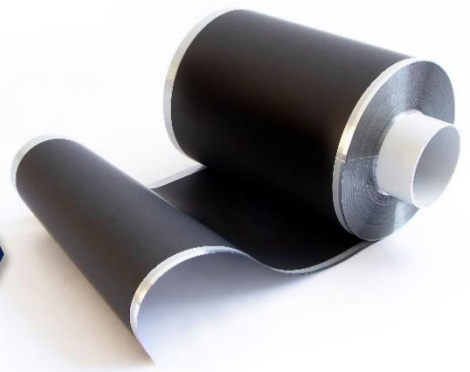




EnyGy® Proprietary Graphene Film

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:

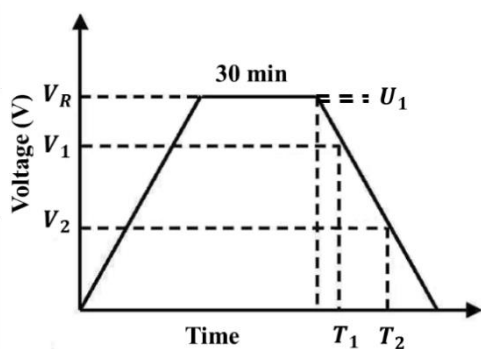
1. When opening the package (box) and removing the vacuum-sealed bag, inspect the bag thoroughly. If the bag does not appear appropriately sealed or shows any signs of damage or tearing, the product is compromised and may not perform as expected.
2. Store the product within a vacuum-sealed bag or enclosure at all times.
3. Maintain the vacuum-sealed product at room temperature with a humidity level below 60% RH.
4. Do not exceed a storage duration of 12 months under the specific conditions (points 2 and 3 above). Ideally, initiate the handling process and supercapacitor assembly early within this timeframe.
5. Upon removal from the vacuum-sealed enclosure, utilize the product within 72 hours.
6. Throughout this 72-hour handling period, avoid exposure to direct sunlight, moisture, temperature fluctuations, and extreme temperatures, as well as contaminants such as dust, dirt, and oils. Therefore, ensure the product is handled:
 - with gloves to prevent contamination;
 - in a clean environment free from dust, dirt, and other contaminants;
 - in a low humidity environment (avoid exposing it to water or humidity because moisture can degrade the performance of the electrode films);
 - under constant room temperature (excessive heat or cold can impact the conductivity and stability of the materials, leading to diminished performance or even damage, and rapid temperature fluctuations can cause stress on the electrode films and lead to mechanical failure or delamination), and;
 - Refrain from subjecting the product to any cleaning processes before use.
7. During this 72-hour handling period, undertake supercapacitor assembly in a dry room (environments with controlled moisture and oxygen levels to minimize the risk of degradation and ensure optimal performance and longevity).
8. Any unused film must be thoroughly dried and promptly returned to a vacuum-sealed environment within the 72-hour handling period for future use (while adhering to storage conditions mentioned in points 2-4) or disposed of properly.
9. For any questions or concerns regarding the handling, storage, or use of our electrode films, please contact our technical support team at support@enygy.com.

Datasheet Electrode Films Specifications

	Double side coated film	Unit
Thickness	160-230	µm
Uniformity	± 5	µm
Width	20-23	cm
Area Loading	10 – 16	mg/cm ²
Volumetric capacitance	20 ± 1	F/cm ³
Operating Temperature Range		
Minimum	-40	°C
Maximum	65	°C
Storage Temperature Range		
Minimum	-40	°C
Maximum	65	°C
Shelf life If unopened and kept in the vacuum bag		
5 years		

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.



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

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