

# How Do Resistive Load Banks Work?



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LOAD BANK SOLUTIONS

Our Knowledge, Your Power.



To ensure the dependable performance of your power backup systems, you must conduct load tests during facility commissioning and as part of ongoing preventative maintenance. Often these tests use resistive load banks to mimic grid power. But how do resistive load banks work? This ebook will explain the benefits and challenges of resistive load bank testing.

A load bank device produces an electrical load and applies the load to an electrical power source. It then converts or dissipates the power output from this source. Load banks accurately simulate the real load the power source encounters during actual operation.

Load banks are used to test a variety of power systems within different mission-critical facilities, including generators, battery systems, uninterruptible power supply (UPS) systems, power distribution units (PDUs), inverters, ground power units, auxiliary power units, substation transformers, and alternative energy systems.

Why employ load banks instead of power from the grid? Relying on real load from the power grid can cause issues. Frequently, loads delivered from the grid can be dispersed, unpredictable, and random in value. Conversely, a self-contained load bank device allows you to control load delivery fully.





# Load Testing with Resistive Load Banks

Real-life resistive loads involve lighting and heating. Some typical houseware examples of resistive load devices include incandescent light bulbs, electrical heaters, and hot plates. During testing, a resistive load bank imitates real-life resistive, electrical load scenarios to confirm the operation of an electrical system.

A resistive load bank represents the most common load bank solution. It impacts all aspects of a facility's power generating system. Using power resistors, resistive load banks create a load by converting current into forms of electrical energy such as heat. A resistive load bank then dissipates the generated heat from the load by using air, water, forced means, or convection. A resistive load bank test gradually changes the kW load in specific increments during an established time frame.

As mentioned before, resistive load banks mimic the operational load the power source will likely experience during actual operation. However, a resistive load bank can also simulate the resistive or unity power factor component of magnetic loads delivered by motors and transformers.





# Types of Resistive Load Banks

Resistive load bank solutions come in several varieties. You can select from DC or AC small portable units that you can carry or push on wheels. The DC solution tests DC power equipment including UPS systems, DC generators, and battery systems. The AC solution tests power equipment such as UPS systems up to 100 kilowatts (kW).

You can use a large AC portable unit to maintain larger AC power equipment like UPS systems and generators up to 1000 kW. These units also come with wheels to provide quick and easy transport. If you need to test even bigger systems, you can deploy a trailer-mounted AC unit for testing power equipment up to 3000 kW.

For specialized applications, radiator-mounted and AC water-cooled units exist. Radiator-mounted load banks provide an economical solution that installs on a generator's radiator and uses the radiator's airflow to cool the load elements. AC water-cooled load banks use water instead of air to cool resistive load elements and operate more quietly during testing.





# Is Resistive Load Bank Testing Sufficient?

Load bank testing allows a commissioning agent to verify all integrated equipment within your facility are fully operational. A properly tested system under controlled loads confirms the operation and efficiency of critical components. Load bank testing can also uncover any issues before your power system becomes operational.

Load bank testing provides the peace-of-mind your systems will perform when you need them. If utility service gets interrupted, you will have confidence your emergency power system will remain operational. Many organizations, especially hospitals and data centers, depend on uninterrupted power delivery, and routinely test backup systems monthly or annually.

Load bank testing also allows testing of your entire emergency power generation system, not just the individual components. Testing the whole system provides reassurance that all the different parts will function correctly together. This is most important in data center applications that have full back up systems and generators. Although testing your complete power backup system requires more time, budget, and expertise, it guarantees that everything works together.

However, using resistive-only load banks may fail to test your entire system adequately. Resistive loads do not draw large enough loads to test power system performance accurately. In a full system application, a good load bank partner will also be able to supply resistive/reactive load banks. Reactive loads involve electric motors and other electromagnetic devices on your power network. When you combine both resistive and reactive elements in a single load bank device, you can test the full spectrum of equipment within your operation.

Resistive/reactive load banks provide a useful solution in many testing environments, especially microgrids and data centers. These load banks work efficiently for testing generators, UPS systems, switchgear, turbines, utility substation protection systems, and solar inverters.

When you depend on your backup power system, you must test every component to ensure it performs as required during an outage. Working with an experienced load bank expert can help you match the best solution to your application.





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