LyondellBasell

# *Quantum-ESC*

A summary of the LyondellBasell *Quantum-ESC* (Engineered Structural Composites) portfolio.



## Product Selection Guide

In a class of its own, our proprietary Quantum Engineered Structural Composites (*Quantum-ESC*) is a series of unique materials with exceptional performance for the most demanding applications. This industry renowned portfolio goes head-to-head with metal in the most challenging environments where high pressure and heat tolerance is required.

| Material Reference | Fiber% w/w | Fiber Length (inches / mm) and Type | Description | Features / Benefits / Applications |
|---|---|---|---|---|
| **Vinyl Ester - Fiberglass E Grade** | | | | |
| QC 8560 | 60% | 0.5 / 12 E glass | Higher heat resistant vinyl ester | High temp auto, industrial. Lower cost Aerospace. |
| QC 8700 | 63% | 1 / 25 E glass | Increased temperature resistance over the QC 8800 | General purpose structural, prosthetics, marine, automotive, industrial, safety. Color and flame retardant versions available. |
| **Styrene-free Hybrid Resin - Carbon Fiber - PAN based std modulus** | | | | |
| AMC 85697 | 60% | 1 / 25 48K/3K | AMC with split fibers (48K/3K) | Structural automotive, inner panels, brackets, etc. Sporting goods, golf clubs, bicycle components, medical. Designed for structural applications requiring high stiffness and high strength. Low VOC, styrene-free hybrid resins combine epoxy safety benefits with efficient processing. |
| AMC 85698 | 55% | 1 / 25 48K | AMC with 48K fibers | |
| *Forged Preg* 85675 | 60% | Bi-axial 0/90 | Bi-axial 0/90 for co-molding with chopped carbon fiber AMC materials | |
| *Forged Preg* 85695 | 60% | Continuous 50K | Unidirectional for co-molding with chopped carbon fiber AMC materials | |
| **Vinyl Ester - Carbon Fiber - PAN based std modulus** | | | | |
| AMC 8590 | 53% | 1 / 25 12K | Widely used across AMC carbon fiber | Structural automotive, inner panels, brackets, etc. Sporting goods, golf clubs, bicycle components, medical. Designed for structural applications requiring high stiffness and high strength. |
| AMC 85591 | 55% | 1 / 25 48K split fiber | Widely used across AMC carbon fiber offering | |
| AMC 8593 | 50% | 1 / 25 3K | Offering highest properties and lowest coefficient of variation | |
| **Epoxy - Fiberglass E grade** | | | | |
| *Lytex* 9063 | 63% | 0.5 / 12 E glass | *Lytex* 9063 is specified by numerous aero and military OEMs. Short cure time for complex geometry molded parts solutions. | Aerospace secondary and tertiary components, fairings, brackets, etc. Industrial, high temperature / high pressure. Suitable for molding thick cross sections (>3"). Flame retardant & low density versions available. |
| **Epoxy - Carbon Fiber - PAN based std modulus** | | | | |
| *Lytex* 4149 | 55% | 1 / 25 3K | *Lytex* 4149 is specified by numerous aero and military OEMs | Aerospace secondary and tertiary structures, components, fairings, brackets, panels. Advantages of Lytex resin system with light weight and stiffness of carbon fiber. Flame retardant version available. |
| **Vinyl Ester - Recycled Carbon Fiber** | | | | |
| *Forged Preg* 85545 | 30% | non-woven mat | *Forged Preg* 85545 is designed for sustainable approaches in various applications | Carbon Fiber from post-industrial recycling is used as reinforcement for applications that require lower mechanical properties, while substantially decreasing the $CO_2$ footprint. |

Product names comprising four digits are designated for the United States portfolio, whereas those comprising five digits are designated for the European portfolio.



## Product Selection Guide

*Quantum-ESC* addresses complex 3D geometry for the most intricate designs while achieving a lighter weight. When using carbon fiber, this material's unique luxurious look and feel has global appeal. Additionally, it offers faster throughputs together with cost-effective tooling when compared to metal.

| Material Reference | SG | Flexural Modulus D-790/ ISO 14125 Machined | Flexural Strength D-790/ ISO 14125 Machined | Tensile Modulus D-638 / ISO 527-4 D-3039 Machined | Tensile Strength D-638/ ISO 527-4 D-3039 Machined | Glass Transition D-7028/ ISO 11357-2 Tan Delta | |
|---|---|---|---|---|---|---|---|
| | g/cc | GPa | MPa | GPa | MPa | F° | C° |
| **Vinyl Ester - Fiberglass E Grade** | | | | | | | |
| QC 8560 | 1.89 | 20 | 424 | 21 | 210 | 329 | 165 |
| QC 85561 | 1.81 | 18 | 506 | 17 | 264 | 293 | 145 |
| QC 8700 | 1.85 | 21 | 483 | 20 | 242 | 260 | 127 |
| **Styrene-free Hybrid Resin - Carbon Fiber - PAN based std modulus** | | | | | | | |
| AMC 85697 | 1.5 | 25 | 410 | 44 | 230 | 284 | 140 |
| AMC 85698 | 1.5 | 22 | 290 | 27 | 110 | 284 | 140 |
| *Forged Preg* 85695 | 1.5 | 50 | 730 | 56 | 451 | 293 | 145 |
| *Forged Preg* 85675 | 1.5 | 22 | 370 | 22 | 147 | 284 | 140 |
| **Vinyl Ester - Carbon Fiber - PAN based std modulus** | | | | | | | |
| AMC 8590 | 1.48 | 28 | 448 | 37 | 162 | 288 | 142 |
| AMC 85590 | 1.48 | 25 | 390 | 27 | 150 | 284 | 140 |
| AMC 85591 | 1.48 | 27 | 310 | 29 | 120 | 284 | 140 |
| AMC 8593 | 1.47 | 31 | 504 | 36 | 290 | 288 | 142 |
| AMC 85593 | 1.46 | 30 | 524 | 31 | 281 | 284 | 140 |
| **Epoxy - Fiberglass E grade** | | | | | | | |
| *Lytex* 9063 | 1.82 | 18 | 407 | 18 | 193 | 329 | 165 |
| *Lytex* 90563 | 1.76 | 17 | 380 | 17 | 200 | 356 | 170 |
| **Epoxy - Carbon Fiber - PAN based std modulus** | | | | | | | |
| *Lytex* 4149 | 1.48 | 32 | 531 | 35 | 221 | 329 | 165 |
| *Lytex* 41549 | 1.48 | 29 | 530 | 34 | 320 | 320 | 160 |

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# About us

We are LyondellBasell (LYB) – a leader in the global chemical industry creating solutions for everyday sustainable living. Through advanced technology and focused investments, we are enabling a circular and low carbon economy. Across all we do, we aim to unlock value for our customers, investors and society. As one of the world's largest producers of polymers and a leader in polyolefin technologies, we develop, manufacture and market high-quality and innovative products for applications ranging from sustainable transportation and food safety to clean water and quality healthcare. For more information, please visit www.lyb.com or follow @LyondellBasell on LinkedIn.

**More information about Engineered Composites from LyondellBasell can be found at www.lyb.com/engineeredcomposites**

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