Carbon Alternatives to Common Thermoplastics

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Thermoplastic (common brand names)	**Key Attributes**	**Carbon Comparison**
ABS (Absylux®, Cycolac®, Polystone®, Lustran®, Royalite®, TECARAN™)	*Tough, rigid material with moderate temperature & chemical resistance.*	**RPU 70**, **Loctite 3843** and **UMA 90** offer similar stiffness and are easy to use, but have lower impact toughness **RPU 130** offers comparable impact toughness and temperature resistance, but is slightly softer
Polyamides (Nylons, Zytel®, Vestamid®)	*Wide range of properties depending on specific polyamide (PA6, PA66, PA11, PA12, PA46).* *Unfilled grades have excellent tougness and stiffness, but can be prone to water uptake. Filled grades offer excellent strength, temperature resistance and chemical resistance.*	**RPU 130** is a good alternative to unfilled grades of Nylon due to a combination of temperature resistance, ductility & abrasion resistance **EPX 82** and **EPX 150** are good alternatives to filled grades of Nylon due to a combination of high stiffness, temperature resistance and functional toughness. **EPX 86FR** offers similar performance and is UL 94 V0 Blue Card certified
Polycarbonate (HYDEX®, Makrolon®, Lexan®, TECANAT®, Zelux®)	*Often used for its clarity and combination of strength, impact resistance and temperature resistance.*	**Loctite IND 405 Clear** is a clear resin with functional toughness **EPX 82** and **EPX 150** are good choices if stiffness & temperature resistance are most important **RPU 130** offers the best combination of high impact toughness and temperature resistance
PMMA (Acrylic)	*Great aesthetics - good optical properties, high gloss, scratch resistant. Poor chemical resistance, and can be brittle.*	**Loctite IND 405 Clear** is a clear material with functional toughness **RPU 70** and **Loctite 3843** offer good stiffness, aesthetics & ease-of-use, but are only available in black
POM (Delrin®, Celcon®)	*Stiff & relatively tough, POM is known for it's good lubricity, low creep and excellent fatigue properties.*	**RPU 130** offers best-in-class abrasion resistance for an additive material, but is softer and less lubricious than POM **RPU 70**, **UMA 90**, **Loctite 3843** or **IND 405 Clear** can be good options if abrasion and temperature resistance are not as crucial
PBT (Crastin®, others)	*Notable for excellent electrical properties. Unfilled grades are tough and rigid, and filled grades add strength & temperature resistance.*	**EPX 150** is the best option for glass-filled PBT replacement, offering a similar combination of strength, temperature resistance, electrical properties, and functional toughness **EPX 82** is suitable for use cases up to 105°C **EPX 86FR** offers similar performance and is UL 94 V0 Blue Card certified
Polypropylene	*Commonly used for low cost, excellent acid/ base resistance and flexible, snappy properties, with moderate temperature resistance.* *Filled grades (talc, mineral, or glass) add increased temperature resistance and stiffness while sacrificing toughness.*	**RPU 130** or **FPU 50** offer flexible, snappy properties. RPU 130 is stiffer, and FPU 50 is better for living hinges **EPX 82** is a good option for replacement of filled grades **Loctite IND 405 Clear** offers good toughness and moderate temperature resistance
High-Performance Thermoplastics PEEK, PEI (Ultem™) , PSU (Udel®, Ultrason®), PPSU (Radel®)	*Generally, these thermoplastics have exceptional temperature and chemical resistance, exhibit high stiffness and toughness, and are commonly available in flame retardant grades.*	**Loctite IND 147 Black** offers the high temperature & chemical resistance, but can be more brittle than these offerings **EPX 150** offers a combination of high temperature & chemical resistance with sufficient toughness and the ability to be steam sterilized **EPX 82** offers a strong balance of temperature resistance, strength and toughness **EPX 86FR** offers similar performance and is UL 94 V0 Blue Card certified **RPU 130** can be an option if stiffness is not the most important criteria
Thermoplastic Polyurethane Elastomers (TPUs)	*TPU elastomers can offer a broad range of properties, with varied durometer and resilence. They typically offer excellent tear strength, abrasion resistance, and chemical resistance.*	Carbon has a variety of polyurethane-based elastomers that are excellent matches for commercial TPU products: **EPU 40** is a 68A durometer elastomer with moderate resilience **EPU 41** is a 73A durometer elastomer with high resilience **EPU 43** is a 76A durometer elastomer with good damping **EPU 44** is a 77A durometer elastomer with high resilience, suitable for industrial production workflows **EPU 45** is a 77A durometer elastomer with excellent damping **EPU 46** is a 78A durometer elastomer with excellent return and a full spectrum of colors