

Power Factor Correction Application & PFC input capacitor

1. Background



1) Background

- ◆ In 2001, The European Union put EN61000-3-2 into effect to set the harmonic regulation standard on any power grid supplied application with power consumption
 - Require Power Factor Correction (PFC)
 - Application ; EPS (External Power supply)



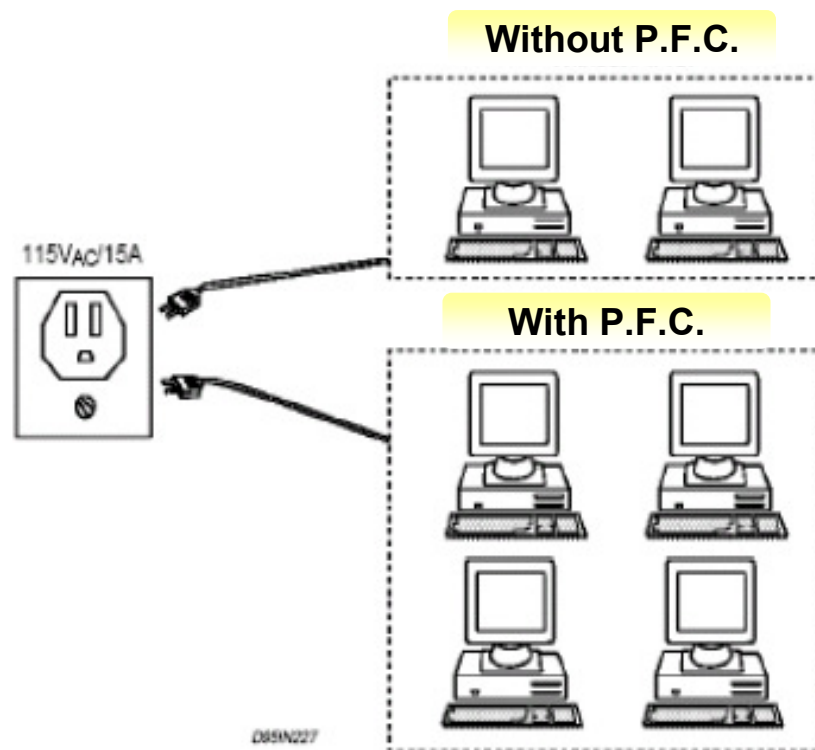
2) Global EPS Specifications

Table 1: Harmonized External Power Supply Specifications (P_{no} = Nameplate Output Power, L_n = the natural log, W = watts, PFC = power factor correction)					
Organization	Region	Mandatory or Voluntary	Effective Date	Minimum Active Efficiency	Maximum No-Load Power
ENERGY STAR	US	Voluntary	January 1, 2005	$\geq 0.49 \cdot P_{no}$ for 0-1 W $\geq [0.09 \cdot L_n(P_{no})] + 0.49$ for >1-49 W ≥ 0.84 for >49-250W	≤ 0.50 W for 0-<10 W ≤ 0.75 W for 10-250 W
CECP	China	Voluntary	January 1, 2005		
AGO	Australia	Mandatory MEPS	April 1, 2006		
California Energy Commission	California	Mandatory	July 1, 2006		
EU Code of Conduct	Europe	Voluntary	January 1, 2007		≤ 0.30 W for non-PFC ≤ 0.50 W for PFC

◆ Upgrade regulation

- Energy Star 2.0 / IEC 61000-3-2
- Power factor correction (PFC) solves utilization losses
- Regulation requires PFC in SMPS > 75W

3) User's Benefits



2. PFC input capacitor for SMPS



1) **Circuit ; Active PFC**

2) **Application ; LCD / PDP power or others SMPS**

3) **Primary role**

- **To filter the high frequency ripple of the PFC circuit that would be required to smooth the 50~60Hz input**

4) **Customer's request**

- **Mini size, High reliability & Low noise**

- * The noise (buzz) produced by the film capacitor is caused by the vibration of the film due to the Coulomb force that is generated between the electrodes with opposite polarity.

The noise becomes louder if the applied voltage waveform presents distortion and / or high frequency harmonics.

3. Pilkor's PFC input capacitor

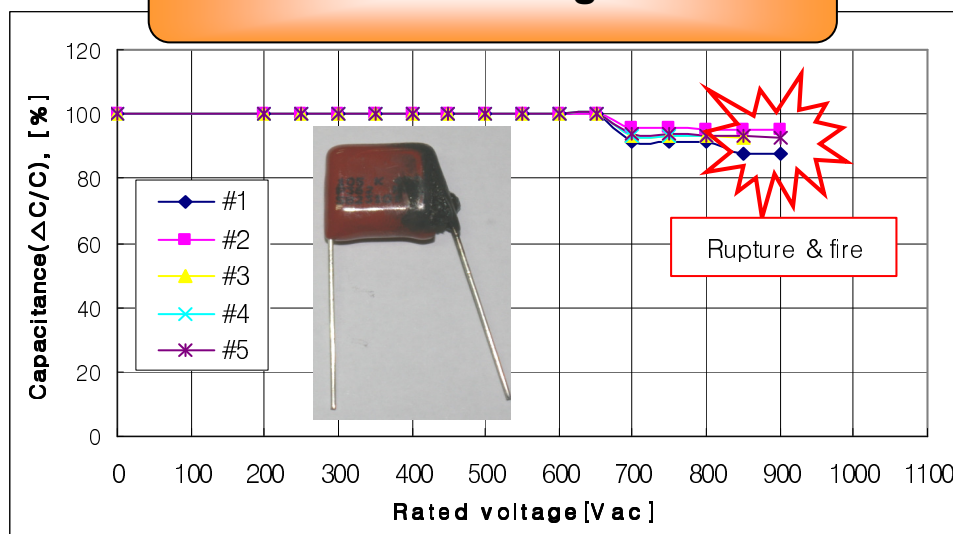


1) Specification Data

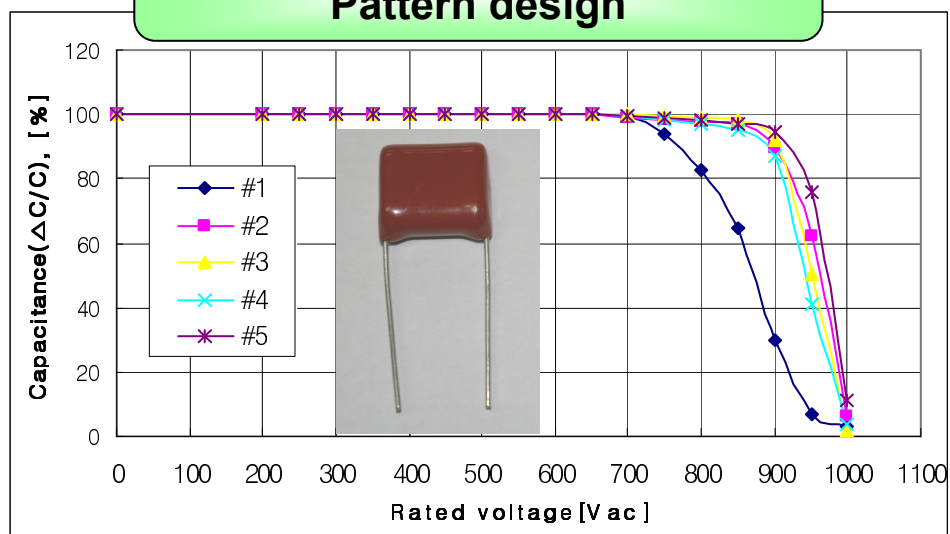
Series	PCMT 362	PCMP 472	PCMP 372
Dielectric	PET	PP	PP
Type	Brown L/Q	Brown L/Q	Blue Box
Rated voltage [Vdc]	450	450, 500, 550, 630	450, 550, 630
Cap. Range	474~105	474~225	474~225
Temperature range	-40℃ ~ 110℃	-40℃ ~ 105℃	-40℃ ~ 105℃
Reference specification	IEC 60384-2	IEC 60384-16	IEC 60384-16
Passive flammability category	Class B	Class B	Class B
Application	Active filter	Active filter	Active filter
Design	Pattern	Mono or Pattern (mini)	Mono or Pattern (mini)
Property	Miniature Low noise High reliability	Miniature Low noise High reliability	Miniature Low noise High reliability

2) AC step up test

Mono design



Safety design Pattern design

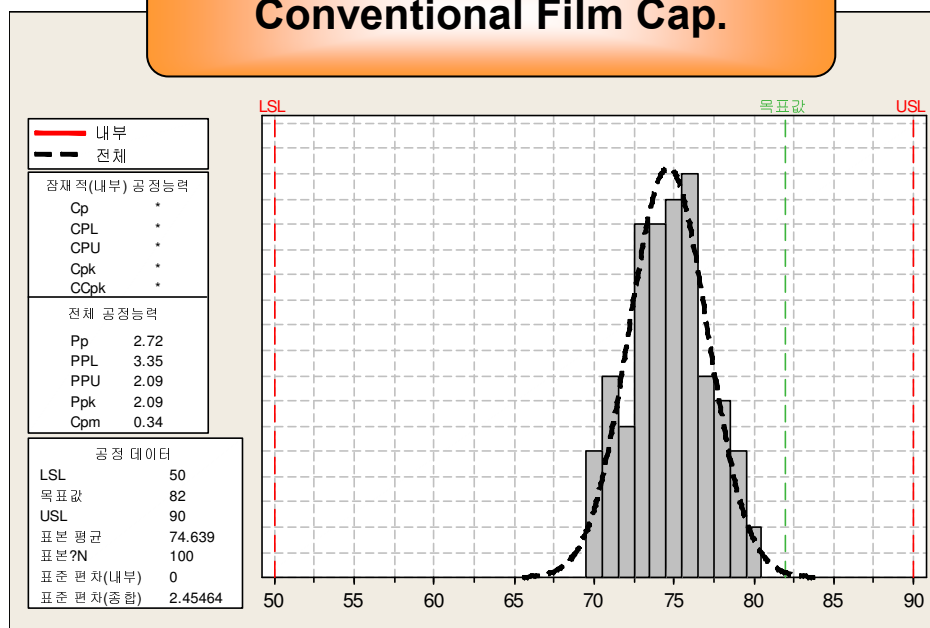


* Test

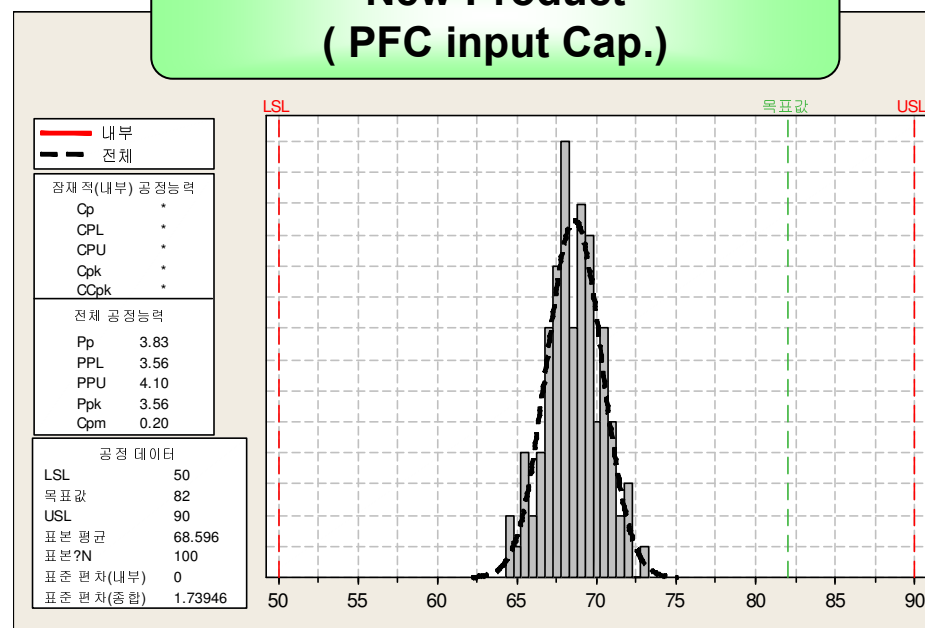
- PCMT 362FL2105 (450V P15.0 1uF)
- Q'ty ; 5ea
- R & D Lab. test

3) Noise test

Conventional Film Cap.



New Product (PFC input Cap.)



* Test

- PCMP 472FL2105 (450V P15.0 1uF)
- Q'ty ; 50ea
- R & D Lab. test