Issue 1 / 2019

CHARGE

May 2019

A Technical News Journal from Deki Electronics Ltd

Editor's Desk

Dear Reader,

Deki is India's largest manufacturer of plastic film capacitors and the leading supplier of film capacitors for the Indian lighting industry. In fact, over half of Deki's turnover comes from the lighting segment.

The manufacturers of LED bulbs are aware of the accidents caused by the burning of unsafe capacitors being sold by Chinese manufacturers. Our recently developed MPET-F and MPP-F capacitors have an in-built fuse in the film to ensure that the capacitor fails in the safe mode and does not burn and cause accidents. We hope that more and more manufacturers will shift to these safe capacitors in due course of time.

In this issue we talk in detail about these two capacitors and where they should be used.

Lastly, we look forward to your suggestions to improve charge further.

Anil Bali

Deki MD is CII UP Chairman

On 1st March 2019, Deki MD Mr Vinod Sharma took over the responsibility of chairing the UP State Council of the Confederation of Indian Industry (CII).

He has earlier served as the Chairman of the CII-National ICTE Committee, working on policy advocacy and industry development in this important sector at the national level.

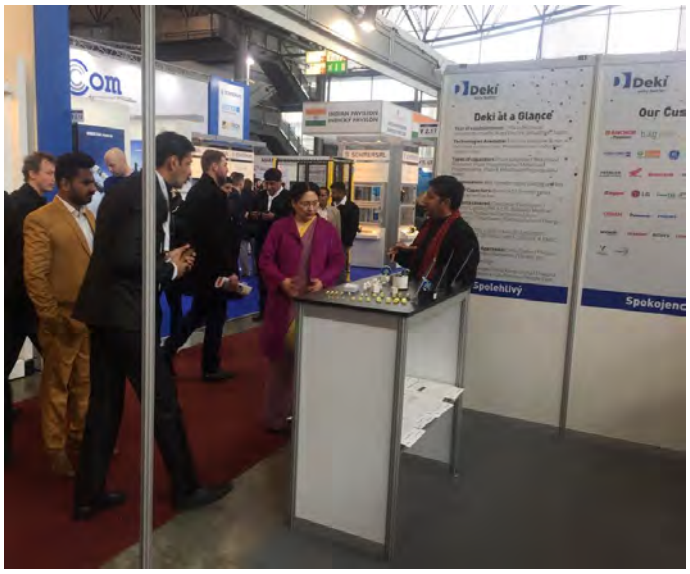
In the new role Mr Sharma's focus shifts to industry issues and promotion at the state level. In terms of population, Uttar Pradesh would be the world's 5th largest 'country' with immense potential for industry and manufacturing.

"I am grateful for the trust that the CII members have reposed in me. The challenges are immense and I hope to be able to contribute my bit with the manufacturing experience that I have garnered at Deki and the institutional experience gained at CII." says Mr. Sharma.

Deki at Amper, Czech Republic

Deki was part of the India Pavilion at Amper 2019 from 19 to 22 March 2019. Held in Brno, Czech Republic, the 28th international trade fair of electrotechnics, energetics, automation, communication, lighting, and security technologies is one of the important business expositions in eastern Europe.

Deki products evinced a keen interest and the initial feedback is extremely positive. H.E. Mrs Narinder Chauhan, the Indian Ambassador to the Czech Republic, also visited the Deki stall.



Deki works for Goonj

Team Deki undertook a collection drive for the "Dil Ki Suno, Kuchh Karo" initiative launched by Goonj. Between October and November, we collected around 185 kg of clothes, school uniforms, shoes, slippers, etc. All this material was sorted, packed and delivered at the Goonj office on 27 November 2018. We also handed over a cheque for Rs 5000/- to meet the transportation expenses for the material that Goonj will incur in getting it across to the needy.

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LED: APPLICATION BASED ANALYSIS

Deki has some of the biggest names in the lighting industry as our customers and with them comes years of experience. In order to provide better solutions to our customers we are constantly engaged with them through discussions and seminars with their technical teams.

Our main concern, during these discussions, is to educate customers about film capacitor selection preceding any new development. We also perform joint exercises with client technical teams as and when required or when faced with a technical question. During these interactions we bring to bear our experience that we have built over the years in servicing the LED lighting industry and suggest the best from our product portfolio to match customer requirements.

In order to select the right capacitor we perform three different tests:
1. IEC specific tests
2. Customer specific tests
3. Development tests.

For development test we check the stress that a capacitor has to endure electrically, physically and environmentally.

In order to check the stress that a film capacitor goes through in an LED light in a real life scenario, we performed a stress analysis of different LEDs randomly picked from the market.

PROCEDURE

We took LED lamps of different manufacturers and analysed them based on their design, wattage, rating of capacitor used.

When it comes to LED lamps, a film capacitor has basically two roles:

1. Before the Bridge
For AC noise reduction (Interference Suppression) in the input signal and act as a filter to bypass high frequency.

2. After the Bridge
For the purpose of filtering/smoothening DC ripple current.

We then compared each manufacturer's LED performance on the basis of:
- Electrical Stress
- Environmental Stress

PROCEDURE FOR ELECTRICAL STRESS

We attached a voltage probe on the capacitors connected in circuit before bridge (across the mains) and after the bridge and measured the stress at under voltage, rated voltage and over voltage respectively, i.e., 170V, 240V and 310V.

We found the following results:

	Input Voltage		
Parameters	@ 170V	@ 240V	@ 310V
Peak to Peak Voltage	176V	268V	370V
Maximum Voltage	248V	340V	440V
RMS Voltage	172V	240V	304V
Base Frequency	98.43Hz	100.9Hz	99.70 Hz

ENVIRONMENTAL ANALYSIS

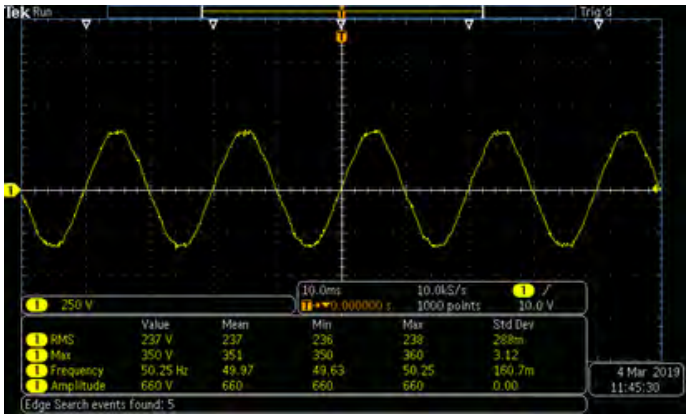
We connected a temperature sensor on capacitors connected in circuit before bridge (across the mains) and after the bridge to check for temperature.

Positioning of sensor and arrangement is shown in the image below.

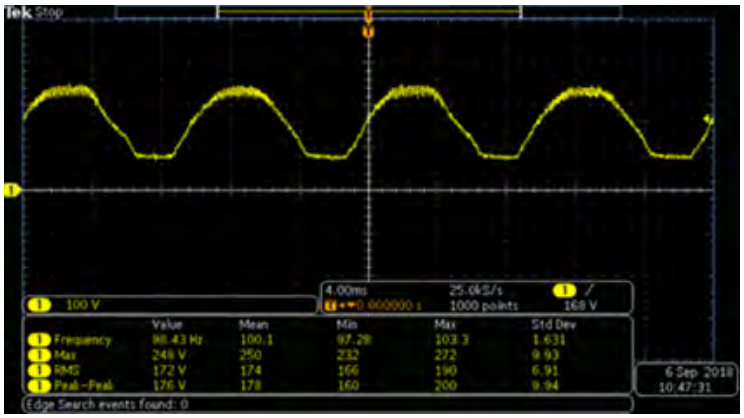
Positioning of sensor and arrangement

Please note the analysis is done at 45°C ambient working temperature which is quite normal in summer.

The table alongside shows the variation in temperature on the capacitors used before and after the bridge. The maximum temperature on the capacitors, keeping the LED at 45°C ambient temperature, was above 100°C.

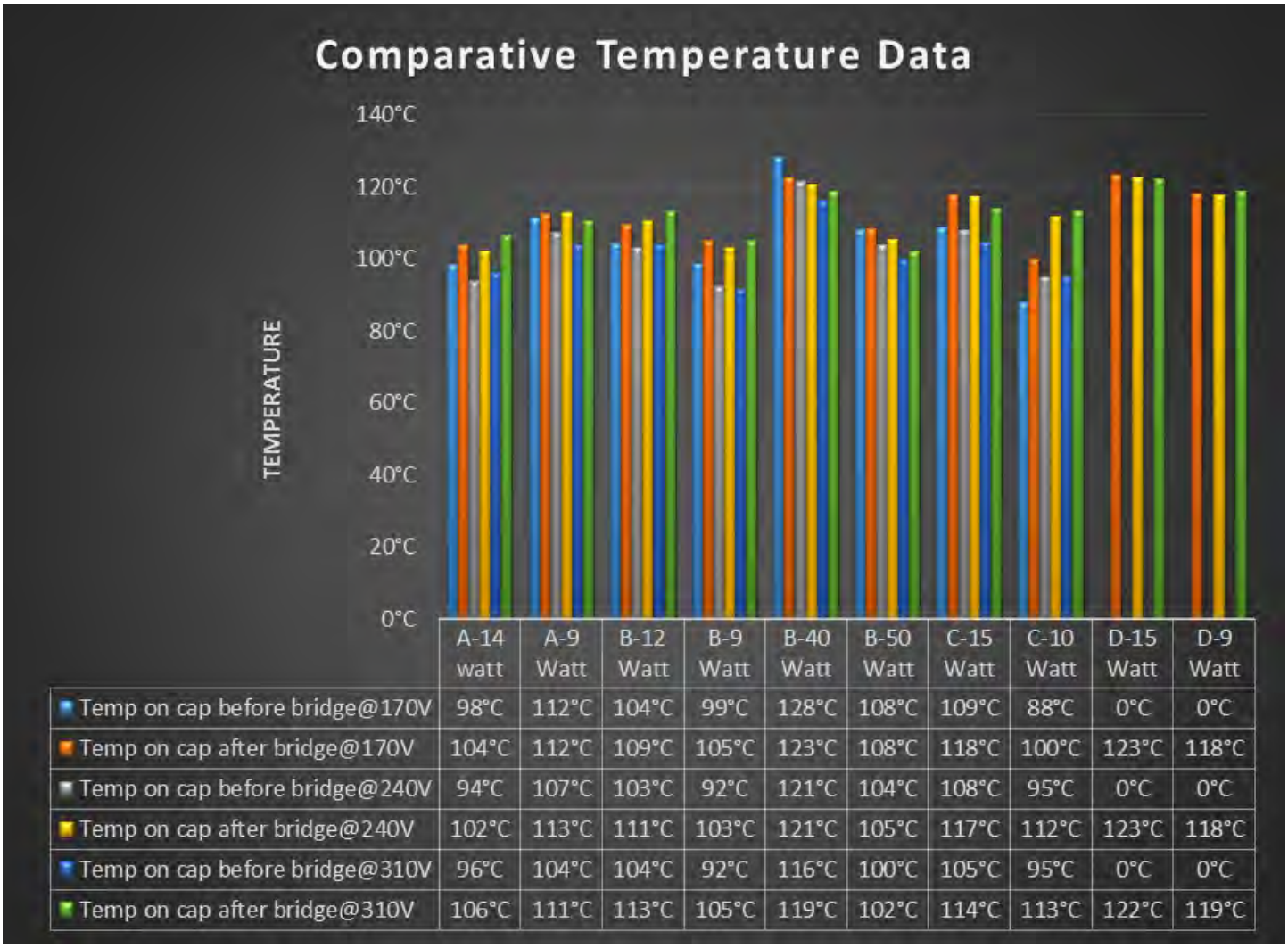


Input voltage wave form



Voltage wave form for stress after the bridge

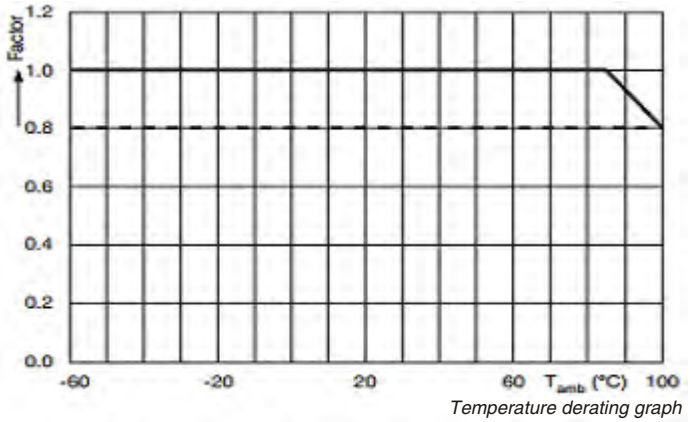
LED: APPLICATION BASED ANALYSIS



	A-14 watt	A-9 Watt	B-12 Watt	B-9 Watt	B-40 Watt	B-50 Watt	C-15 Watt	C-10 Watt	D-15 Watt	D-9 Watt
Temp on cap before bridge@170V	98°C	112°C	104°C	99°C	128°C	108°C	109°C	88°C	0°C	0°C
Temp on cap after bridge@170V	104°C	112°C	109°C	105°C	123°C	108°C	118°C	100°C	123°C	118°C
Temp on cap before bridge@240V	94°C	107°C	103°C	92°C	121°C	104°C	108°C	95°C	0°C	0°C
Temp on cap after bridge@240V	102°C	113°C	111°C	103°C	121°C	105°C	117°C	112°C	123°C	118°C
Temp on cap before bridge@310V	96°C	104°C	104°C	92°C	116°C	100°C	105°C	95°C	0°C	0°C
Temp on cap after bridge@310V	106°C	111°C	113°C	105°C	119°C	102°C	114°C	113°C	122°C	119°C

**0°C in graph above indicates the absence of a capacitor in that position.*

For polypropylene/polyester dielectric capacitor rated temperature is 85°C and after this temperature derating has to be applied. For temperature between +85˚C and 100˚C a decreasing factor of 1.25% per °C on the rated voltage V_R has to be applied.



Temperature derating graph

RECOMMENDATION

Before bridge (Across the Line)

Since it is a pure AC application with a voltage 220-240V, frequency 50Hz and temperature in input side is less as compared to the output side we recommend the MPP-AC-F (fuse) version.

The benefits of the fuse version are:
1. Inbuilt safety feature
2. Compact size
3. Cost effective solution
4.Prevent failure in burst/burn mode.

After Bridge

This capacitor is employed after bridge rectifier so basically this is a DC application but the temperature is high as compared to the input. From a design perspective the main constraint here is temperature. Our recommendation is the MPET-F (fuse) with a rated temperature 110° C.

The benefits in this case are:
1. High operating temperature
2. Inbuilt safety feature
3. Compact size
4. Cost effective solution
5. Prevents failure in burst/burn mode.

For any queries this application based analysis or any other information pertaining to film capacitors, please write to *info@dekielectronics.com*.

CSR - Reusable Menstrual Pad Project

Consistent with Deki's prime CSR mission of undertaking initiatives to improve the educational and economic well-being of girls and women from disadvantaged backgrounds, through Shashi Kiran Charitable Trust we have partnered with The Mooncatcher Project – a philanthropic organization based in New York, USA to optimize girls lives by removing barriers related to menstruation.

The centerpiece of Mooncatcher's activity is a reusable menstrual management kit that is distributed without charge to schoolgirls with the goal of allowing them to continue their education uninterrupted. In addition, an educational workshop on Menstrual Awareness, Management and Hygiene is also imparted to the girls– a critical gap in the typical curriculum in developing countries.

Our productive discussions with Mooncatcher led to a formative visit to Delhi by the organization's Founder and Executive Director, Ellie von Wellsheim in October 2018. We have successfully established a production center in NOIDA, U.P. to make the Mooncatcher kits with all material sourced locally providing employment to local women.

We started our outreach in Noida in January of 2019 by educating and distributing our kits to the most needy girls, and so far have successfully distributed over a thousand kits.

Our kits and educational curriculum have been well received. We are now in discussion and planning phase with other NGOs working on the ground to take our project to Rajasthan and Uttarakhand.

The MoonCatcher project directly and indirectly supports several of the United Nations Sustainable Development Goals, namely:

Goal 3: Good Health and Well-being – providing education and hygiene products works towards improving health outcomes for girls and women.

Goal 4: Quality Education – enabling girls to attend school while menstruating works towards improving education outcomes for girls.

Goal 5: Gender Equality – helping girls complete their education and women find employment works towards reducing gender disparities.

Goal 6: Clean Water and Sanitation – providing easily washable menstrual pads works towards improving hygiene for girls and women.

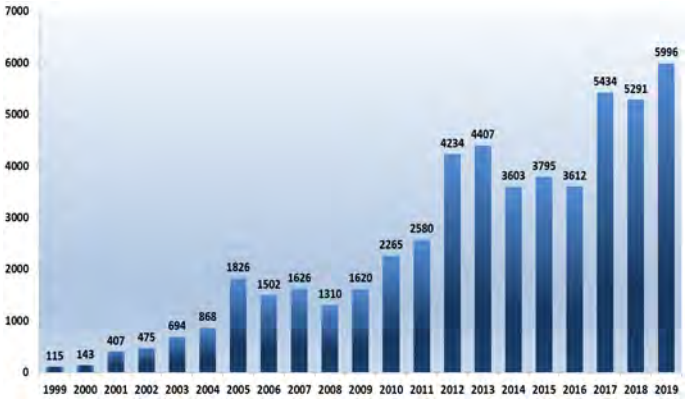
Goal 8: Decent Work and Economic Growth – hiring local women to make menstrual kits works towards increasing decent employment for women.

Goal 12: Responsible Consumption and Production – providing long-lasting reusable menstrual pads works towards reducing waste.

Watch the Mooncatcher video at http://bit.ly/mooncatcher

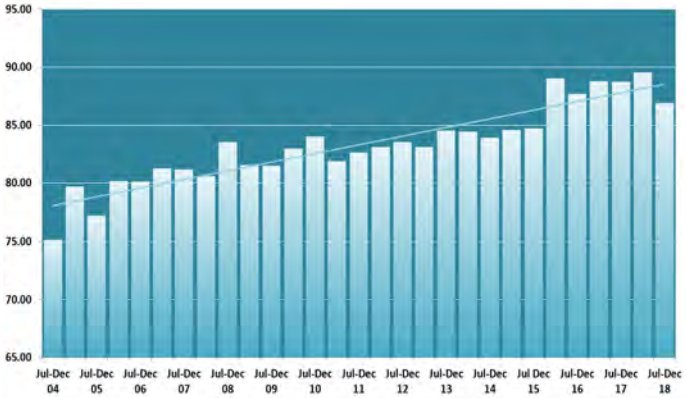
Training Effort at Deki

As most readers of Charge are aware, training at Deki receives utmost importance with close to 5% of the time being spent on it. As an integral part of continual skill enhancement it has been growing consistently. Detailed, stage wise training is being conducted continuously in which knowledge of the process and the machines is being imparted to the floor staff. This is followed by a written test where an employee has to score a minimum of 80% at critical stages to qualify to run the machine. Deki's training modules have been well recognized and serve as a benchmark for component manufacturers.



External Customer Satisfaction Survey

Deki conducts an external customer satisfaction survey every six months. From the time we started this measurement in 2004 we have been showing consistent growth from a level of 75% to a peak of 89.56% in the most recent survey of Jan-June 2018. This is because we take action on the two points that our customers want us to focus on in the following six months. Our customers recognize this effort of Deki and it is reflected in the score.



Retirements

There were two retirements at Deki during the previous six months.

First, Mr Rajendra Singh Kushwaha, Asstt. Manager (R&D) retired on 30 June 2018 after almost 33 years with Deki, having joined the company in December 1985. Next, Mr O K Narashimhan, Sr. Manager (Materials) retired on 30 November 2018 after completing 20 years in the company having joined in August 1998.

It is a matter of pride that we have colleagues who have spent long stints in the company. We wish both our erstwhile colleagues and their families all the very best.