



Event Safety Working Group

**ES1.17 - 202x, Electrical Safety & Lighting
Public Review 1 Comment Resolutions**

Reference document: ES1.17 - 202x, *Electrical Safety & Lighting* (Document number ES/2018-20001r1a)

ANSI Public review period: 17 February 2023 through 03 April 2023

Question: In your opinion, do you think the requirements of ES1.17 - 202x, *Electrical Safety & Lighting* (DCN ES/2018-20001r1a) are reasonable, and adequately address the intended subject matter?

Please answer the question using one of the options below. Select “Yes”, “Yes, but...” (provide comments to support your opinion), or “No, with reasons” (the document’s requirements are unacceptable or unreasonable).

Responses:

Karl G Ruling – Unit 12 Productions (KGR)	No
Ian Foulds (ICF)	Yes, but...
Morgan Myler – I. A. T. S. E Local 58 (MM)	No
Mitch Hefter (MKH)	No
Gordon Peck - I. A. T. S. E Local 58 (GP)	Yes, but...
Doug Hook - I. A. T. S. E Local 58 (DH)	Yes, but... (comments received after close of public review period)

Individual Comments:

No.	Commenter	Ref. section	Comment	Resolution
1	MKH	Foreword	The second paragraph of the Foreword (and multiple places in the document) calls this a standard, but the Title makes no such statement. Also, since this is part of the family of documents under the Event Safety Guide, clarification is recommended. Is this a Guide (as an element of the Event Safety Guide), a standard with primarily mandatory requirements under the scope of being a voluntary standard, or a recommended practice with primarily recommendations but some mandatory requirements?	Reject with Reasons : The group is following the standard rubric for naming the draft standard established by the event safety working group. ANSI does not require the word standard in the title for it to be deemed a standard. Once ANSI accepts it as a standard it is a standard regardless of the word standard in the title. Additionally, a standard can be many things, it can have requirements and it can provide guidance. The fact of it being a voluntary standard does not(per ansi guidelines) influence whether or not things can be mandated as part of the standard. NFPA 70 is a voluntary standard until is adopted into regulation at the national, state or municipal level. The full title was “Event Safety (ES) 1.17 Electrical Safety &

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				Lighting” to make it easier to say and read ES 1.17 Event Lighting & Electrical Safety
2	MKH	Introduction	Second paragraph – define ‘we’ to confirm the audience. The way that we <u>the live entertainment industry</u> utilizes and distribute electricity is unique . . .	Accept in principle
3	MKH	Sections 1 & 1.2 – Scope/Intent	See comment for Foreword re: standard vs guide, etc. Please clarify the geographic scope. Is this applicable for the United States only? The Codes & Standards referenced are U.S focused, and there are no references to Canadian Codes or Standards. There are multiple references to the UK and Europe. Other than wire colors, why? Why not Canada?	Reject with reasons: this deliberately broad to be inclusive This is to aid potential adoption in other jurisdictions Examples are from jurisdictions that have requirements Accept in principle we will see if we can add Canadian refs
4	MKH	Sections 1.3 – Equivalency	Overly wordy. Suggest: The innovations and advancements in technologies in the entertainment industry may not be addressed or necessarily align with this document or other Codes and Standards. This standard is not intended to replace or supersede any applicable local rules or laws but should supplement them in an abundance of caution and coordination with the authority having jurisdiction with the goal of improving safety.	Accept in Principle: changed the language to make it simpler and broader
5	MKH	Section 1.4 – Application	See comment for Foreword re: standard vs guide, etc. Also reference Codes. This document is one part of a larger collection of standards relating to special event safety. The requirements of the complete collection shall be considered in relation to the application of this standard and applicable jurisdictional Codes and Standards, where necessary to coordinate and correlate all related requirements into the scope of the event.	Accept in Principle: Language has been revised for clarity and content
6	MKH		Language regarding applicable sections of the NEC is not clear. Restructure/reword: In the United States the NEC (National Electrical Code) contains, Articles, Chapters 5 through 7 address special occupancies or conditions including special equipment. Chapters 1, 2, 3, and 4 apply generally. Chapters 5, 6, and 7 may modify the requirements in Chapters 1 through 7, in particular:	Reject with Reasons: The group felt the list was simple and clear and felt that the last sentence highlights the non-exclusive nature of the list

No.	Comment er	Ref. section	Comment	Resolution
			<p>Article 518 Assembly Occupancies Article 520 Theatres, Audience Areas, Performance Areas and Similar Locations Article 522 Control Systems for Permenent Permanent Amusement Attractions Article 525 Carnivals, Circuses and Fairs and Similar Events Article 530 Motion Picture and Television Studios and Similar Remote Locations Article 700 Emergency Systems However, there There are numerous other articles that pertain to spaces that might not normally host an event but would be applicable if the space became an event space. Examples of these spaces are agricultural buildings, marinas and boatyards, recreational parks and vehicles, hospitals, etc. In such cases these additional articles of the NEC would become applicable and should be consulted. Recommend changing the IES reference to: Illuminating Engineering Society (IES) Online Lighting Library While not referenced, should the International Building Code (IBC) be included? In many areas, the IBC applies. Same for the Fire Codes. For example, NFPA 1 is in the document, but does not appear here. Should the E1 standards with dates be updated to the current versions?</p>	<p>Accept in principle: Language Added</p>
7	MKH	2 – Definitions	2.2 AHJ definition duplicates the NEC definition. Does this need modification or reference?	Reject with reasons, definition is a common one adopted by several standards in the working group and is used to maintain consistency
8	MKH	2.3 Bonding	he purpose should be an Explanatory note. Suggest simplifying closer to the NEC definition.	Reject with reasons this was the consensus reached by the group that included discussions about the NEC version and this definition was felt to meet the requirements of this draft standard
9	MKH	2.5 Cable ramp	should the trip hazard note be explanatory?	Reject with reasons see comment 8
10	MKH	2.6 Circuit Breaker	is defined, but not a Fuse. Add Fuse definition or remove Circuit Breaker.	Reject with reasons the draft standard does not use the word fuse in the document and therefore no definition is required
11	MKH	2.6 Circuit Breaker	definition duplicates the NEC definition. Does this need modification or reference?	Accept: Added Reference
12	MKH	2.7 Competen t person	duplicates language in OSHA. Does this need modification or reference?	Accept: Added Reference
13	MKH	2.8	this is clumsy. Is it necessary? \	Accept : Removed Definition

No.	Commenter	Ref. section	Comment	Resolution
		Conductor		
14	MKH	2.10 Earthing	change wire to conductor.	Accept
15	MKH	2.10 Earthing	Delete last sentence. The grounding of the neutral at the service entrance is connecting a current carrying part, not a non-current carrying part.	Accept
16	MKH	2.18 Field Certification	this also applies to a field certification by a Nationally Recognized testing Laboratory, not just for repaired equipment.	Accept in principle: deleted definition as it is not needed in the context of the standard
17	MKH	2.20 Flexible Cord or Cable	this is confusing. Suggest referring to the NEC definition for Flexible cord. Suggest and explanatory note such as: Cords are typically designed for temporary wiring for portable gear, while cables are often (but not exclusively) designed for permanent wiring or portable feeders for equipment.	Accept in principle: removed reference to cable in definition and added language about extension cords
18	MKH	2.28 Hot/Live	this also refers to equipment, not just conductors. Add clarification.	Accept in principle: added language
19	MKH	2.34 Neutral conductor	also is gray in the NEC, and the neutral is not always grounded. Suggest: A color-coded conductor (designated white or gray in the U.S. by the NEC, blue in Europe & the UK) that acts as the return electrical pathway for an AC electrical circuit. The neutral conductor may also be referred to as a grounded conductor as when it is bonded to the grounding system by means of a bonded bus bar in the main electrical panel.	Accept in principle: Added language
20	MKH	2.34 Neutral gray	this document uses the spelling 'grey' but the NEC uses 'gray' – Recommend changing to 'gray' for consistency.	Accept
21	MKH	2.43 Shall	Coordinate with must. <i>2.43 Shall: denotes a mandatory requirement (must).</i>	Accept
22	MKH	2.45 Tying In or Tie In	Parenthetical statement should be an Explanatory note.	Reject with reasons, group simplified the language but felt examples were an important part of the definition
23	MKH	AEGCP	AEGCP (Assured Equipment Grounding Conductor Program) is addressed in 6.1 & E6.1, but not defined except in E6.1. Should it appear here in Chapter 2?	Reject with reasons: the group felt that the explanatory note in E6.1 clearly explained what was meant by AEGCP and therefor a separate definition in section 2 for a term that was only used in section 6 was superfluous
24	MKH	3.5	Needs some commas after standard and AHJ as it reads like the AHJ shall be maintained on site. <i>All documentation required by applicable regulation, this</i>	Yes, Accept

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			<i>standard, and the AHJ, shall be maintained onsite throughout the duration of the event. The documents should be easily identifiable and readily accessible.</i>	
25	MKH	E3.8	All electrical equipment, not just distribution. And a mandatory requirement is not appropriate in an Explanatory note. <i>In the United States, Europe and the U.K., all distribution-system-electrical equipment shall <u>is required to be</u> "Acceptable" to the AHJ which usually means Listed by a Nationally Recognized Testing Laboratory for the purpose for which it is being used.</i>	Accept
26	MKH	5.1 Method	Some bullets should be mandatory or at least leave out the should statement. <ul style="list-style-type: none"> •<i>A physical examination of the event site or space & event production elements to determine the risks present.</i> •<i>Identification of potential impacts of any risk or hazard.</i> •<i>Steps should to be taken to reduce the risks likelihood and severity</i> •<i>The control measures to should reduce the likelihood & severity to an acceptable level in the given circumstances.</i> •<i>It should be A written document and relevant sections <u>shall be</u> made freely available to all affected event personnel.</i> •<i>It should be revised <u>Revised</u> as necessary throughout the production process</i> 	Accept in principle: Made the risk assessment mandatory but not the method of risk assessment which needs to adapt to the circumstances of the event.
27	MKH	5.2 Risk Factors	Would this be better as a form providing the minimum factors?	Reject with Reasons: The group has received a lot of input/comments on the list and this reflects that input.
28	MKH	E6.3 Understanding the Risks	This can be shortened to what should be essentially a reminder for people using this document, not an explanation of basic electricity. Suggest replacing the first five paragraphs with the below or similar (leave the last paragraph): <i>Most fatal electrical shocks happen to people who should know better. Electric shock occurs when the body, a good conductor of electricity, contacts two conductors of a live circuit and provides a path of lower or least resistance to ground. It's the flow through the body that kills or injures, not the voltage. While higher voltage often results in higher current, electrocution can happen at very low voltages where conditions allow for high current (e.g., wet skin presenting a lower resistance).</i>	Accept : Added suggested language and removed previous language

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29	MKH	7.3 Required information	If required, why is it a 'should' statement? Change to " ... 'shall' be documented."	Accept
30	MKH	8.3	Remove commas in this sentence.	Accept in principle: removed a comma and simplified wording
31	MKH	8.8 Cable Ramps/Cable Protection	A reference to NEC section 525.20(G) (Carnivals, Circuses, Fairs, and Similar Events Wiring Methods Protection) may be appropriate here.	Reject with reasons: The article is already referenced in the normative references and the group did not feel that a re-emphasis here was beneficial as the language in this document goes beyond 525.20(G) as the group does not feel that 525.20(G) is a sufficient minimum standard in this use case.
32	MKH	8.8.1	reads as if you shouldn't use cable ramps. Not sure how to rephrase this.	Reject with Reasons: Group felt that the text was clear that you should avoid using cable ramps in areas where people might be walking but does not prohibit it.
33	MKH	E10.1.2	<ul style="list-style-type: none"> Neutral in the NEC can also be gray. The Neutral in most of our applications is grounded, but that is not always the case under the NEC. The color is white or gray – the term 'natural gray' was eliminated in 2002, changing it to just white or gray. Under the NEC, the grounding conductor may be green, green with one or more yellow stripes, or bare. 	<ul style="list-style-type: none"> Accept in principle: Language amended
34	GP	11.18	<p>to be added before 11.18.1</p> <p><i>11.18.05 Event personnel shall be trained generally in the working at heights per local regulations and/or industry standards. Event personnel shall also be trained specifically in safety procedures and systems available at the event site. Training shall include reference to rated tie-off points for fall arrest systems and their proper use. Re-training shall be provided at intervals not more than a year to maintain knowledge and compliance with procedures. [sic]</i></p> <p>I think this is important to add before the 11.18.1 clause. Fall arrest systems must be used correctly if they are expected to save lives. Formal training is the only way ensure that engineered procedures and systems are used correctly.</p>	Accept in principle and added language
35	MM	11.18 Working at Height	11.18.1 Event personnel shall not work at height without other event personnel being present who have been trained to assist or respond in an emergency. A fall rescue plan shall be in place with authorized event personnel.	Accept in principle however the group did not feel that adding more detail was appropriate for this standard and instead elected to point to other existing standards.

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			<p>AMENDED</p> <p>14,18.1 Event personnel shall not work at height without their event personnel being present who have been trained to assist or respond in an emergency AND FIRST AID. A fall rescue plan shall be in place and REHERSED ANNUALLY, POSTED AND REVIEWED. ·DETAILS OF SITE AND PRODUCTION ISSUES DOCUMENTED PRIOR TO WORK with authorized event personnel equipped and able to supply prompt rescue as necessary.</p> <p>NEW</p> <p>11.18.1a ALL PERSONELL SHOULD HAVE FALL ARREST OR EQUIVILENT TRAINING</p> <p>11.18.1b ALL FALL ARREST EQUIPMENT INSPECTED BEFORE USE</p> <p>11.18.1c EQUIPMENT USED IN RESCUE INSPECTED AND DEPLOYED IN AREAS AS SITUATION DICTATES.</p> <p>1.18.2 Event personnel working at height shall secure all tools, equipment, and personal items to prevent accidental drops..</p> <p>11.18.3 Means and methods of securing tools, equipment, or personal items shall not create additional hazards (e.g., attachment of heavy objects to the body).</p> <p>This Section does not address Suspension Traura and standard of retrieving a casualty. It is not morally adequate as a standard with todays information on At Height Rescue situations. See Below.</p> <p>Please see below the ONTARIO guideline for Rescue plans for working at heights.</p> <p>Identify the designated trained person(s) in charge of rescue. Identify qualified on-site first aid personnel and the location of first aid and safety equipment, Crew members who have First Aid/CPR Certification and the nurse or paramedic on set and their location, should also be identified.</p> <p>Ensure all equipment to be used in the event of a rescue Is inspected and available at the work locationm for the rescue.</p>	

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			<p>Identify the names and contact phone numbers of Emergency Medical Services (EMS) resources in .the jurisdiction. For example, if needed, who would perform high angle rescue (e.g. fire department) and identity special skilled technicians and personnel.</p> <p>Outline Emergency Services access, including meeting area to ensure evacuation from the worksite and nearest hospital. This outline must include cast and crew evacuation routes etc.</p> <p>Include a viable pre-designated system of secondary communication. This may include hand signals, contact information i.e. call phone numbers, alarm, alarm codes, tec.</p>	
36	KGR	16.2.4 E16.2.4	<p>The references to the brand name “Trico” must to be removed from clauses 16.2.4 and E16.2.4. Using a commercial name in an American National Standard runs counter to the commercial terms and conditions rules in ANSI's Essential Requirements, and in this case runs against ESTA's restraint of trade policy statement read at the beginning of every working group meeting. Clauses E16.2.4 and 16.2.4 in a standard look like an agreement NOT to do business with Trico.</p> <p>A bigger problem is that the reader has no idea what a “Trico” style connector” is other than a connector made by Trico. Are all connectors made by Trico “Trico style”? Are there connectors by other companies that are Trico style?</p> <p>Furthermore, what objective data is there that Trico connectors are subject to slippage and failure so much more often than connectors by other manufacturers that this brand has to be called out as unreliable? You will need that data if called to defend this statement in a libel suit.</p> <p>I think what you are trying to do—keeping connectors that clamp on but fall off out of a system—is already accomplished by other clauses. In 11.1 you required tie-ins to be “performed by authorized, competent and qualified event personnel.” In 3.4 you require all equipment, devices and materials to be used in accordance with the manufacturer’s instructions. In E3.8 you note that in the United States, Europe and the U.K.,</p>	Accept in principle: Language has been amended to remove references to Trico and to improve the clarity of the language.

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			all distribution system equipment shall be “Acceptable” to the AHJ. These clauses should be enough to keep unreliable connectors out of the system without running into restraint of trade problems and libel suits by calling out particular brand names.	
37	MKH	19.1 Clearances – Refer to NEC 100.26.	<p>Refer to NEC 100.26. The example (figure) shown covers most instances our industry will deal with, but it is not exclusive. For example, the requirement for a minimum 90° opening of equipment doors is not indicated, nor situations with exposed live parts no voltages above 600.</p> <p>An additional reference here (as in the NEC) to NFPA 70E would be appropriate.</p> <p>The Figure needs a number and reference in the text.</p>	Accept in Principle: Added E19.1.3 with a specific reference
38	MKH	22.1 Approvals	<p>Approval is in the purview of the AHJ, it is not conveyed by NRTL Listing (NRTLs do not approve despite many people and many equipment data sheets stating such). NEC 90.4 states:</p> <p>“90.4(B) Interpretations. The authority having jurisdiction for enforcement of the Code has the responsibility for making interpretations of the rules, for deciding on the approval of equipment and materials, and for granting the special permission contemplated in a number of the rules.”</p> <p>Suggest rewording:</p> <p><i>All electrical equipment used at the event shall be approved by the AHJ according to local, regional and national regulations. This requirement applies equipment as designed and assembled for the end user and not simply the parts it is assembled from.</i></p>	Accept in principle: Added language to clarify role of the AHJ and NRTL’s
39	ICF	E21.1.2	<p><i>E21.1.2 Lighting for stairways, gangways, corridors, exit doorways, gates, emergency lighting, etc., should be installed, operated and maintained in accordance with local, regional and national regulation</i></p> <p>I find this line to be difficult to visualize for a non expert.</p>	Accept in principle: Added some examples from other regulation

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			<p>Would it be possible to include an example of a "local" regulation requirement to more fully define the expectations of the document. Possibly expected light levels, areas requiring more light and illumination for exit doors etc.</p>	
40	MKH	E22.1	<p>This is wrong. The AHJ approves, they don't look for approvals. Suggested rewording:</p> <p><i>Most electrical inspectors and other AHJ's will look for <u>certifications (normally Listing by a Nationally Recognized Testing Laboratory) approval on all electrical equipment, including equipment not used by event personnel, before approving the installation.</u></i></p>	<p>Accept in principle: Added language to clarify role of the AHJ and NRTL's</p>
41	MKH	A2.0 Approval of electrical equipment	<p>The quoted material appears to be from OSHA 1910 subpart S, 1910.399 (https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.399), defining acceptance by the assistant secretary of labor, but not approval.</p> <p><i>Acceptable. An installation or equipment is acceptable to the Assistant Secretary of Labor, and approved within the meaning of this subpart S:</i></p> <p><i>(1) If it is accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory recognized pursuant to § 1910.7; or</i></p> <p>...</p> <p><i>Approved. Acceptable to the authority enforcing this subpart. The authority enforcing this subpart is the Assistant Secretary of Labor for Occupational Safety and Health. The definition of "acceptable" indicates what is acceptable to the Assistant Secretary of Labor, and therefore approved within the meaning of this subpart.</i></p> <p>Therefore, I believe it is more accurate to state this is criteria the AHJ can use in determining whether to approve or not.</p> <p>Suggest changing the opening to read:</p>	<p>Accept in Principle: Amended language for clarity</p>

No.	Commenter	Ref. section	Comment	Resolution
			<p>Approval of electrical equipment <i>In the US, <u>OSHA defines approval as to acceptance by the authority enforcing the subpart of the regulation, and acceptance as (from OSHA 1910 Subpart S, 1910.399): there are three ways something can be approved.</u></i></p>	

The following comments were received from Doug Hook after the public review period closed:

This document is titled Electrical Lighting And Safety. Yet it addresses a great many other areas , that while relevant to live event safety, are not under the purview of Electrical Lighting and Safety.

Reject with reasons: The group felt that event lighting and electrical safety potentially intersects with all aspects of an event in most circumstances where there is power and lighting. Whether it be an additional feed for the ovens and hot plates in an portable event kitchen or the potential risk to attendees at an event. Event lighting and electrical safety and how it is used installed distributed and operated poses significant potential risks to all aspects of the event

Topics such as Working At Heights requirements are governed by local and national regulations, and exist in a much broader space than that covered by this guideline. Anything more than pointing the used to follow the appropriate local requirements (as mentioned in 1.3) means that the guideline will be out of step with those same local , state/provincial, and national regulations

*Reject with reasons the group feels that they have addressed issues that can be specific to the topic of event lighting and electrical safety. The document also points to several examples relevant standard regarding working at height. Language has been added to clarify that parties must comply with all applicable national, regional and local regulation -See **11.18.1**. This was already stated in the “general” section of the draft standard, but the group felt that a specific re-enforcement of that requirement would be beneficial. The material doesn’t conflict with existing standards, but does re-enforce and complement them.*

Section 5.2.5 Major incidents omits Active Shooter/Terrorism/Criminal Action

Reject with reasons: Yes 5.25 does omit Active Shooter etc. as this section covers the assessment of electrical risks and list specifics risk that could impact the lighting and electrical safety of the event. Whilst it perhaps possible that the examples cited in the section might cause a lighting or electrical safety risk. The group felt it would cause confusion and it already covered by the PMI and Venue & Site design task groups

Section 11.1 states that tie in shall only be performed by Authorized, competent and qualified EVENT Personell. Often the Authorized, Qualified and Competent person is not Event Personnel, but rather a Venue Staffer or Electrical Contractor engaged for the explicit purpose of the *tie in*.

Reject with reasons Event personnel covers venue personnel and other contractors

Section 11.16 Appears to suggest that a 25' - 6 circuit multi cable be the standard that might be reasonably deployed or coiled and carried by a single individual. No mention is made as to the guage of said cable. This significantly affects the weight of that cable. Advising users to use only 25' cables introduces multiple failure points at each connection along the cable run, and is contrary to best practices. It is very common to deploy multi-cables of 100' in length, often in bundled. These can be safely wrapped onto the floor or into road cases by individuals who have been instructed on techniques for doing so, and avoid the hazard of lifting the entire 100' peice of cable by hand..

Reject with reasons: There's no requirement of length in the language, the language referring to length is given as an example only.

Section 11.19.3 The arc source lams are very frequently struck while the trusses are at working height, to allow testing of the lights before the truss is raised. this avoids repeated up and down of a truss during troubleshooting.

Accept in principle: The group has modified the language for clarity and added the word "exposed" to indicate that the greatest hazard when striking an arc source lamp is when it is exposed for maintenance, troubleshooting etc. The group believes this now does not prevent the striking of moving lights already installed in the grid.

Section 12 delves into operating and maintenance procedures for equipment suppliers. This is outside the stated scope.

Reject with Reasons : The group considers this to be within scope as section twelve addresses the reality for many events and event personnel when equipment turns up at the event site already damaged. Many event personnel have received the same piece of damaged equipment from the supplier repeatedly on different events and even at different venues. The purpose of this section is to address as reasonable set of procedures for event personnel to follow to ensure the damaged equipment is removed from service for that event in a manner that ensures it in not used accidentally by someone else working the event.

Regarding repair, event personal often find themselves in situations at the event where they may be pressured or required to perform a repair of a damaged piece of equipment. The group is generally trying to discourage this practice as it often undertaken by people lacking the relevant training and experience, who may not have the right tools or parts. However, the group recognizes that repairs will inevitably occur and felt that information should be provided on the steps necessary to conduct a repair that is safe and to undertake the repair safely.

This is by no means a complete list of issues with the document. much further examination is required.