



## TECHNICAL SERVICES DEPARTMENT

# BULLETIN

No. 101  
April 2011  
Rev. December 2020

### Wiring Options for Protected Premises Fire Alarm Systems based on NFPA 72 Survivability Requirements

The purpose of this bulletin is to address questions relating to the required rating of cables that are used in Protected Premises Fire Alarm Systems (any fire alarm system located at the protected premises) in accordance with 2019 Edition of NFPA 72, National Fire Alarm and Signaling Code, where the survivability of Emergency Voice/Alarm Communications is required.

The requirement for survivability is covered in Section 24.3.14 of NFPA 72. The level of survivability required is dependent on the type of fire alarm system being installed. Levels of survivability apply to systems used for relocation or partial evacuation of occupants. NFPA 72 section 24.3.14.4.1 states for systems employing relocation or partial evacuation, a Level 2 or Level 3 pathway survivability shall be required. Section 24.3.14.4.2 states that for systems that do not employ relocation or partial evacuation, a Level 0, Level 1, Level 2, or Level 3 pathway survivability shall be permitted. Other levels apply to systems that do not employ relocation or partial evacuation.

Section 12.4 defines levels of survivability; Levels 0 – 3. Section 24.4.8 covers the requirements for relocation and partial evacuation including both audible and visual notification appliance circuits. The level of survivability is dependent on whether the appliance circuits are for systems within a notification zone or for systems outside of the notification zone.

Section 24.4.8.6.3 requires that circuits have a pathway survivability of level 2 or 3 until they enter the notification zone that they serve. A notification zone is defined by NFPA 72 as a discrete area of a building, bounded by smoke or fire barriers, from which occupants are intended to relocate or evacuate.

Wiring within the notification zone may have a survivability Level 0, 1, 2 or 3 except that attack by fire within the notification zone shall not impair the control and operation of notification appliances outside the notification zone.

NFPA 72 Section 12.2 specifies that all wiring shall be in accordance with NFPA 70 National Electrical Code and specifically Articles 770 and 760.

Where attack by fire within the notification zone will impair the control and operation of notification appliances outside the notification zone, Section 24.4.8.6.1 and Annex Note A.24.4.8.6.1 specify methods for survivability of the system within the notification zone, including pathway survivability Levels 2 or 3, and that it is subject to authorities having jurisdiction (AHJ) evaluation.

In the case where the wiring is outside of the notification zone, all circuits necessary for the operation of notification appliances shall be protected until they enter the notification zone they serve at a pathway survivability Level 2 or 3.

Conclusion: Circuit Integrity (CI) rated Cables may be used where pathway survivability Level 2 or 3 is required.

Where pathway survivability Levels 0 and 1 is permitted, CI rated Cables are not required. Wiring in accordance with NFPA 70 National Electrical Code Article 760 may be used. In all cases, the AHJ should be consulted.

**Wiring Options based on Survivability Requirements**

<b>Wiring options for outside of the notification zone where a minimum Level 2 Pathway Survivability is required (12.4.3)</b>	<b>Wiring options within the notification zone where minimum Level 0 Pathway Survivability is required (12.4.1)</b>	<b>Option within notification zone where Pathway Survivability May be required (24.4.8.6.1)</b>
<p>2-Hr. rated (CI) cable</p> <p style="text-align: center;">Or</p> <p>2-Hr. rated cable System (electrical circuit protective system)</p> <p style="text-align: center;">Or</p> <p>2-Hr. rated enclosure or protected area</p> <p style="text-align: center;">Or</p> <p>AHJ approved alternatives</p> <p>Note: Level 3 pathway survivability may be used in place of Level 2 methods and consists of Level 2 methods in addition to installation in a fully sprinklered building. (12.4.4)</p>	<p>National Electrical Code Article 760.</p> <p>I.e. FPL cable (12.4.1 and 12.4.2)</p>	<p>Along with pathway survivability Level 2 or 3 one or more of the following could be considered acceptable. The AHJ should be consulted. (A.24.4.8.6.1)</p> <p>Routing notification appliance circuits separately</p> <p>Short circuit fault tolerant signaling line circuits</p>

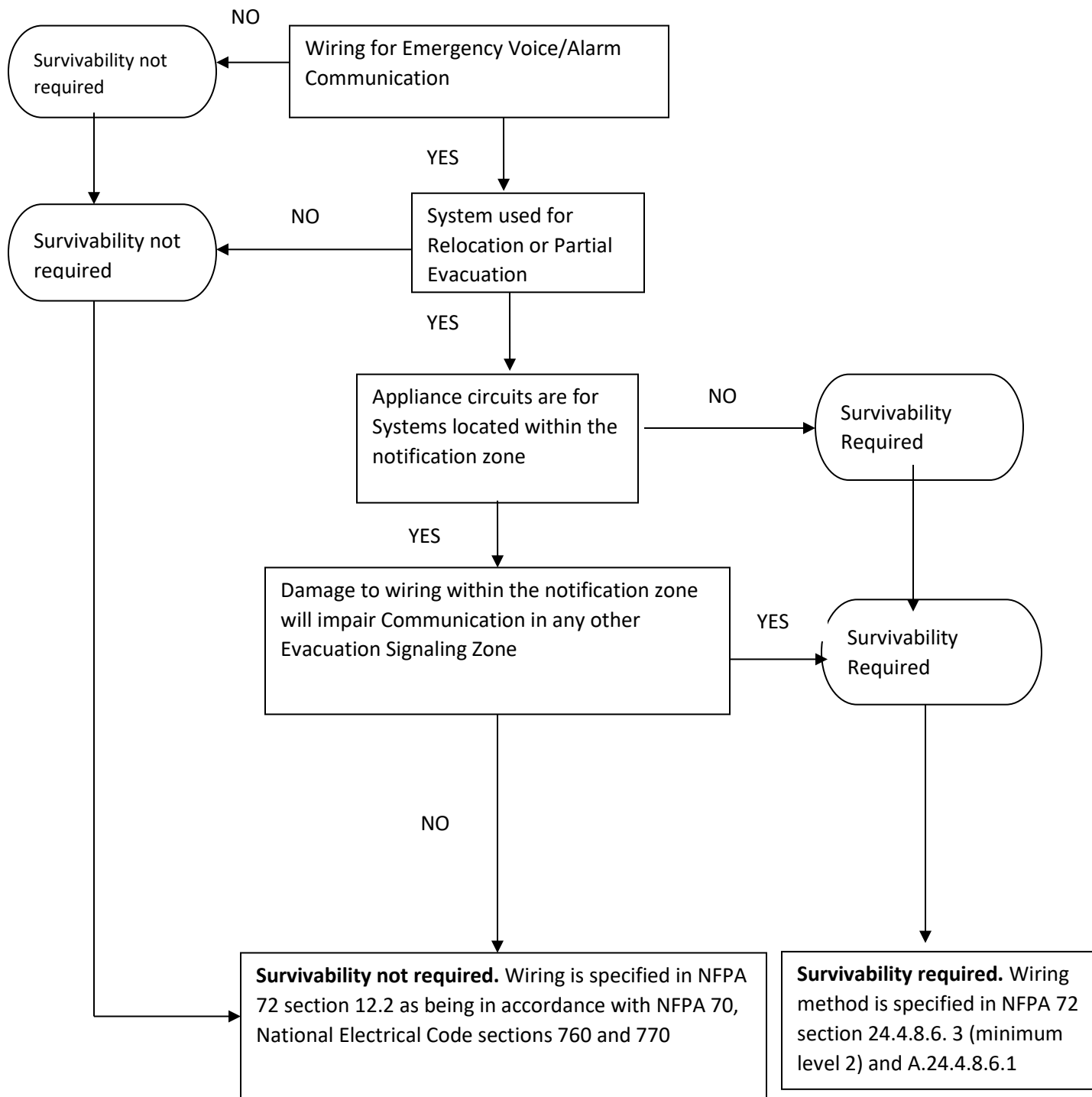
Note: Parenthetical references are to NFPA 72-2019

**NFPA 72 Pathway Survivability Table**

The intent of the Pathway Survivability Table is to provide options for the protection of the pathway circuits and not to create a hierarchical ranking. Other chapters within *NFPA 72* or other code-making jurisdictions can select the survivability option that best meets their needs.

<b>12.4* Pathway Survivability.</b>	All pathways shall comply with <i>NFPA 70</i> .
<b>12.4.1 Pathway Survivability Level 0</b>	Level 0 pathways shall not be required to have any provisions for pathway survivability.
<b>12.4.2 Pathway Survivability Level 1</b>	Pathway survivability Level 1 shall consist of pathways in buildings that are fully protected by an automatic sprinkler system in accordance with <i>NFPA 13</i> with any interconnecting conductors, cables, or other physical pathways protected by metal raceways or metal armored cables.
<b>12.4.3* Pathway Survivability Level 2.</b>	Pathway survivability Level 2 shall consist of one or more of the following: <ul style="list-style-type: none"> <li>(1) 2-hour fire-rated circuit integrity (CI) or fire-resistive cable</li> <li>(2) 2-hour fire-rated cable system [electrical circuit protective system(s)]</li> <li>(3) 2-hour fire-rated enclosure or protected area</li> <li>(4)*Performance alternatives approved by the authority having jurisdiction</li> </ul>
<b>12.4.4 Pathway Survivability Level 3.</b>	Pathway survivability Level 3 shall consist of pathways in buildings that are fully protected by an automatic sprinkler system in accordance with <i>NFPA 13</i> and one or more of the following: <ul style="list-style-type: none"> <li>(1) 2-hour fire-rated circuit integrity (CI) or fire-resistive cable</li> <li>(2) 2-hour fire-rated cable system [electrical circuit protective system(s)]</li> <li>(3) 2-hour fire-rated enclosure or protected area</li> <li>(4)*Performance alternatives approved by the authority having jurisdiction</li> </ul>

**FLOW CHART on the NFPA 72 Requirement for Survivability**



**Distribution List:**

Standards and Conformity Assessment Policy Committee  
 Codes and Standards Committee  
 NEMA Technical Services Department

### **Disclaimer**

The standards or guidelines presented in a NEMA standards publication are considered technically sound at the time they are approved for publication. They are not a substitute for a product seller's or user's own judgment with respect to the particular product referenced in the standard or guideline, and NEMA does not undertake to guarantee the performance of any individual manufacturer's products by virtue of this standard or guide. Thus, NEMA expressly disclaims any responsibility for damages arising from the use, application, or reliance by others on the information contained in these standards or guidelines.