

# THE EVEN KEEL

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## "Too Tall" Keel Cast at Derecktor

At Mars, we are very accustomed to taking on big projects. So casting a 110,000 lb. lead keel wasn't a stretch. What was a stretch, very literally speaking, was the height of this keel for the 150' sloop being built by Derecktor Shipyards. At 14 feet 2.5 inches high and 29 feet long, we could accommodate the height in our manufacturing plant, but the problem was outside of our plant.

The roads between our factory in Burlington, Ontario and Derecktor's Bridgeport, Connecticut facility wouldn't accommodate such a tall item loaded on a drop deck trailer. We investigated shipping the completed keel by sea through the Port of Hamilton, Ontario, but at the end of the journey we still had low bridge clearance problems.



The problem was solved by casting the keel in Bridgeport. The logistics of moving one of our melt pots, the venting system, raw materials, and of course, the people to complete the pour was simply a matter of good planning and scheduling.

The real task for our on site Production Group, led by Paul Freudiger, James Izzard, and Dave Nuell was meeting the demands of this unique pour.

Primarily, these demands came from the fact that we were casting lead into a shell constructed of 5086 Aluminum, which is a high strength alloy. We usually cast our lead at about 800°F. The potential for shell distortion and heat related affects on the strength properties of the Aluminum prompted the on site Lloyd's Registry

representative to insist that the Aluminum shell temperature not exceed 550°F. This is below the melting point of lead.

Throughout the pour we walked a tight rope of keeping the lead hot enough to flow without solidifying, while continuously monitoring surface temperatures of the Aluminum shell. While casting we used large fans to blow cool air over the keel's surface to dissipate excess heat. We preheated substantial amounts of lead prior to charging the melt pot. This mean that we could keep our overall furnace temperature lower.

To maintain a level pour, we continuously moved the fill pipe to the 4" x 6" access ports in each of the 11 internal keel sections. We successfully cast 110,000 lbs. of lead in 2 days.

The 66.5" diameter keel bulb was completely filled with lead leaving the fin area of the keel open to act as a fuel tank when the boat is in service.

The other statistics for this 45.50m (150') sloop designed by German Frers, with an interior by John Munford, are very impressive starting with its overall displacement of 160 metric tons (352,640 lbs.). Its carbon fiber rigging is almost 60.6m (200') tall with a total sail area of 892.86m<sup>2</sup> (9700 ft<sup>2</sup>) . Draft is 5m (16.4') with an 8.86m (29.2') beam. This built for comfort and speed racer is being designed to compete in the world's super-yacht regattas. When completed by Derecktor in 2003, the boat will have the distinction of being the largest built in the United States in the categories of Sloop and Aluminum sailing craft.

***The blue welding glow lights up the huge bulb and fin, that dwarfs the workman. Notice in the left foreground, two of the large fans used to cool the Aluminum shell during casting***

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