

# Frequently Asked Questions

## SEISMIC FRAME® TWO-POST RACK



### **Q. What is a seismic rack?**

A. A seismic rack is a two-post or four-post rack designed with an extra rigid structure to resist deflection under load from the motion and vibration caused by a seismic event. Most seismic racks are welded, have heavy built-up bases and deep side channels.

### **Q. How are seismic racks tested?**

A. Seismic racks are tested per Section 4.4, Earthquake, Office Vibration and Transportation Vibration of the Telcordia® Technologies, Inc. GR-63-CORE Network Equipment Building Systems (NEBS): Physical Protection requirements document, the industry-recognized standard for testing seismic racks. The racks are tested in a loaded condition on a seismic “shaker” table to simulate a seismic event. The table generates a random front-to-back, side-to-side or up-down pattern of varying intensity based on NEBS requirements for Zone 1 and 2 (least severe), Zone 3 or Zone 4 (most severe) conditions. Various sensors are used to observe and record the amount of movement and vibration in the rack during the tests and any damage to the rack is also noted.

### **Q. How did the CPI Seismic Frame® Two-Post Rack perform when tested?**

A. CPI’s Seismic Frame® Two-Post Rack performed extremely well in seismic tests with minimal deflection during the simulated event and no physical damage to the frame. Four racks were tested: two 19” wide and two 23” wide racks with rails set 6” (150 mm) and 3” (89 mm) apart. Each rack was loaded with 1,000 lb (453.6 kg) of weight to simulate mounted equipment and 50 lb (22 kg) on top of the rack to represent overhead cables and cable entry. The weight was evenly distributed top-to-bottom in rack-mount shelves. Each rack was attached to a 6” (150 mm) thick concrete slab with seismic-rated floor anchors to simulate a typical data center or equipment room floor. Testing simulated NEBS Zone 4 (the most severe) conditions per Section 4.4 of GR-63-CORE, Issue 3, March 2006.

### **Q. When should I choose a seismic rack over a standard rack?**

A. Choose seismic racks in areas with a high probability of seismic activity. Seismic racks may be required by job specifications or building code. Specifications may reference the GR-63-CORE document and require a NEBS Zone 3 or Zone 4 rack.

In the United States, the US Geological Survey (USGS) tracks earthquake activity and defines earthquake hazard zones. This data is used to develop requirements for building design and building codes. Hawaii; the west coast including the southern part of Alaska; the area around St. Louis, Missouri; the border between Utah, Idaho, Wyoming and Montana; and the area around Charleston, South Carolina are the highest risk areas. Internationally, the west coast of Central and South America; Japan and the islands in the western Pacific Ocean south of Asia and east of Australia; central and western China; the area around Afghanistan, Turkey, Greece and southern Europe are the highest risk areas. For more detailed information about seismic events in the United States and around the world refer to the USGS Website ([www.usgs.gov](http://www.usgs.gov)) or ([earthquakes.usgs.gov](http://earthquakes.usgs.gov)).



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**Q. Does the use of a seismic rack guarantee that equipment will not be damaged during a seismic event?**

A. No. There is no way to predict the outcome of a seismic event. However, the design parameters for standard relay racks do not typically include the severe front-to-back, side-to-side and up-down forces that a seismic rack must survive to pass seismic testing. So, the use of seismic racks in areas that experience seismic events provides an extra level of defense against potential damage. Seismic-rating is not the manufacturer's guarantee that the rack will survive an earthquake. It is the added assurance of a rack design that has been tested under simulated earthquake conditions to an industry-recognized standard.

**Q. Does the use of a seismic rack eliminate the need to have a licensed structural engineer provide advice on placement, bracing and installation practices for racks, cabinets and cable runway?**

A. No. In seismically active areas, seismic racks provide a higher degree of protection for network equipment than standard racks do; however, a seismic install (the placement and bracing of racks, cabinets, cable runway, etc.) can only be designed by a licensed structural engineer who is familiar with local codes and job requirements.

**Q. Why are seismic racks more expensive than non-seismic racks?**

A. Seismic racks require considerably more engineering design time and material than standard relay-style racks and are also more difficult to manufacture because they are typically built-up welded assemblies with tight tolerances. In addition, independent testing and certifications adds to the cost of the product.

**Q. Do seismic racks have a lower load-bearing capacity than non-seismic racks?**

A. No. The specifications for non-seismic racks list the load-bearing capacity for non-seismic conditions, sometimes referred to as a static load. The rack is loaded to assure that the load will not deform the rack, but the load is not placed in motion. The specifications for seismic racks list the load-bearing capacity for seismic conditions, sometimes

referred to as a dynamic load. The rack is loaded with weight and then placed in motion to exert a front-to-back, side-to-side and up-down force against the rack. Although both values are stated as a weight limit, it is important to recognize the difference. When you compare racks for seismic applications, be sure to compare seismic (dynamic) loads. If you compare racks for non-seismic applications, compare the non-seismic (static) loads. In some cases, specifications for seismic racks include a seismic (dynamic) and non-seismic (static) load. The non-seismic (static) load will be higher. If you compare seismic and non-seismic racks, be sure to compare the values for non-seismic (static) loads only. Generally, seismic racks will have a higher non-seismic (static) load than similarly sized non-seismic racks.

**Q. What is the difference between threaded and square-punched equipment mounting rails?**

A. Threaded equipment mounting rails are punched with round holes threaded for #12-24 screws. Square-punched equipment mounting rails have square openings that accept cage nuts of various threads. Both styles are punched with an EIA-310-D compliant Universal hole pattern with 1-3/4" RMU spaces and attachment points spaced on 5/8"-5/8"-1/2" intervals. Use threaded equipment mounting rails for quick installation of panel-mount equipment such as patch panels and small switches. Use square-punched mounting rails for larger equipment. Square-punched rails let you change the thread at the attachment point to match equipment requirements.

**Q. Does the Seismic Frame Two-Post Rack include equipment mounting hardware?**

A. Yes. Racks with threaded equipment mounting rails include 50 each #12-24 screws (CPI P/N 40605-001 or 40605-005) and racks with square-punched equipment mounting rails include 50 each #12-24 cage nuts and screws (2 each of CPI P/N 12639-001). Additional equipment mounting hardware can be ordered separately, if required.



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### **Q. What is the advantage of zinc-plated equipment mounting rails?**

A. The zinc-plated finish provides direct metal (non-painted) contact for rack-mount equipment, which may be important for ensuring proper equipment grounding. Note that both the zinc-plated and the painted mounting rails are bonded to the rack frame through the assembly hardware.

### **Q. How deep are the equipment mounting rails on the CPI Seismic Frame Two-Post Rack?**

A. Equipment mounting rails can be attached to the rack at four locations so that rails are spaced 6" (150 mm) or 3"D (80 mm). Racks ship with rails set 6"D (150 mm). Rails depth can be adjusted in the field; each rail attaches with five bolts. The recommended configuration is the 6"D (150 mm) spacing which aligns rails with the front and rear surfaces of the frame. The 3"D (80 mm) locations require both pairs of rails to be recessed into the frame. When rails are recessed, the outside width of equipment is limited by the sides of the frame to 19.32" (490 mm) on the 19" wide rack and 23.32" (592 mm) on the 23" wide rack.

### **Q. How are the RMU markings reversed on the Seismic Frame Two-Post Rack's mounting rails?**

A. RMU spaces are marked and numbered on each mounting rail. Numbering can start at the bottom or top of the rack. The mounting rails attach to the rack with hardware – five bolts per rail. Mounting rails ship installed with numbering starting at the bottom of the rack. Reverse the numbering by removing the rails, turning them over and attaching them to the opposite sides of the rack. The process is repeated for the rear pair of mounting rails.

### **Q. Is special installation hardware required with the CPI Seismic Frame Two-Post Rack?**

A. Yes. All seismic racks must be secured to the structured floor with a special, heavy-duty anchor. CPI recommends M12 x 5-1/8" long Hilti HSL-3-G Heavy Duty Sleeve Anchors or equivalent. Each anchor has specific installation requirements for seismic installs. When bayed in a continuous row, the spacing between racks should be determined by a licensed

structural engineer familiar with seismic applications and code in the area. Minimum recommended thickness of the concrete slab on the ground floor is 5-1/2" (140 mm).

### **Q. Which cabling sections can be used with the CPI Seismic Frame Two-Post Rack?**

A. All CPI cabling sections will attach to the CPI Seismic Frame Two-Post Rack, but because of the deep side channels and locations of the mounting holes, only certain cabling sections will attach so that the vertical and horizontal managers align and project past the front of the rack. For best results, use the CPI Seismic Frame Two-Post Rack Vertical Cabling Section (CPI P/N 13704-X03), a double-sided cable manager developed specifically for CPI Seismic Frame Two-Post Rack, or a Single-Sided Wide Vertical Cabling Section (CPI P/N 11374-X03) attached to the rack with the Vertical Cabling Section Offset Mounting Brackets Kit (CPI P/N 13699-701). Both managers will align with the front of the rack and can be used with the Cable Management Fingers Kit (CPI P/N 13696-001) to organize cables by RMU. As an alternative, use MCS-EFX Master Cabling Sections with Extended Fingers or Evolution™ Vertical Cable Management.



Back view of  
Seismic Frame  
Two-Post Rack



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### **Q. How do you manage cables on the CPI Seismic Frame Two-Post Rack?**

A. There are several cable management accessories for the Seismic Frame Two-Post Rack:

- The Top-Mount Cable Waterfall Tray (CPI P/N 15275-701) attaches to the top of the rack in a centered or overhanging position and provides an overhead side-to-side cable pathway for patch cords.
- The Cable Management Fingers Kit (CPI P/N 13696-001) includes several 7 RMU plastic cable finger guides that snap onto the front and rear of the rack to provide by-RMU cable management for patch cord or premise cables.
- The Seismic Frame Two-Post Rack Vertical Cabling Section (CPI P/N 13704-X03) attaches to the side of the rack to provide a front and rear pathway for cables.
- Alternately, you can also attach a Single-Sided Wide Vertical Cabling Section (CPI P/N 11374-X03) to the side of the rack with the Vertical Cabling Section Offset Mounting Bracket Kit (CPI P/N 13699-701) to provide a front or rear facing pathway for cables.

### **Q. How do you attach CPI Cable Runway to the Seismic Frame Two-Post Rack?**

A. The top of the Seismic Frame Two-Post Rack is punched with attachment holes for Cable Runway and the Rack-To-Runway Mounting Plate.

- Attach 9" (230 mm), 12" (300 mm), 15" (380 mm) or 18"W (460 mm) Cable Runway to the top of the rack in the perpendicular (front-to-back) orientation using the Cable Runway J-Bolt Kit (CPI P/N 11308-X01). The 23" wide rack will also support 20"W (510 mm) Cable Runway.
- Attach 12" wide (300 mm) to 24" wide (610 mm) Cable Runway to the top of the rack in the parallel (side-to-side) orientation using the Rack-To-Runway Mounting Plate (CPI P/N 10595-XXX). Installation requires two 5/16" hex cap bolts, washers and hex nuts. Cable Runway Elevation Kit (CPI P/N 10506-XXX) is not recommended with Seismic Frame Two-Post Rack. The Rack-to-Runway Mounting Plate cannot be used with an MCS or MCS-EFX Cabling Section.
- The Top-Mount Cable Waterfall Tray (CPI P/N 15275-701) cannot be used when Cable Runway is attached to the top of the rack.

### **Q. How do you attach vertical power strips to the CPI Seismic Frame Two-Post Rack?**

A. Use the Vertical Power Strip Mounting Hardware Kit (CPI P/N 13697-001) to attach CPI Vertical Power Strips to the Seismic Frame Two-Post Rack. A single Vertical Power Strip can be attached at each corner of the rack. The Vertical Power Strips attach to the keyhole-shaped attachment points punched through the sides of the rack. Power Strips that are less than 1.6"W (41 mm) can be mounted on the inside of the rack, but the Cable Management Fingers Kit cannot be used at the same corner. All CPI Vertical Power Strips can attach to the outside of the rack channel unless a vertical cable manager is used in the same space

### **Q. Which shelf should I use with the CPI Seismic Frame Two-Post Rack?**

- A. Shelf selection depends on the location of the rack's mounting rails, which can be set at 6" (150 mm) or 3"D (80 mm). Racks ship with rails set 6" (150 mm) deep.
- When rails are set 6"D (150 mm), the mounting surfaces are flush with the front and rear of the rack. CPI single-sided, low profile and keyboard shelves will attach to the front rail. For deeper equipment, use the Heavy Duty Equipment Shelf for 6" (150 mm) Channel (CPI P/N 12293-719) and a Tower CPU Adjustable Tie-Down Bracket (CPI P/N 12086-719). The Lockable Storage Drawer (CPI P/N 1308X-X19) and the 2-Post LCD Monitor+Shelf will also attach to racks with rails set 6" (150 mm) apart.
  - When rails are set 3"D (80 mm), both pairs of rails are recessed into the rack's frame. The outside width of shelves is limited by the sides of the frame to 19.3" (490 mm) on the 19" wide rack and 23.3" (592 mm) on the 23" wide rack. The Standard Double-Sided Steel Shelf (CPI P/N 40751-X19), the Low Profile Shelves (CPI P/N 11293-XXX; 11294-XXX), the Sun Microsystems CPU Shelf (CPI P/N 11744-XXX), the Lockable Storage Drawers (CPI P/N 1308X-X19) and the LCD Monitor+Shelf (CPI P/N 13390-729) can be attached to rack when rails are set 3" (80 mm) apart.



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