UL RP 121203

Recommended Practice for Portable/Personal Electronic Products Suitable for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2, Class III, Division 1, Class III, Division 2, Zone 21 and Zone 22 Hazardous (Classified) Locations

Recommended Practice for Portable/Personal Electronic Products Suitable for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2, Class III, Division 1, Class III, Division 2, Zone 21 and Zone 22 Hazardous (Classified) Locations, UL RP 121203

Second Edition, Dated January 14, 2021

Summary of Topics

This new edition ANSI/UL RP 121203, Recommended Practice for Portable/Personal Electronic Products Suitable for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2, Class III, Division 1, Class III, Division 2, Zone 21 and Zone 22 Hazardous (Classified) Locations, provides guidance to the owner/operator of hazardous (classified) locations.

These requirements are substantially in accordance with Proposal(s) on this subject dated May 15, 2020 and September 25, 2020.

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First Edition – June, 2011

Second Edition

January 14, 2021

This ANSI/UL Recommended Practice consists of the Second Edition.

The most recent designation of ANSI/UL RP 121203 as an American National Standard (ANSI) occurred on January 14, 2021. ANSI approval for a Recommended Practice does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Recommended Practice may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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Preface

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1 Scope

1.1 This recommended practice provides guidance to the owner/operator of hazardous (classified) locations for the use of portable/personal electronic products in Class I, Division 2; Class I, Zone 2; Class II, Division 2; Class III, Division 1; Class III, Division 2; Zone 21, Group IIIA only; or Zone 22, Groups IIIA and IIIB only hazardous (classified) locations.

1.2 This recommended practice is not suitable for product certification.

1.3 Further, this recommended practice is not suitable for the evaluation of the following:

a) Products that are powered by premises wiring or connected to a communication line during use in the hazardous (classified) location.

b) Products powered by power sources other than battery or photovoltaic cell.

c) Products intended to be used for Zone 1, Zone 0, Zone 22 Group IIIC, Zone 21 Group IIIB or Group IIIC, Zone 20, Class I Division 1, Class II Division 1.

d) Products intended for mining applications.

1.4 Also, this recommended practice is not suitable for the evaluation of types of portable/personal electronic products that are available as certified products for the hazardous (classified) locations by an OSHA Nationally Recognized Testing Laboratories (NRTL). Examples of available NRTL certified products include but are not limited to radios, pagers, flashlights, cell phones, tablets, cameras, smart watches, and test instruments. Differences in manufacturer/brand or software feature do not constitute a lack of availability.

NOTE 1: The following are the typical Division system standards for these products:

• UL 121201, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.

• UL 783, Electric Flashlights and Lanterns for Use in Hazardous (Classified) Locations.

NOTE 2: The Zone system standards for these products are UL 60079 series, Explosive Atmospheres for EPC Gc and Dc applications.

NOTE 3: In the United States, an OSHA interpretation of 29CFR1910.399 requires that a certified, listed, or labeled product be used if it is available. When certified, listed, or labeled equipment is not available, the CFR allows for testing and inspection by the owner/operator. This recommended practice is intended to provide guidance to the owner/operator for such testing and inspection.

1.5 This recommended practice does not address other considerations involving the use of portable/personal electronic products which may result in these products being considered unsafe due to creation of a distraction from important work tasks or radio frequency interference with measurement and control equipment.

2 Units of Measurement

2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3 Reference Publications

3.1 Products covered by this guidance document shall comply with the referenced installation codes and standards noted in this clause as applicable.

3.2 Where reference is made to any Standards, such reference shall be considered to refer to the latest editions and revisions thereto available at the time of printing unless otherwise specified.

FM 60079-29-2, *Explosive Atmospheres – Part 29-2: Gas Detectors – Selection, Installation, Use and Maintenance of Detectors for Flammable Gases and Oxygen*

ITU-R BS.561.2, *Definitions of Radiation in LF, MF and HF broadcasting Bands*

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*

NFPA 70, *National Electrical Code®*

OSHA Regulation, General Requirements, SubPart S, Electrical 29CFR1910

UL 783, *Electric Flashlights and Lanterns for Use in Hazardous (Classified) Locations*

UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations*

UL 60079 Series, *Explosive Atmospheres*

UL 60079-29-2, *Explosive Atmospheres – Part 29-2: Gas Detectors – Selection, Installation, Use and Maintenance of Detectors for Flammable Gases and Oxygen*

4 Glossary

4.1 For the purpose of this recommended practice, the following definitions apply.

4.2 APPROVED – Acceptable to the authority having jurisdiction.

4.3 AUTHORITY HAVING JURISDICTION (AHJ) – The organization, office or individual that has the responsibility and authority for approving equipment, installations, or procedures.

4.4 BATTERY – An assembly consisting of one or more cells. When multiple cells are connected to each other, they to increase the voltage or capacity.

4.5 BUTTON CELL – Small round non-rechargeable cell, where the overall height is less than the diameter.

4.6 CELL – An assembly of electrodes and electrolytes which constitutes the smallest electrical unit of a battery.

4.7 CERTIFIED – Equipment that bears a label, tag, or other record of certification that the equipment has been tested and found by an OSHA Nationally Recognized Testing Laboratory (NRTL) to meet nationally recognized standards. This is also referred to as listed (see 4.13) and labeled (see 4.12).

4.8 EQUIPMENT, PERSONAL – Equipment intended to be worn by and to be in contact with a person's body during operation.

4.9 EQUIPMENT, PORTABLE – Equipment intended to be carried by a person during its operation.

Note to entry: Portable equipment carried by a person during its operation is sometimes referred to as hand-held equipment.

4.10 EXCESSIVE TEMPERATURE – A temperature in excess of that tolerable to human touch [approximately 60°C (140°F)].

4.11 GAS FREE WORK PERMIT (GFWP) – A permit, resulting from approval by an authorized person under the application of a defined documented management work process, stating that work involving potential ignition sources may be performed in a hazardous (classified) location by ensuring that the atmosphere is free of ignitable concentrations of flammable gases or vapors.

Note 1 to entry: Refer to NFPA 51B which provides provisions to prevent loss of life and property from fire or explosion as a result of any work involving burning, welding, or similar operations that is capable of initiating fires or explosions.

Note 2 to entry: Gas free work permit may sometimes be referred to as a “Hot Work Permit.”

4.12 LABELED – Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

4.13 LISTED – Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or services meets identified standards or has been tested and found suitable for a specified purpose.

FPN: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

4.14 NORMAL OPERATION – Operation of equipment conforming electrically and mechanically with its design specification and used within the limits specified by the manufacturer.

4.15 PORTABLE/PERSONAL ELECTRONIC PRODUCT (PEP) – Battery powered or photovoltaic cell powered apparatus that can be hand-held or that is intended for use while worn on a person's body.

a) PEP 1 – Personal equipment that is deemed incapable of causing an ignition under normal operation.

b) PEP 2 – Portable or personal equipment that is deemed incapable of causing an ignition under normal operation.

5 Application

5.1 Locations containing flammable gases flammable liquid-produced vapor, combustible liquid-produced vapor, combustible dusts or ignitable fibers/flyings are required to be classified in accordance with Articles 500 – 506 of the National Electrical Code®. Portable/personal products could become an ignition source in these hazardous (classified) locations.

5.2 The hierarchy of control to determine if particular portable/personal products may be used in a specific hazardous (classified) location is shown in Table 5.1. PEP 1 or PEP 2 is only an option where NRTL certified products for use in the location are not available (refer to 1.4 for additional clarity for the term available).

5.3 Personnel shall take portable/personal products including PEP 1 and PEP 2 products with them when they vacate the area.

Table 5.1
Hierarchy of control

Class, Division	Zone	Portable/Personal products that may be used in the classified location
I,2	2	a) NRTL certified product for use in the location. b) PEP 1; c) PEP 2; or d) Any product when a gas free work permit is in effect.
II, 2	22	a) NRTL certified product for use in the location. b) PEP 1; c) PEP 2; or d) Any product when a hot work permit is in effect similar to 4.11.
III, 1 or 2	21 Group IIIA only, 22 Groups IIIA and IIIB only	a) NRTL certified product for use in the location. b) PEP 1; c) PEP 2; or d) Any product when a hot work permit is in effect similar to 4.11.

6 Portable/Personal Electronic Products (PEPs)

6.1 General

6.1.1 PEPs shall meet the following criteria:

a) No available NRTL certified types of portable/personal electronic products suitable for the area classification and capable of performing the intended function. Differences in manufacturer/brand or software feature do not constitute a lack of availability.

b) The equipment complies with the applicable equipment requirements to ensure general product safety. Examples of general product safety requirements are protection from fire, electrical shock, chemical, mechanical hazards, etc.

NOTE: Some standards used to demonstrate compliance with general product safety are UL 62368-1, UL 60950-1, UL 61010-1, UL 60601 series, UL 1642 etc.

c) Equipment used in accordance with manufacturer's instructions.

d) Unless permitted by the manufacturer's instruction, the configuration of the product may not be changed for the purpose of meeting a PEP definition.

NOTE: An example of a non-permitted configuration change would be a substitution of cells or batteries other than those identified in the manufacturer's instruction.

e) No provisions for forced ventilation.

f) No sparks visible in normal operation.

g) No excessive temperatures (see 4.10) in normal operation.

h) No motors unless it can be demonstrated the motor incorporates non-arcing technology (construction that does not incorporate brushes).

NOTE: Devices that incorporate a vibration feature may be using a motor that incorporates arcing technology (construction that does incorporate brushes).

i) No visible damage.

6.2 PEP 1

6.2.1 Personal equipment meeting the general criteria in 6.1 and all of the following additional criteria may be designated as PEP 1:

a) Powered by a maximum of two primary (non-rechargeable) button cells in series, with each cell with a nominal voltage not greater than 4.5 V and capacity rated 1.5 Ah or less.

b) No electrical connections accessible outside the product.

NOTE: Examples of PEP 1 equipment are simple wristwatches and hearing aids.

6.3 PEP 2

6.3.1 Portable or personal equipment meeting the general criteria in 6.1 and all of the following additional criteria may be designated as PEP 2:

a) Housed in an enclosure meeting a minimum of IP54, Type 12 (for indoor use only), or Type 3.

b) Powered by one or more cells, batteries, or photovoltaic cells that pass the drop test described in 8.1.

c) No external electrical connections or wired accessories are used in the hazardous (classified) location.

NOTE: Bluetooth headset is an example of a non-wired accessory.

d) Exposed terminals (for example battery charging terminals) are recessed to prevent a discharge caused by an accidental shorting of these terminals.

e) No make/break contacts under normal operation (see 8.2).

NOTE Examples are some calculators, some medical injection devices and fitness/activity tracking devices (see Annex B).

7 Administrative Controls

7.1 General

7.1.1 A process of administrative control and training is necessary to ensure that portable/personal products do not present an unacceptable risk of ignition when used in hazardous classified areas.

7.2 PEP 1 and PEP 2

7.2.1 The owner/operator of the hazardous (classified) location should establish a process of inspection including a follow-up verification schedule in which a qualified person establishes that particular products can be accepted as PEP 1 or PEP 2.

For PEP 1, products can be accepted without additional marking.

For PEP 2, all accepted products should be marked in accordance with Section 9.

7.2.2 Supporting documentation for the PEP evaluations should be maintained for the life of the use of those products. This documentation should include information for the product such as reference number or code, product manufacturer and model, owner name, approver name, and original date approved, dates (s) re-verified or equivalent information.

NOTE The supporting documentation reference number or code may be a serial number, an approver generated tag number or other means of unique identification to provide tracking with the documentation.

7.3 Safe/hot work permit

7.3.1 Gas Free Work Permit

7.3.1.1 A Gas Free Work Permit (GFWP) should incorporate the following:

a) A measurement to confirm the absence of an ignitable concentration of any flammable gas or vapor.

b) Sampling to confirm the continued absence of a flammable gas or vapor. For example a NRTL safety and performance certified body-worn continuous flammable gas detecting device suitable for the hazardous (classified) area.

NOTE: The performance standard for flammable gas detectors is UL 60079-29-1.

c) Contingency plans for emergencies.

Annex A provides an example of a Gas Free Work Permit process that incorporates these requirements and restrictions.

NOTE Additional guidance regarding the use of gas detectors when issuing a GFWP may be found in UL 60079-29-2.

7.3.2 Dust Free Work Permit

7.3.2.1 A similar concept to the Gas Free Work Permit (GFWP) may also be applied to areas with combustible dusts or ignitable fibers although measurement and sampling are not required. Visual analysis is usually sufficient.

8 Examination and Testing

8.1 Drop test

8.1.1 For PEP 2, the product shall be able to pass a drop test. The product (or a representative sample of the product) in the form in which it is intended to be used, shall be dropped onto a horizontal concrete surface from a height of 6 feet 6 inches (2 meters). The test is repeated six times on the same sample of the product, with the single sample being dropped in six different orientations that are considered most likely to cause a failure. At the conclusion of the testing, the integrity of the enclosure shall not have been compromised, the cell or battery shall not have fallen out or become disconnected, and the device shall operate as intended.

If the product is intended to be used only while in a case and the case affords protection to the battery, then the drop test is done with the product in its case. If the product is intended to be used after the product is removed from its case, then the drop test is performed with the product removed from its case.

8.2 Make/break contacts and switches

8.2.1 Any product with a make/break contact that interrupts electrical current under normal operation is not acceptable for PEP 2 because the make/break contact may cause an ignition-capable arc.

9 Marking

9.1 PEP 1 or PEP 2 devices may be marked “PEP 1" or "PEP 2" respectively, along with the evaluating company name, supporting documentation reference number or code. In lieu of marking, the user should obtain the evaluation documentation, which provides a level of traceability.