

Research on Injection Molding of racing sailboats for mixed crews in non-regulated conditions - POLCOM 2026

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Competitive sailing yachts, often referred to as racing sailboats, are high-performance vessels designed for speed, agility, and precision on the water. Built with lightweight materials such as carbon fiber and advanced composites, these boats are engineered to reduce drag and maximize velocity. Every element—from the streamlined hull to the high-tech sails and rigging systems—is optimized for performance. There are various classes of racing sailboats, including dinghies, keelboats, and catamarans, each with its own set of rules and design parameters. Some races focus on one-design boats, where every competitor uses the same model, ensuring that skill and strategy determine the winner. Others, like the America's Cup, allow custom designs, pushing the limits of nautical engineering. Competitive sailing demands not only technical knowledge but also teamwork and rapid decision-making. Sailors must constantly adjust sails, balance weight, and navigate wind shifts and currents to gain an advantage. Weather conditions can change rapidly, requiring adaptability and expert seamanship. Modern racing yachts are often equipped with sophisticated instrumentation for navigation, wind analysis, and real-time performance tracking. Whether competing in coastal regattas or long offshore races, these boats embody the fusion of sport, science, and adventure on the open sea.

1. Introduction

Competitive sailing yachts, often referred to as racing sailboats, are high-performance vessels designed for speed, agility, and precision on the water. Built with lightweight materials such as carbon fiber and advanced composites, these boats are engineered to reduce drag and maximize velocity. Every element—from the streamlined hull to the high-tech sails and rigging systems—is optimized for performance. [1]

2. Production of Corn-Based Granules for Injection Molding

Every element—from the streamlined hull to the high-tech sails and rigging systems—is optimized for performance. There are various classes of racing sailboats, including dinghies, keelboats, and catamarans, each with its own set of rules and design parameters. Some races focus on one-design boats, where every competitor uses the same model, ensuring that skill and strategy determine the winner. Others, like the America's Cup, allow custom designs, pushing the limits of nautical engineering.

3. Technological and Environmental Benefits

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Thermal	Total content [m]	Renewable [mm]	Renewable B [kg]	Recyclable	Particle [mm]	S (d001) [mm]	Amber [mm]
108 – 110 °C	40-80	80 ± 3	96 ± 3	no	8 ± 4	60 ± 7	10 ± 8

Table 1. material properties [2]

Figure 1 illustrates the material structure, highlighting its specific properties.



Figure 1. Sup-based material structure [2]

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Material Calculation:

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4. Properties and material obtained

Modern racing yachts are often equipped with sophisticated instrumentation for navigation, equation:

$$H_t = \frac{\pi \cdot B^5 \cdot \Delta SR}{15 \cdot \eta \cdot M}$$

Equation 2. Equation [5]

D	K	ΔSR	G	Alpha
ambient flow velocity (m/s)	diameter of the anulus (mm)	applied boundary loads (Pa)	acceleration (m/s ²)	length of characteristic strenght (mm)

Modern racing yachts are often equipped with sophisticated instrumentation for navigation, equation. Modern racing yachts are often equipped with sophisticated instrumentation for navigation, equation:

$$c(FG)=r_{33} \cdot e^{\frac{Gbb}{P \cdot Ykk}}$$

Equation 1. Modern racing yachts are often equipped with sophisticated [6]

Crr	Fpp	J	Kll
reference temperature at ground level (T)	activation (J/M s)	University graduation (6.6 J/N N mm)	absolute reference target (F mm)

5. Behavior of matyerials during heating stage

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5.1 Processing Parameters

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Table 2. Corn granule adjustment parameters in an injection mold [5]

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Figure 2. Product obtained from injection

Experimental Validation

Competitive sailing yachts, often referred to as racing sailboats, are high-performance vessels designed for speed, agility, and precision on the water. Built with lightweight materials such as carbon fiber and advanced composites, these boats are engineered to reduce drag and maximize velocity. Every element—from the streamlined hull to the high-tech sails and rigging systems—is optimized for performance.

6. Conclusion

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Conflict of Interest Statement

The authors declare no conflict of interest.

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