# EnyGy® Proprietary Graphene Film

## Product Handling Instructions and Datasheet

- *High energy density.*
- *Good ESR.*
- *Good uniformity.*
- *Easily adapted to existing manufacturing facilities.*
- *Cost-effective.*
- *Customization available.*

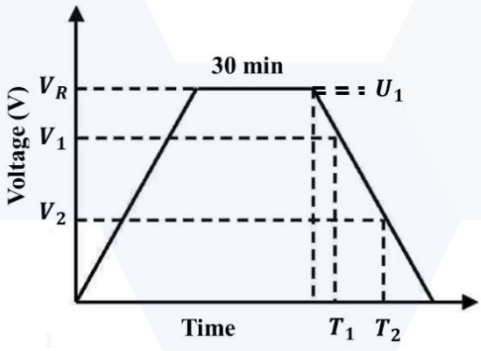
## Product Storage & Handling Instructions

EnyGy Proprietary Graphene Film is a new product that offers significant benefits when incorporated into ultracapacitor technology. The higher surface area makes it more susceptible to moisture absorption. To ensure optimal performance enyGy have developed these simple yet specific product storage and handling guidelines:

- **Product must be stored within a vacuum seal bag/enclosure at all times.**
- **Product must be stored within a temperature range of 0°C to 40°C.**
- **Once product is removed from the vacuum seal enclosure, it must be used immediately within 24 hours.**
- **Product must be handled in an environment with humidity <30%RH.**
- **Supercapacitor assembly must be undertaken in a dry room with moisture and oxygen level less than 1 ppm.**
- **Any unused film must be completely dried and returned to a vacuum seal environment immediately within 24 hours.**
- **Product must not undergo any cleaning processes before use.**

## Datasheet Electrode Films Specifications

| | Double side coated film | Unit |
|---|---|---|
| Thickness | 200-230 | µm |
| Uniformity | ±5 | µm |
| Width | 20-23 | cm |
| Area Loading | 13 – 16 | mg/cm$^2$ |
| Volumetric capacitance | ≥ 20 | F/cm$^3$ |
| Operating Temperature Range | | |
| Minimum | -40 | °C |
| Maximum | 65 | °C |
| Storage Temperature Range | | |
| Minimum | -40 | °C |
| Maximum | 65 | °C |
| Shelf life<br>If unopened and kept in the vacuum bag | 5 years | |




$$C = I \times \frac{T_2 - T_1}{V_1 - V_2}$$

Where $V_R$ is the rated voltage;
$V_1$ is 80% of $V_R$; $V_2$ is 40% of $V_R$;
$T_1$ and $T_2$ are the corresponding time for $V_1$ and $V_2$, respectively;
Volumetric capacitance $C_v$=C/V, where V is the volume of two electrodes

NOTES:
Capacitance is measured with symmetric cell of two pieces of identical electrode film with TEABF4/ACN electrolyte. Constant current (I) is used to charge the cell to rated voltage, and the voltage is held for 30 mins, before constant current (I) discharge to 0.1 V.