



## LIGHTNING PROTECTION SYSTEMS

### Verifying Surge Protective Devices in Lightning Protection System Installations

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UL provides guidance to stakeholders for verifying proper markings on surge protection devices used in Lightning Protection System installations. This guidance is intended for Lightning Protection Systems demonstrating compliance with UL 96A Standard “Installation Requirements of Lightning Protection Systems” and NFPA 780 standard “Standard for the Installation of Lightning Protection Systems”. The information contained in this document is considered for reference.

#### **Why this information is important**

A key element in determining compliance with UL requirements for surge protection devices used in lightning protection system installations is understanding the proper application and markings of the surge protection devices. The information provided in this document is based on requirements defined in the UL 96A Installation Requirements of Lightning Protection Systems and NFPA 780 Standard for the Installation of Lightning Protection Systems.

#### **Who will use this information**

Stakeholders may include Lightning Protection System (LPS) Installers, electrical contractors, general contractors, building owners, authorities having jurisdiction, UL Field Engineers, or other interested parties who want to understand markings on surge protection devices.

#### **Surge Protection Device Categories**

UL uses a system of CCN – Category Control Number to identify categories of products that have been evaluated. Each CCN category typically consists of four or more alpha-numeric digits, followed by a title to identify the product grouping.

Each CCN category publishes “guide card” information that defines applicable standards, criteria for use of the UL Mark, along with other general information about the product category.

The information referenced in this document is extracted from published CCN guide card information. For additional details, users are encouraged to access the CCN guide card information available through UL Product iQ™. Product iQ is an online searchable database available to the public. Additional information on how to access and use of UL Product iQ is provided in Appendix A.

#### **Table of Contents**

1. Electric Service Entrances
2. Communication, Radio and Television Systems
3. Coaxial Signal Cable Service Entrances



4. Outdoor Antenna Lead-In Connections for Radio and Television Receiving Equipment and Amateur Radio-Transmitting and Receiving Equipment
5. Class 2 or 3 Remote Control, Signaling and Power-Limited Circuits or Fire Protection Signaling Circuits
6. Resources

Appendix A: Use of UL Product iQ Tool

## 1. How to Verify Surge Protection Devices Suitable for Use On Electric Service Entrances

### **UL LISTED SURGE PROTECTIVE DEVICES, INCLUDING PHOTOVOLTAIC APPLICATIONS (PV SPD) - (CCN VZCA) - TYPE 1 & 2 ONLY ARE SUITABLE FOR LPS**

- Voltage Rating: 1000 Volts AC or less or 1500 Volts DC or less
- Device Standard, NFPA 780 & UL 96A References:
  - UL Standard: UL 1449 3<sup>rd</sup> through current editions
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.1

To verify compliant devices to this category, the following information should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - Electrical Ratings, Operating Volts, Frequency & Number of Phases or DC, Voltage Protection Rating (VPR), Nominal Discharge Current ( $I_n$ ) Rating (minimum 20kA), Maximum Continuous Operating Voltage Rating (MCOV), and Short-Circuit Current Rating (SCCR) (why were the periods removed?)
  - PV SPDs investigated to UL 1449 (3rd ed.) are marked, "For Use in Photovoltaic Systems Only," or the equivalent.
  - PV SPDs investigated to UL 1449 (4th ed.) are marked "PVSPD," Vp<sub>vdc</sub>, VPR per mode, Leakage Current (I<sub>q</sub>), Short-circuit-current Rating (SCCR), Maximum Ambient Temperature Rating and Load Current Rating in amperes (when applicable).
  - SPDs investigated for general dc applications may also be marked, "Suitable for Use in Photovoltaic Systems."
  - Product Identity consisting of one of the following: "Surge Protective Device", or "SPD", and marked as Type 1 or Type 2 SPD
- The following is additionally required to be marked on the device for UL 96A only:
  - UL in a Circle
  - The Word "Listed" (Note - For the New Enhanced UL Certification Mark, the Words "Certified" and "Safety" along with a geographic identifier and file number is required)
  - Control Number (4-digit alpha numeric number)
    - Note – For the New Enhanced UL Certification Mark, a control number is not required.




- The UL Listing Mark requires the use of a holographic label, regardless of the country of manufacture.
  - Note – This also applies to the New Enhanced UL Certification Mark
- The following is additionally allowed to be marked on the device for NFPA 780 only:
  - Any NRTL listing mark suitable for the specific product certification
- Installation Notes:
  - Where the circuit voltage does not exceed 1000VAC or 1500VDC Type 1 devices are suitable to be installed on the line or load side of the service disconnect overcurrent protective device and Type 2 devices must be installed only on the load side of the service disconnect overcurrent protective device.
  - Need to verify the following electrical ratings based on the device markings:
    - The operating voltage rating is suitable for the circuit voltage.
    - Nominal Discharge Current ( $I_n$ ) Rating is 20 kA or greater.



**UL RECOGNIZED COMPONENT SURGE PROTECTIVE DEVICES, INCLUDING PHOTOVOLTAIC APPLICATIONS (PV SPD) - (CCN VZCA2) – TYPE 1 OR 2 COMPONENT ASSEMBLIES**

- Voltage Rating: 1000 Volts AC or less or 1500 Volts DC or less
- Device Standard, NFPA 780 and UL 96A References:
  - UL Standard: UL 1449 3<sup>rd</sup> and 4<sup>th</sup> editions
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.1

To verify compliant devices to this category, the following information should be used:

- The following is required to be marked on the device:
  - Recognized Company's Identification
  - Catalog, Model, or other product designation as shown in the Certification Directory.
  - The Recognized Component Symbol 
  - Nominal Discharge Current ( $I_n$ ) rating (minimum 20 kA)
  - Marked as Type 1 or Type 2
  - PV SPDs are marked, PV SPD
  - SPDs evaluated for both general DC and PV Applications may be marked: "Suitable for use in DC Systems and Photovoltaic (or PV) Applications."
- Installation Notes:
  - Must be factory installed by utilization equipment manufacturer only, as part of NRTL Listed equipment, i.e., switchboard, panelboard, etc.
  - Only devices Recognized as Type 1 or Type 2 are acceptable for LPS applications.
  - Where the circuit voltage does not exceed 1000VAC or 1500VDC devices marked Type 1 may be installed on the line or load side of the service disconnect overcurrent protective device and devices marked Type 2 must be installed only on the load side of the service disconnect overcurrent protective device.
  - Need to verify the following electrical ratings based on the device markings:
    - The operating voltage rating is suitable for the circuit voltage.
    - Nominal Discharge Current ( $I_n$ ) Rating is 20 kA or greater.



**UL LISTED COMBINATION CIRCUIT BREAKER AND SURGE-PROTECTIVE DEVICES – (CCN DIMV) – TYPE 1 OR 2 ONLY ARE SUITBLE FOR LPS**

- Voltage Rating: 600 Volts AC or less
- Device Standard, NFPA 780 & UL 96A References:
  - UL Standard: UL 1449 3<sup>rd</sup> and 4<sup>th</sup> editions
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.1

To verify compliant devices to this category, the following information should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - Product Identity consisting of one of the following: “Circuit Breaker and SPD” or “Circuit Breaker and Surge-protective Device”, and marked as Type 1 or Type 2 SPD
  - Electrical Ratings, Operating Volts, Frequency & Number of Phases, Voltage Protection Rating (VPR), Nominal Discharge Current ( $I_n$ ) Rating (minimum 20kA), Maximum Continuous Operating Voltage Rating (MCOV), and Short-Circuit Current Rating (SCCR)
- The following is additionally required to be marked on the device for UL 96A only:
  - UL in a Circle
  - The Word “Listed” (Note - For the New Enhanced UL Certification Mark, the Words “Certified” and “Safety” along with a geographic identifier and file number is required)
  - Control Number (4-digit alpha numeric number). (Note – For the New Enhanced UL Certification Mark this is only required for a Multiple Listee)
- The following is additionally allowed to be marked on the device for NFPA 780 only:
  - Any NRTL listing mark suitable for the specific product certification.
- Installation Notes:
  - Must be factory installed by utilization equipment manufacturer only, as part of UL Listed equipment, i.e., switchboard, panelboard, circuit breaker enclosures, etc.
  - Where the circuit voltage does not exceed 600VAC Type 1 devices are suitable to be installed on the line or load side of the service disconnect overcurrent protective device and Type 2 devices must be installed only on the load side of the service disconnect overcurrent protective device.
  - Need to verify the following electrical ratings based on the device markings:
    - The operating voltage rating is suitable for the circuit voltage.
    - Nominal Discharge Current ( $I_n$ ) Rating is 20 kA or greater.



## **UL LISTED TRANSIENT VOLTAGE SURGE SUPPRESSORS OR TVSS – (CCN XUHT)**

**Note** - This category has been discontinued and information is no longer available on UL's Product iQ database for devices previously covered in this category.

It is recommended that devices under the category (VZCA), (VZCA2), or (DIMV) surge protective devices be used, since information is readily available on UL's Product iQ database.

- Voltage Rating: 600 Volts AC or less
- Device Standard, NFPA 780 & UL 96A References:
  - UL Standard: UL 1449 2<sup>nd</sup> edition
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.1

For verifying compliant devices manufactured prior to this category being discontinued, the following information should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - UL in a Circle
  - The Word "Listed"
  - Control Number (4-digit alpha numeric number)
  - Product Identity consisting of the following: "Transient Voltage Surge Suppressor" or "TVSS" and reference to LPS, i.e. "TVSS for LPS".
  - Special Note - The device is not suitable for LPS applications unless device is marked with the LPS reference.
  - The UL Listing Mark requires the use of a holographic label for devices manufactured in China effective as of 11/01/1996.
- Installation Notes:
  - Only suitable to be installed on the load side of the service disconnect overcurrent protective device and where the circuit voltage does not exceed 1000VAC.
  - Do not need to verify Nominal Discharge Current ( $I_n$ ) rating.
  - Only need to verify device is marked as indicated above.



**UL LISTED LIGHTNING PROTECTION SURGE ARRESTERS –  
(COMPLIMENTARY LISTED FOR CCNs OWHX AND XUHT)**

**Note** - This category has been discontinued and information is no longer available on UL's Product iQ database for devices previously covered in this category.

It is recommended that devices under the category (VZCA), (VZCA2), or (DIMV) Surge Protective Devices be used, since information is readily available in the UL Product iQ database.

- Rating: 600 Volts AC or less
- Device Standard, NFPA 780 & UL 96A References:
  - UL Standard: UL 1449, 2<sup>nd</sup> edition
  - ANSI/IEEE C62.11
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.1

For verifying compliant devices manufactured prior to this category being discontinued, the following information should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - UL in a Circle
  - The Word "Listed"
  - Control Number (4-digit alpha numeric number)
  - Product Identity consisting of one of the following: "Surge Arrester", "Secondary Surge Arrester", "Secondary MOV Surge Arrester", "Secondary Metal-Oxide Surge Arrester", "Secondary Valve Type Surge Arrester", or "Distribution Duty Surge Arrester".
  - In addition, since this device is required to be complementary listed under the category of (XUHT), the following product identity would also need to be marked on the device: "Transient Voltage Surge Suppressor" or "TVSS"
- Installation Notes:
  - Device must be Complementary UL Listed under the categories (OWHX) and (XUHT).
  - Device is suitable to be installed on the line or load side of the service disconnect overcurrent protective device and where the circuit voltage does not exceed 600V.
  - Do not need to verify Nominal Discharge Current ( $I_n$ ) rating.
  - Only need to verify device is marked as indicated above.



### **UL LISTED SURGE ARRESTERS (CCN VZQK) – RATED GREATER THAN 1000 VOLTS AC**

**NOTE** – Currently, there are no Listings established under this category. The guide card information is available to installers in the Product iQ database.

- Voltage Rating: Greater than 1000 Volts AC
- Device Standard, NFPA 780 & UL 96A:
  - ANSI/IEEE C62.1 or ANSI/IEEE C62.11
  - NFPA 780, Section Reference: 1.3
  - UL 96A Paragraph Reference: 13.3

To verify compliant devices to this category, the following information should be used:

- The following is required to be marked on the device for UL 96A and NFPA 780:
  - Arrester classification (e.g., Station, Intermediate, Distribution Heavy Duty, Distribution Normal, Duty, Distribution Light Duty)
  - MCOV of the arrester
  - Product manufacturer shows compliance to ANSI/IEEE C62.1 or ANSI/IEEE C62.11
- Installation Notes:
  - Device is suitable to be installed on the line or load side of the service disconnect overcurrent device.
  - Verify device is marked as indicated above and suitable for use in a circuit voltage greater than 1kVAC.





## 2. How to Verify Surge Protection Devices Suitable for Use On Communication, Radio, and Television Systems

### UL LISTED PRIMARY PROTECTORS FOR COMMUNICATION CIRCUITS – (CCN QVGV)

- Voltage Rating: At or over 300 Volts to ground as defined in the NEC
- Device Standard, NFPA 780 and UL 96A References:
  - UL 497 – Primary Protectors for Paired-Conductor Communication Circuits
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.2

To verify compliant devices to this category, the following guidelines should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - Product Identity consisting of the following: “Signal Circuit Protector”, “Telephone Protector”, or “Network Interface Device”.
- The following is additionally required to be marked on the device or on the smallest unit container in which the product is packaged for UL 96A only:
  - UL in a Circle
  - The Word “Listed” (Note - For the New Enhanced UL Certification Mark, the Words “Certified” and “Safety” along with a geographic identifier and file number is required)
  - Control Number (4-digit alpha numeric number)
    - Note – For the New Enhanced UL Certification Mark, a control number is not required.
- The following is additionally required to be marked on the device for NFPA 780 only:
  - Any NRTL listing mark suitable for the specific product certification
  - Maximum discharge current ( $I_{max}$ ) of at least 10kA
    - Note: For devices listed by UL that bear the  $cUL_{US}$  mark the product is not required to be marked 10kA  $I_{max}$ . Any other NRTL listing mark must be marked 10kA  $I_{max}$ .
- Installation Notes:
  - Typical use applications include circuits for voice, audio, data, interactive services, telegraph, fire alarm & burglar alarm wiring, network interface devices, etc.
  - Device should be mounted near the point of service entrance.



### 3. How To Verify Surge Protection Devices Suitable for Use on Coaxial Signal Cable Service Entrances

#### **UL LISTED PRIMARY PROTECTORS FOR COAXIAL COMMUNICATION CIRCUITS AND NETWORK-POWERED BROADBAND COMMUNICATION SYSTEMS – (CCN QVKC)**

- Voltage Rating: At or over 300 Volts to ground as defined Articles 800 and 830 of the NEC
- Device Standard, NFPA 780 & UL 96A References:
  - UL 497C – Primary Protectors for Coaxial Communication Circuits
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.2

To verify compliant devices to this category, the following information should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - Product Identity consisting of the following: “Primary Coaxial Protector”.
- The following is additionally required to be marked on the device or on the smallest unit container in which the product is packaged for UL 96A only:
  - UL in a Circle
  - The Word “Listed” (Note - For the New Enhanced UL Certification Mark, the Words “Certified” and “Safety” along with a geographic identifier and file number is required)
  - Control Number (4-digit alpha numeric number).
    - Note – For the New Enhanced UL Certification Mark, a control number is not required.
- The following is required to be marked on the device for NFPA 780:
  - Any NRTL listing mark suitable for the specific product certification
  - Maximum discharge current ( $I_{max}$ ) of at least 10kA
    - Note: Devices not marked with 10kA  $I_{max}$  are eligible in lightning protection system installations obtaining a UL Master Label® certificate.
- Installation Notes:
  - Typical use applications include circuits for coaxial communication circuits, network powered broadband communication systems, coaxial cable (CATV) systems, etc.
  - Device should be mounted near the point of service entrance.



## 4. How to Verify Surge Protection Devices Suitable For Use On Outdoor Antenna Lead-In Connections for Radio and Television Receiving Equipment and Amateur Radio-Transmitting and Receiving Equipment

### UL LISTED ANTENNA DISCHARGE UNITS – (CCN ASWA)

- Voltage/Frequency Rating: None Required
- Device Standard, NFPA 780 & UL 96A References:
  - UL 452 – Antenna Discharge Units
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.2

To verify compliant devices to this category, the following information should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - Product Identity consisting of the following: "Antenna Discharge Unit," or other appropriate product name as shown in the individual listing
- The following is additionally required to be marked on the device for UL 96A only:
  - UL in a Circle
  - The Word "Listed" (Note - For the New Enhanced UL Certification Mark, the Words "Certified" and "Safety" along with a geographic identifier and file number is required)
  - Control Number (4-digit alpha numeric number).
    - Note – For the New Enhanced UL Certification Mark, a control number is not required.
- The following is additionally required to be marked on the device for NFPA 780 only:
  - Any NRTL listing mark suitable for the specific product certification.
  - Maximum discharge current ( $I_{max}$ ) of at least 10kA
    - Note: Devices not marked with 10kA  $I_{max}$  are eligible in lightning protection system installations obtaining a UL Master Label® certificate.
- Installation Notes:
  - Typical use applications include antenna systems for radio & television, i.e., multi-element, vertical rod, and dish
  - Only need to verify device is marked as noted above.
  - Device should be mounted on the antenna lead-in conductor.



### **UL LISTED PROTECTORS FOR ANTENNA LEAD-IN CONDUCTORS – (CCN QVLA)**

- Voltage/Frequency Rating: None required
- Device Standard, NFPA 780 and UL 96A References:
  - UL 497E – Outline of Investigation for Protectors for Antenna Lead-In Conductors
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.2

To verify compliant devices to this category, the following information should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - Product Identity consisting of the following: "Antenna Lead-in Protector" or "Antenna Lightning Protector," or other appropriate product name as shown in the individual Listing.
- The following is additionally required to be marked on the device or on the smallest unit container in which the product is packaged for UL 96A only:
  - UL in a Circle
  - The Word "Listed" (Note - For the New Enhanced UL Certification Mark, the Words "Certified" and "Safety" along with a geographic identifier and file number is required)
  - Control Number (4-digit alpha numeric number).
    - Note – For the New Enhanced UL Certification Mark, a control number is not required.
- The following is additionally required to be marked on the device for NFPA 780 only:
  - Any NRTL listing mark suitable for the specific product certification
  - Maximum discharge current ( $I_{max}$ ) of at least 10kA
- Installation Notes:
  - Typical use applications include antenna installations for radio and television receiving equipment, amateur radio transmitting and receiving equipment, cellular telephone towers and WiMax or WiFi wireless networks
  - Device should be mounted on the antenna lead-in conductor.



## 5. How To Verify Surge Protection Devices Suitable For Use On Class 2 or Class 3 Remote Control, Signaling, and Power-Limited Circuits or Fire Protection Signaling Circuits

### UL LISTED ISOLATED LOOP CIRCUIT PROTECTORS – (CCN QVGQ)

- Rating: 300 Volts or less
- Device Standard, NFPA 780 and UL 96A References:
  - UL 497B – Protectors for Data Communication and Fire Alarm Circuits
  - NFPA 780, Section Reference: 4.20
  - UL 96A Paragraph Reference: 13.2

To verify compliant devices to this category, the following guidelines should be used:

- The following is required to be marked on the device for both NFPA 780 and UL 96A:
  - Product Identity consisting of the following: "Isolated Loop Circuit Protector"
- The following is additionally required to be marked on the device when size permits, or on the smallest unit container in which the product is packaged for UL 96A:
  - UL in a Circle
  - The Word "Listed" (Note - For the New Enhanced UL Certification Mark, the Words "Certified" and "Safety" along with a geographic identifier and file number is required)
  - Control Number (4-digit alpha numeric number)
    - Note – For the New Enhanced UL Certification Mark, a control number is not required.
- The following is additionally required to be marked on the device for NFPA 780 only:
  - Any NRTL listing mark suitable for the specific product certification
  - Maximum discharge current ( $I_{max}$ ) of at least 10kA
    - Note: Devices not marked with 10kA  $I_{max}$  are eligible in lightning protection system installations obtaining a UL Master Label® certificate.
- Installation Notes:
  - Typical use applications include Class 2 or Class 3 remote control, signaling and power limited circuits, or fire protection signaling circuits.
  - Only need to verify device is marked as noted above.
  - Device should be mounted near the point of service entrance.



## 6. Resources

If there are any questions about the content of this document, or if further clarification is needed, please feel free to reach out to the following resources at UL:

	<b>Name</b>	<b>Role</b>	<b>e-mail</b>
1	Eric Boettcher	Lightning Protection Systems Primary Designated Field Engineer (PDFE)	<a href="mailto:Eric.S.Boettcher@ul.com">Eric.S.Boettcher@ul.com</a>
2	David Gerstetter	Lightning Protection Systems Primary Designated Engineer (PDE)	<a href="mailto:David.A.Gerstetter@ul.com">David.A.Gerstetter@ul.com</a>
3	Bill Costello	Lightning Protection Systems Program Manager	<a href="mailto:William.J.Costello@ul.com">William.J.Costello@ul.com</a>



## Appendix A

### How to search for Surge Protective Devices for Lightning Protection System Installations

Step 1 - Go to [www.ul.com](http://www.ul.com)

- Scroll down to the Featured Tools section to find the Product iQ tool



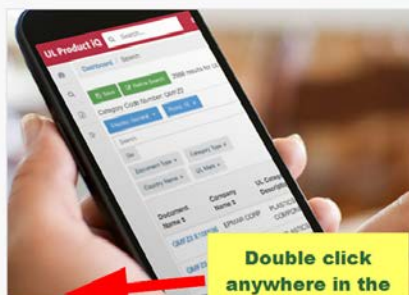
Offerings

Insights

News

Events

#### Featured tools



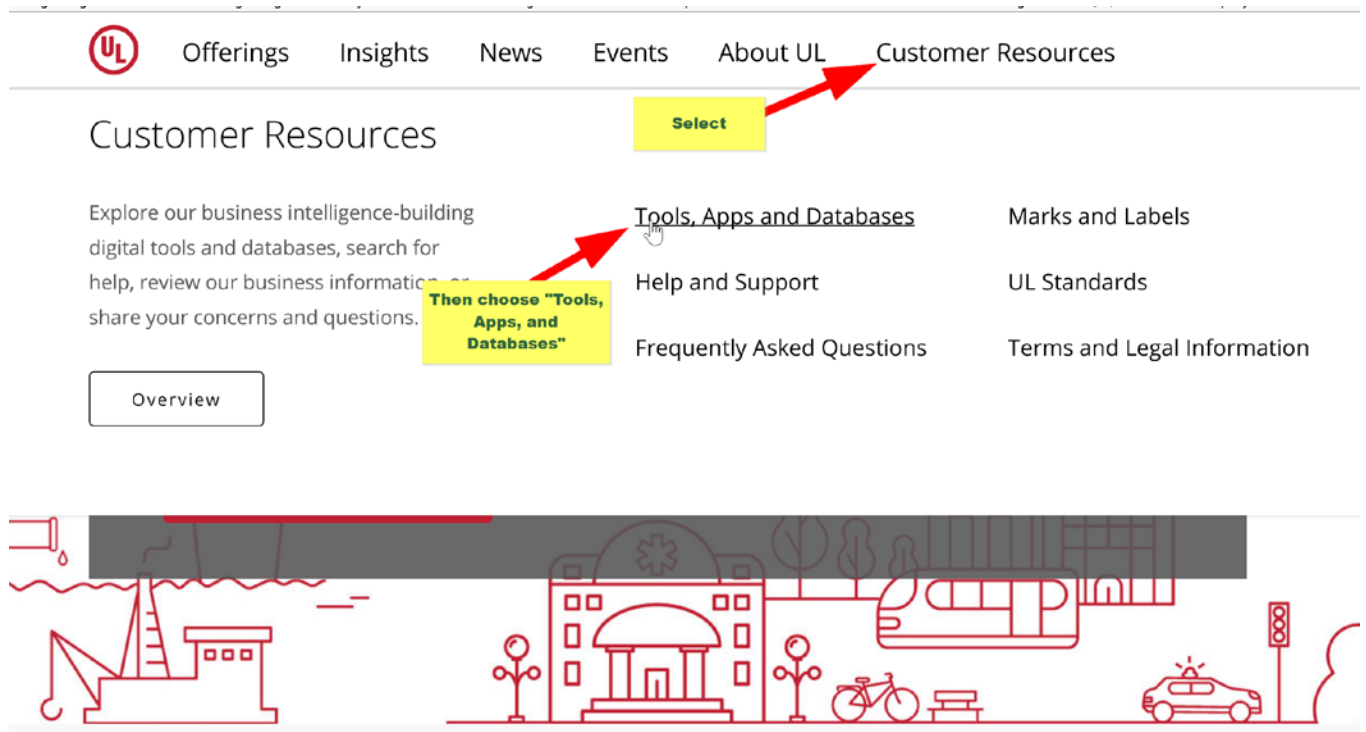
TOOL

Product iQ™

Engineers, product developers and other professionals can use Product iQ to verify UL certification of products and components, locate UL guide information and search for alternative products they can trust.



- Alternatively, you can select “Customer Resources” at the top of the UL page.
- Then choose “Tools, Apps, and Databases”.



- Once you have found the UL Product iQ tool, then open it by double clicking anywhere in the box.
- You will need to register to use this Product iQ search engine. Registration is free and only takes a few minutes.
- This will take you to the search page once you login.

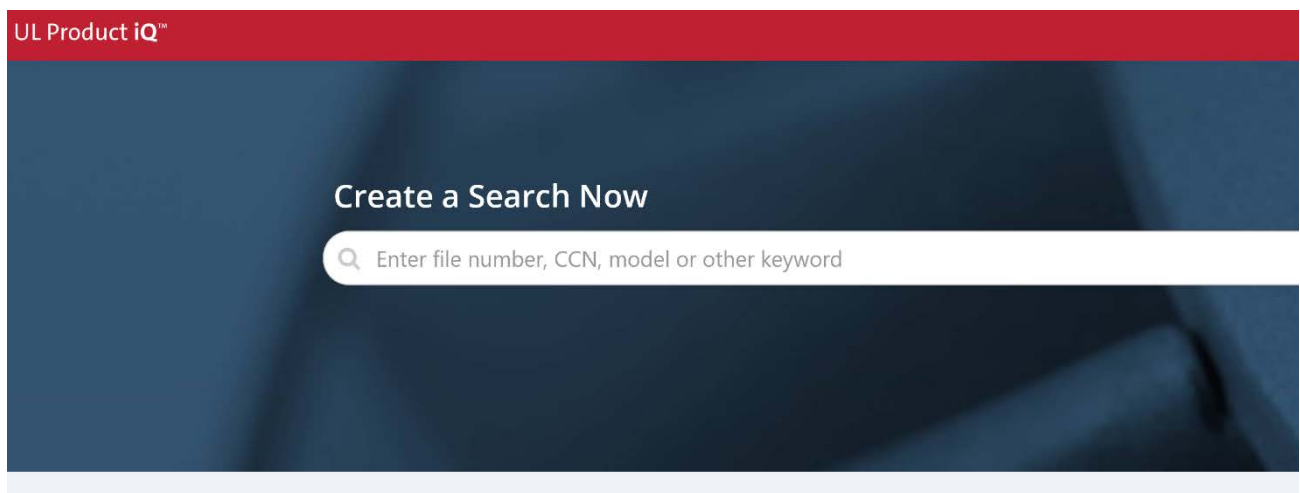




## Surge Protective Devices (SPD) Search Page

Step 2 - The search page as shown below is where you will enter the UL Category Code (CCN)

- For example: Enter VZCA, DIMV, QVGV, etc., or applicable CCN
- To help with finding DC rated SPDs, type in "DC" in the keyword field.
- This field can also be used to further refine your search.



Example of search for Category Control Number (CCN) DIMV – Circuit Breakers and Surge Protection Devices

UL Product iQ™

SEARCH | MY SEARCHES | MY

Dashboard / Search

REFINE RESULTS  
Build or filter your results by keyword and/or adding criteria like document type, file number and country name.

**Keyword**  
Filter by Keyword Search

**UL Category Control Number**  
DIMV

Add Filter  
Cancel Reset Save Search

4 Results - UL Category Control Number: DIMV

Display: General Rows: 15

Document Name	Company Name	UL CCN Description	My Tags
DIMV.E143035	SIEMENS INDUSTRY INC	CIRCUIT BREAKERS AND SURGE-PROTECTIVE DEVICES	
DIMV.E344634	EATON	CIRCUIT BREAKERS AND SURGE-PROTECTIVE DEVICES	
DIMV.E350924	SCHNEIDER ELECTRIC USA, INC.	CIRCUIT BREAKERS AND SURGE-PROTECTIVE DEVICES	
DIMV.GuideInfo		CIRCUIT BREAKERS AND SURGE-PROTECTIVE DEVICES	

1 of 1