



## Seismic Certification Enables Essential Electrical Systems to Remain in Operation Following a Catastrophic Event

Seismic-compliant Matrix<sup>®</sup> AP Harmonic Filters are built to withstand physical shocks from a catastrophic event and provide full proven performance once the event is over.

Critical needs facilities such as hospitals, police and fire stations, emergency shelters, and operations centers play a vital role in providing services 24 hours a day, seven days a week, especially after a catastrophic event such as an earthquake, hurricane, or tornado. To do so, the equipment within those facilities must go beyond surviving an event to remain in operation after the event is over.

The International Building Code (IBC) addresses seismic design requirements for both buildings and systems attached to the buildings, including electrical equipment. While the IBC is not a government mandate, its adoption has been encouraged, and in some cases required, to ensure funding coverage by the Federal Emergency Management Administration (FEMA). All state and many local authorities have adopted a version of the code, which is updated every three years.

### The challenge:

A large HVAC manufacturer was awarded a contract to provide air handler systems with Variable Frequency Drives (VFDs) for a major university hospital. While VFDs are an effective energy management tool and help run electric motors more efficiently, they also introduce harmonic distortion.

Adding to the complexity of the project was the fact that the system needed to be certified to comply with seismic requirements due to the location of the hospital facility. According to the IBC, hospital-related critical equipment needs to be designed, constructed and installed not just for anchorage but for full proven

performance operation after a seismic, wind, or flood event.

### The solution:

MTE commissioned seismic testing of the Matrix AP Harmonic Filter to meet IBC standards. Compliance with the seismic provisions of the IBC requires either shake-table testing or mathematical modeling to establish whether the product can withstand the required amount of seismic activity. This resulted in the approval for the 2012 IBC Special Seismic Certification of Non-Structured Component and Systems.

### The result:

The seismic certified Matrix AP Harmonic Filter enabled the supplier to meet the strict seismic building codes, ensured the hospital facility would have uninterrupted performance, and allowed the building owner to protect their investment with funding coverage from FEMA should the need arise.

Once MTE's Matrix AP Harmonic Filter was determined to be seismic-compliant, the product with its innovative adaptive passive technology was able to be used in this specialized HVAC application to deliver best-in-class harmonic reduction and energy savings.

MTE delivered cost-effective proven performance for a critical needs facility at 40% less than the competition!

## MTE Matrix® AP Harmonic Filter Models Approved:

480V, 6A - 103A, NEMA 3R and all associated contactor options.

### Seismic Certification Details:

Special Seismic Certification (SSC) is an approval process in which equipment and nonstructural components are evaluated for their ability to withstand the effects of earthquakes and meet functional requirements following these events. Seismic analysis and shake-table testing were conducted in accordance with strict adherence with the following building codes: 2012 IBC (International Building Code), ASCE 7-10 (American Society of Civil Engineers), and 2012 ICC AC 156 (International Code Council).

MTE's seismically-certified Matrix AP Harmonic Filter is approved for seismic applications when properly installed, used as intended, and located in North America where the design spectral Response Acceleration at Short Periods, SDS, is less than or equal to 2.0g. Installation below grade, at grade, on roof-level and any location in between is permitted and included in this approval (Installation Elevation Ratio,  $z/h = \text{Installation Elevation}/\text{Total Building Height}$ ). Installation in essential facilities and for life safety applications, both requiring post event functionality, are also included in this approval as appropriate for systems with a Component Importance Factor,  $I_p$ , equal to or below 1.5.

The maximum certification parameters for the building codes listed above for MTE seismically-certified filters are  $S_{DS}=2.0$ ,  $z/h=1.0$ , and  $I_p=1.5$ .

The Matrix AP Harmonic Filter, with MTE's innovative adaptive passive technology, is the most advanced harmonic filter that provides improved power factor and energy efficiency. Using the patent pending adaptive passive technology, the filter adapts to various loads while providing optimized THID performance. It guarantees a THID performance of 8% MAX at 30% load and 5% MAX at full load and helps meet IEEE-519 requirements.



### Matrix AP Benefits

- Adaptive passive technology offers best-in-class harmonic reduction in virtually all applications
- Efficient performance delivers lower heat generation and helps keep the entire electrical system running smoother and longer
- Simplified wiring for quick, easy installation and serviceability
- Modular design allows flexibility in system integration
- Robust product design is backed by a three-year warranty



**MTE Corporation**  
N83 W13330 Leon Road  
Menomonee Falls WI 53051  
(800) 455-4MTE • (262) 253-8200