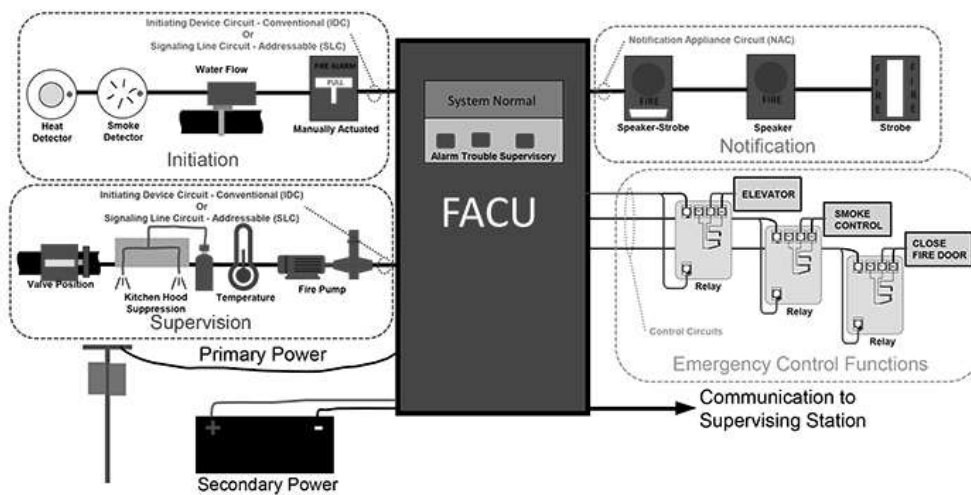


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A Guide to Fire Alarm Basics: Notification

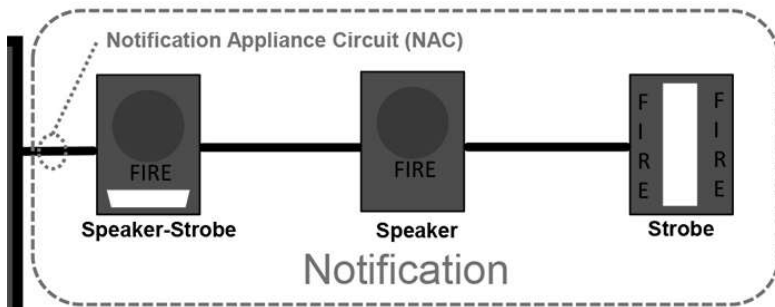
By Shawn Mahoney

21-May-2021



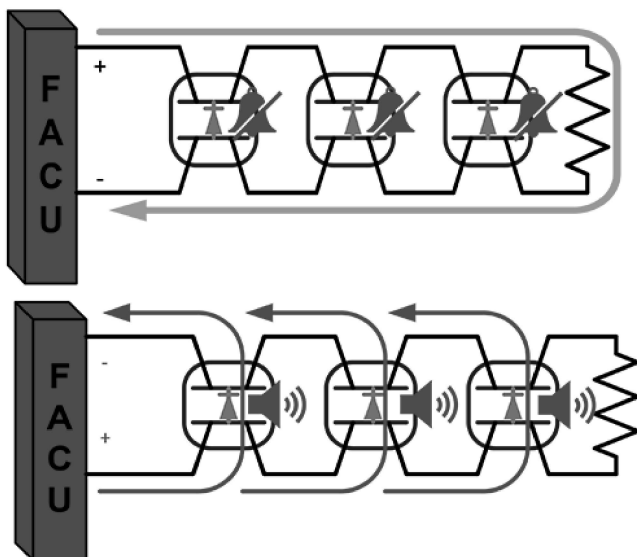
[See larger image](#)

A fire alarm system is a crucial part of the overall fire protection and life safety strategy of a building. A fire alarm system serves many functions and the differences between the functions can be a bit confusing, so I created a visual guide to fire alarm basics. The objective of this blog series is to discuss some of the major components and functions of a fire alarm system. For an overview of the entire system take a look at my [Guide to Fire Alarm Basics Blog](#). This blog will take a deeper dive into the notification portion of a fire alarm system.



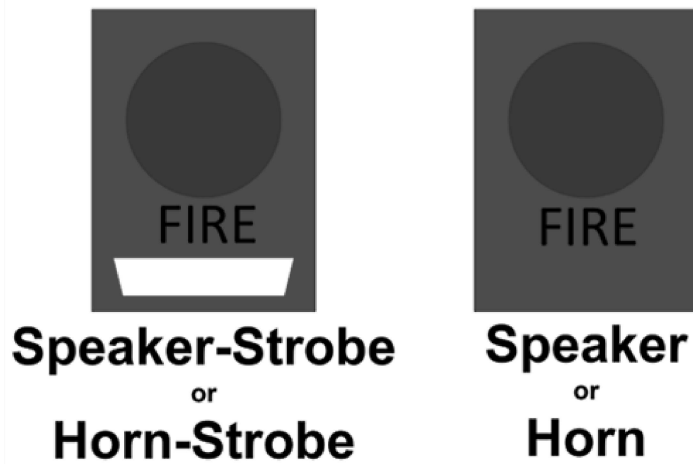
A fire alarm system can notify the occupants and in some cases on site emergency forces of an emergency. Notification is provided via visible and audible notification appliances. The visible notification is typically provided via strobes, and audible notification is provided by either speakers, which can provide different tones and voice signals, or horns, which can only provide a single sound. The fire alarm control unit provides the signal to the notification appliances via a notification appliance circuit (NAC). When a fire alarm system is installed within a building, the requirements for the type of notification (audible, visible, and voice) is driven by the building code, fire code, or life safety code that is adopted in that jurisdiction.

Notification Appliance Circuit



Notification appliances are controlled by the fire alarm control unit (FACU) using a notification appliance circuit (NAC). Each notification appliance has a diode in it that only allows current to pass through it in one direction (think of it like a one way valve). In a non-alarm condition, the FACU will send a small supervisory voltage through the circuit to monitor it for integrity (typically 6 vdc). The supervisory voltage is sent through in a direction such that the diodes do not allow any current to pass through the notification appliances. If the FACU no longer sees the supervisory voltage, it knows that there is an issue and it will create a trouble condition. During an alarm condition the FACU will reverse the polarity of the voltage (switch the direction of the current flow) and increase it (typically to 24 vdc). Since the direction of the flow has changed, the diodes will allow the current to flow through the notification appliances and cause the audible and or visual notification.

Audible Notification



The audible notification can consist of either tones and a voice message, or just tones. Fire Alarm speakers are used to create tones and voice messages, while a horn can only create a tone or single sound. Notification appliances can just be speakers or horns, or they can be a combination unit which provides a strobe light in addition to the speaker or horn. You may see these appliances mounted on the wall or on the ceiling.

The audible notification is designed to produce a specific sound pressure level (volume). This sound pressure level is measured in decibels. The design is based on producing a sound level that is over the ambient sound level of the space. The required sound level is based upon the type of signaling mode the system is using, it can be either public mode signaling, or private mode signaling. There is not a requirement for the specific sound that is used, however, there is a requirement for the sound pattern and in some cases, there is a requirement for the frequency (pitch) of the sound.

Public Vs Private Mode



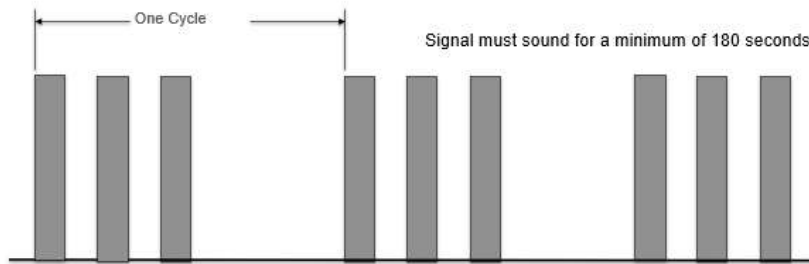
Public mode signaling is used when you want to alert all the occupants within the building that there is an emergency, while private mode signaling is used to only alert the occupants responsible for responding that there is an emergency. For example, a fire alarm system within a restaurant would utilize public mode signaling to alert all the occupants that there is an emergency and that they need to evacuate. On the other hand, in a hospital the fire alarm system may utilize private mode signaling to alert the hospital staff that there is an emergency, and they need to begin evacuating or relocating the patients in accordance with their emergency action plan. [For more information on private operating mode, take a look at this blog.](#)

Public mode signaling is required to have a sound level that is at least 15 decibels above the average ambient sound level and 5 decibels above the maximum sound level having a duration of 60 seconds, while private mode signaling is only required to have

a sound level that is at least 10 decibels above the average ambient sound level and 5 decibels above the maximum sound level having a duration of 60 seconds. In addition to public and private operating mode, there are some requirements that are specific to areas in which occupants may be sleeping.

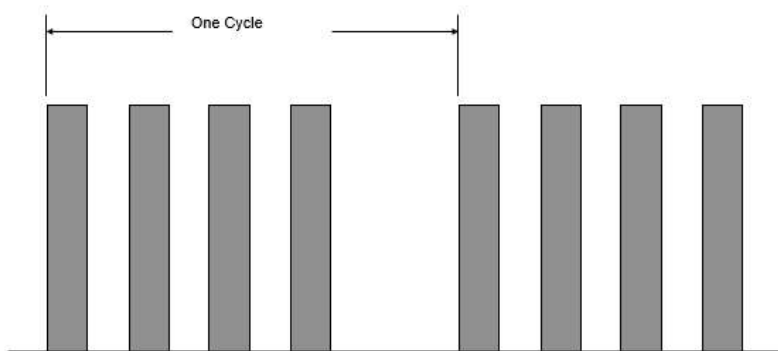
While these operating modes address how a system must be designed in regard to the sound level, it is important to note that some buildings may utilize different zoned notification strategies. For example, a high-rise building may implement a notification strategy where they notify the occupants on the fire floor along with the occupants on the floor above and the floor below. After those floors are evacuated, other floors can be notified to evacuate.

Temporal 3 – Evacuation/Relocation



If the fire alarm system is notifying the occupants that they need to evacuate or relocate, the system must utilize the temporal 3 pattern. There is no requirement for the sound that is used to create the pattern, it can be a horn, bell, chime, or even a slow whoop. In the case of sleeping areas, the sound is required to have a low frequency 520 Hz (typical fire alarm notification frequencies are in the 3150 Hz range) as studies have shown that this low frequency is more effective at waking occupants. For fire alarm systems utilizing a voice message, the voice message will proceed the temporal 3 signal. For an example of a temporal 3 signal take a look at this [video](#).

Temporal 4 – Carbon Monoxide



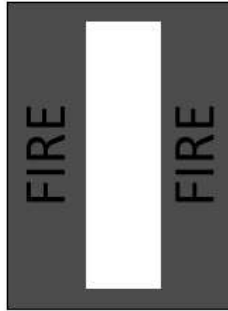
Where the occupants are required to be notified of carbon monoxide within a building, a temporal 4 pattern is to be used. For an example of the temporal 4 take a look at this [video](#).



Visual Notification



Speaker-Strobe
or
Horn-Strobe



Strobe

Types of visual signaling from a fire alarm system include strobe lights, textual signals, and graphical signals. The most common type of visual signals provided to occupants from a fire alarm system is the use of strobes. The notification appliances that create these visual signals can be just a strobe or can be a combination speaker-strobe or horn-strobe. You may see these appliances mounted on either the wall or the ceiling.

The systems are designed to produce a given amount of light over the area in which notification is required, this light level is measured in lumens/ft² or lumens/m². Based on the type of notification being provided (private mode or public mode) strobe may be placed to provide notification to all the occupants, or only the occupants responsible for responding.

Want to Learn More?

Like I noted in the beginning of this blog, if you are interested in learning more about fire alarm basics, take a look at my [Fire Alarm Basics Blog](#). I will be updating this series over the next few months to add a deeper dive into different portions of the fire alarm system. If you found this article helpful, subscribe to the NFPA Network Newsletter for monthly, personalized content related to the world of fire, electrical, and building & life safety.

Important Notice: Any opinion expressed in this column (blog, article) is the opinion of the author and does not necessarily represent the official position of NFPA or its Technical Committees. In addition, this piece is neither intended, nor should it be relied upon, to provide professional consultation or services.

Fire Alarm Basics Fact Sheet

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Shawn Mahoney

NFPA Technical Services Engineer

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- D

Diaaeldin Mostafa 4 years ago (Edited)

very informative Shawn as usual. but the below paragraph need to distinguish between Private and public as public condition is duplicated

"Public mode signaling is required to have a sound level that is at least 15 decibels above the average ambient sound level and 5 decibels above the maximum sound level having a duration of 60 seconds, while public mode signaling is only required to have a sound level that is at least 10 decibels above the average ambient sound level and 5 decibels above the maximum sound level having a duration of 60 seconds. In addition to public and private operating mode, there are some requirements that are specific to areas in which occupants may be sleeping."

👍 1 🗨️ 0 Reply
- T

Terry Horan 6 months ago

Is there a code section that require the word "FIRE" to be on Notification Devices?

👍 0 🗨️ 0 Reply
- S

Shawn Mahoney 6 months ago

Terry, take a look at 18.3.3 in the 2025 edition of NFPA 72, there is actually no requirement that they say fire, just a requirement that they do not say fire if they are alerting for other situations as well such as a emergency communications system.

👍 0 🗨️ 0 Reply
- V

Vinoth kumar Kannan 7 months ago

Hi, can anyone help to find global evacuation time guidance by NFPA or UAE fire code?, we have custer type apartment of 5 building of 8 floors sharing GF & 1F. @ what condition the entire building set for evacuation

👍 0 🗨️ 0 Reply
- V

viknesh 8 months ago

Hi , i need a confirmation that why ceiling strobe are installed in every room and the detectors are not provided in california projects?

👍 0 🗨️ 0 Reply
- S

Salih Parambil 9 months ago

We have been commissioned a facility few days ago and client commented there is no mass notification speaker in three rooms but still there is horn strobe and detection devices. according to the NFPA regulations the mass notification speaker is mandatory ?

👍 0 🗨️ 0 Reply
- Eugene Lavalley** 11 months ago

Looking for guidance placing notification appliances in a large walk-in freezer. Have concerns about using the appliances in operating temperatures below freezing?

👍 0 🗨️ 0 Reply

K

Karlo Shogel Khan 1 year ago

What is the requirement in testing the battery for a textural graphical display?

👍 0 🗨️ 0 Reply

A

Anis Samaha 1 year ago (Edited)

Hello and thank you for this informative blog and discussion. Question on audible notification. We have a building with a PA system (NFPA 72, 24.4.3) interfaced with the fire alarm. Is it allowed to have the fire alarm carry-out the visual notification (strobes) but have the PA broadcast the audible notification through an evacuation message preceded and followed by an alert tone? The speakers are not rated to produce the same sound level as horns but we do meet the audibility requirements. Thank you.

👍 0 🗨️ 0 Reply

F

Fire drill 1 year ago

Fire drill

👍 0 🗨️ 0 Reply

I

Ivan Vazquez 1 year ago

Good morning, Is there a section in NFPA 72 that prohibits the obstruction of Fire alarm Strobes? Multiple schools in my jurisdiction have projector screens placed in front of the horn/Strobes.

👍 0 🗨️ 0 Reply

J

Justin Patrick 1 year ago

Hi Ivan, If you havent found this yet, check out NFPA72 18.5.5.6 "obstructions"

👍 1 🗨️ 0 Reply

E

Erin Hesse 1 year ago

I appreciate the information you provided here, very informational. I have been looking into what kind of notification system would be required in stairways in a commercial application. I have looked in IBC and NFPA 72 and don't see that it calls for smoke detectors or strobes. Do you have a code you could reference to help with that?

👍 0 🗨️ 0 Reply

E

Edwin 1 year ago

does egress lighting system need to be tied in to fire alarm system by NFPA-72 fire code

👍 0 🗨️ 0 Reply

h

hastoro 1 year ago

how size for visual Sign alarm ?

👍 0 🗨️ 0 Reply

A

Ari Freund 9 months ago

take a look at this article, it will help you. <https://www.pfannenbergl.com/en/know-how/signaling-technology/en-54-23-standard-for-visual-alarm/>

👍 0 🗨️ 0 Reply

S

Steve D 1 year ago

Is it against NFPA 72 code if a supervisory signal (10.13.1) sets off notification Devices as in hornstrobes & strobes from a duct detector?

👍 0 🗨️ 0 Reply

M

Miguel 1 year ago

yes it is against code

👍 0 🗨️ 0 Reply

S

Sarah Pasco 1 year ago

Fantastic guide on fire alarm basics! 🙌 As a first-time buyer, your insights are invaluable. Considering getting my smoke alarm from <https://directwholesale.com.au/accessories/smoke-alarms/brooks> . Any feedback on their products? Thanks for the help! 🙌 🙌

👍 0 🗨️ 0 Reply

L **Liu Shaopeng** 1 year ago

I find an addressable notification device with 4 terminals, two connections to SLC and two for 24VDC extra supply loop. The Vendor says that the load of one SLC loop is limited, and an additional power supply loop can increase the number of devices carried by the SLC loop.

I wonder if NFPA72 allows this kind of device to connect to SLC? And is this SLC with additional power supply circuit connection allowed?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 1 year ago

Yes, NFPA 72 does permit this as long as the power to the device is also supervised by the fire alarm control unit.

👍 0 🗨️ 0 Reply

J **Juan Siller** 2 years ago

Does code allow for a NON-Fire related canned message to be programmed into the FACU and be remote triggered? Scenario: i have building staffed with officers monitoring security alarms and fire alarms, that said the panel is fully automated and will send out a canned message based on type of alarm.... The desire would be to program a non-fire alarm canned message to be remote trigger by another site in another state. Example I get a call with indication of an Active Shooter on site and would like to trigger a canned message. Does code allow that code and what section of NFPA talks about this area. Thank you for your time

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 2 years ago

Without getting into all of the details, yes NFPA 72 would permit this to be done. The system would need to meet the requirements in chapter 24, most likely section 24.5 for In-Building Mass Notification Systems. One other thing to pay attention to is that section 18.3.3.2 would not permit the notification appliances to say FIRE on them if they are being used to signal for events other than fire.

👍 0 🗨️ 0 Reply

L **LMC Fire & Security** 2 years ago

Thanks for sharing.

👍 0 🗨️ 0 Reply

J **Javier** 2 years ago

Does notification appliances has to be labeled with Nac CKT and device number in ammusments parks systems?

👍 0 🗨️ 0 Reply

N **Nancy** 2 years ago

Where I live by the common door a fire alarm is going off for the last week.Its a light noise but its telling you as well And the sound is getting louder.It says something like Alarm stage 2.We are all poor.I think everyone is scared that if we call the fire dept they will.make us all leave!But I feel.its just going to ramp up...n soon the big alarm will come.Can too.much rain trigger this alarm?Its on the inside of the building.What would the fire dept.do?Maybe just reset the alarm?Thank you.

👍 0 🗨️ 0 Reply

J **James Eng** 2 years ago

My question relates to a five-floor building with about 250 apartments, one-third of which are said to be ADA compliant. Every apartment has detectors and notification appliances tied into a central control unit.

Some residents use wheelchairs and are unable to evacuate themselves when elevators have been shut down. The control unit notifies responding firefighters of residents who need evacuation.

The notification appliances in all apartments emit a loud obnoxious sound designed to wake residents and make them want to leave. That goes on for 15 minutes or so unless the alarm is canceled first. Ideally residents who cannot evacuate themselves would get a less obnoxious notification so they could remain in their apartments until the alarm ends or they are rescued. Maybe it would also identify a safe place to relocate to if that becomes necessary.

Can you advise about whether what I described is legal? possible with current technology?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 2 years ago

Unfortunately I am unable to review your situation and let you know if it is legal or not as I am not permitted to consult. The situation you describe would most likely utilize a combination of construction features to prove the residents with an area of refuge along with

the signaling approach.

👍 0 🗨️ 0 Reply

K **Kourtney Daly** 2 years ago

Hello, curious about outdoor strobe/horns in a large outdoor patio type area for a nursing home. How do I know how many devices I will need?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 2 years ago

The fire alarm designer would place devices such that the horns created a signal that is a specified decline level throughout the area. Additionally, each strobe has a specific coverage area based on its brightness, so the strobes are placed in order to get full "coverage"

👍 0 🗨️ 0 Reply

B **Bruce Hill** 2 years ago

Regarding 18.3.3.2, If the fire alarm detection has combination smoke and CO detection and the notification is strobe and voice, can the notification appliance have the word "FIRE" on it?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 2 years ago

This type of question would need to be submitted via our technical question service. <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=72&tab=questions>

👍 0 🗨️ 0 Reply

S **Scott Brooks** 3 years ago

I can find in NFPA 72 where it states that a signaling device used for anything other than a fire alarm cannot say fire. I have a contractor that is asking if a signaling device used exclusively for a fire alarm can say "ALERT" instead of "FIRE". This is strictly because of supply chain issues and not being able to complete the project because he can't get the strobes.

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 3 years ago

Section 18.3.3.2 of the 2022 edition of NFPA 72 requires that notification appliances used for signaling other than fire shall not have the word FIRE, or any fire symbol.

👍 0 🗨️ 0 Reply

A **Azim Rawji** 3 years ago

When are speaker strobes required in bathrooms and changing rooms?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 3 years ago

You will need to discuss this with the AHJ, typically visual notification is going to be required in all public areas.

👍 0 🗨️ 0 Reply

M **Mike Orfitelli** 3 years ago

Thank you- I have a similar question- if you have a strobe in a bathroom or changing room, are there instances where a horn is not required (for example- it is allowable to have the strobe without the horn)?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney**  M **Mike Orfitelli** 3 years ago

Yes, there are instances where you will have a strobe in a space and then rely on the sound from an audible appliance located in another room to provide audible notification in the space. There are calculations to determine the amount of sound pressure that can travel through closed doors and through spaces. So for instance, you may have a bathroom with a strobe in it and then have a horn located in the hallway that is sized enough to create the minimum sound pressure level (volume) within the bathroom.

👍 0 🗨️ 0 Reply

J **Jason Cherene**  S **Shawn Mahoney** 2 years ago

Where do I find in the nfpa 72 where it has the requirements for level of sound from a strobe in another room?

👍 0 🗨️ 0 Reply

A

Abhishek 4 years ago (Edited)

this is such an informative blog, every aspect of fire alarm systems has been elaborated nicely

👍 0 💬 0 Reply



Nimesh Goyal 4 years ago (Edited)

Very Informative, Shawn. I will share it with our R&D team at Notofire to take away some of the key points from this article for the next keynote meeting; with you as an honorable mention, of course. We constantly strive to make our Fire Alarm Systems better. Currently, very few players in the market in India inform the clients on the different variations of sounders - for Public and Private Mode.

👍 0 💬 0 Reply

