

# House hold appliance test facility - Michigan

A large warehouse for household appliance testing was having severe problems with harmonic distortion, low power factor and data communication loss.



APF Cabinet

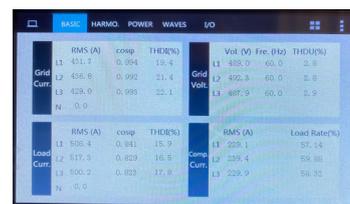
## Background

EMES was hired to perform a detailed power quality analysis of all the distributions in the facility and deliver mitigating solutions for any power quality issue discovered in the analysis. The plant had previously known power quality issues with high harmonic distortion levels.

EMES conducted a 3-week power quality survey on the facility, using our highly advanced AX300 power quality analyzers. The survey revealed a large amount of harmonic distortion and uncompensated reactive power. The high amount of harmonic distortion was mainly due to the 6-pulse VFDs and rectifiers in the distribution

## Solution

Based on the power quality survey, we decided to go for a solution where we installed our APF (active power filter) to remove the harmonic distortion and optimize the power factor. We delivered a cabinet solution with two rack mounted modules of 100 and 300 amps respectively, giving a total of 400A capacity. If additional capacity is needed in the future, the cabinet can be upgraded to a total of 900A capacity.



APF HMI

## Customer Benefits

- Stable data communication system
- Unity power factor with no over or under-compensation of reactive power due to the APFs dynamic reactive power compensation.
- Harmonic distortion reduced to levels within planning levels
- Reduced energy consumption with decreased transformer losses.
- Reduced maintenance costs
- Balanced load due to the APFs current balancing capabilities.

## Before and After results

From before the plant had problems with large amounts of harmonic distortion and poor power factor. The table to the right shows the before and after results after installing the APF.

We see a drastic reduction in current harmonics, and improved power factor. This improvement also reduced the total current consumption close to 100A. The current reduction will greatly reduce the transformer load and I<sup>2</sup>R losses, ensuring a more energy efficient system.



APF Cabinet front side

	Before and after APF installation	
	Before	After
THDi	21.3%	2.7%
THDv	4%	1.5%
Power Factor	0.82	0.995
Reactive power	238kVAr	19kVAr
Current consumption	520A	425A



300A APF Module

The client had a large capacitor bank which was damaged and not contributing to any improvement in the power factor. The capacitor bank was removed



Old capacitor bank was changed out with more advanced technology