - 15

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D3286	1996	Standard Test Method for Gross Calorific Value of Coal and Coke by the Isoperibol Bomb Calorimeter	Withdrawn Standard: ASTM D3286-96 | Developed by Subcommittee: D05.21WITHDRAWN, REPLACED BY D5865
ASTM D3371	1995	Standard Test Method for Nitriles in Aqueous Solution by Gas-Liquid Chromatography	Withdrawn Standard: ASTM D3371-95 | Developed by Subcommittee: D19.06 WITHDRAWN, NO REPLACEMENT
ASTM D3454	1997	Standard Test Method for Radium-226 in Water	D3454 - 11
ASTM D3588	1998	Standard Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels	D3588 - 98(2011)
ASTM D3697	1992 (1996)	Standard Test Method for Antimony in Water	D3697 - 12
ASTM D388	1998a	Standard Classification of Coals by Rank	D388 - 15
ASTM D396	1998	Standard Specification for Fuel Oils	D396 - 15c
ASTM D4057	1995e 1	Standard Practice for Manual Sampling of Petroleum and Petroleum Products	D4057 - 12

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D4084	1994	Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method)	D4084 - 07(2012)
ASTM D413	1982 (1993) e 1	Standard Test Method for Rubber Property--Adhesion to Flexible Substrate	D413 - 98(2013)
ASTM D4177	1995	Standard Practice for Automatic Sampling of Petroleum and Petroleum Products	D4177 - 15a
ASTM D4239	1997e 1	Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods	D4239 - 14e2
ASTM D4268	1993	Standard Test Method for Testing Fiber Ropes	Withdrawn Standard: ASTM D4268-93 | Developed by Subcommittee: D13.16 WITHDRAWN, NO REPLACEMENT
ASTM D4294	1998	Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry	D4294 - 10
ASTM D4329	1999	Standard Practice for Fluorescent UV Exposure of Plastics	D4329 - 13

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM E283	1991 (1999)	Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen	E283 - 04(2012)
ASTM E185	1982	Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels	E185 - 15e1
ASTM D4891	1989 (1994) E 1	Standard Test Method for Heating Value of Gases in Natural Gas Range by Stoichiometric Combustion	D4891 - 13
ASTM D5489	1996a	Standard Guide for Care Symbols for Care Instructions Textile Products	D5489 - 14
ASTM E408	1971	Standard Methods of Test for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques	E408 - 13
ASTM D611	1982 (1998)	Standard Test Methods for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents	D611 - 12
ASTM D5373	1993 (1997)	Standard Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Laboratory Samples of Coal and Coke	D5373 - 14e1

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM E606	1980	Standard Recommended Practice for Constant-Amplitude Low-Cycle Fatigue Testing	E606 / E606M - 12
ASTM E695	1979 (1997) e 1	Standard Method of Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading	E695 - 03(2015)e1
ASTM D814	1995	Standard Test Method for Rubber Property--Vapor Transmission of Volatile Liquids	D814 - 95(2014)
ASTM F478	1992 (1999)	Standard Specification for In-Service Care of Insulating Line Hose and Covers	F478 - 14a
ASTM D6216	1998	Standard Practice for Opacity Monitor Manufacturers to Certify Conformance with Design and Performance Specifications	D6216 - 12
ASTM D6228	1998	Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection	D6228 - 10
ASTM E72	1980	Standard Methods of Conducting Strength Tests of Panels for Building Construction	E72 - 15
ASTM D6503	1999	Standard Test Method for Enterococci in Water Using Enterolert	D6503 - 14
ASTM F1122	1987 (1998)	Standard Specification for Quick Disconnect Couplings	F1122 - 04(2015)e1

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM F1155	1998	Standard Practice for Selection and Application of Piping System Materials	F1155 - 10(2015)
ASTM F1273	1991 (1996) e 1	Standard Specification for Tank Vent Flame Arresters	F1273 - 91(2013)
ASTM D975	1998b	Standard Specification for Diesel Fuel Oils	D975 - 15c
ASTM F631	1993	Standard Guide for Collecting Skimmer Performance Data in Controlled Environments	F631 - 15
ASTM F715	1995	Standard Test Methods for Coated Fabrics Used for Oil Spill Control and Storage	F715 - 07(2012)
ASTM F722	1982 (1988)	Standard Specification for Welded Joints for Shipboard Piping Systems	F722 - 82(2014)
ASTM D4986	1998	Standard Test Method for Horizontal Burning Characteristics of Cellular Polymeric Materials	D4986 - 10
ASTM D5673	1996	Standard Test Method for Elements in Water by Inductively Coupled Plasma-Mass Spectrometry	D5673 - 15
ASTM E154	1968 (1979) e 1	Standard Methods of Testing Materials for Use as Vapor Barriers Under Concrete Slabs and as Ground Cover in Crawl Spaces	E154/E154M - 08a(2013)e1

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D5865	1998a	Standard Test Method for Gross Calorific Value of Coal and Coke	D5865 - 13
ASTM D665	1998e 1	Standard Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water	D665 - 14e1
ASTM D86	2007	Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure	D86 - 15
ASTM D5257	1997	Standard Test Method for Dissolved Hexavalent Chromium in Water by Ion Chromatography	D5257 - 11
ASTM E1337	1990 (1996)	Standard Test Method for Determining Longitudinal Peak Braking Coefficient of Paved Surfaces Using a Standard Reference Test Tire	E1337 - 90(2012)
ASTM E23	1982	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials	E23 - 12c
ASTM D512	1989 (1999)	Standard Test Methods for Chloride Ion In Water	D512 - 12
ASTM D975	2007	Standard Specification for Diesel Fuel Oils	D975 - 15c
ASTM E29	1993a	Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications	E29 - 13

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM E29	1990	Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications	E29 - 13
ASTM D976	1991 (1995) e 1	Standard Test Methods for Calculated Cetane Index of Distillate Fuels	D976 - 06(2011)
ASTM E424	1971	Standard Methods of Test for Solar Energy Transmittance and Reflectance (Terrestrial) of Sheet Materials	E424 - 71(2015)
ASTM E11	1995	Standard Specification for Wire Cloth and Sieves for Testing Purposes	E11 - 15
ASTM E1625	1994	Standard Test Method for Determining Biodegradability of Organic Chemicals in Semi- Continuous Activated Sludge (SCAS)	Withdrawn Standard: ASTM E1625-94(2008) | Developed by Subcommittee: E47.04 WITHDRAWN, NO REPLACEMENT
ASTM E168	1988	Standard Practices for General Techniques of Infrared Quantitative Analysis	Withdrawn Standard: ASTM E168-06 | Developed by Subcommittee: E13.03 WITHDRAWN, NO REPLACEMENT

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM D4420	1994	Standard Test Method for Determination of Aromatics in Finished Gasoline by Gas Chromatography	Withdrawn Standard: ASTM D4420-94(1999)e1 | Developed by Subcommittee: D02.04.0L WITHDRAWN, REPLACED BY D5580
ASTM D4809	1995	Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method)	D4809 - 13
ASTM E773	1997	Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units	Withdrawn Standard: ASTM E773-01 | Developed by Subcommittee: E06.22WITHDRAWN, NO REPLACEMENT
ASTM E774	1997	Standard Specifications for the Classification of the Durability of Sealed Insulating Glass Units	Withdrawn Standard: ASTM E774-97 | Developed by Subcommittee: E06.22 WITHDRAWN, NO REPLACEMENT
ASTM E169	1987	Standard Practices for General Techniques of Ultraviolet-Visible Quantitative Analysis	E169 - 04(2014)
ASTM D6420	1999	Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry	D6420 - 99(2010)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM E145	1994e 1	Standard Specification for Gravity-Convection and Forced- Ventilation Ovens	E145 - 94(2011)
ASTM E96	1995	Standard Test Methods for Water Vapor Transmission of Materials	E96/E96M - 15
ASTM E260	1996	Standard Practice for Packed Column Gas Chromatography	E260 - 96(2011)
ASTM F1006	1986 (1997)	Standard Specification for Entrainment Separators for Use in Marine Piping Applications	F1006 - 86(2014)e1
ASTM F1007	1986 (1996) e 1	Standard Specification for Pipe-Line Expansion Joints of the Packed Slip Type for Marine Application	F1007 - 86(2014)
ASTM E711	1987 (1992)	Standard Test Method for Gross Calorific Value of Refuse-Derived Fuel by the Bomb Calorimeter	Withdrawn Standard: ASTM E711-87(2004) | Developed by Subcommittee: D34.03 WITHDRAWN, NO REPLACEMENT
ASTM F1020	1986 (1996) e 1	Standard Specification for Line-Blind Valves for Marine Applications	F1020 - 86(2011)
ASTM F1120	1987 (1998)	Standard Specification for Circular Metallic Bellows Type Expansion Joints for Piping Applications	F1120 - 87(2015)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM E776	1987 (1992)	Standard Test Method for Forms of Chlorine in Refuse-Derived Fuel	E776 - 87(2009)
ASTM E1719	1997	Standard Test Method for Vapor Pressure of Liquids by Ebulliometry	E1719 - 12
ASTM F1123	1987 (1998)	Standard Specification for Non-Metallic Expansion Joints	F1123 - 87(2015)
ASTM F1139	1988 (1998)	Standard Specification for Steam Traps and Drains	F1139 - 88(2015)
ASTM E681	1985	Standard Test Method for Concentration Limits of Flammability of Chemicals	E681 - 09(2015)
ASTM F1172	1988 (1998)	Standard Specification for Fuel Oil Meters of the Volumetric Positive Displacement Type	F1172 - 88(2015)e1
ASTM F1173	1995	Standard Specification for Thermosetting Resin Fiberglass Pipe and Fittings to be Used for Marine Applications	F1173 - 01(2012)
ASTM E775	1987 (1992)	Standard Test Methods for Total Sulfur in the Analysis Sample of Refuse-Derived Fuel	E775 - 15

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM E885	1988	Standard Test Methods for Analyses of Metals in Refuse-Derived Fuel by Atomic Absorption Spectroscopy	Withdrawn Standard: ASTM E885-88(2004) | Developed by Subcommittee: D34.03WITHDRAWN, NO REPLACEMENT
ASTM F1003	1986 (1992)	Standard Specification for Searchlights on Motor Lifeboats	F1003 - 02(2012)e1
ASTM F1199	1988 (1998)	Standard Specification for Cast (All Temperatures and Pressures) and Welded Pipe Line Strainers (150 psig and 150 Degrees F Maximum)	F1199 - 88(2015)
ASTM F1200	1988 (1998)	Standard Specification for Fabricated (Welded) Pipe Line Strainers (Above 150 psig and 150°F)	F1200 - 88(2010)
ASTM F1201	1988 (1998)	Standard Specification for Fluid Conditioner Fittings in Piping Applications Above Zero Degrees F	F1201 - 88(2010)
ASTM F1014	1992	Standard Specification for Flashlights on Vessels	F1014 - 02(2012)e1
ASTM F1121	1987 (1998)	Standard Specification for International Shore Connections for Marine Fire Applications	F1121 - 87(2015)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM F1193	2006	Standard Practice for Quality, Manufacture, and Construction of Amusement Rides and Devices	F1193 - 14
ASTM F1196	1994	Standard Specification for Sliding Watertight Door Assemblies	F1196 - 00(2013)
ASTM F1471	1993	Standard Test Method for Air Cleaning Performance of a High-Efficiency Particulate Air-Filter System	F1471 - 09
ASTM F1197	1989 (1994) e 1	Standard Specificatiion for Sliding Watertight Door Control Systems	F1197 - 00(2012)
ASTM F1548	1994	Standard Specification for the Performance of Fittings for Use with Gasketed Mechanical Couplings Used in Piping Applications	F1548 - 01(2012)
ASTM F1271	1990 (1995) e 1	Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment	F1271 - 90(2012)
ASTM F1321	1992	Standard Guide for Conducting a Stability Test (Lightweight Survey and Inclining Experiment) to Determine Light Ship Displacement and Centers of Gravity of a Vessel	F1321 - 14

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM F1323	1998	Standard Specification for Shipboard Incinerators	F1323 - 14
ASTM F462	1979 (1999)	Standard Consumer Safety Specification for Slip-Resistant Bathing Facilities	F462 - 79(2007)
ASTM F1546 / F 1546M	1996	Standard Specification for Fire Hose Nozzles	F1546 - 96(2012)e1
ASTM F1950	1999	Standard Specification for Physical Information to be Transferred With Used Amusement Rides and Devices	Withdrawn Standard: ASTM F1950-99 | Developed by Subcommittee: F24.20 WITHDRAWN, NO REPLACEMENT
ASTM F1951	1999	Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment	F1951 - 14
ASTM F682	1982a (1988)	Standard Specification for Wrought Carbon Steel Sleeve-Type Pipe Couplings	F682 - 82a(2014)
ASTM F1957	1999	Standard Test Method for Composite Foam Hardness Durometer Hardness	F1957 - 99(2011)
ASTM F631	1980 (1985)	Standard Method for Testing Full Scale Advancing Spill Removal Devices	F631 - 15
ASTM F715	1981 (1986)	Standard Methods of Testing Spill Control Barrier Membrane Materials	F715 - 07(2012)

ASTM Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ASTM F747	1997	Standard Terminology Relating to Amusement Rides and Devices	F747 - 15
ASTM F808	1983 (1988) e 1	Standard Guide for Collecting Skimmer Performance Data in Uncontrolled Environments	Withdrawn Standard: ASTM F808-83(1988) | Developed by Subcommittee: F20.12 WITHDRAWN, NO REPLACEMENT
ASTM G151	1997	Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources	G151 - 10
ASTM G154	2000a	Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials	G154 - 12a
ASTM G21	1990	Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi	G21 - 15

EXHIBIT 98

NFPA Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
NFPA 1	2003	Uniform Fire Code	2015
NFPA 1	2006	Uniform Fire Code	2015
NFPA 11	2005	Standard for Low Medium and High Expansion Foam	2016
NFPA 12	2005	Standard on Carbon Dioxide Extinguishing Systems	2015
NFPA 10	2002	Standard for Portable Fire Extinguishers (Title of work on certificate of registration is “National Fire Codes Vol. 1-12 and Master Index”)	2013
NFPA 13	2002	Installation of Sprinkler Systems (Title of work on certificate of registration is “National Fire Codes Vol. 1-12 and Master Index”)	2016
NFPA 25	2002	Inspection, Testing and Maintenance of Water-Based Fire Protection Systems (Title of work on certificate of registration is “National Fire Codes Vol. 1-12 and Master Index”)	2014
NFPA 30	2003	Flammable and Combustible Liquids Code	2015
NFPA 54	2006	National Fuel Gas Code	2015

NFPA Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
NFPA 58	2001	Liquified Petroleum Gas Code (Title of work on certificate of registration is “National Fire Codes Vol 3”)	2014
NFPA 58	2004	Liquefied Petroleum Gas Code	2014
NFPA 59	2004	Utility LP Gas Plant Code	2015
NFPA 70	1999	National Electrical Code	2014
NFPA 70	2005	National Electrical Code	2014
NFPA 70	2008	National Electrical Code	2014
NFPA 70	2011	National Electrical Code	2014
NFPA 70	2014	National Electrical Code	NA
NFPA 72	2002	National Fire Alarm Code	2016
NFPA 99	2005	Health Care Facilities Code	2015
NFPA 101	2000	Life Safety Code	2015
NFPA 101	2003	Life Safety Code	2015
NFPA 101	2006	Life Safety Code	2015
NFPA 704	2007	Standard System for the Identification of the Hazards of Materials for Emergency Response	2012

EXHIBIT 99

ASHRAE Editions Incorporated by Reference

No.	Edition	Title	Superseded by:
ANSI/ASHRAE/IES 90.1	2010	ANSI/ASHRAE/IESNA Standard 90 1-2010, Energy Standard for Buildings Except for Low-Rise Residential Buildings (I-P Edition)	2013
ANSI/ASHRAE/IESNA 90.1	2007	ANSI/ASHRAE/IESNA Standard 90 1-2007, Energy Standard for Buildings Except for Low-Rise Residential Buildings (I-P Edition)	2013
ANSI/ASHRAE/IESNA 90.1	2004	ANSI/ASHRAE/IESNA Standard 90 1-2004, Energy Standard for Buildings Except for Low-Rise Residential Buildings (I-P Edition)	2013
ASHRAE Handbook	1993	1993 ASHRAE Handbook: Fundamentals (I-P Edition)	2013

EXHIBIT 100

Mission Statement

Mission:

Committed to serving global societal needs, ASTM International positively impacts public health and safety, consumer confidence and overall quality of life. We integrate consensus standards, developed with our international membership of volunteer technical experts, and innovative services to improve lives—Helping our world work better.

Five Strategic Objectives

1. ### Leadership

   Promote focus on public health and safety, expand leadership position in the standards community and broaden the international use of ASTM products and services.

2. ### Global Technical Expertise

   Attract and retain technical experts from around the world by creating an intellectually and professionally rewarding collaborative environment that meets participant needs and expectations.

3. ### Standards and Technical Content Development

   Always be relevant and continuously enhance the technical quality of standards and related content by providing a best-in-class, scalable development infrastructure.

4. ### Service Provider

   Understand global societal needs and service stakeholders through the integration of

innovative products and services.

5. ## Organizational Vitality

Provide an organizational culture of service and innovation with the appropriate resources to
achieve ASTM.s mission — positioned to respond to the changing environment.