



## Joint CCFS/APPA Webinar Series

# Low-Frequency Sounders and NFPA 72

**Presented by**  
**Rodger Reiswig**  
**Vice President, Industry Relations**  
**Johnson Controls**



## Promoting & Supporting CFS Efforts Nationwide

### The Center for Campus Fire Safety

- National, non profit, member based organization.
- Board of Directors from across the country.
- Training programs for campus fire & life safety officials and emergency responders.
- Library of online resources & free e-magazine.
- Breaking News Service.
- Premier events such as our Annual Campus Fire Forum and Campus Fire Safety Month activities.

### APPA

- *APPA - Leadership in Educational Facilities*, and is most easily recognized and referred to as simply "APPA."
- In existence for over 100 years.

#### APPA's Purpose

- Seeks to create positive impact in educational facilities.
- Elevate educational facilities professionals into higher performing managers/leaders.
- Transform member institutions into more inviting and supportive learning environments.

# APPA Standards and Codes Council



**Brooks Baker, Chair**  
University of Alabama -  
Birmingham (*retired*)  
**SRAPPA**



**Clint Lord**  
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**Dana Peterson**  
University of New Hampshire  
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Arkansas State University  
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**Alan Sactor, CFPS,**  
University of Maryland  
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**Ted Weidner, Ph.D.**  
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**MAPPA**



## CCFS Committees that deliver webinar training

### **The Center's Codes & Standards Committee**

Charged with assessing and promoting proposals for changes in national model codes, industry and reference standards as they relate to college and university infrastructures.

Richard Roberts, Chair  
Honeywell Fire & Security

### **The Center's Professional Development, Education & Events Committee**

Develop training programs, events, products and services that enhance the technical skills and professional knowledge of The Center's members.

Justin Daniels, Chair  
University of Oklahoma



## Getting Involved

### CCFS

#### Participate in a Committee

***Codes, Educational, Social Media, Government, Membership, Industry Relations***

- Choose a committee from our website: [Campusfiresafety.org>about us>committees](http://www.campusfiresafety.org/about-us/committees)  
<http://www.campusfiresafety.org/About-Us/Committees>
- Contact Cathy Tabor 978.961.0410
- Email [SupportTeam@campusfiresafety.org](mailto:SupportTeam@campusfiresafety.org)

### APPA

#### How to participate on APPA Standards & Codes Work Groups

- Go to <https://www.appa.org/standards.cfm>
- Contact John Bernhards at [john@appa.org](mailto:john@appa.org) or Billie Zidek at [billie@appa.org](mailto:billie@appa.org)

## Webinar – Preview of what to expect

- When you enter the webinar, your microphone will automatically be muted.
- If you have a question, please type it in the question box section of your control panel.
- You can enter your question anytime throughout the presentation. We will break for questions at the end.
- The presentation will be available on the CCFS website.
- Continuing Education Credits available for this webinar:
  - .1 CEU (ICC Re-certification CEU through CCFS)
- Other Credits through APPA include:
  - 1 PDH
  - 1 LU
  - 5 APPA units
  - 1 AIA LU



## Welcome our presenter

### Rodger Reiswig

- Johnson Controls for over 31 years.
- Started career as a Technical Representative and has held several positions within SimplexGrinnell.
- Now VP of Industry Relations, Johnson Controls worldwide
- Represents Johnson Controls on various codes and standards committees as well as serving on various association and organization boards and committees.
- Currently serves as Vice-President on the Board of Directors of AFAA
- Vice-Chair of the NEMA Signaling Section, 3SB.
- Chair of the Standards Committee for NEMA.
- Director of The Center for Campus Fire Safety.
- Serves on the CCFS Codes, Standards and Technical Research Committee.
- Rodger also served as Chair for the creation of the NEMA document, "COMMUNICATIONS SYSTEMS FOR LIFE SAFETY IN SCHOOLS"



## NFPA 72®, The National Fire Alarm and Signaling Code® and Low Frequency Sounders

**Rodger Reiswig, SET**  
VP, Industry Relations  
Johnson Controls





# Notification:

## Low Frequency Sounders, aka 520 Hz Tone

# History of Low Frequency Requirements

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- Studies conducted between 1998 and 2001 proved that the ability of different segments of the population to wake to the sound of a smoke alarm varied widely.
- The most recent Civilian Fire Fatalities in Residential Buildings report states:
  - 48% of fatal fires in residential buildings occurred between the hours of 11 p.m. and 7 am
  - 35% of the victims were sleeping
- Gallaudet University research institute estimates:
  - 6.8 million people not likely to hear a smoke alarm regardless of their waking state
  - 43.6 million will not necessarily hear it all of the time due to having a severe hearing impairment or being functionally deaf
- Children also constitute a special population with regard to the effectiveness of a notification device. An unrelated study looking at the difference in effectiveness between conventional smoke alarm tones and parental voice discovered that only 58% of children between the ages of 6-12 were awakened by the higher frequency tone. Twenty percent of the U.S. population is under 15 years old

# History of Low Frequency Requirements

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- NFPA's Fire Protection Research Foundation was led to commission a study through the School of Psychology and The Centre for Environmental Safety and Risk Engineering at Victoria University in Australia.

The study found that under the testing conditions the 520 Hz square wave T-3 sound was the single most effective signal.

- 92% of study participants were awakened at 75 dBa
- 100% of study participants were awakened at 95 dBa

# History of Low Frequency Requirements

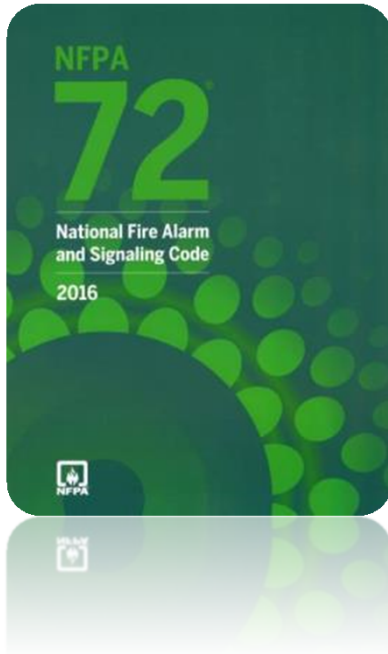
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- The research prompted:
  - The associated NFPA 72 technical committees to review the current standard for applicable sections that lent themselves to modification of requirements based on the study's findings.
  - The committees decided the focus should be on notification devices in areas meant for areas used for sleeping.
  - Subsequently, requirements for low frequency signals were added to the 2010 edition of NFPA 72.

# Low Frequency Notification Requirement

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- Introduced with the 2010 edition of NFPA 72
  - 18.4.5.3\* Effective January 1, 2014, where audible appliances are provided to produce signals for sleeping areas, they shall produce a low frequency alarm signal that complies with the following:
  - 18.4.5.3\* Effective January 1, 2014, audible appliances provided for the sleeping areas to awaken occupants shall produce a low frequency alarm signal that complies with the following:
    - Low frequency notification is required in “sleeping rooms and guest rooms” for those with mild to severe hearing loss” (NFPA 72, 2010 – 29.3.8).
    - 29.3.8.1\* Mild to severe hearing loss. Notification appliances provided for those with mild to severe hearing loss shall comply...low frequency sounders.

# When is Low Frequency Notification Required?

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- NFPA 72 Chapter 18 applies this requirement to ALL sleeping areas in:
  - Hotels & Motels
  - Apartments & Condominiums
  - Colleges & Universities
  - Retirement and Assisted Living facilities
  
- This signal is NOT required in:
  - Areas such as lobbies, hallways, meeting rooms, etc.
  - Hospitals (i.e. “Private Mode” signaling)
  - Detention/Correctional facilities
  - See A.18.4.5.3 (NFPA 72 – 2013)

# What about Upgrades and Retrofits?

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- The requirements of the affected chapters in NFPA 72 and the IFC/IBC are not retroactive to existing systems
- However, certain upgrades and/or retrofits may trigger compliance with low frequency notification
- **As with any code requirement, check with your local AHJ for compliance guidelines**

# Starting in the 2010 edition of NFPA 72

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- 18.4.5.3 Makes no specific mention of a disability requirement but its annex material specifically calls out occupants with hearing loss in its opening sentence.
- 18.4.5.3\* Effective January 1, 2014, where audible appliances are provided to produce signals for sleeping areas, they shall produce a low frequency alarm signal that complies with the following:
  - (1) The alarm signal shall be a square wave or provide equivalent awakening ability.
  - (2) The wave shall have a fundamental frequency of 520 Hz  $\pm$  10 percent.



# Starting in the 2010 edition of NFPA 72

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- Chapter 24 - Emergency Communications  
Chapter section 24.4.1.4.1 requires low frequency tones in conjunction with voice alerting.
- 24.4.1.4.1 In occupancies where sleeping accommodations are provided, the pre-alert tone shall include a low frequency component of 520 Hz square wave range to accommodate the need of the hearing impaired for fire voice messages and emergency communication messages.

# Starting in the 2010 edition of NFPA 72

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- Chapter 29, Single and Multiple-Station Alarms and Household Fire Alarm Systems
- Section 29.3.8 part 1 and 2 are specific to occupants with hearing loss.
- 29.3.8 Notification appliances provided in sleeping rooms and guest rooms for those with hearing loss shall comply with 29.3.8.1 and 29.3.8.2, as applicable.

# Where is Low Frequency Notification Required? (Chapter 18)

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- The code clearly states the intent is to “awaken” people who are sleeping.
- This signal is NOT required in:
  - Areas such as lobbies, hallways, meeting rooms, etc.
  - Hospitals (i.e. “Private Mode” signaling)
  - Detention/Correctional facilities
  - See **A.18.4.5.3** (NFPA 72 – 2013)

# What's the Big Deal?

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- Non-voice appliances which produce low frequency notification signals require new “Low Frequency Alarm” markings and listing:
  - UL 464, Standard for Safety Audible Signal Appliances
  - UL 217, Single and Multiple Station Smoke Alarms
- Current draws for the new devices can be high
  - In cases the current draw can be up to 5 times more than a typical horn or mini-horn.

These two issues combine for costly code-compliant system designs...

# Questions?

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