

Aluminum Hyperbaric Welding Procedure

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WASHINGTON - NAVSEA has achieved the qualification of a hyperbaric aluminum welding procedure using an underwater dry habitat. This effort represents the first of its kind in the underwater welding industry.

NAVSEA OOC, Director of Ocean Engineering, and Supervisor of Salvage and Diving (SUPSALV), led a team consisting of Naval Surface Warfare Center, Carderock, (NSWC-CD), NAVSEA O5P2, and contracted welder-divers from Phoenix International Holdings, Inc. (Phoenix) in the qualification of procedures for underwater hyperbaric dry chamber welding of aluminum. These procedures, executed by a welder-diver who enters the chamber's dry environment from the bottom, are qualified for the welding of 5000 and 6000 series aluminum base materials using a Gas Metal Arc Welding (GMAW) process at a depth range from the surface to 23 feet of seawater.



A Phoenix diver inside a hyperbaric dry chamber – habitat - performing a weld on a Navy ship. The procedure for aluminum hulled ships involves using a Gas Metal Arc Welding (GMAW) process.

The qualification of these procedures is the culmination of two years of welding development aimed at providing in-water repair alternatives for LCS 2 Class ships (USS INDEPENDENCE and follow on) and the Joint High Speed Vessel Class ships.



GULF OF MEXICO (April 19, 2012) The Military Sealift Command joint high-speed vessel USNS SPEARHEAD (JHSV 1), the first of 10 Navy joint high-speed vessels designed for rapid intra-theater transport of troops and military equipment, conducts builder's trials. The 338-foot-long aluminum catamarans are designed to be fast, flexible and maneuverable even in austere ports, making them ideal for transporting troops and equipment quickly within a theater of operations. An approved aluminum hull welding procedure will make in-water repairs possible, greatly reducing the need for emergency drydocking. (U.S. Navy photo Courtesy Austal USA/Released)

"These procedures provide the Fleet with a significant resource that will result in dry-docking cost avoidance and the availability of a small footprint, forward deployable ship repair asset with tremendous capability", said Mr. Michael Dean, OOC Deputy Director.



An example of a habitat being deployed from the pier. After the dry chamber is positioned against the hull of the ship and blown down with air, the diver enters from the bottom.

Equipment to support underwater repairs to vessels with aluminum hulls will supplement diving and welding systems that are prepositioned in Norfolk, San Diego, Pearl Harbor, Sasebo and Bahrain. Additionally, the Pearl Harbor, Sasebo and Bahrain diving and underwater welding systems can be immediately deployed by air to support repair operations worldwide.



USS INDEPENDENCE (LCS 2) and follow on ships of the class will greatly benefit from the aluminum welding procedure developed and approved for use on 5000 and 6000 series aluminum base materials. (U.S. Navy photo by Lt. Jan Shultis/Released)

SUPSALV is responsible for all aspects of ocean engineering, including salvage, underwater ship repair, towing, diving safety, and diving equipment maintenance and procurement. The Underwater Ship Husbandry Division develops techniques, procedures, and equipment to perform ship repairs waterborne and conducts these repairs worldwide.

Phoenix holds the SUPSALV Diving Services Contract and specializes in both wet and dry habitat welding repairs. Phoenix is the only company that is authorized to conduct underwater welding repairs to Naval Vessels.