

humm3® in Focus: Unlocking Diverse Composite Heating Possibilities with Pulsed Xenon Power.

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August, 2025

Overview

The Noblelight® humm3 pulsed xenon heating system from Excelitas® offers an innovative solution to heat composite materials commonly used in aerospace, medical, automotive, and industrial sectors. These materials are favored for their strength and thermal stability. Applications include lightweight structures and composite parts, ranging from automotive and aerospace exteriors and interiors to gas storage tanks and pipes. The Noblelight humm3 system is the best way to process a wide variety of composite materials for these applications and markets.

Benefits of humm3

Unlike traditional heating methods that target just the composite fibers and rely on conduction to heat the resin, humm3 uses a non-collimated broad-spectrum pulsed light to deliver high power photonic energy across a wide range of wavelengths. This enables humm3 to simultaneously heat both the fibers and the resin matrix, ensuring a more uniform and efficient thermal profile throughout the composite material. The system's rapid, targeted heating supports in situ consolidation — improving throughput and reducing the need for post processing.

humm3 is a highly adaptable and precise heating solution that supports a wide variety of black and non-black composite materials including thermoset and high temperature thermoplastic, ceramic matrix composites, as well as glass and other natural or bio-based fiber materials. Unlike lasers, this non-laser system requires no enclosure — only standard personal protection equipment (PPE) such as light shielding and dark glasses.



humm3 enables efficient processing of high-performance composite materials such as:

1. **Thermoplastics – PEAK, LM-PAEK, PA6:** Very high impact resistance. Can be remolded and recycled.
2. **Thermosets – Dry Fibers:** High strength, high temperature resistance but cannot be reworked after curing.
3. **Composite Fabrics – Woven and Non-Crimped:** Sheets of parallel composite fibers, interlocked with a grid like weave, or without any fiber reinforcement.
4. **Composite Yarns:** A multifilament core incorporated in a reinforcing polymer matrix.
5. **Aramids:** Strong and heat resistant but their properties (such as color) make them difficult to process with conventional heating.
6. **Bio Composites:** Composites reinforced with a natural fiber, offering a sustainable alternative to synthetic materials.
7. **Glass Fiber Tapes:** Valued for their strength, thermal resistance, and dimensional stability.

Material Database



PEAK (Poly Ether Aryl Ketone)



LM-PAEK (Low Melt Poly Ether Aryl Ketone)



PA6 (Polycaprolactam / Nylon 6)



Dry Fiber



Woven and non-crimped composite fabrics



Poly Urethane Yarn



Poly Propylene Yarn



Carbon Fiber Yarn



Glass Fiber Yarn



Aromatic Polyamide (Aramids)



Hemp / Bio Composite



Glass Fiber Tapes





Application*	Material Group	Material name	Material Type	Process Temperature °C
AFP / FW	Thermoplastic	CF-PEAK	Carbon Fiber Poly Ether Aryl Ketone	350
AFP	Thermoplastic	CF-LM-PAEK	Carbon Fiber Low Melt Poly Aryl Ether Ketone	280 - 350
AFP	Thermoplastic	CF-PA-12	Carbon Fiber Polyamide-12	178 - 210
AFP / FW	Thermoplastic	CF-PA-11	Carbon Fiber Polyamide-11	300
AFP / FW	Thermoplastic	GF-PA-6	Glass Fiber Polyamide-6	220 - 260
AFP	Thermoplastic	CF-PC	Carbon Fiber Reinforced Polycarbonate	140- 307
AFP	Thermoplastic	CF-PEK	Carbon Fiber Reinforced Poly Ether Ketone	367
AFP / FW	Thermoplastic	CF-PEEK	Carbon Fiber Reinforced Poly Ether Ether Ketone	346 - 373
AFP	Thermoplastic	CF-PEEKK	Carbon Fiber Reinforced Poly Ether Ether Ketone Ketone	363
AFP	Thermoplastic	CF-PEKEKK	Carbon Reinforced Fiber Poly Ether Ketone Ether Ketone Ketone	377
AFP	Thermoplastic	CF-PEKK	Carbon Fiber Reinforced Poly Ether Ketone Ketone	330 -375
AFP	Thermoplastic	GF-PET	Glass Fiber Reinforced Polyethyleneterephthalate	215 - 230
AFP	Thermoplastic	CF-PP	Carbon Fiber Polypropylene	190 - 205
AFP	Thermoplastic	CF-PPA	Carbon Fiber Polyphthalamide	310
AFP	Thermoplastic	CF-PPS	Carbon Fiber Reinforced Polyphenylene Sulfide	310 - 320
AFP	Thermoplastic	CF-PEI	Carbon Fiber Reinforced Poly Ether Imide	247 - 248
AFP	Thermoplastic	GF-rPET	Glass Fiber Reinforced Recycled Polyethylene Terephthalate	280 - 290
AFP	Thermoplastic	GF-HDPE	Glass Fiber Reinforced High Density Polyethylene	160 -167
AFP	Dry Fiber	Dry Fiber	Toray Cetex TX 1100	170
AFP	Dry Fiber	Dry Fiber	Hexcel® HiTape®	170
AFP	Thermoset	CF-Uni Directional Prepreg	Carbon Fiber Reinforced Pre-impregnated Resin	60 - 80
AFP	Aramid	Polymid	Fiber Reinforcement	400
AFP / FW	Bio Composites	Various	Various - Dependent on Binder	Various

***Automated Fiber Placement (AFP), Filament Winding (FW)**

The table details indicative process temperatures for a variety of materials. Please note that exact parameters to reach these process temperatures are dependent on the desired application, environmental conditions and machinery constraints. In addition to the above list, humm3 can process a wide variety of other high temperature materials such as oxide-oxide ceramic matrix composites (OxOx CMCs).

If you would like more information about how humm3 can work with your application, please contact us. Excelitas can conduct material sample tests to validate compatibility or offer other support to help accelerate your work.

Conclusion

Noblelight humm3 from Excelitas offers a highly controllable, powerful heating solution for a wide range of advanced materials, from high-performance thermoplastics and thermosets to natural fiber bio-composites and technical fabrics like aramids and glass fibers. Its’ broadband pulsed xenon light technology enables precise, controllable heating. This flexibility supports a variety of manufacturing processes including automated layup, filament winding, preforming, and in-situ consolidation. As industries continue to demand lighter, stronger, and more sustainable materials, humm3 provides a scalable and adaptable platform for next-generation composite processing.



About Excelitas

Excelitas is the leading provider of advanced, life-enriching technologies that make a difference, serving global market leaders in the life sciences, advanced industrial, next-generation semiconductor and avionics end markets. Headquartered in Pittsburgh, PA, USA, Excelitas is an essential partner in the design, development and manufacture of photonic technologies, offering leading-edge innovation in sensing, detection, imaging, optics and specialty illumination for customers worldwide.



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