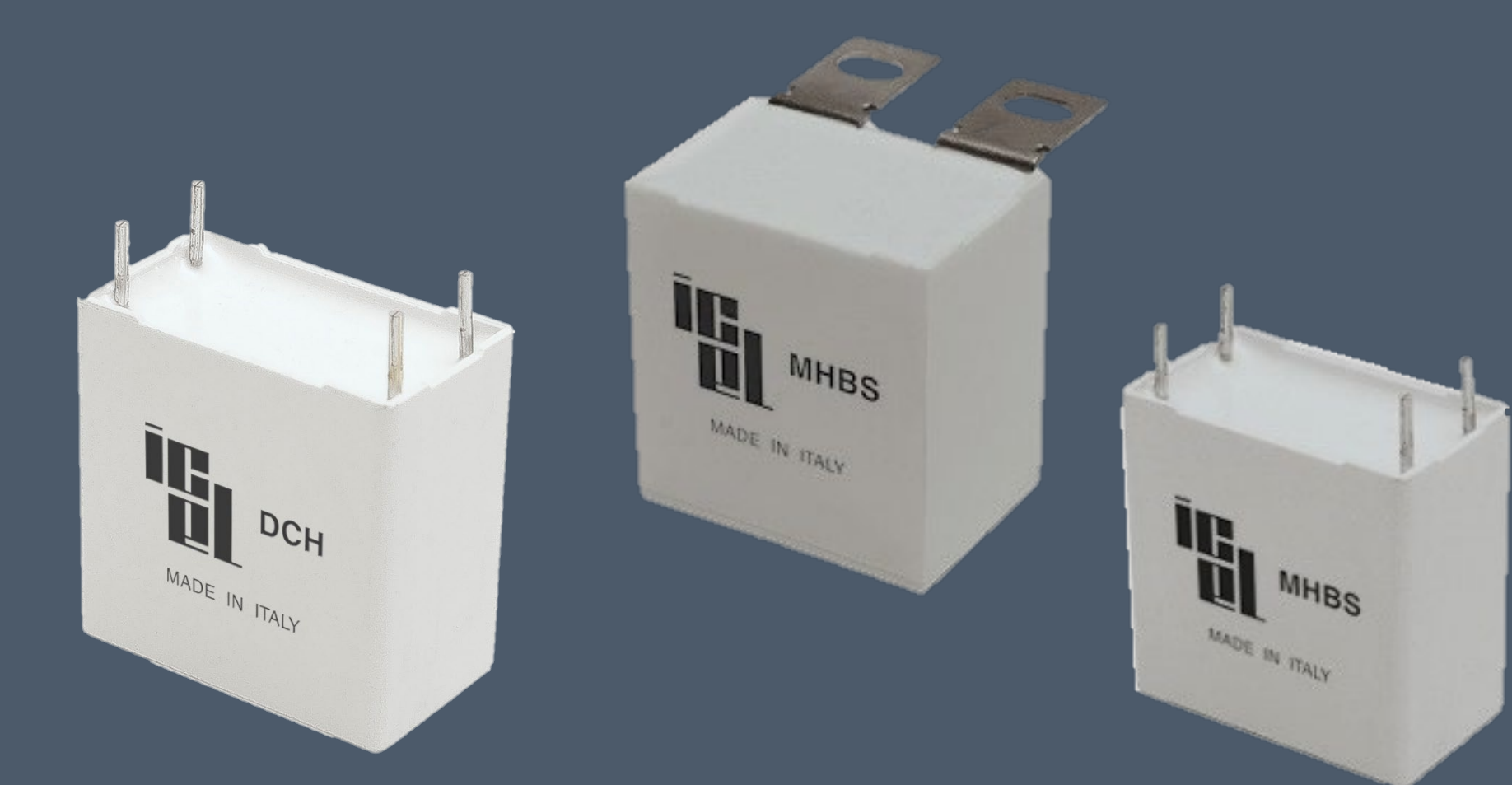


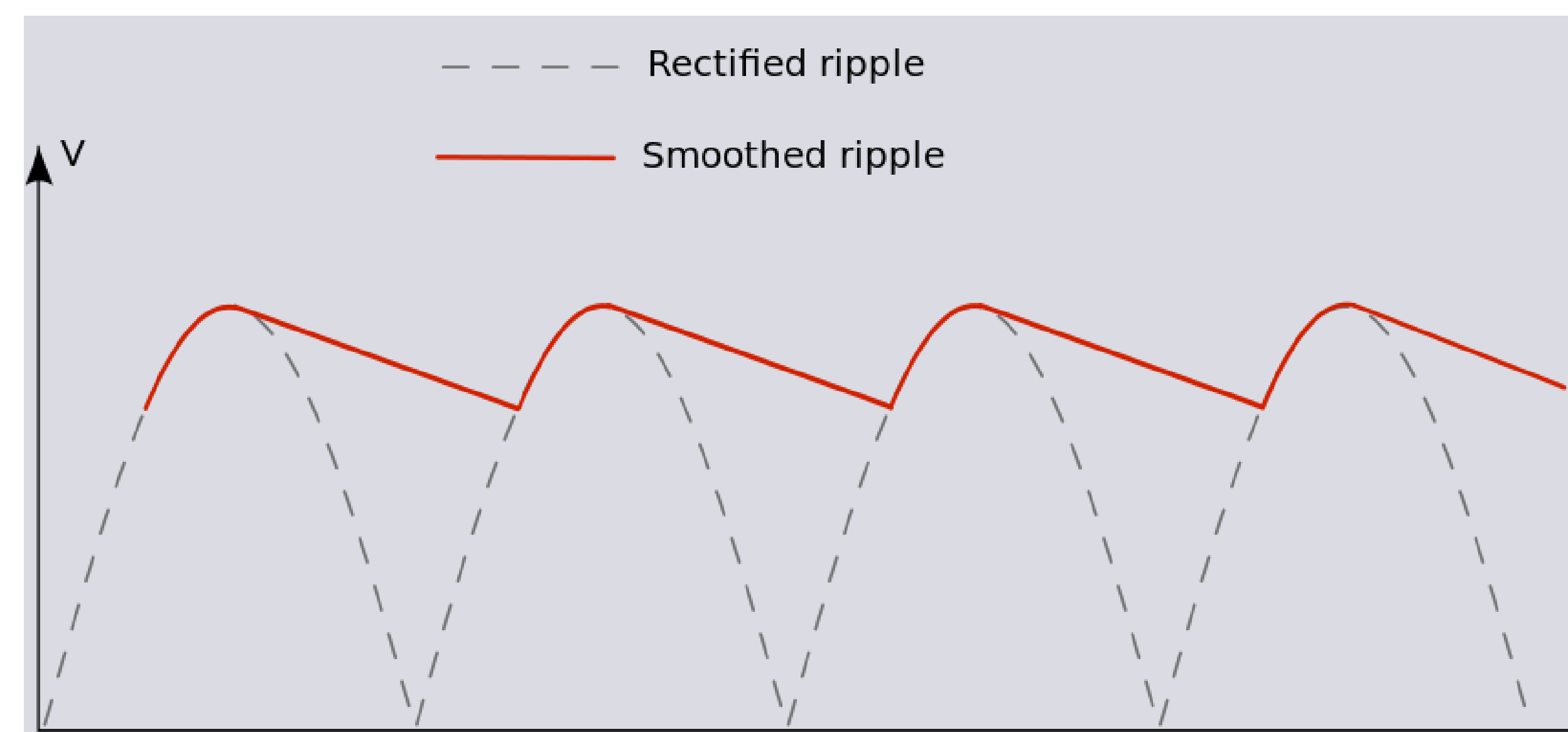
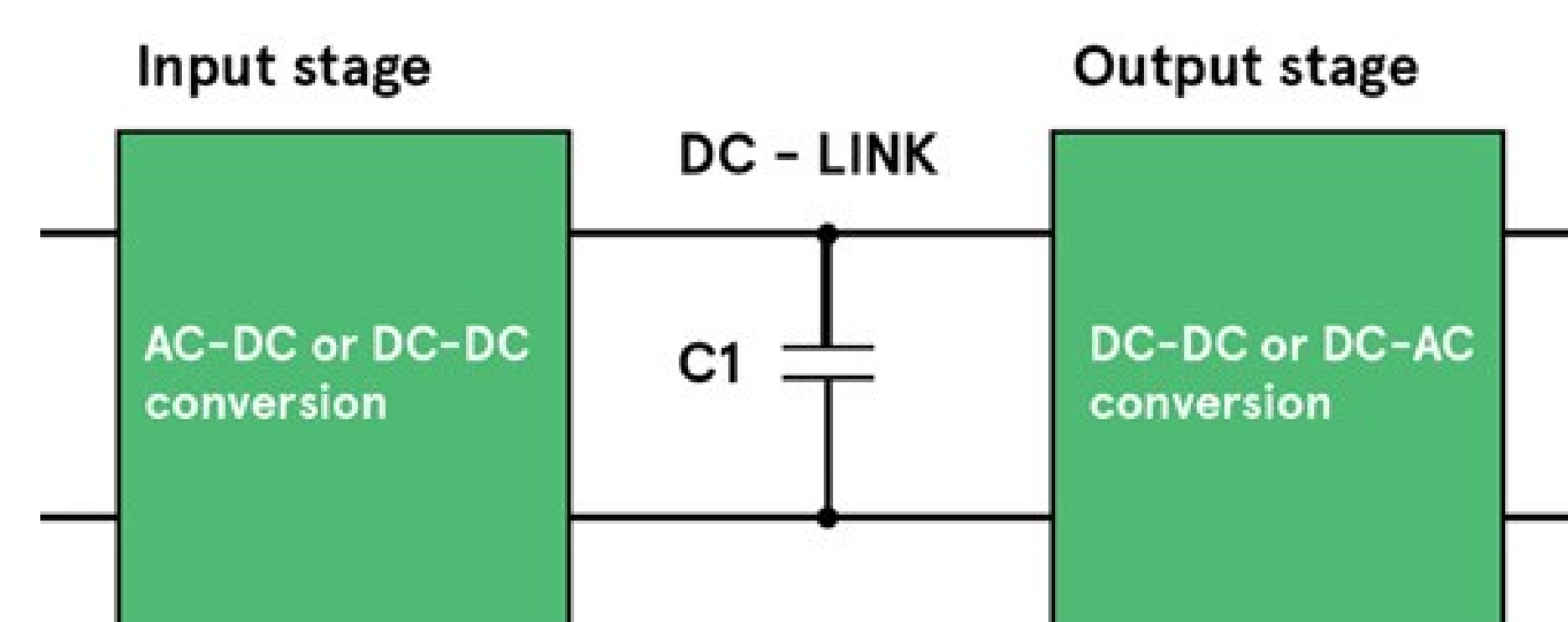


# Application & Technical Support *DC-Link capacitors*



## WHY DC-LINK CAPACITORS?

- DC-Link capacitors are essential in inverters and switching power supply circuits
- The main function of a DC-Link is to balance the instantaneous power variations between the input source and the output load



## PLASTIC FILM DC-LINK

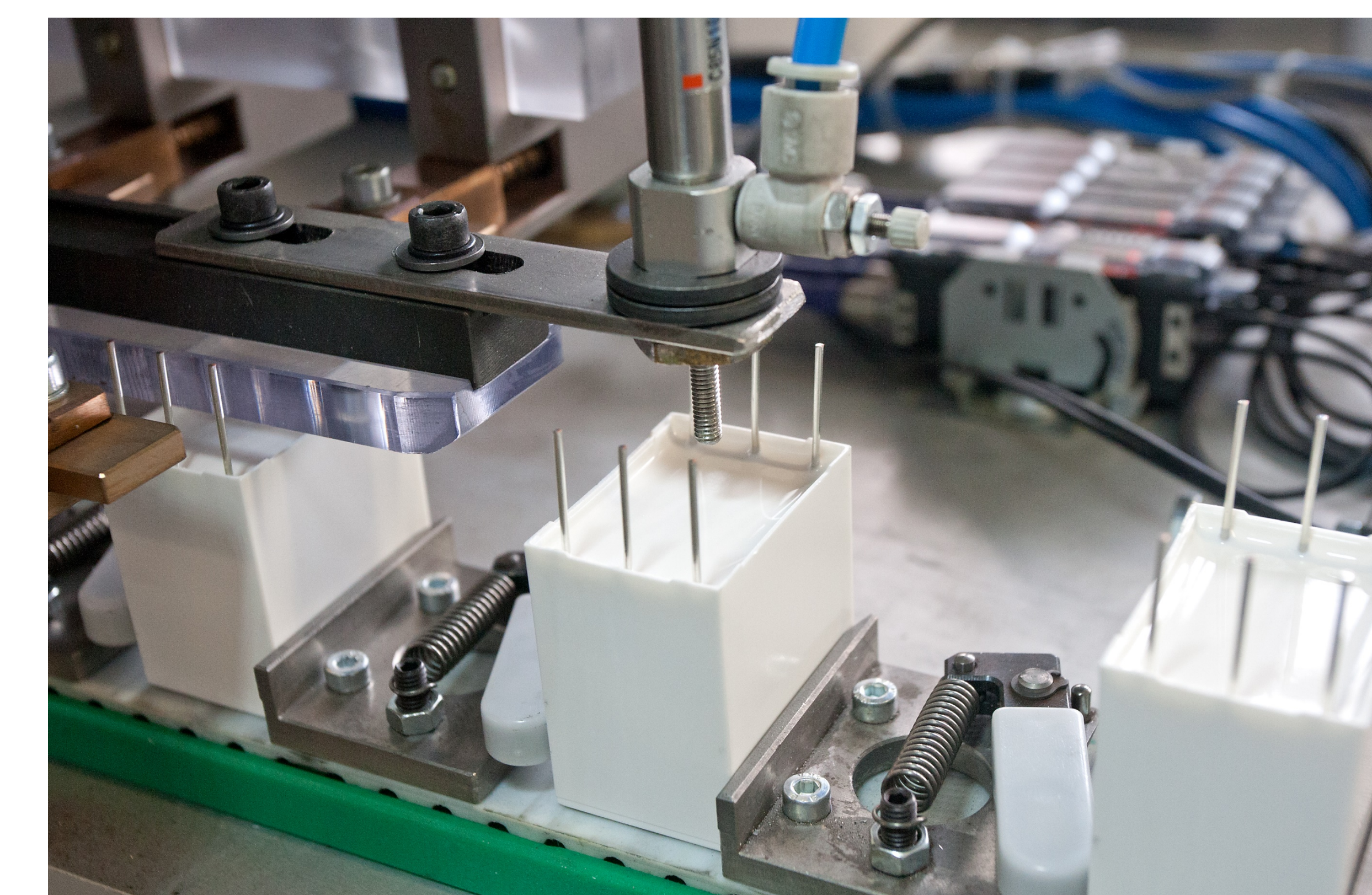
- The most commonly used DC-Link capacitors are:
  - Electrolytic capacitors
  - Plastic film capacitors
- In general aluminum electrolytic capacitors are used in power electronics due to their very high power density. However, in an increasing number of applications plastic film are selected as they show some fundamental advantages:
  - higher rated voltage
  - very low dissipation factor and equivalent series resistance (ESR)
  - very high insulation resistance
  - higher tolerance to power surges
  - wider temperature range
  - considerably higher reliability by outstanding self-healing properties
  - long life expectancy
  - non-polarized construction
  - high vibration and shock resistance
  - excellent mechanical stability

## MATERIALS AND CHARACTERISTICS

- Most DC-Link plastic film capacitors are designed with *polypropylene metallized film* material
  - *low-loss dielectric* material, suitable for designing capacitors for use in both low and high pulse applications
- The properties of a film capacitor are significantly dependent on the construction technology used, but a good DC-Link capacitor shall have:
  - Very low ESR
  - low self-inductance
  - high ripple-current ratings
- The above variables are defined for a specific frequency and temperature range

## ICEL PRODUCTS - DC-LINK

- **Boxed – PINS execution**
  - **DCH / DCS** – **NEW!** medium-high current, medium-high frequency, not suitable for AC, **DCS**: high safety version
  - **MHBS** – high current, high energy density, suitable for AC applications and high Irms switching applications upon restrictions
  - **MHBA** – Input/output AC and DC filtering. Suitable for high Irms switching applications. High frequency, high current
- **Boxed – LUGS execution**
  - **MHBS** – high current, high energy density, suitable for AC applications and high Irms switching applications upon restrictions
  - **MHBA** – Input/output AC and DC filtering. Suitable for high Irms switching applications. High frequency, high current ★ recommended



## MAIN APPLICATIONS

- In applications from the simplest cell-phone charger to grid-tied inverters operating at hundreds of kW, power conversion schemes are used which incorporate an intermediate stage where energy is processed at DC
- A DC-link capacitor is fitted at this point to provide
  - low impedance path for high frequency switching currents
  - energy storage
  - output filter, absorbing switching currents for minimum ripple voltage

## FUNCTIONALITY

- In a switching power supply, AC power is converted to DC without passing through a transformer, and fed to a high-frequency power oscillator
  - the DC link capacitor is applied from positive to negative after rectification
- In a power inverter, a DC link capacitor is placed in parallel with the input to minimize the effects of voltage variations as the load changes
- The spikes generated by the power device (switching on and off) need to be effectively decoupled
  - to minimize heat and best protect the power devices, very low equivalent series resistance (ESR) and low self-inductance are required
  - the other critical performance specification is ripple-current

**ICEL s.r.l. – Industria Componenti Elettronici**

Unit B1 Wymeswold Industrial Park,  
Burton on the Wolds  
Loughborough  
Leics., LE12 5TY, UK

John G Peck Ltd

UK Representatives;  
[www.jgpl.com](http://www.jgpl.com)  
Email: [enquiries@jgpl.com](mailto:enquiries@jgpl.com)  
Tel: 01509 881010



[icel@icel.it](mailto:icel@icel.it) – [www.icel.it](http://www.icel.it)