

---

**AUTOMOTIVE APPLICATION PROFILE**

# Lithium Ion Battery Frame and Cage

We understand that in the automotive industry, you need reliable materials that perform to a higher standard. Ascend offers a comprehensive portfolio of engineered plastics for challenging automotive applications. We work with our customers to achieve the very best from our products. That's why we offer a worldwide support network of application specialists and technical experts. Our material knowledge and expertise in automotive systems can help you improve part performance and reduce material usage and cycle times.

**Products Used:** R530H NT, R530H BK0201, R530HR BK652, R433H, R435H

## Application Description

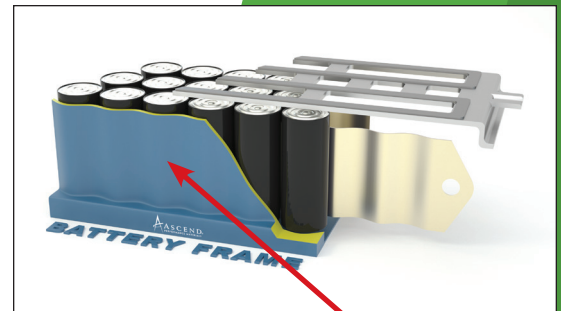
Lithium ion (Li-ion) batteries are made of many individual battery cells grouped together in modules. The modules are enclosed in a structure to provide support, stiffness, electrical insulation and chemical resistance to the entire module structure. These can be comprised of metallic or polymeric materials. Polymeric structures are preferred because of their light weight. Some mounts, depending on design, are attached to the battery cage via adhesives or bolted on.

Given its exceptional temperature resistance, battery frames made with Vydyne® glass-filled PA66 provide support to the Li-ion cells over a wide range of temperatures (-30°C to 85°C). PA66 strength, stiffness

and dimensional stability at elevated temperatures are critical to performance. Furthermore, its electrical insulating and chemical resistance properties help ensure batteries continue to operate safely over their lifespan.

## Benefits

- Stiffness and strength
- Electrical insulation
- Dimensional stability
- Chemical resistance



Battery frame supporting Li-ion cells



## The Vydne Difference

Impact modified, glass-filled Vydne R433H protects Li-ion batteries with superior energy absorption. These PA66 grades keep batteries safer in the event of a crash and provide another level of protection for battery cages. They perform well across a range of temperatures, including sub-zero, making them a material of choice for Li-ion batteries.

Ascend's Vydne R530H and R530HR family of glass-filled products possess a combination of high strength, stiffness and heat deflection temperature

(HDT) to support the battery cells at elevated temperature and protect them during vehicle crashes. The inherent electrical insulating properties of PA66 make it the perfect fit for electric vehicle (EV) battery module frames and cages. All grades exhibit high flow that helps reduce warpage during molding and frequently provide faster cycle times versus the competition. Outstanding PA66 chemical resistance is characteristic of these grades.

## Product Properties

R530H NT, R530H BK0201, R530HR BK652, R433H, R435H						
Property*	Test Method	Units	R530H NT R530H BK0201	R530HR BK652	R433H	R435H
Density	ISO 1183	g/cm <sup>3</sup>	1.37	1.37	1.35	1.39
Tensile Strength	ISO 527-2	MPa	195	185	148	173
Flexural Modulus	ISO 178	MPa	9,600	9,500	8,500	10,100
Notched Charpy Impact at 23°C	ISO 179	kJ/m <sup>2</sup>	12	13	23	18
DTUL @ 1.8 MPa	ISO 75-2/A	°C	250	250	245	248
Dielectric Strength	IEC 60112	kV/mm	20	20	28	NA
Volume Resistivity	IEC 60093	ohms-cm	1.0 E+13	1.0 E+13	NA	NA

\*Dry as molded (DAM)



Ascend Performance Materials is the world's largest fully integrated producer of nylon 6,6 resin. We manufacture and reliably supply world-class plastics, fibers and chemicals that are used in thousands of everyday applications such as car parts, electronics and cable ties.

### North America

1010 Travis Street  
Suite 900  
Houston, TX 77002  
United States

+1 713 315 5700

### Europe

Watson & Crick Hill Park  
Rue Granbonpré 11 – Bâtiment H  
B-1435 Mont-Saint-Guibert  
Belgium

+32 10 608 600

### Asia

Unit 3602,  
Raffles City Office Towers  
268 Xi Zang Road (M)  
Shanghai 200001  
China

+86 21 2315 0888

© 2019 Ascend Performance Materials Operations. The Ascend Performance Materials and Vydne marks and logos are trademarks or registered trademarks of Ascend Performance Materials Operations.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Ascend Performance Materials Operations makes no representations or warranties as to the completeness or accuracy thereof. The full disclaimer of warranty and liability can be found at [ascendmaterials.com/disclaimer](http://ascendmaterials.com/disclaimer). Rev. 8/2019 AAP053



inspiring everyday