

Application Profile



Better Harmonic Performance at Light Loads Results in Less Overall Distortion on the Power Grid

Matrix® AP Harmonic Filters provided the optimum solution for reciprocating pump operators in the Bakken oil fields.

Oil reciprocating pumps rely on a large counterweight to offset the weight of the pump rod which can be several hundred feet long. This produces a motor and drive load profile that is cyclical with a frequency from 2 to 5 cycles per minute. During one of these cycles, the load can vary from 0% to 100% or more for short bursts, with an average load of about 40% to 60% during the loaded portion of the cycle. In the oil fields, these reciprocating pumps are the main load on the power grid and sometimes can be the only load for many square miles. The cumulative effect of perhaps hundreds of these types of loads on the power grid results in higher background harmonic voltage distortion for the entire grid in that region.

The challenge:

Conventional harmonic filters are designed to perform between 80% and 100% load.

In the oil fields, the cumulative effect of lightly loaded drives and filters results in background voltage distortion of 10% or more.

The power grids that feed these reciprocating pumps cannot support the additive harmonic distortion created resulting in nuisance tripping, overheating of transformers, and overall system downtime.

The solution:

MTE worked closely with a large energy company to test the Matrix AP Harmonic Filter against a competitor's filter on several well sites.

The Matrix AP Filter with its patented adaptive passive technology, provides superior harmonic reduction over a very wide operating load range, achieving less than 5% total harmonic current distortion THID at 45% load.

With the Matrix AP Harmonic Filter, the overall voltage distortion was reduced by as much as 50% compared to the competition.



The result:

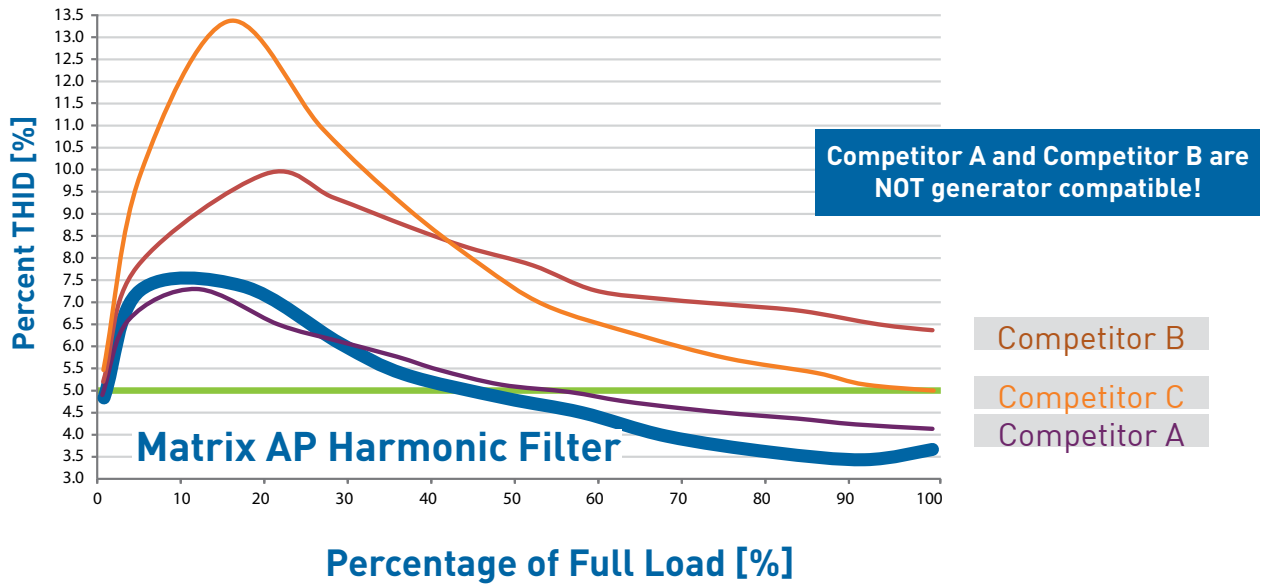
MTE's Matrix AP Harmonic Filter proved to be the best solution for keeping low level harmonic distortion from accumulating on the power grid.

Current distortion was 15% to 30% lower with the Matrix AP Filter. Voltage distortion at the utility transformer was lower as well.

MTE's Matrix AP Harmonic Filter, with its patented adaptive passive technology, together with 6-pulse drives, out-performed the competition.

The solution ensured that the energy company minimized harmonic distortion to the grid and stayed in production, thus maximizing revenue.

Matrix AP Harmonic Filter vs. Competition THID [%]



The generator compatible Matrix AP Harmonic Filter has best-in-class performance.

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 patented 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



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