Second Revision No. 57-NFPA 110-2020 [Detail]

[Add new subsection as shown below]

5.7.2 Fuel Cell System Ratings.

Derating factors, such as altitudes, ambient temperature, fuel energy content, accessory losses, and site conditions as recommended by the manufacturer of the fuel cell system shall be used in determining whether or not the fuel cell system meets the connected load requirements.

Submitter Information Verification

Committee:

Submittal Date: Sat Aug 01 09:57:54 EDT 2020

Committee Statement

Committee Statement: This aligns with the work to add fuel cells as a permissive power source for an EPSS. Language aligns with rotary equipment requirements of Section 5.6.2.

This is ballotable detail for SR-22.

Response Message: SR-57-NFPA 110-2020

Second Revision No. 58-NFPA 110-2020 [Detail]

[Add new subsection as shown below]

5.7.3 Fuel Cell System Accessories.

Fuel cell system controls/power conditioning systems shall maintain a bandwidth of rated frequency for any constant load (i.e., steady-state condition) that is compatible with the load.

5.7.3.1

The frequency droop between no load and full load shall be within the range for the load.

5.7.3.2

The frequency dip upon one-step application of the full load shall not be outside the range for the load, with a return to steady-state conditions occurring within the requirements of the load.

Submitter Information Verification

Committee:

Submittal Date: Sat Aug 01 10:03:56 EDT 2020

Committee Statement

Committee Statement: This aligns with the work to add fuel cells as a permissive power source for an EPSS. The language in this section aligns with rotary equipment requirements of Section 5.6.3 to ensure operation and control within the parameters of the system.

This is ballotable detail for SR-22.

Response Message: SR-58-NFPA 110-2020

Second Revision No. 59-NFPA 110-2020 [Detail]

[Add new subsection as shown below]

5.7.4* Fuel Cell System Starting Equipment.

Fuel cell starting system shall be in accordance with the manufacturer's instructions.

A.5.7.4

Many fuel cells do not rely on batteries to begin operation. Because the initial starting of a fuel cell varies based on technology, and because fuel cells do not rely on batteries for emergency starts, batteries are not included in this section as they are for rotating equipment. Some fuel cells use power from the utility grid for initial start-up until the fuel cell system is up to operational status, then the system can disconnect from grid power and run continuously and independently of the grid.

Submitter Information Verification

Committee:

Submittal Date: Sat Aug 01 10:08:04 EDT 2020

Committee Statement

Committee Statement: This aligns with the work to add fuel cells as a permissive power source for an EPSS. The language in this section clarifies that unlike rotating equipment fuel cells don't typically rely on batteries to start.

This is ballotable detail for SR-22.

Response Message: SR-59-NFPA 110-2020

Second Revision No. 60-NFPA 110-2020 [Detail]

[Add new subsection as shown below]

5.7.5 Control Functions.

5.7.5.1

An on-site control panel that includes local status notification shall be provided.

5.7.5.1.1

Where approved by the authority having jurisdiction, a remote monitoring control system shall be permitted to be used instead of an on-site control panel.

5.7.5.1.2

The following functions shall be provided:

(1) Automatic remote start capability

(2) Run/Off/Automatic switch function

(3) Shutdowns as required by 5.7.5.2.2(2)

(4) Alarms as required by 5.7.5.2.2(3)

(5) Controls as required by 5.7.5.2.2(4)

(6) Load shed controls as required by 5.7.5.2.2(5)

5.7.5.2

An automatic control and safety panel shall be a part of the EPS.

Table 5.7.5.2 Safety Indications and Shutdowns

	Level 1			Level 2		
Indicator Function	**CV**	**S**	**RA**	**CV**	**S**	**RA**
(a) EPS supplying load	X	N/A	N/A	O	N/A	N/A
(b) Low pressure—fuel line or low fuel level	X	X	X	X	X	O
(c) High pressure—fuel line	X	X	X	X	X	O
(d) High-temperature prealarm	X	N/A	X	O	N/A	N/A
(e) High temperature	X	X	X	X	X	O
(f) Loss of ventilation fan	X	X	X	X	X	O
(g) Loss of communication with control panel or monitoring source	X	X	O	X	X	O
(h) Contacts for local and remote common alarm	X	N/A	X	X	N/A	X
(i) Audible alarm silencing switch	N/A	N/A	N/A	O	N/A	N/A
(j) Remote emergency stop	N/A	X	N/A	N/A	X	N/A
(k) Load Shed	X	N/A	X	N/A	N/A	N/A

CV: Control panel or monitoring station visual. S: Shutdown of EPS. RA: Remote audible. X:

Required. O: Optional. N/A: Not applicable.

Notes:

(1) All required CV functions shall be visually annunciated by a remote, common visual indicator.

(2) Items (b), (c), (e), (f), and (g) shall lead to system shut down when the time limit exceeds the manufacturer's specifications.

(3) Item (h) shall be provided, but a separate remote audible signal shall not be required when the regular work site in 5.7.6 is staffed 24 hours a day.

(4) Item (a) EPS ac ammeter shall be permitted for this function.

(5) All required functions indicated in the RA column shall be annunciated by a remote, common audible alarm as required in 5.7.5.2.2(3).

(6) Item (b): Low fuel level is required by 5.5.2 for onsite fuel storage tanks.

5.7.5.2.1

Where approved by the authority having jurisdiction, a remote monitoring control system shall be permitted to be used instead of an on-site control panel.

5.7.5.2.2

The control system shall contain the following equipment or possess the following characteristics, or both:

(1) Run/Off/Automatic control functions as described as follows:

(a) *Run:* Manually initiate, start of fuel cell system

(b) *Off:* Stop fuel cell system or reset safeties, or both

(c) *Automatic:* Allow fuel cell system to start by a signal from a remote-control system

(2) Controls to shut down and lock out the fuel cell system under any of the following conditions:

(a) Failing to start after manufacturer's specified time

(b) Abnormal conditions, including high temperatures as listed in Table 5.7.5.2

(c) Operation of remote manual stop station

(3) Individual alarm indication on a control panel with the following characteristics to annunciate any of the conditions listed in Table 5.7.5.2:

(a) Battery powered (if utilized)

(b) Visually indicated

(c) Have additional contacts or circuits for a common audible alarm that signals locally and remotely when any of the itemized conditions occurs

(d) Have a lamp test switch(es) to test the operation of all alarm lamps

(4) Controls to shut down the fuel cell system upon removal of the initiating signal or manual emergency shutdown

(5) Controls to shed Level 2 loads and to initiate an overload alarm for EPS that serves both Level 1 and Level 2 loads

5.7.5.3

The control panel or remote monitoring control system in 5.7.5.2.2(4) shall be approved for either a Level 1 or a Level 2 EPS consistent with the installation.

5.7.5.4

All installations shall be provided with at least one remote emergency stop switch for each fuel cell power system.

5.7.5.4.1

The remote emergency stop switch shall be located outside the room housing the fuel cell power system or exterior enclosure.

5.7.5.4.2

The remote emergency stop switch shall be permitted to be mounted on the exterior of the enclosure.

5.7.5.4.3

Provisions shall be made so access is limited to qualified persons.

5.7.5.4.4

The remote emergency stop switch shall identify the EPS it controls.

5.7.5.5*

A remote, common audible alarm shall be provided as specified in 5.7.5.2.2(3).

A.5.7.5.5

The minimum remote alarm annunciation is to alert personnel at a constantly attended station somewhere on the site when the facility is in use as a Level 1 system. If the site is not continuously occupied, network remote should allow people at another site to know the operating status of the equipment. The preferred method of remote annunciation is to notify personnel both somewhere on the site and at other locations via a network such as LAN, WAN, or Internet, including the ability to initiate auto-dial and send predefined text messages.

Supplemental Information

File Name	Description	Approved
SR-60_Table_5.7.5.2.docx	SR-60 table 5.7.5.2 for ballotable detail from SR-22 - for staff use	

Submitter Information Verification

Committee:

Submittal Date: Sat Aug 01 10:10:21 EDT 2020

Committee Statement

Committee Statement: This aligns with the work to add fuel cells as a permissive power source for an EPSS. The language and control functions described in this section align with rotary equipment requirements of Section 5.6.5 to ensure operation and control within the parameters of the system.

This is ballotable detail for SR-22.

Response Message: SR-60-NFPA 110-2020

Second Revision No. 62-NFPA 110-2020 [Detail]

[Add new subsection as shown below]

5.7.6 Fuel Cell Cooling Systems.

Cooling systems for fuel cell systems shall be either forced-air or natural convection, liquid-cooled, or a combination thereof.

Submitter Information Verification

Committee:

Submittal Date: Sat Aug 01 10:15:58 EDT 2020

Committee Statement

Committee Statement: This aligns with the work to add fuel cells as a permissive power source for an EPSS. The language in this section aligns with rotary equipment requirements of Section 5.6.7 to ensure operation within the parameters of the system.

This is ballotable detail for SR-22.

Response Message: SR-62-NFPA 110-2020

Second Revision No. 35-NFPA 110-2020 [Section No. 2.2]

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 2, *Hydrogen Technologies Code,* 2020 edition.

NFPA 30, *Flammable and Combustible Liquids Code,* 2021 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines,* ~~2018~~ 2021 edition.

NFPA 54, *National Fuel Gas Code,* 2021 edition.

NFPA 58, *Liquefied Petroleum Gas Code,* 2020 edition.

NFPA 70®, National Electrical Code®, 2020 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, ~~2016~~ 2019 edition.

NFPA 99, *Health Care Facilities Code,* 2021 edition.

NFPA 780, *Standard for the Installation of Lightning Protection Systems,*~~2017~~ 2020 edition.

NFPA 853, *Standard for the Installation of Stationary Fuel Cell Power Systems,* 2020 edition.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 15:25:21 EDT 2020

Committee Statement

Committee Statement: NFPA 2 and NFPA 853 are referenced within the body of the standard. NFPA 72 and NFPA 780 updated to latest edition.

Response Message: SR-35-NFPA 110-2020

Second Revision No. 50-NFPA 110-2020 [Section No. 2.3.1]

2.3.1 ASCE Publications.

American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191.

ASCE/SEI 7, *Minimum Design Loads for Buildings and Other Structures,*~~2010~~ 2016 .

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Mon Jul 27 10:03:40 EDT 2020

Committee Statement

Committee Statement: ASCE/SEI updated to latest edition.
Response Message: SR-50-NFPA 110-2020

Second Revision No. 49-NFPA 110-2020 [Section No. 2.4]

2.4 References for Extracts in Mandatory Sections.

NFPA 1, *Fire Code,* ~~2018~~ 2021 edition.

NFPA 70®, National Electrical Code®, ~~2017~~ 2020 edition.

NFPA 790, *Standard for Competency of Third-Party Field Evaluation Bodies,* ~~2018~~ 2021 edition.

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Mon Jul 27 10:01:01 EDT 2020

Committee Statement

Committee Statement: NFPA 70 updated to latest edition.
Response Message: SR-49-NFPA 110-2020

Second Revision No. 33-NFPA 110-2020 [New Section after 3.3.6]

3.3.7 Fuel Cell.

An electrochemical system that consumes fuel to produce an electric current. In such cells, the main chemical reaction used for producing electric power is not combustion. However, there may be sources of combustion used within the overall cell system, such as reformers/fuel processors. [**70:** 100]

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Thu Jul 16 14:53:52 EDT 2020

Committee Statement

Committee Statement: Fuel cell definition is extracted from the NEC to keep the standards aligned.
Response Message: SR-33-NFPA 110-2020

Second Revision No. 34-NFPA 110-2020 [New Section after 3.3.6]

3.3.8 Fuel Cell System.

The complete aggregate of equipment used to convert chemical fuel into usable electricity and typically consisting of a reformer, stack, power inverter, and auxiliary equipment. [**70:** 100]

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Thu Jul 16 14:56:52 EDT 2020

Committee Statement

Committee Statement: Fuel cell system definition is extracted from the NEC to keep the standards aligned.
Response Message: SR-34-NFPA 110-2020

Second Revision No. 56-NFPA 110-2020 [Section No. 5.1.1]

5.1.1*

The following energy sources shall be permitted to be used for the emergency power supply (EPS):

(1)* Liquid petroleum products at atmospheric pressure as specified in the ~~appropriate~~ applicable ASTM standards and as recommended by the engine manufacturer

(2)* Liquefied petroleum gas (liquid or vapor withdrawal) as specified in the ~~appropriate~~ applicable ASTM standards and as recommended by the engine manufacturer

(3)* Natural or synthetic gas

(4)* Hydrogen gas

A.5.1.1(4)

NFPA 2 provides fundamental safeguards for the generation, installation, storage, piping, use, and handling of hydrogen in compressed gas (GH_2) form or cryogenic liquid (LH_2) form. It includes requirements for the production, storage, transfer, and use of hydrogen in all occupancies and on all premises. The use of hydrogen within this standard includes both stationary and portable applications and correlates with NFPA 855 inclusion of fuel cells within its coverage of energy storage systems.

5.1.1.1

For Level 1 installations in locations where the probability of interruption of off-site fuel supplies is high, on-site storage of an alternate energy source sufficient to allow full output of the EPSS to be delivered for the class specified shall be required, with the provision for automatic transfer from the primary energy source to the alternate energy source.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Sat Aug 01 08:39:48 EDT 2020

Committee Statement

Committee Statement: In line with the technical committee's work to add fuel cells as a permissive power source for an EPSS, the addition of hydrogen as a permitted fuel source is to recognize this fuel source which is in use today with some fuel cells. The inclusion of this fuel source allows for its use where approved by the AHJ. The reference to NFPA 2 in the annex is to assist users in finding requirements for the piping, tanks, and other equipment specific for the hydrogen fuel source.

Response Message: SR-56-NFPA 110-2020

Public Comment No. 33-NFPA 110-2020 [Section No. 5.1.1 [Excluding any Sub-Sections]]

Second Revision No. 2-NFPA 110-2020 [Section No. 5.2.1 [Excluding any Sub-Sections]]

Energy converters shall consist only of ~~rotating~~ equipment as indicated in 5.2.4.

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Tue Jun 16 14:34:34 EDT 2020

Committee Statement

Committee Statement: The deletion of the word rotating allows for other technologies that are not of the rotating nature.
Response Message: SR-2-NFPA 110-2020

Public Comment No. 34-NFPA 110-2020 [Section No. 5.2.1 [Excluding any Sub-Sections]]

Second Revision No. 7-NFPA 110-2020 [New Section after 5.2.1.1]

5.2.1.2*

Fuel cell systems utilized as Level 1 energy converters shall be listed or field labeled.

A.5.2.1.2

A standard available for listing or field labeling fuel cells is ANSI/CSA FC1, *Standard for Stationary Fuel Cell Power Systems* .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jun 18 14:35:30 EDT 2020

Committee Statement

Committee Statement: This change requires fuel cells to be listed and for those solutions that are not listed or modified it provides the ability to be field labeled through the process of a field evaluation. The annex provides an example of recognized reference standards.

Response Message: SR-7-NFPA 110-2020

Public Comment No. 35-NFPA 110-2020 [New Section after 5.2.1.1]

Second Revision No. 51-NFPA 110-2020 [Section No. 5.2.4]

5.2.4 EPS.

5.2.4.1

~~Rotating~~ EPS utilizing rotating equipment shall consist of a generator driven by one of the following prime mover types:

(1) Otto cycle (spark ignited)

(2) Diesel cycle

(3) Gas turbine cycle

5.2.4.2*

EPS utilizing fuel cell systems shall consist of one or more of the following types:

(1) Proton exchange membrane (PEMFC)

(2) Solid oxide (SOFC)

(3) Molten carbonate (MCFC)

(4) Phosphoric acid (PAFC)

(5) Alkaline (AFC)

A.5.2.4.2

There is a difference in start-up ramp time to full power based on the fuel cell type ranging from seconds to hours. During start-up, fuel cells have an average power output until they reach full power. If needed, additional power supplied from another source, such as a battery or ultra-capacitor, assists with powering the intended load during this time. Fuel cell systems that require high operating temperatures ramp slowly until they reach full power and an additional start-up power source is not necessary. For these types of fuel cells, they are typically run continuously to provide emergency power in the required time period.

5.2.4.3

~~Other~~ For EPS utilizing rotating equipment, other types of prime movers and their associated equipment meeting the applicable performance requirements of this standard shall be permitted, if acceptable to the authority having jurisdiction.

5.2.4.4

Where used for Level 1 applications, the prime mover shall not mechanically drive any equipment other than its operating accessories and its generator.

Supplemental Information

File Name	Description	Approved
sr-12_attchement.docx	SR-12 attachment - for staff use only.	

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Mon Jul 27 10:17:36 EDT 2020

Committee Statement

Committee Statement: Defines fuel cell types in the category of EPS, similar to rotating systems.

Response Message: SR-51-NFPA 110-2020

Public Comment No. 36-NFPA 110-2020 [Section No. 5.2.4]

Second Revision No. 9-NFPA 110-2020 [New Section after 5.2.5]

5.2.6

A fuel cell system EPS shall be installed in accordance with NFPA 853 .

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Thu Jun 18 14:57:05 EDT 2020

Committee Statement

Committee Statement: This adds a general installation requirement reference to NFPA 853 for fuel cells.
Response Message: SR-9-NFPA 110-2020

Public Comment No. 37-NFPA 110-2020 [New Section after 5.2.5]

Second Revision No. 10-NFPA 110-2020 [New Section after 5.3.1]

5.3.2

A fuel-cell-system-type EPS shall be provided with a thermal management system in accordance with its listing and intended installation location for cold start and load acceptance for the type of EPSS.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jun 18 14:59:43 EDT 2020

Committee Statement

Committee Statement: Some fuel cells require thermal management for proper operation from a cold start.

Response Message: SR-10-NFPA 110-2020

Public Comment No. 38-NFPA 110-2020 [New Section after 5.3.1]

Second Revision No. 11-NFPA 110-2020 [New Section after 5.3.5]

5.3.6

Fuel cell system EPS's shall be installed in accordance with its listing and manufacturer's recommended installation instructions and specifications.

5.3.6.1*

Fuel cell system EPS's shall be provided with a thermal management system in accordance with its listing.

A.5.3.6.1

The type of thermal management system utilized by a fuel cell system will be permitted to vary depending upon the type of fuel cell system and the limitations of its intended installation (e.g., outdoors or indoors in a controlled environment). Therefore, the fuel cell system should be installed in accordance with the manufacturer's recommended installation instructions and system specifications, and in accordance with its listing. The ability of the thermal management system to maintain the fuel cell system within its operating parameters in accordance with its intended installation environment are evaluated as part of its listing.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jun 18 15:18:24 EDT 2020

Committee Statement

Committee Statement: Fuel cells are required to be installed in accordance with the listing. Temperature management is required in accordance with the listing. The annex material provides information regarding thermal management relative to fuel cell type and installation location.

Response Message: SR-11-NFPA 110-2020

Public Comment No. 39-NFPA 110-2020 [New Section after 5.3.5]

Second Revision No. 22-NFPA 110-2020 [New Section after 5.6]

5.7 Fuel Cell System Equipment.

5.7.1 General.

Fuel cell systems and accessories shall comply with NFPA 853 , except as modified in this standard.

Detail SR-57

5.7.2 Fuel Cell System Ratings.

Derating factors, such as altitudes, ambient temperature, fuel energy content, accessory losses, and site conditions as recommended by the manufacturer of the fuel cell system shall be used in determining whether or not the fuel cell system meets the connected load requirements.

Detail SR-58

5.7.3 Fuel Cell System Accessories.

Fuel cell system controls/power conditioning systems shall maintain a bandwidth of rated frequency for any constant load (i.e., steady-state condition) that is compatible with the load.

5.7.3.1

The frequency droop between no load and full load shall be within the range for the load.

5.7.3.2

The frequency dip upon one-step application of the full load shall not be outside the range for the load, with a return to steady-state conditions occurring within the requirements of the load.

Detail SR-59

5.7.4* Fuel Cell System Starting Equipment.

Fuel cell starting system shall be in accordance with the manufacturer’s instructions.

Detail SR-60

5.7.5 Control Functions.

5.7.5.1

An on-site control panel that includes local status notification shall be provided.

5.7.5.1.1

Where approved by the authority having jurisdiction, a remote monitoring control system shall be permitted to be used instead of an on-site control panel.

5.7.5.1.2

The following functions shall be provided:

(1) Automatic remote start capability

(2) Run/Off/Automatic switch function

(3) Shutdowns as required by 5.7.5.2.2 (2)

(4) Alarms as required by 5.7.5.2.2 (3)

(5) Controls as required by 5.7.5.2.2 (4)

(6) Load shed controls as required by 5.7.5.2.2 (5)

5.7.5.2

An automatic control and safety panel shall be a part of the EPS.

Table 5.7.5.2 Safety Indications and Shutdowns

-	Level 1			Level 2		
Indicator Function	**CV**	**S**	**RA**	**CV**	**S**	**RA**
(a) EPS supplying load	X	N/A	N/A	O	N/A	N/A
(b) Low pressure—fuel line or low fuel level	X	X	X	X	X	O
(c) High pressure—fuel line	X	X	X	X	X	O
(d) High-temperature prealarm	X	N/A	X	O	N/A	N/A
(e) High temperature	X	X	X	X	X	O
(f) Loss of ventilation fan	X	X	X	X	X	O
(g) Loss of communication with control panel or monitoring source	X	X	O	X	X	O
(h) Contacts for local and remote common alarm	X	N/A	X	X	N/A	X
(i) Audible alarm silencing switch	N/A	N/A	N/A	O	N/A	N/A
(j) Remote emergency stop	N/A	X	N/A	N/A	X	N/A
(k) Load Shed	X	N/A	X	N/A	N/A	N/A

CV: Control panel or monitoring station visual. S: Shutdown of EPS. RA: Remote audible. X: Required. O: Optional. N/A: Not applicable.

Notes:

(1) All required CV functions shall be visually annunciated by a remote, common visual indicator.

(2) Items (b), (c), (e), (f), and (g) shall lead to system shut down when the time limit exceeds the manufacturer's specifications.

(3) Item (h) shall be provided, but a separate remote audible signal shall not be required when the regular work site in 5.7.6 is staffed 24 hours a day.

(4) Item (a) EPS ac ammeter shall be permitted for this function.

(5) All required functions indicated in the RA column shall be annunciated by a remote, common audible alarm as required in 5.7.5.2.2(3).

(6) Item (b): Low fuel level is required by 5.5.2 for onsite fuel storage tanks.

5.7.5.2.1

Where approved by the authority having jurisdiction, a remote monitoring control system shall be permitted to be used instead of an on-site control panel.

5.7.5.2.2

The control system shall contain the following equipment or possess the following characteristics, or both:

(1) Run/Off/Automatic control functions as described as follows:

(a) *Run:* Manually initiate, start of fuel cell system

(b) *Off:* Stop fuel cell system or reset safeties, or both

(c) *Automatic:* Allow fuel cell system to start by a signal from a remote-control system

(2) Controls to shut down and lock out the fuel cell system under any of the following conditions:

(a) Failing to start after manufacturer's specified time

(b) Abnormal conditions, including high temperatures as listed in Table 5.7.5.2

(c) Operation of remote manual stop station

(3) Individual alarm indication on a control panel with the following characteristics to annunciate any of the conditions listed in Table 5.7.5.2:

(a) Battery powered (if utilized)

(b) Visually indicated

(c) Have additional contacts or circuits for a common audible alarm that signals locally and remotely when any of the itemized conditions occurs

(d) Have a lamp test switch(es) to test the operation of all alarm lamps

(4) Controls to shut down the fuel cell system upon removal of the initiating signal or manual emergency shutdown

(5) Controls to shed Level 2 loads and to initiate an overload alarm for EPS that serves both Level 1 and Level 2 loads

5.7.5.3

The control panel or remote monitoring control system in 5.7.5.2.2(4) shall be approved for either a Level 1 or a Level 2 EPS consistent with the installation.

5.7.5.4

All installations shall be provided with at least one remote emergency stop switch for each fuel cell power system.

5.7.5.4.1

The remote emergency stop switch shall be located outside the room housing the fuel cell power system or exterior enclosure.

5.7.5.4.2

The remote emergency stop switch shall be permitted to be mounted on the exterior of the enclosure.

5.7.5.4.3

Provisions shall be made so access is limited to qualified persons.

5.7.5.4.4

The remote emergency stop switch shall identify the EPS it controls.

5.7.5.5*

A remote, common audible alarm shall be provided as specified in 5.7.5.2.2(3).

Detail SR-62

5.7.6 Fuel Cell Cooling Systems.

Cooling systems for fuel cell systems shall be either forced-air or natural convection, liquid-cooled, or a combination thereof.

Supplemental Information

File Name	Description	Approved

SR-60_Table_5.7.5.2.docx SR-60 Table 5.7.5.2 for ballotable detail - for staff use

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 10:50:31 EDT 2020

Committee Statement

Committee Statement: This revision aligns with the work to add fuel cells as a permissive power source for an EPSS.

5.7.1 The language in this section aligns with NFPA 99, NFPA 70 (NEC) and other sections of NFPA 110.

5.7.2 This revision is in line with the technical committee's work to add fuel cells as a permissive power source for an EPSS. Language aligns with rotary equipment requirements of Section 5.6.2.

5.7.3 This revision is in line with the technical committee's work to add fuel cells as a permissive power source for an EPSS. The language in this section aligns with rotary equipment requirements of Section 5.6.3 to ensure operation and control within the parameters of the system.

5.7.4 This revision is in line with the technical committee's work to add fuel cells as a permissive power source for an EPSS. The language in this section clarifies that unlike rotating equipment fuel cells don't typically rely on batteries to start.

5.7.5 This revision is in line with the technical committee's work to add fuel cells as a permissive power source for an EPSS. The language and control functions described in this section align with rotary equipment requirements of Section 5.6.5 to ensure operation and control within the parameters of the system.

5.7.6 This revision is in line with the technical committee's work to add fuel cells as a permissive power source for an EPSS. The language in this section aligns with rotary equipment requirements of Section 5.6.7 to ensure operation within the parameters of the system.

SR-57, SR-58, SR-59, SR-60, and SR-62 are ballotable details

Response Message: SR-22-NFPA 110-2020 Also see SR-23, SR-24, SR-25, SR-26, and SR-27

Public Comment No. 40-NFPA 110-2020 [New Section after 5.6.10.6]

Second Revision No. 3-NFPA 110-2020 [Section No. 5.6.5.1]

5.6.5.1

A control panel shall be provided ~~and shall contain the following:~~ .

~~Automatic remote start capability~~

~~"Run-off-automatic" switch function~~

~~Shutdowns as required by 5.6.5.2(3)~~

~~Alarms as required by 5.6.5.2(4)~~

~~Controls as required by 5.6.5.2(5)~~

5.6.5.2

Control panels provided in accordance with 5.6.5.1 shall contain the following:

(1) Automatic remote start capability

(2) "Run-off-automatic" switch function

(3) Shutdowns as required by 5.6.5.4(3)

(4) Alarms as required by 5.6.5.4(4)

(5) Controls as required by 5.6.5.4(5)

(6) Load shed controls for Level 1 systems as required by 5.6.5.4 (7)

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Tue Jun 16 15:01:57 EDT 2020

Committee Statement

Committee Statement: NFPA 70 section 700.4 (B) requires "selective load pick up and load shedding" when both emergency and other loads are served from a Level 1 common generator.

Response Message: SR-3-NFPA 110-2020

Public Comment No. 9-NFPA 110-2020 [Section No. 5.6.5.1]

Second Revision No. 4-NFPA 110-2020 [Section No. 5.6.5.2]

5.6.5.3

Where a control panel is mounted on the energy converter, it shall be mounted by means of antivibration shock mounts, if required, to maximize reliability. An automatic control and safety panel shall be a part of the EPS containing the following equipment or possess the following characteristics, or both:

Cranking control equipment to provide the complete cranking cycle described in 5.6.4.2 and required by Table 5.6.4.2

Panel-mounted control switch(es) marked "run-off-automatic" to perform the following functions:

Run: Manually initiate, start, and run prime mover

Off: Stop prime mover or reset safeties, or both

Automatic: Allow prime mover to start or stop by operating a remote contact.

Controls to shut down and lock out the prime mover under any of the following conditions:

Failing to start after specified cranking time

Overspeed

Low lubricating-oil pressure

High engine temperature (An automatic engine shutdown device for high lubricating-oil temperature shall not be required.)

Operation of remote manual stop station

Individual alarm indication to annunciate any of the conditions listed in Table 5.6.5.3 and with the following characteristics:

Battery powered

Visually indicated

Have additional contacts or circuits for a common audible alarm that signals locally and remotely when any of the itemized conditions occurs

Have a lamp test switch(es) to test the operation of all alarm lamps

Controls to shut down the prime mover upon removal of the initiating signal or manual emergency shutdown

The ac instruments listed in 5.6.9.9

Table 5.6.5.3 Safety Indications and Shutdowns

	Level 1			Level 2		
Indicator Function (at Battery Voltage)	CV	S	RA	CV	S	RA
(a) Overcrank	X	X	X	X	X	O
(b) Low water temperature	X	NA	X	X	NA	O
(c) High engine temperature pre-alarm	X	NA	X	O	NA	NA
(d) High engine temperature	X	X	X	X	X	O
(e) Low lube oil pressure	X	X	X	X	X	O
(f) Overspeed	X	X	X	X	X	O
(g) Low fuel main tank	X	NA	X	O	NA	O
(h) Low coolant level	X	O	X	X	O	X
(i) EPS supplying load	X	NA	NA	O	NA	NA
(j) Control switch not in automatic position	X	NA	X	X	NA	X
(k) High battery voltage	X	NA	NA	O	NA	NA
(l) Low cranking voltage	X	NA	X	O	NA	O
(m) Low voltage in battery	X	NA	NA	O	NA	NA
(n) Battery charger ac failure	X	NA	NA	O	NA	NA

	Level 1			Level 2		
Indicator Function (at Battery Voltage)	CV	S	RA	CV	S	RA
(o) Lamp test	X	NA	NA	X	NA	NA
(p) Contacts for local and remote common alarm	X	NA	X	X	NA	X
(q) Audible alarm silencing switch	NA	NA	X	NA	NA	O
(r) Low starting air pressure	X	NA	NA	O	NA	NA
(s) Low starting hydraulic pressure	X	NA	NA	O	NA	NA
(t) Air shutdown damper when used	X	X	X	X	X	O
(u) Remote emergency stop	NA	X	NA	NA	X	NA
(v) Overload alarm/load shed contact	X	NA	X	NA	NA	NA

CV: Control panel–mounted visual. S: Shutdown of EPS. RA: Remote audible. X: Required. O: Optional. NA: Not applicable.

Notes:

(1) Item (p) shall be provided, but a separate remote audible signal shall not be required when the regular work site in 5.6.6 is staffed 24 hours a day.

(2) Item (b) is not required for combustion turbines.

(3) Item (r) or (s) shall apply only where used as a starting method.

(4) Item (i) EPS ac ammeter shall be permitted for this function.

(5) All required CV functions shall be visually annunciated by a remote, common visual indicator.

(6) All required functions indicated in the RA column shall be annunciated by a remote, common audible alarm as required in 5.6.5.2(4).

(7) Item (g) on gaseous systems shall require a low gas pressure alarm.

(8) Item (b) shall be set at 11°C (20°F) below the regulated temperature determined by the EPS manufacturer as required in 5.3.1.

5.6.5.4

An automatic control and safety panel shall be a part of the EPS containing the following equipment or possess the following characteristics, or both:

(1) Cranking control equipment to provide the complete cranking cycle described in 5.6.4.2 and required by Table 5.6.4.2

(2) Panel-mounted control switch(es) marked ~~"run-off-automatic"~~ Run/Off/Automatic to perform the following functions:

(a) *Run:* Manually initiate, start, and run prime mover

(b) *Off:* Stop prime mover or reset safeties, or both

(c) *Automatic:* Allow prime mover to start or stop by operating a remote contact.

(3) Controls to shut down and lock out the prime mover under any of the following conditions:

(a) Failing to start after specified cranking time

(b) Overspeed

(c) Low lubricating-oil pressure

(d) High engine temperature unless high temperature is due to high lubricating-oil temperature ~~(An automatic engine shutdown device for high lubricating-oil temperature shall not be required.)~~

(e) Operation of remote manual stop station

(4) Individual alarm indication to annunciate any of the conditions listed in Table 5.6.5.4 and with the following characteristics:

(a) Battery powered

(b) Visually indicated

(c) Have additional contacts or circuits for a common audible alarm that signals locally and remotely when any of the itemized conditions occurs

(d) Have a lamp test switch(es) to test the operation of all alarm lamps

(5) Controls to shut down the prime mover upon removal of the initiating signal or manual emergency shutdown

(6) The ac instruments listed in 5.6.9.9

(7) Controls to shed Level 2 loads and to initiate an overload alarm for EPS that serves both Level 1 and Level 2 loads, per Table 5.6.5.4

Table 5.6.5.4 Safety Indications and Shutdowns

	Level 1			Level 2		
Indicator Function (at Battery Voltage)	**CV**	**S**	**RA**	**CV**	**S**	**RA**
(a) Overcrank	X	X	X	X	X	O
(b) Low water temperature	X	~~NA~~ N/A	X	X	~~NA~~ N/A	O
(c) High engine temperature ~~pre-alarm~~ prealarm	X	~~NA~~ N/A	X	O	~~NA~~ N/A	~~NA~~ N/A
(d) High engine temperature	X	X	X	X	X	O
(e) Low ~~lube oil~~ lube-oil pressure	X	X	X	X	X	O
(f) Overspeed	X	X	X	X	X	O
(g) Low fuel main tank	X	~~NA~~ N/A	X	O	~~NA~~ N/A	O
(h) Low coolant level	X	O	X	X	O	X
(i) EPS supplying load	X	~~NA~~ N/A	~~NA~~ N/A	O	~~NA~~ N/A	~~NA~~ N/A
(j) Control switch not in automatic position	X	~~NA~~ N/A	X	X	~~NA~~ N/A	X
(k) High battery voltage	X	~~NA~~ N/A	~~NA~~ N/A	O	~~NA~~ N/A	~~NA~~ N/A
(l) Low cranking voltage	X	~~NA~~ N/A	X	O	~~NA~~ N/A	O
(m) Low voltage in battery	X	~~NA~~ N/A	~~NA~~ N/A	O	~~NA~~ N/A	~~NA~~ N/A
(n) Battery charger ac failure	X	~~NA~~ N/A	~~NA~~ N/A	O	~~NA~~ N/A	~~NA~~ N/A
(o) Lamp test	X	~~NA~~ N/A	~~NA~~ N/A	X	~~NA~~ N/A	~~NA~~ N/A
(p) Contacts for local and remote common alarm	X	~~NA~~ N/A	X	X	~~NA~~ N/A	X

	Level 1			Level 2		
Indicator Function (at Battery Voltage)	**CV**	**S**	**RA**	**CV**	**S**	**RA**
(q) Audible alarm silencing switch	~~NA~~ N/A	~~NA~~ N/A	X	~~NA~~ N/A	~~NA~~ N/A	O
(r) Low starting air pressure	X	~~NA~~ N/A	~~NA~~ N/A	O	~~NA~~ N/A	~~NA~~ N/A
(s) Low starting hydraulic pressure	X	~~NA~~ N/A	~~NA~~ N/A	O	~~NA~~ N/A	~~NA~~ N/A
(t) Air shutdown damper when used	X	X	X	X	X	O
(u) Remote emergency stop	~~NA~~ N/A	X	~~NA~~ N/A	~~NA~~ N/A	X	~~NA~~ N/A
(v) Overload alarm/load shed contact	X	~~NA~~ N/A	X	~~NA~~ N/A	~~NA~~ N/A	~~NA~~ N/A

CV: ~~Control panel–mounted~~ Control-panel-mounted visual. S: Shutdown of EPS. RA: Remote audible. X: Required. O: Optional. ~~NA~~ N/A : Not applicable.

Notes:

(1) Item (p) shall be provided, but a separate remote audible signal shall not be required when the regular work site in 5.6.6 is staffed 24 hours a day.

(2) Item (b) is not required for combustion turbines.

(3) Item (r) or (s) shall apply only where used as a starting method.

(4) Item (i) EPS ac ammeter shall be permitted for this function.

(5) All required CV functions shall be visually annunciated by a remote, common visual indicator.

(6) All required functions indicated in the RA column shall be annunciated by a remote, common audible alarm as required in 5.6.5.2(4).

(7) Item (g) on gaseous systems shall require a low gas pressure alarm.

(8) Item (b) shall be set at 11°C (20°F) below the regulated temperature determined by the EPS manufacturer as required in 5.3.1.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Tue Jun 16 15:09:35 EDT 2020

Committee Statement

Committee Statement: NFPA 70 Section 700.4 (B) requires "selective load pick up and load shedding" when both emergency and other loads are served from a Level 1 common generator.

Response Message: SR-4-NFPA 110-2020

Public Comment No. 10-NFPA 110-2020 [Section No. 5.6.5.2]

Second Revision No. 13-NFPA 110-2020 [Section No. 7.4.1]

7.4.1

~~Rotating energy~~ Energy converters shall be installed on solid foundations that are capable of supporting the equipment or components, and to prohibit sagging of items, such as fuel, exhaust, or lubricating-oil piping, and damage to parts resulting in leakage at joints.

7.4.1.1

~~Such~~ For rotating energy converters, such foundations or structural bases shall raise the engine at least 150 mm (6 in.) above the floor or grade level and be of sufficient elevation to facilitate lubricating-oil drainage and ease of maintenance.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:02:58 EDT 2020

Committee Statement

Committee Statement: This section is revised to expand beyond “rotating” equipment, using a more generic term of “energy converters”, which would include fuel cells. Requirements in 7.4.1.1 are specific to rotating equipment, so the requirement is revised accordingly

Response Message: SR-13-NFPA 110-2020

Public Comment No. 41-NFPA 110-2020 [Section No. 7.4.1]

Second Revision No. 5-NFPA 110-2020 [Section No. 7.4.4]

7.4.4 EPS Utilizing Rotating Equipment.

~~The EPS shall be mounted on a fabricated metal skid base of the type that shall resist damage during shipping and handling. After installation, the base shall maintain alignment of the unit during operation.~~

7.4.4.1

EPS utilizing rotating equipment shall be mounted on a fabricated metal skid base.

7.4.4.2

The fabricated metal skid base shall be able to resist damage during shipping and handling.

7.4.4.3

After installation, the fabricated metal skid base shall maintain alignment of the ~~unit~~ EPS during operation.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Tue Jun 16 15:28:04 EDT 2020

Committee Statement

Committee Statement: Not all technologies require a rigid frame. As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells, by limiting the application of this section to rotating equipment.

Response Message: SR-5-NFPA 110-2020

Public Comment No. 42-NFPA 110-2020 [Section No. 7.4.4]

Second Revision No. 14-NFPA 110-2020 [Section No. 7.5]

7.5* Vibration.

Vibration isolators, as recommended by the manufacturer of the EPS, shall be installed either between the EPS utilizing rotating equipment and its skid base or between the skid base and the foundation or inertia base.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:13:45 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells, by limiting the application of this section to rotating equipment.

Response Message: SR-14-NFPA 110-2020

Public Comment No. 43-NFPA 110-2020 [Section No. 7.5]

Public Comment No. 44-NFPA 110-2020 [New Section after 7.5]

Second Revision No. 15-NFPA 110-2020 [Section No. 7.7.2 [Excluding any Sub-Sections]]

Air shall be supplied to the EPS equipment for ~~combustion~~ proper operation .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:17:38 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells.

Response Message: SR-15-NFPA 110-2020

Public Comment No. 45-NFPA 110-2020 [Section No. 7.7.2 [Excluding any Sub-Sections]]

Second Revision No. 17-NFPA 110-2020 [New Section after 7.9.1.1]

7.9.1.2

All fuel tanks and systems for use with fuel cell power systems shall be installed and maintained in accordance with NFPA 853 .

7.9.1.3

All fuel tanks and systems for use with hydrogen-powered fuel cells shall be installed and maintained in accordance with NFPA 853 and NFPA 2 .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:29:04 EDT 2020

Committee Statement

Committee Statement: New sections identify the standards which contains the requirements for fuel cell power systems fuel tanks and systems.

Response Message: SR-17-NFPA 110-2020

Public Comment No. 47-NFPA 110-2020 [New Section after 7.9.1.1]

Second Revision No. 16-NFPA 110-2020 [Section No. 7.9.1.1]

7.9.1.1*

All fuel tanks and systems intended for use with rotating equipment shall be installed and maintained in accordance with NFPA 30, NFPA 37, NFPA 54, and NFPA 58.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:24:14 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells, by limiting the application of this section to rotating equipment.

Response Message: SR-16-NFPA 110-2020

Public Comment No. 46-NFPA 110-2020 [Section No. 7.9.1.1]

Second Revision No. 18-NFPA 110-2020 [Section No. 7.9.1.2]

7.9.1.4*

Fuel system design shall provide for a supply of clean fuel to the ~~prime mover~~ energy converter .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:45:49 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This change is ensuring this requirement applies to all energy converters and is not limited to prime movers.

Response Message: SR-18-NFPA 110-2020

Public Comment No. 48-NFPA 110-2020 [Section No. 7.9.1.2]

Second Revision No. 19-NFPA 110-2020 [Section No. 7.9.2 [Excluding any Sub-Sections]]

Fuel tanks shall ~~be close enough to the prime mover for the fuel lift (suction head) of the prime mover fuel pump to meet the fuel system requirements, or a fuel transfer pump and day tank shall be provided.~~ comply with one of the following:

(1) Be close enough to the energy converter for the fuel lift (i.e., suction head) of the energy converter fuel pump to meet the fuel system requirements

(2) Be provided with a fuel transfer pump and day tank

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:51:32 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells.

Response Message: SR-19-NFPA 110-2020

Public Comment No. 49-NFPA 110-2020 [Section No. 7.9.2 [Excluding any Sub-Sections]]

Second Revision No. 20-NFPA 110-2020 [Section No. 7.9.3.2]

7.9.3.2

Approved flexible fuel lines shall be used between the ~~prime mover~~ energy converter and the fuel piping.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:55:35 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells.

Response Message: SR-20-NFPA 110-2020

Public Comment No. 50-NFPA 110-2020 [Section No. 7.9.3.2]

Second Revision No. 21-NFPA 110-2020 [Section No. 7.9.6]

7.9.6*

The fuel supply for gas-fueled and liquid-fueled ~~prime movers~~ energy converters shall be installed in accordance with applicable standards.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 09 15:59:16 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells.

Response Message: SR-21-NFPA 110-2020

Public Comment No. 51-NFPA 110-2020 [Section No. 7.9.6]

Second Revision No. 36-NFPA 110-2020 [Section No. 7.9.7]

7.9.7*

Where the gas supply is connected to the building gas supply system, it shall be connected on the supply side of the main gas shutoff valve and marked as supplying an emergency ~~generator~~ power source .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 15:35:46 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells,

Response Message: SR-36-NFPA 110-2020

Public Comment No. 52-NFPA 110-2020 [Section No. 7.9.7]

Second Revision No. 37-NFPA 110-2020 [Section No. 7.9.9]

7.9.9

The fuel supply for gas-fueled and liquid-fueled ~~prime movers~~ energy converters shall be designed to meet the demands of the ~~prime mover~~ energy converter for all of the following factors, as applicable :

(1) Sizing of fuel lines
(2) Valves, including manual shutoff
(3) Battery-powered fuel solenoids
(4) Gas regulators
(5) Regulator vent piping
(6) Flexible fuel line section
(7) Fuel line filters
(8) Fuel vaporizers (LP-Gas)
(9) Ambient temperature effect of fuel tank vaporization rates of LP-Gas, where applicable

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Thu Jul 16 15:38:49 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells, by limiting the application of this section to rotating equipment

Response Message: SR-37-NFPA 110-2020

Public Comment No. 53-NFPA 110-2020 [Section No. 7.9.9]

Second Revision No. 38-NFPA 110-2020 [Section No. 7.9.13]

7.9.13

Automatically actuated valves shall not be permitted in the fuel oil supply or fuel oil return lines for Level 1 ~~emergency power supply systems~~ EPSS .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 15:40:26 EDT 2020

Committee Statement

Committee Statement: Editorial change for consistency.

Response Message: SR-38-NFPA 110-2020

Public Comment No. 54-NFPA 110-2020 [Section No. 7.9.13]

Second Revision No. 40-NFPA 110-2020 [New Section after 7.10.1]

7.10.2

The exhaust system equipment and installation, and related accessories for fuel cell power systems, shall be in accordance with NFPA 853 and other applicable standards.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 15:50:09 EDT 2020

Committee Statement

Committee Statement: New section identifies the proper standards used as requirements for exhaust systems for use with fuel cell power systems

Response Message: SR-40-NFPA 110-2020

Second Revision No. 39-NFPA 110-2020 [Section No. 7.10.1]

7.10.1

The exhaust system equipment and installation, including piping, muffler, and related accessories~~,~~ for combustion engines and gas turbines, shall be in accordance with NFPA 37 and other applicable standards.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 15:47:58 EDT 2020

Committee Statement

Committee Statement: To accommodate alternate EPS types, such as fuel cells, this section is revised to apply to combustion engines and gas turbines only.

Response Message: SR-39-NFPA 110-2020

Public Comment No. 55-NFPA 110-2020 [Section No. 7.10.1]

Second Revision No. 41-NFPA 110-2020 [Section No. 7.10.3 [Excluding any Sub-Sections]]

Exhaust piping shall be ~~connected to the prime mover by means of a flexible connector and shall be independently supported thereafter so that no damaging weight or stress is applied to the engine exhaust manifold or turbocharger.~~ both of the following:

(1) Connected to the energy converter by means of a flexible connector

(2) Independently supported thereafter so that no damaging weight or stress is applied to the converter components

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 15:55:46 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells, by limiting the application of this section to rotating equipment.

Response Message: SR-41-NFPA 110-2020

Public Comment No. 56-NFPA 110-2020 [Section No. 7.10.3 [Excluding any Sub-Sections]]

Second Revision No. 42-NFPA 110-2020 [Section No. 7.10.3.7]

7.10.4.7

Design consideration shall be given to insulating the ~~engine~~ energy converter exhaust systems in buildings after the flexible section.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 15:57:37 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells.

Response Message: SR-42-NFPA 110-2020

Public Comment No. 57-NFPA 110-2020 [Section No. 7.10.3.7]

Second Revision No. 43-NFPA 110-2020 [Section No. 7.10.4]

7.10.5

For maximum efficiency, operation economy, and prevention of ~~engine~~ energy converter damage, the exhaust system shall be designed to eliminate excessive backpressure on the ~~engine~~ energy converter by ~~properly~~ selecting, routing, and installing the piping size, connections, and muffler.

7.10.5.1

Exhaust systems shall be installed to ensure satisfactory EPS operation and meet the requirements of the manufacturer.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 23 13:16:07 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells.

Response Message: SR-43-NFPA 110-2020

Public Comment No. 58-NFPA 110-2020 [Section No. 7.10.4]

Second Revision No. 44-NFPA 110-2020 [Section No. 7.11.2]

7.11.2*

Where fire suppression systems are installed in EPS equipment rooms or separate buildings, the following systems shall not be used:

(1) Carbon dioxide or halon systems, unless ~~prime mover~~ energy converter combustion air is taken from outside the structure

(2) An automatic dry chemical system, unless the manufacturers of the EPS certify that the dry chemical system cannot damage the EPS system, hinder its operation, or reduce its output

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 23 13:18:49 EDT 2020

Committee Statement

Committee Statement: As requirements in NFPA 110 are written to be more generic, requirements that are specific to rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types.

Response Message: SR-44-NFPA 110-2020

Public Comment No. 59-NFPA 110-2020 [Section No. 7.11.2]

Second Revision No. 45-NFPA 110-2020 [Section No. 7.12.5 [Excluding any Sub-Sections]]

~~The starting battery units~~ Where starting batteries are required, the batteries shall be located next to the ~~prime mover starter~~ EPS to minimize voltage drop.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 23 13:21:01 EDT 2020

Committee Statement

Committee Statement: This change is ensuring this requirement applies to all energy converter and is not limited to prime movers. This change also knowledges that all EPS do not require starting batteries.

Response Message: SR-45-NFPA 110-2020

Public Comment No. 60-NFPA 110-2020 [Section No. 7.12.5 [Excluding any Sub-Sections]]

Second Revision No. 46-NFPA 110-2020 [New Section after 7.13.4]

7.13.5 Fuel Cell–Based EPSS Acceptance Testing.

7.13.5.1

The EPSS shall perform within the limits specified in this standard.

7.13.5.2

For fuel cell–based EPSS, compliance is determined by the requirements in 7.13.5.3 through 7.13.5.5 .

7.13.5.3

The on-site installation acceptance test shall be conducted in accordance with 7.13.5.3.1 through 7.13.5.3.4 .

7.13.5.3.1

In a new and unoccupied building or facility, with the emergency load at operating level, a normal power failure shall be initiated by opening all switches or circuit breakers supplying the normal power to the building or facility.

7.13.5.3.2

In an existing occupied building or facility, with the emergency load at operating level, a normal power failure shall be simulated by operating at least one transfer switch test function or initiated by opening all switches or breakers supplying normal power to all automatic transfer switches (ATSs) that are part of the EPSS being commissioned by the initial acceptance test.

7.13.5.3.3

Where the EPSS consists of paralleled EPSs, the system control function for paralleling and load shedding shall be verified in accordance with system design documentation.

7.13.5.3.4

The tests conducted in accordance with 7.13.5.3.1 and 7.13.5.3.2 shall be performed in order as follows:

(1) Where the EPSS consists of paralleled EPSs, the quantity of EPSs intended to be operated simultaneously shall be tested simultaneously with building load for the test period identified in 7.13.5.3.4(6) .

(2) The test load shall be all loads that are served by the EPSS—there is no minimum loading requirement for this portion of the test.

(3) The time delay on transfer shall be observed and recorded.

(4) For noncontinuously operating fuel cells, the time taken to reach operating frequency shall be observed and recorded.

(5) The fuel cell operation shall be confirmed by verifying operaion of the initiating circuit of all transfer switches supplying EPSS loads.

(6) The time taken to achieve a steady-state condition with all switches transferred to the emergency position shall be observed and recorded.

(7) The voltage, frequency, and amperes shall be recorded.

(8) The load test with building load, or other loads that simulate the intended load as specified in Section 5.4 , shall comply with both of the following:

  (a) Be continued for not less than 1.5 hours

  (b) Have the run time recorded

(9) When normal power is restored to the building or facility, the time delay on retransfer to normal power for each switch with a minimum setting of 5 minutes shall be recorded.

7.13.5.4 Full-Load Test.

7.13.5.4.1

A load shall then be applied for a 2-hour, full-load test.

7.13.5.4.2

The building load shall be permitted to serve as part or all of the load, supplemented by a load bank of sufficient size to provide a load equal to 100 percent of the nameplate kW rating of the EPS, less applicable derating factors for site conditions.

7.13.5.4.3

The full-load test shall be initiated after the acceptance test specified in 7.13.5.3 , by any method that picks up not less than 30 percent of the nameplate kW rating for the first 30 minutes, not less than 50 percent of the nameplate kW rating for the next 30 minutes, and 100 percent of the nameplate kW rating for the next 60 minutes, less applicable derating factors for site conditions.

7.13.5.4.4

A unity power factor shall be permitted for on-site testing, provided that rated load tests at the rated power factor have been performed by the manufacturer of the EPS prior to shipment.

7.13.5.4.5

Where the EPS is a paralleled multi-unit EPS, each unit shall be permitted to be tested individually at its rating.

7.13.5.4.6

The data specified in 7.13.5.3.4 (3) and 7.13.5.3.4 (5) shall be recorded at first load acceptance of the test period identified in 7.13.5.3.4 (7).

7.13.5.4.7

The data specified in 7.13.5.3.4 (6) shall be recorded at first load acceptance and every 15 minutes thereafter until the completion of the test period identified in 7.13.5.3.4 (7).

7.13.5.5

All safeties specified in 5.7.5 and 5.7.6 shall be tested on-site as recommended by the manufacturer.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 23 13:40:19 EDT 2020

Committee Statement

Committee Statement: This section was added to provide guidance on testing of fuel cell systems. This section generally follows the procedures of generator system testing but has been modified to be specific to fuel cell.

Response Message: SR-46-NFPA 110-2020

Public Comment No. 62-NFPA 110-2020 [New Section after 7.13.4.5.2]

Second Revision No. 47-NFPA 110-2020 [Section No. 7.13.4]

7.13.4 Generator-Based EPSS Acceptance Testing.

7.13.4.1

The EPSS shall perform within the limits specified in this standard.

7.13.4.2

For generator-based EPSS, compliance shall be determined by the requirements in 7.13.4.3 through 7.13.4.8 .

7.13.4.3

The on-site installation acceptance test shall be conducted in accordance with ~~7.13.4.1.1~~ 7.13.4.3.1 through ~~7.13.4.1.4~~ 7.13.4.3.4 .

7.13.4.3.1*

In a new and unoccupied building or facility, with the prime mover in a cold start condition and the emergency load at operating level, a normal power failure shall be initiated by opening all switches or circuit breakers supplying the normal power to the building or facility.

7.13.4.3.2*

In an existing occupied building or facility, with the prime mover in a cold start condition and the emergency load at operating level, a normal power failure shall be simulated by operating at least one transfer switch test function or initiated by opening all switches or breakers supplying normal power to all ATSs that are part of the EPSS being commissioned by ~~this~~ the initial acceptance test.

7.13.4.3.3

~~When~~ Where the EPSS consists of paralleled EPSs, the system control function for paralleling and load shedding shall be verified in accordance with system design documentation.

7.13.4.3.4

The tests conducted in accordance with ~~7.13.4.1.1~~ 7.13.4.3.1 and ~~7.13.4.1.2~~ 7.13.4.3.2 shall be performed in accordance with ~~7.13.4.1.4(1) through 7.13.4.1.4(12)~~ . the following:

(1) When the EPSS consists of paralleled EPSs, the quantity of EPSs intended to be operated simultaneously shall be tested simultaneously with building load for the test period identified in ~~7.13.4.1.4(10)~~ 7.13.4.3.4(10) .

(2) The test load shall be all loads that are served by the EPSS. ~~There~~ —there is no minimum loading requirement for this portion of the test.

(3) The time delay on start shall be observed and recorded.

(4) The cranking time until the prime mover starts and runs shall be observed and recorded.

(5) The time taken to reach operating speed shall be observed and recorded.

(6)* The engine start function shall be confirmed by verifying operation of the initiating circuit of all transfer switches supplying EPSS loads.

(7) The time taken to achieve a steady-state condition with all switches transferred to the emergency position shall be observed and recorded.

(8) The voltage, frequency, and amperes shall be recorded.

(9) Where applicable, the prime mover oil pressure and water temperature shall be recorded.

(10) The load test with building load, or other loads that simulate the intended load as specified in Section 5.4, shall ~~be continued for not less than 1.5 hours, and the run time shall be recorded.~~ comply with both of the following:

(a) Be continued for not less than 1.5 hours

(b) Have the run time recorded

(11) When normal power is restored to the building or facility, the time delay on retransfer to normal power for each switch with a minimum setting of 5 minutes shall be recorded.

(12) The time delay on the prime mover cooldown period and shutdown shall be recorded.

7.13.4.4

After completion of the test performed in ~~7.13.4.1~~ 7.13.4.3 , the prime mover shall be allowed to cool for not less than 5 minutes.

7.13.4.5* Full-Load Test.

~~A load shall be applied for a 2-hour, full-load test. The building load shall be permitted to serve as part or all of the load, supplemented by a load bank of sufficient size to provide a load equal to 100 percent of the nameplate kW rating of the EPS, less applicable derating factors for site conditions. With full load applied, the coolant temperature of the generator set shall stabilize at a constant value relative to outdoor ambient temperature at least 30 minutes prior to completion of the test.~~

7.13.4.5.1

A load shall be applied for a 2-hour, full-load test.

7.13.4.5.2

The building load shall be permitted to serve as part or all of the load, supplemented by a load bank of sufficient size to provide a load equal to 100 percent of the nameplate kW rating of the EPS, less applicable derating factors for site conditions.

7.13.4.5.3

With full load applied, the coolant temperature of the generator set shall stabilize at a constant value relative to outdoor ambient temperature at least 30 minutes prior to completion of the test.

7.13.4.5.4*

~~This~~ The full-load test shall be initiated after the test specified in ~~7.13.4.1.4~~ 7.13.4.3.4 by any method that starts the prime mover and, upon reaching rated rpm, picks up not less than 30 percent of the nameplate kW rating for the first 30 minutes, not less than 50 percent of the nameplate kW rating for the next 30 minutes, and 100 percent of the nameplate kW rating for the next 60 minutes, less applicable derating factors for site conditions.

7.13.4.5.5

A unity power factor shall be permitted for on-site testing, provided that rated load tests at the rated power factor have been performed by the manufacturer of the EPS prior to shipment.

7.13.4.5.6

Where the EPS is a paralleled multi-unit EPS, each unit shall be permitted to be tested individually at its rating.

7.13.4.5.7

The data specified in ~~7.13.4.1.4(4)~~ 7.13.4.3.4(4) , ~~7.13.4.1.4(5)~~ 7.13.4.3.4(5) , and ~~7.13.4.1.4(7)~~ 7.13.4.3.4(7) shall be recorded at first load acceptance of the test period identified in ~~7.13.4.1.4(10)~~ 7.13.4.3.4(10) .

7.13.4.5.8

The data specified in ~~7.13.4.1.4(8)~~ 7.13.4.3.4(8) and ~~7.13.4.1.4(9)~~ 7.13.4.3.4(9) shall be recorded at first load acceptance and every 15 minutes thereafter until the completion of the test period identified in ~~7.13.4.1.4(10)~~ 7.13.4.3.4(10) .

7.13.4.6

Any method recommended by the manufacturer for the cycle crank test shall be utilized to prevent the prime mover from running.

7.13.4.6.1

The control switch shall be set at “run” to cause the prime mover to crank.

7.13.4.6.2

The complete crank/rest cycle specified in 5.6.4.2 and Table 5.6.4.2 shall be observed.

7.13.4.6.3

The battery charge rate shall be recorded at 5-minute intervals for the first 15 minutes or until charge rate stabilization.

7.13.4.7

All safeties specified in 5.6.5 and 5.6.6 shall be tested on site as recommended by the manufacturer.

7.13.4.7.1

It shall be permitted for the manufacturer to test and document overcrank, high engine temperature, low ~~lube oil~~ lube-oil pressure and overspeed safeties prior to shipment.

7.13.4.7.2

Where the safety functions are proven to be fail-safe as demonstrated by monitoring of normal conditions on engine metering and demonstration that a failed sensor or circuit will not cause shutdown of the engine, further testing of the safeties shall not be required.

7.13.4.8

~~Items (1) through (4)~~ The following shall be made available to the authority having jurisdiction at the time of the acceptance test:

(1) Evidence of the prototype test as specified in ~~5.2.1.2~~ 5.2.1.3 (for Level 1 systems)

(2) A certified analysis as specified in 5.6.10.2

(3) A letter of compliance as specified in 5.6.10.5

(4) A manufacturer’s certification of a rated load test at rated power factor with the ambient temperature, altitude, and fuel grade recorded

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 23 13:53:33 EDT 2020

Committee Statement

Committee As requirements in NFPA 110 are written to be more generic, requirements that are specific to

Statement:	rotating equipment are revised accordingly. This revision will also accommodate alternate EPS types, such as fuel cells, by limiting the application of this section to rotating equipment.
Response Message:	SR-47-NFPA 110-2020

Public Comment No. 63-NFPA 110-2020 [Section No. 7.13.4.6]

Public Comment No. 61-NFPA 110-2020 [Section No. 7.13.4.1]

Second Revision No. 29-NFPA 110-2020 [New Section after 8.2.4]

8.2.5

For fuel cell system maintenance, a maintenance manual shall be provided in accordance with Section 7.4.5 of IEC 62282-3-100, *Fuel cell technologies - Part 3-100: Stationary fuel cell power systems safety* .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 13:12:05 EDT 2020

Committee Statement

Committee Statement: This change reflects the latest published industry practice for the types of content necessary in a fuel cell system maintenance manual.

Response Message: SR-29-NFPA 110-2020

Public Comment No. 64-NFPA 110-2020 [New Section after 8.2.4.1]

Second Revision No. 6-NFPA 110-2020 [Section No. 8.3.7]

8.3.7*

A fuel quality test shall be performed at least annually using ~~appropriate~~ applicable ASTM standards or the manufacturer's recommendations.

A.8.3.7

Diesel fuel maintenance and regular testing should begin the day of installation and first fill to establish a benchmark guideline for future comparison. Diesel fuel should be monitored for water on the tank bottom and tested for degradation and contamination.

All testing should be performed using ASTM-approved test methods such as, but not limited to, ASTM D4057, *Standard Practice for Manual Sampling of Petroleum and Petroleum Products* , for fuel quality, ASTM D7464, *Standard Practice for Manual Sampling of Liquid Fuels, Associated Materials and Fuel System Components for Microbiological Testing* , for microbial contamination, ASTM D2709, *Standard Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge* , for water and sediment, ASTM D4176, *Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)* , for appearance-distillate, and ASTM D7220, *Standard Test Method for Sulfur in Automotive, Heating, and Jet Fuels by Monochromatic Energy Dispersive X-ray Fluorescence Spectrometry*, for Sulfur (ppm), and meet engine manufacturer requirements.

If diesel fuel is found to be outside of the acceptable range in the testing, the fuel should be remediated to bring it back to the required fuel quality specified under ASTM. Where annual fuel testing has revealed the need for remediation (e.g., cleaning, treatment, or replacement of fuel), additional testing of fuel should be implemented every 90 days until analysis is acceptable.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jun 18 13:53:15 EDT 2020

Committee Statement

Committee Statement: Annual fuel testing is adequate as a minimum. Flood prone areas or areas at risk of higher contamination may choose to test at a higher frequency. The addition of annex material gives further guidance as to the types of tests available as well as guidance on how to mitigate deficiencies.

Response Message: SR-6-NFPA 110-2020

Public Comment No. 29-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 27-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 69-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 18-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 24-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 19-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 32-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 2-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 23-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 25-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 31-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 68-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 16-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 14-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 20-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 17-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 26-NFPA 110-2020 [Section No. 8.3.7]

Public Comment No. 22-NFPA 110-2020 [Section No. 8.3.7]

Second Revision No. 30-NFPA 110-2020 [New Section after 8.4.1.1]

8.4.1.2

If a continually operating fuel cell system is used for standby power or for peak load shaving, such use shall be both of the following:

(1) Recorded

(2) Permitted to be substituted for scheduled operations and testing of the fuel cell system, providing the same record as required by Section 8.5

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 13:26:44 EDT 2020

Committee Statement

Committee Statement: This change reflects that continually operating fuel cells do not need additional scheduled operations and testing.

Response Message: SR-30-NFPA 110-2020

Public Comment No. 65-NFPA 110-2020 [New Section after 8.4.1.1]

Second Revision No. 31-NFPA 110-2020 [Section No. 8.4.4]

8.4.4

Load tests of generator sets shall include complete cold starts.

8.4.4.1

An EPS that is continually running as an energy source shall not be required to comply with 8.4.4 .

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 13:36:28 EDT 2020

Committee Statement

Committee Statement: This change reflects that it is not necessary to conduct a cold start of a continually running EPS.

Response Message: SR-31-NFPA 110-2020

Public Comment No. 66-NFPA 110-2020 [Section No. 8.4.4]

Second Revision No. 32-NFPA 110-2020 [New Section after 8.4.9.5.3]

8.4.9.5.4

For fuel cell–system EPSs, loading shall be the available EPSS load.

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 13:40:38 EDT 2020

Committee Statement

Committee Statement: It is not necessary to meet manufacturer-recommended exhaust gas temperatures since fuel cells do not create wet stacking conditions.

Response Message: SR-32-NFPA 110-2020

Public Comment No. 67-NFPA 110-2020 [New Section after 8.4.9.5.3]

Second Revision No. 48-NFPA 110-2020 [Section No. A.4.4.2]

A.4.4.2

Typically, Level 2 systems are intended to supply power automatically to selected loads (other than those classed as emergency systems) in the event of failure of the primary source.

Level 2 systems typically are installed to serve loads, such as the following, that, when stopped due to any interruption of the primary electrical supply, could create hazards or hamper rescue or fire-fighting operations:

(1) Heating and refrigeration systems

(2) Communications systems

(3) Ventilation and smoke removal systems

(4) Sewage disposal

(5) Lighting, including unit equipment ~~defined~~ described in *NFPA 70 (NEC)*, 700.12(I)

(6) Industrial processes

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 23 14:14:23 EDT 2020

Committee Statement

Committee Statement: This revision clarifies the NEC reference describing the components necessary in unit equipment.

Response Message: SR-48-NFPA 110-2020

Public Comment No. 70-NFPA 110-2020 [Section No. A.4.4.2]

Second Revision No. 28-NFPA 110-2020 [Section No. B.1]

B.1 Typical Power Supply Systems.

See Figure B.1(a) through Figure B.1(g) for examples.

Figure B.1(a) Typical Rotating Emergency Power Supply System.

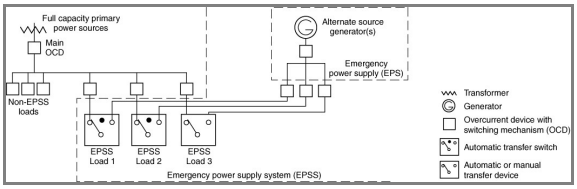


Figure B.1(b) Typical Multiple-Unit Emergency Power Supply System.

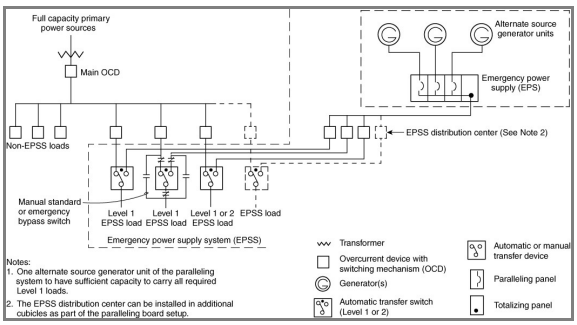


Figure B.1(c) Typical Composite Emergency Power Supply System.

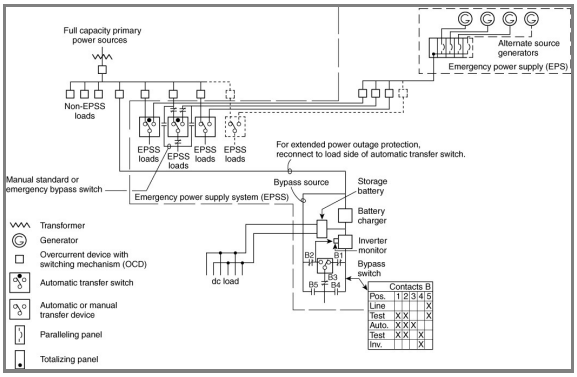


Figure B.1(d) Typical Uninterruptible Power Supply (UPS) System.

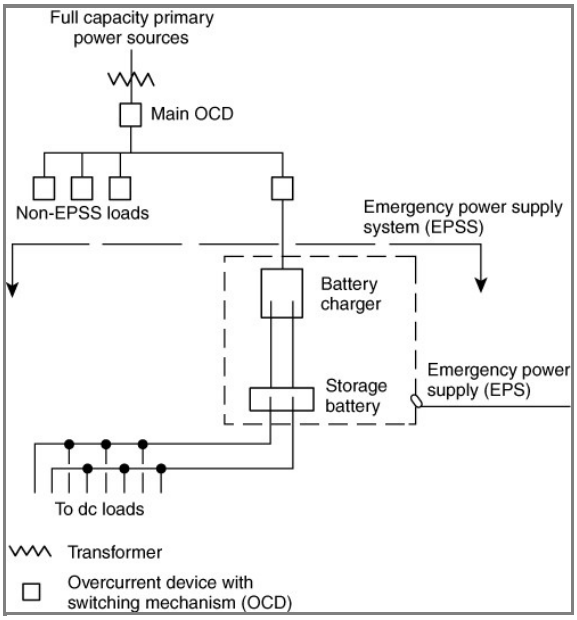


Figure B.1(e) Typical 911 Call Center in Designated Critical Operations Area.

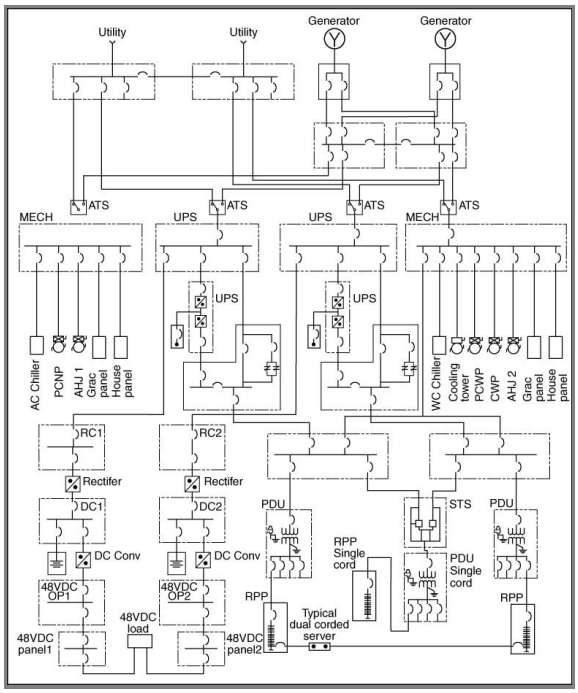


Figure B.1(f) Typical Installation of Continuously Operating Fuel Cell System as the Emergency Source.

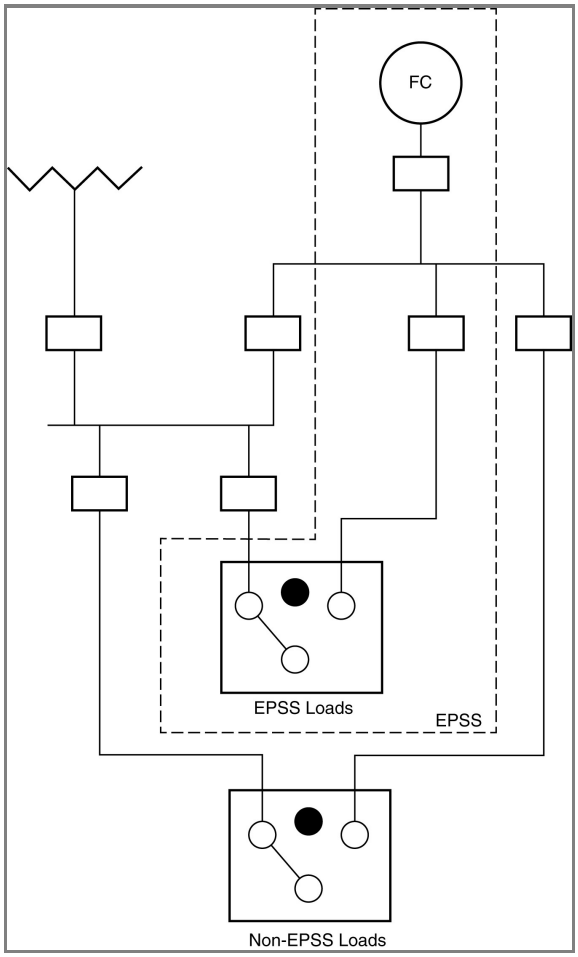
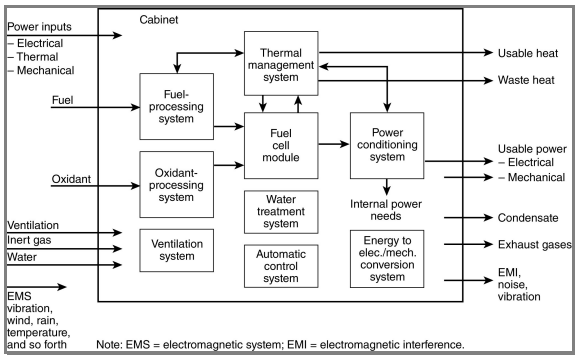


Figure B.1(g) Typical Fuel Cell Emergency Power Supply System.



Supplemental Information

File Name	Description	Approved
SR-28_attachment_figure_B.1_F_.docx	sr-28 attachment figure b1f - for staff use	
SR-28_attachment_figure_B.1_G_.docx	sr-28 attachment figure b1g - for staff use	

Submitter Information Verification

Committee: EPS-AAA

Submittal Date: Thu Jul 16 11:14:45 EDT 2020

Committee Statement

Committee Statement: This revision is in line with the technical committee's work to add fuel cells as a permissive power source for an EPSS. Figure B.1(f) provides clarity on a typical continuously operating fuel cell installation. Figure B.1(g) provides clarity on typical fuel system.

Response Message: SR-28-NFPA 110-2020

Second Revision No. 52-NFPA 110-2020 [Section No. C.1.1]

C.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 2 , *Hydrogen Technologies Code* , 2020 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, ~~2022~~ 2019 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*, 2021 edition.

NFPA 54, *National Fuel Gas Code*, 2021 edition.

NFPA 56, *Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems*, 2020 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2020 edition.

NFPA 70®, *National Electrical Code®*, 2020 edition.

NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance*, ~~2016~~ 2019 edition.

NFPA 99, *Health Care Facilities Code*, ~~2018~~ 2021 edition.

NFPA *101®*, *Life Safety Code®*, 2018 edition.

NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*, 2019 edition.

NFPA 855 , *Standard for the Installation of Stationary Energy Storage Systems* , 2020 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, ~~2022~~ 2019 edition.

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Mon Jul 27 11:17:03 EDT 2020

Committee Statement

Committee Statement: NFPA 70B updated to current edition.
Response Message: SR-52-NFPA 110-2020

Second Revision No. 53-NFPA 110-2020 [Section No. C.1.2.1]

C.1.2.1 ASCE Publications.

American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191.

ASCE/SEI 7, *Minimum Design Loads for Buildings and Other Structures,*~~2010~~ 2016 .

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Mon Jul 27 11:21:53 EDT 2020

Committee Statement

Committee Statement: ASCE/SEI 7 updated to current edition.
Response Message: SR-53-NFPA 110-2020

Second Revision No. 54-NFPA 110-2020 [Section No. C.1.2.2]

C.1.2.2 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D975, *Standard Specification for Diesel Fuel Oils,* ~~2015c~~ 2020 .

ASTM D1835, *Standard Specification for Liquefied Petroleum (LP) Gases,*~~2013~~ 2020 .

ASTM D2709, *Standard Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge* , 2016.

ASTM D4057, *Standard Practice for Manual Sampling of Petroleum and Petroleum Products* , 2019.

ASTM D4176, *Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)* , 2004 (2019).

ASTM D7220, *Standard Test Method for Sulfur in Automotive, Heating, and Jet Fuels by Monochromatic Energy Dispersive X-ray Fluorescence Spectrometry* , 2012 (2017).

ASTM D7464, *Standard Practice for Manual Sampling of Liquid Fuels, Associated Materials and Fuel System Components for Microbiological Testing* , 2020.

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Mon Jul 27 11:26:57 EDT 2020

Committee Statement

Committee Statement: ASTM standards updated to current edition.
Response Message: SR-54-NFPA 110-2020

Second Revision No. 55-NFPA 110-2020 [Section No. C.1.2.4]

C.1.2.5 NEMA Publications.

National Electrical Manufacturers Association, 1300 North 17th Street, Suite 900, Arlington, VA 22209.

ANSI/NEMA C 84.1, *Standard for Electric Power Systems and Equipment — Voltage Ratings (60 hertz)*, ~~2011~~ 2016 .

ANSI/NEMA MG 1, *Standard for Motors and Generators*, 2016.

NEMA MG 2, *Safety Standard and Guide for Selection, Installation and Use of Electric Motors and Generators*, 2014.

Submitter Information Verification

Committee: EPS-AAA
Submittal Date: Mon Jul 27 11:30:22 EDT 2020

Committee Statement

Committee Statement: NEMA publications updated to current edition.
Response Message: SR-55-NFPA 110-2020