



## 7 Tips for choosing a cabinet to protect 19" electronics

Depending on the application, choosing the right cabinet might be a challenge. Outside the traditional 19" data communications and telecommunications market, cabinets may be exposed to extreme heat, high dust/contaminants, clean room/laboratories, Radio-Frequency/Electromagnetic interference (RFI/EMI), and high shock and vibration requirements. To help choose a specific 19" electronics cabinet solution below **seven tips** are essential.

### Tip 1: Design Standards

Depending on your requirements different design standards can apply. Some key design standards associated with electronics cabinets include the following:

- **IEC:** International Electrotechnical Commission (IEC) develops International standards for all electrical, electronic and related technologies.
- **RoHS Compliance:** Restriction of Hazardous Substances. (RoHS), originated in the European Union and restricts the use of six hazardous materials found in electrical and electronic products.
- **MIL-S-901D** is a special military test requirement designed for shipboard applications.

### Tip 2: Cabinet Dimensions

19" cabinets provide a standardized frame or enclosure for mounting various types of electronics equipment. Each piece of equipment is typically 19 inches (482.6 mm) wide. Cabinet height is defined in "Units" (U), each unit equals an industry standard of 1.75 inches (44.45 mm). Rack-mountable equipment is usually designed to occupy a specified number of U. Cabinet depths may vary in accordance with diverse applications, typical depths range 600-1200mm. Detailed guidance regarding mechanical structure standards for 19-inch electronics may be referenced in IEC 60297-3-100.

### **Tip 3: Weight Load Capacity**

The amount of weight loaded into a cabinet can vary widely, so it's important to take a look at this factor to determine the right type of cabinet for a given application. Underestimation of weight loading requirements is a very common frustration for engineers. Depending on the application, some cabinet designs may require dynamic protection, which in turn, necessitates a more robust design depending on the load.

### **Tip 4: Thermal Management and Cooling**

Thermal management is an important design consideration for any electrical or electronics enclosure. Thermal overload can be a common reason for operating failures in electronic devices, and the risk increases for equipment mounted into cabinets as power density of today's electronics increases, and more heat is generated. Additional information regarding heat management design standards and recommendations are defined in IEC 61587-1.

### **Tip 5: Shock & Vibration Protection**

There are two main dynamic requirements – seismic and shock/vibration (S/V) tests.

#### **Shock and Vibration**

This test is a go-to test for equipment that will be used in mobile applications and simulates a typical environment in a train car, vehicle or next to vibration-generating equipment such as a punch press or other piece of industrial equipment. Minimization of weight and S/V-optimized designs offer long-term benefits to users, especially in transportation applications.

#### **Seismic**

Seismic activity is a very complicated, but well-studied phenomenon. Testing equipment and processes are well-defined and well-known with multiple labs capable of doing tests. The test consists of placing a fully loaded, standard cabinet on a platform that can move in any direction and simulate the earth's movements during a seismic event. Certain deformation and movement of the cabinet can lead to test failure.

### **Tip 6: Electromagnetic Compatibility (EMC)**

Electromagnetic interference (EMI) has been a growing concern with equipment manufacturers. Visual inspection alone of cabinet gaskets does not suffice to ensure adequate EMI protection. Proper tests and results are needed to ensure that a cabinet design meets those requirements. Additional design requirements and recommendations can be referenced in IEC 61587-3.

### **Tip 7: Environmental & Safety**

IEC 60529 provides guidance for classifying the ingress protection rating (IP Codes) of enclosures. IP deals with dust and water protection. Equipment that has better protection against dust/objects and water will have higher ratings. IP ratings have two numbers – one shows dust/object protection and the other shows water protection.

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