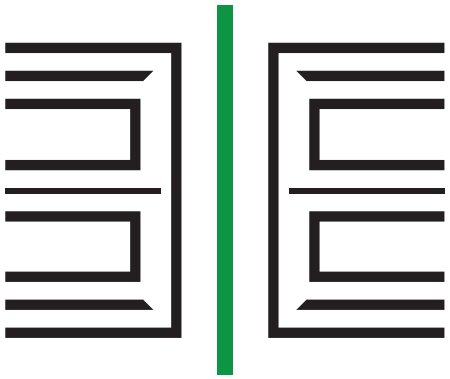

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EEStor Technology (Design Specification) Compared To Two Commercial Utility Grid Power Factor Correction Capacitors Of 600V And 2400V

EEStor, Inc.
715 Discovery Boulevard # 107
Cedar Park, TX 78613
T · 512 · 259 · 7601
F · 512 · 259 · 7452

eestor.us

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One of the key markets that were identified in Mr. Dennis Zogbi's, CEO of Paumanok Inc., report was the utility grid power factor correction capacitor market. Paumanok stated that the size of the total high voltage plastic film market is ~$1.58 billion USD in 2014.

For the purpose of illustrating specific competitive advantages of EEStor technology in this space, the following data compares EEStor technology (design specification) to a 600V capacitor and a 2400V capacitor that are supplied to this industry by two major corporations and the indicated data is from their specifications.

CALCULATION FOR CAPACITANCE from kVAR rating (kilovolt-ampere reactive):
Capacitor One: C = (90 KVAR) / [2 x Π 60 Hz x $(600)^2$] = 663 nano Farads
Capacitor Two: C = (90 KVAR) / [2 x Π x 60 Hz x $(2400)^2$] = 46 nano Farads
Π = 3.14159

600V Capacitor One:

Voltage:	600V
Capacitance:	663 micro Farads
Volume:	35,897.4 cm^3
Price:	>$1,500.00

600V EEStor capacitor design specification: (data taken from the Intertek report)

Utilized Layers:	C3 layers – C3-B 700V
Average capacitance per layer:	6.18 nano Farads
Average resistance per layer:	14.2 giga Ohms
Layer thickness:	25 x 10^{-4} cm
Initial area from Intertek report:	1 inch in diameter
Expanded area for product sizing:	3 inch square (x 11.5)
Capacitance:	0.071 micro Farads
Resistance:	1.24 giga Ohms
Required module capacitance:	26.6 micro Farads
Number of 3"x3" layers per module:	375
Module resistance:	3.3 mega Ohms
Air gap around each capacitor:	0.125 inches
Polypropylene layer around each capacitor:	0.125 inches
Final area (3.5 in^2):	79 cm^2
Final height with 0.25 inch plastic:	1.6 cm
Module volume:	124.5 cm^3
Number of modules for final capacitor:	25
Power dissipation per module:	0.1 watts
Final capacitance:	666 micro Farads
Total volume of capacitor bank:	3,113 cm^3
Price:	See comments below

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2400V Capacitor Two:

Voltage:	2400V
Capacitance:	46 micro Farads
Volume:	8,932 cm^3
Price:	>$1,500.00

2400V EEStor capacitor: (data taken from the Intertek report)

2400V EEStor capacitor design specification: (data taken from the Intertek report)
Two EEStor capacitors (each made up of 25 modules) will be connected in series mode, whereby the capacitance will be divided equally and the resistance will be summed. Both capacitors will utilize EEStor C5-B 1500V layers.

Utilized Layers:	C5-B layer 1500V (average of all C5-B layers)
Average layer capacitance:	3.81 nano Farads
Average layer resistance:	20 giga Ohms
Layer thickness:	35 x 10^{-4} cm
Initial area from Intertek report:	1 inch in diameter
Expanded area for product sizing:	3 inch square (x 11.5)
Capacitance:	0.0438 micro Farads
Resistance:	1.74 giga Ohms
Required module capacitance:	3.68 micro Farads
Number of layers per module:	85
Module capacitance	3.72 micro Farads
Module resistance:	20.5 mega Ohms
Air gap around each capacitor:	0.125 inches
Polypropylene layer around each capacitor:	0.125 inches
Final area (3.5 in^2):	79 cm^2
Final height with 0.25 inch plastic:	0.933 cm
Module volume:	73.7 cm^3
Number of capacitor modules:	25
Capacitor bank resistance	41 mega Ohms
Power dissipated per module:	.144 watts
Final Voltage:	2400V
(Two 1500 V caps in series totals 3000 V but they can be used at 2400V)	
Final module capacitance:	93 micro Farads
Final capacitor bank capacitance	46.5 micro Farads
Total volume of capacitor bank:	3,685 cm^3
Price:	See comments below

For both EEStor 600V and 2400V capacitor types, the air isolation between the modules and utilizing multiple modules will provide for low power dissipation per module. This design is intended to provide a low operating temperature per module.

This capacitor market is highly sensitive to volume and price which will allow EEStor to have competitive advantage due to our low volumetric size and highly competitive costing.

The broad frequency band capability of the EEStor technology, indicated in the Intertek report, is extremely important for these markets due to the need to remove high frequency noise from the energy sources. This feature of EEStor technology will be a significant differentiator in this market due to our ability to filter out high frequencies. Competitive capacitors in this market segment fail in this respect.

The commercial pricing of the EEStor capacitor bank should be significantly less than other polymer capacitors in this market segment as our volume, as illustrated above, is much lower than the existing commercial polymer capacitors. Also Mr. Zogbi noted in the Paumanok Report that "the benefit of the EEStor technology is the cost structure. Since the ceramic dielectric is based upon barium and titanium feedstock, which should be in the $8.00 [USD] a pound range when processed, the cost structure would be much better than that of aluminum anode, etched foil and etched cathode foil which averages about $20.00 per pound, and that of tantalum metal powder which averages about $200.00 USD per pound."

This would also provide a significant cost advantage over thin film high volume metalized polypropylene super thin film material, used in producing their polymer capacitors identified above.

The photovoltaic voltage smoothing capacitor market requires similar polymer capacitors and is a rapidly expanding market.

As the above data indicates EEStor should be highly disruptive in the utility grid power factor correction capacitor market. This market will provide exceptional growth potential for EEStor in the years to come.