

Immediate Release

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Duramax Marine[®] Creates DuraCooler[®] of Seismic Proportions

Who: Duramax Marine[®] LLC

What: Creates Largest DuraCooler[®] System for Astromaritima's Supply Vessel, the Astro Vermelho

Where: Rio de Janeiro, Brazil

Hiram, Ohio – Making a surge in the marine market, Duramax Marine[®] LLC creates a DuraCooler[®] of seismic proportions with its largest keel cooling system to date. Created for Astromaritima's supply vessel, the Astro Vermelho, the DuraCooler measures 32 tubes wide by 16 feet long. A first of its size for Duramax Marine; the previous largest DuraCooler was 24 tubes wide.

Headquartered in Rio de Janeiro, Brazil, Astromaritima owns and operates supply vessels for the oil company Petrobras. Astromaritima is familiar with the high quality of Duramax Marine's work. Two years ago Duramax Marine installed a series of DuraCoolers on the supply vessel, Astro Pargo. Astromaritima was so pleased with the overall performance of the DuraCoolers that when it came time to modify and repower another one of their vessels, the Astro Vermelho, Duramax Marine was given foremost consideration despite strong competition.

"The service provided by Duramax Marine has been excellent, and the results of the DuraCoolers now on the Astro Pargo and the Astro Vermelho are extremely beneficial for our company," as stated by Astromaritima's technical department.

Modifying the Astro Vermelho was more complicated than the previous modification of the Astro Pargo. Duramax Marine's engineers had to approach the challenge creatively and aggressively. Taking into consideration the cooling requirements, available hull space and technical preference, the specified DuraCooler was configured at a width of 32 tubes. Against the clock, new production equipment was configured and built, and a series of four DuraCoolers were successfully manufactured, delivered and installed on time.

Results of the first 32 tube Duracooler installation on the Astro Vermehlo were so good it prompted Astromaritima to install DuraCoolers for the modification of their next two supply vessels; the Astro Enxova and the Astro Guaricema. This project is currently under construction at Transnave shipyard.

The DuraCooler's success is the result of a research and development program Duramax Marine initiated in 1997 to identify areas of improvement for the square-headed outboard keel cooler. Flow pattern studies determined that the outside tubes in traditional keel cooler designs could be improved to increase flow efficiency. Duramax Marine began to develop a more efficient header design. Duramax engineered a DuraCooler featuring a new streamlined header designed to further enhance interior and exterior flow patterns and, at the same time,

reduce the overall pressure drop within the keel cooler unit. In the new header, engine coolant is directed more efficiently to tubes increasing the heat transfer efficiency of the DuraCooler. Based on actual testing, coolant flow distribution in the outer tubes increased 35% after the modifications and heat rejection in the outer tubes jumped 45%. Overall heat transfer in the DuraCooler increased 17% over a traditionally designed unit of equal size.

Made of 90/10 cupro-nickel tubing, the DuraCooler is resistant to flow erosion and has antifouling properties as well. DuraCoolers are easy to install and available with through-hull type fittings or non-through-hull flange mounts.

The Astro Vermelho's DuraCoolers were installed at the Transnave shipyard in Rio de Janeiro, Brazil. Originally built in the mid-1980s, the Astro Vermelho was cut and its overall length increased by 9.1 meters to its current length of 57.16 meters. The vessel was repowered from 2,600 HP to 4,660 HP with brand new MAK Caterpillar diesel engines. The ship's bow thrusters were replaced with two variable pitch bow thrusters and one variable pitch stern thruster. The conventional drive shaft line was replaced with two CPP shaft lines. And, of course, it now has the first series of 32 tube wide DuraCoolers by Duramax Marine.

Duramax Marine LLC is a world leader in providing solutions for customer-driven marine services including Johnson Cutless® bearings, heat exchange systems, shaft sealing and fendering systems. Duramax Marine has a worldwide network of distributors and warehouses, and exports to more than 50 countries around the world. Duramax Marine prides itself on its ability to engineer solutions to customer's specific marine needs. For more information on our product lines, contact Duramax Marine at www.DuramaxMarine.com.

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