

J-CORE™: BEYOND LIGHT WEIGHT

(PART 1 of 2)

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How's **your** weight? Most would agree that reducing the weight of a boat improves performance. The objective of lowering weight without unduly sacrificing strength or raising product cost seems to be well accepted in the marine industry. Building your best, lighter weight boat involves making complex choices among a multitude of materials and processes. In evaluating both the materials and processes, of course, the weight savings is paramount.

But there are other factors to consider beyond the relatively easy to measure weight savings. These can have an impact on both the strength and cost of the product. Let's look beyond the weight savings at some other factors:

Ease of Flow

Most of the applications involve two part molds. The light weight filled material is introduced into the lower (female) part and the upper (male) part flipped and clamped or pressed together. Hence, one can't really see the flow – it is obscured by the male mold. You only can appreciate the flow characteristics when you pull the part and sound for air voids.

The selection of the microsphere for the filled material is critical to ease of flow. Arjay's J-Core line utilizes a sphere that has a very "tight" distribution of sphere sizes (See Figure 1). Why is this important? Because the more uniform in size the spheres are (the "skinnier" the curve), the more they act like ball bearings and tumble over one another, promoting ease of flow at moderate pressure. This ensures that with a reasonable distribution of the material into the female mold, the cavity will be completely filled. Lower viscosity alone cannot achieve this. But these spheres are more highly processed by the manufacturer and their cost is higher. Is it worth the extra cost? We believe it is in terms of the quality of the parts produced and the extremely low amount of rework which results.

Bond Strength

The premium spheres mentioned above also influence bond strength. As the distribution of particle sizes becomes broader (i.e. there are more varied sizes), the phenomenon of "packing" increasingly takes place. This is where smaller spheres nest within the spaces created by larger spheres. In addition to impeding flow, this has a negative effect on resin availability and hence bonding. In theory, the maximum amount of resin is available when all spheres are the same size. While this is a technical and economic impossibility, the skinnier the curve, the better the bond strength is going to be. This is another reason we employ higher cost, more tightly distributed spheres to achieve quality parts.

Ease of flow and bond strength are just two of the factors to consider beyond the weight savings. Part 2 will cover others in our next newsletter scheduled for just before the 2015 IBEX trade show.

Fig. 1

