HIGH PERFORMANCE POLYMERS

Engineering Polymers for Metal Replacement

Lightweighting, mechanical performance, cost reduction and sustainability are some of the requirements driving the market to search for metal alternatives. Using engineering polymers for demanding **metal replacement** applications has a long and successful history at **RadiciGroup High Performance Polymers**, where our continuous focus on innovation has resulted in a very wide offering of materials.

Low density and excellent mechanical performance are typical characteristics of our materials specifically developed as metal alternatives. Moreover, engineering polymers allow for design freedom and lower part cost, owing to the potential of **function integration, modularity and reduction in post-processing time and labour**. Based on our experience and analysis, the replacement of metals with engineering polymers leads to a **significantly lower environmental impact**, thanks to the reduced weight of components, among other factors.

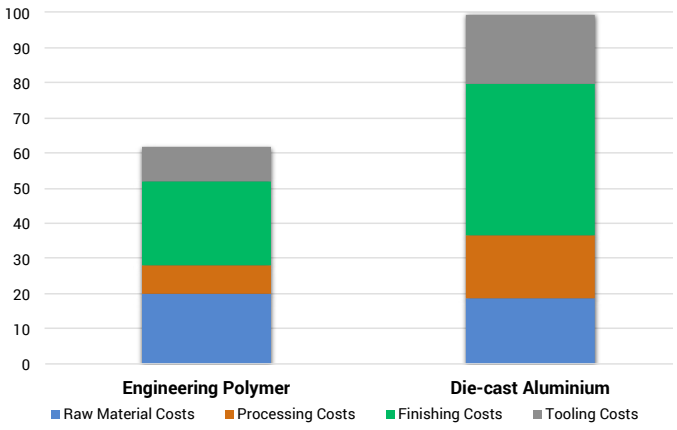
Function Integration

- Functional benefits through part integration
- Design possibilities even with complex parts and more opportunity for design innovation
- Better surface finish with integral colours

Oil Circuit Valve Body

Cost reduction

- Lower tooling and manufacturing costs
- Fewer post-processing operations
- Longer tool life
- Higher productivity
- Less energy demand for part production

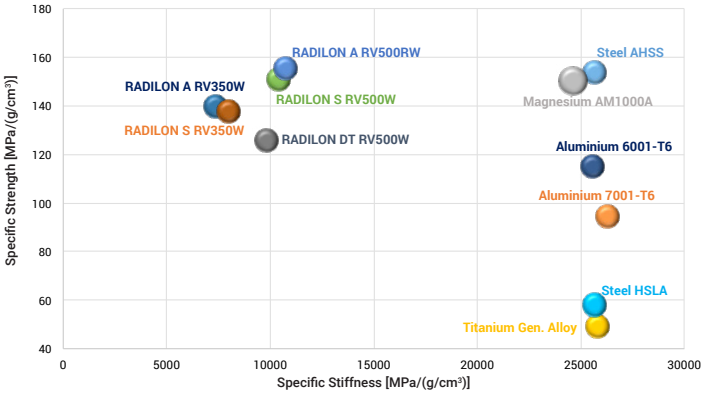


Comparative Cost Analysis

Typical Values for Metal Replacement Projects for 500.000 parts/year

Lighter parts with high performance

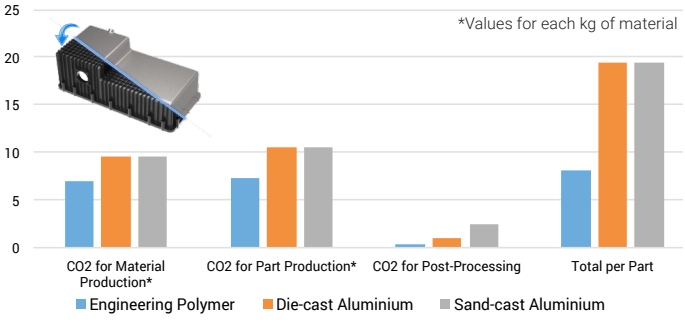
- Less density
- High specific stiffness and strength
- Vibration and noise damping
- Higher corrosion and chemical resistance



Mechanical Properties Chart

Lower environmental impact

- Lower CO_2 emissions from material production
- Lower CO_2 emissions due to lighter parts: very important for vehicle parts.
- Lower CO_2 emissions due to fewer post-processing operations



Oil Pan - LCA - CO_2 Footprint (kg)

Oil Pan	Engineering Polymer	Die-Cast Aluminum	Sand-Cast Aluminum
Part Weight	1.1 kg	1.85 kg	1.85 kg

Selection of Materials for Metal Replacement

Product Name	Polymer Type	Key Features	Typical Applications
RADILON® S RV300W	PA6-GF30	• Very high stiffness and strength • Good surface appearance	• Automotive • Consumer Goods • Industrial
RADILON® S RV500W	PA6-GF50		
RADILON® S URV300W	PA6-GF30	• Very high stiffness and strength • Easy flowability • Good surface appearance	
RADILON® S URV500W	PA6-GF50		
RADILON® A RV350W	PA66-GF35	• Very high stiffness and strength • Developed for demanding applications	• Automotive • Consumer Goods • Industrial
RADILON® A RV500RW	PA66-GF50		
RADISTRONG® A RV500W	(PA66+PA*) - GF50	• Very high stiffness and strength • Excellent surface appearance • Lower moisture absorption	
RADISTRONG® Aroma RV500RKC2			• Water Management
RADILON® D RV500RKC	PA610-GF50	• Improved dimensional stability • High chemical resistance • Partially obtained from renewable sources	• Industrial • Water Management
RADILON® DT RV300W	PA612-GF30	• Excellent chemical resistance • Improved dimensional stability • Very high stiffness and strength	• Industrial • Consumer Goods • Water Management
RADILON® DT RV500W	PA612-GF50		

Successful Metal Replacement Projects

Engine Mount made of **RADILON® A RV500RW 339 BK** [PA66-GF50]

- Very high stiffness
- High fatigue resistance
- Very high strength
- Excellent heat ageing property retention

Windlass Reducer Housing made of **RADILON® DT** [PA612-GF]

- Very high stiffness
- Excellent chemical resistance
- Very high strength
- Good dimensional Stability

Road Manhole Cover made of **RADILON® S RV350W 333 BK** [PA6-GF35]

- High stiffness
- Good fatigue resistance
- High strength
- Good processability

RadiciGroup High Performance Polymers: Engineering Service

engineering service

Customized technical support fuelling the success of innovative metal replacement projects, realized using our broad range of engineering materials. This is what RadiciGroup High Performance Polymers can offer its customers, thanks to its state-of-the-art computer-aided engineering (CAE) virtual simulation tools and the experience and skills of its technical specialists.

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