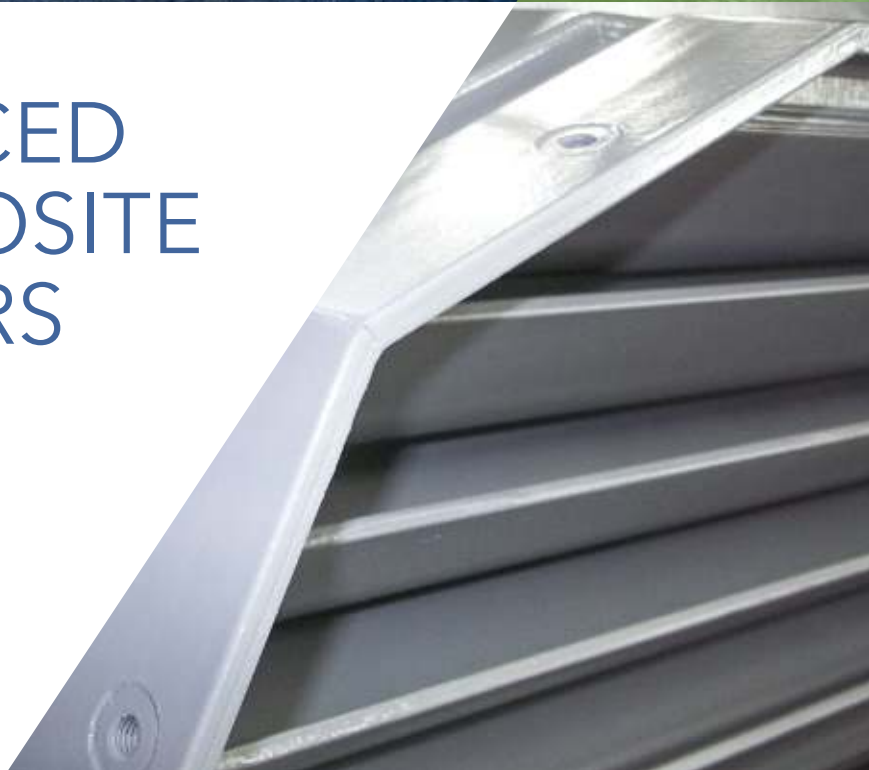


CECO Peerless



FIBER-REINFORCED PLASTIC COMPOSITE MARINE LOUVERS

**SAVE TIME AND MONEY WITH
CORROSION-FREE PERFORMANCE**



THE BATTLE AGAINST CORROSION IS CONSTANT. CECO PEERLESS COMPOSITE LOUVERS CAN REDUCE COST, MAINTENANCE AND YOUR SHIP'S RADAR SIGNATURE.



EACH YEAR, MILLIONS OF DOLLARS AND THOUSANDS OF MAN-HOURS GO TO FIGHT THE BATTLE AGAINST CORROSION.

Shipboard equipment is traditionally made from stainless steel or aluminum to withstand the harsh, salt-laden marine environment. But the cost of maintaining these materials is a constant battle. CECO Peerless provides an alternate approach using fiber reinforced plastic ("FRP") composite materials to eliminate corrosion issues while maintaining essential performance characteristics. In certain military shipboard applications, significant new benefits such as radar absorbing "stealth" technology can also be incorporated.

With installations across multiple U.S. Navy ships, including both radar-absorbing and non-radar-absorbing styles, the use of FRP materials has demonstrated to be effective and offers an opportunity for both **new ship construction** and **retrofit of systems** aboard ships already in service.

Corrosion is constantly occurring aboard U.S. Navy vessels resulting in unsightly effects. To address this environmental challenge, several different manufacturing techniques have been developed to apply FRP materials for air intake moisture separators and shipside louvers.

Louvers aboard LPD-class ships utilize a tongue & groove assembly technique so the louvers can be mounted into bulkhead openings with radiussed corners. Louvers aboard T-AKE-class ships utilize less expensive, square-corner frames as these are mounted flush behind an opening in the hull.





INSTALLATION CHALLENGES

Air intake systems aboard maritime vessels include systems to remove saltwater and airborne particulates from the air that is being transferred into HVAC ventilation or gas turbine combustion air intakes. Other types of louvers are utilized to protect work spaces or cargo holds. These systems are typically located near the ship's hull or on bulkheads which are exposed to weather, bow waves and countermeasure washdown sprays.

As such, the exposure to a saltwater atmosphere presents a formidable corrosion challenge over the life of the ship. Historically, the most common materials of construction have been corrosion-resistant (CRES) grades of stainless steel or marine-grade aluminum. The base materials are treated with (MIL-SPEC) paint or anodized surface treatments to extend service life in some applications.



Eventually, the corrosion effects become so bad that sections of the equipment must be removed and replaced with new base materials or the entire piece of equipment must be replaced.

Regular shipboard maintenance is expensive due to tight work spaces and the challenge of getting tools in place. High elevation access creates worker safety risks and requires auxiliary equipment and manpower.

BENEFITS OF FRP COMPOSITE LOUVERS

Saves weight

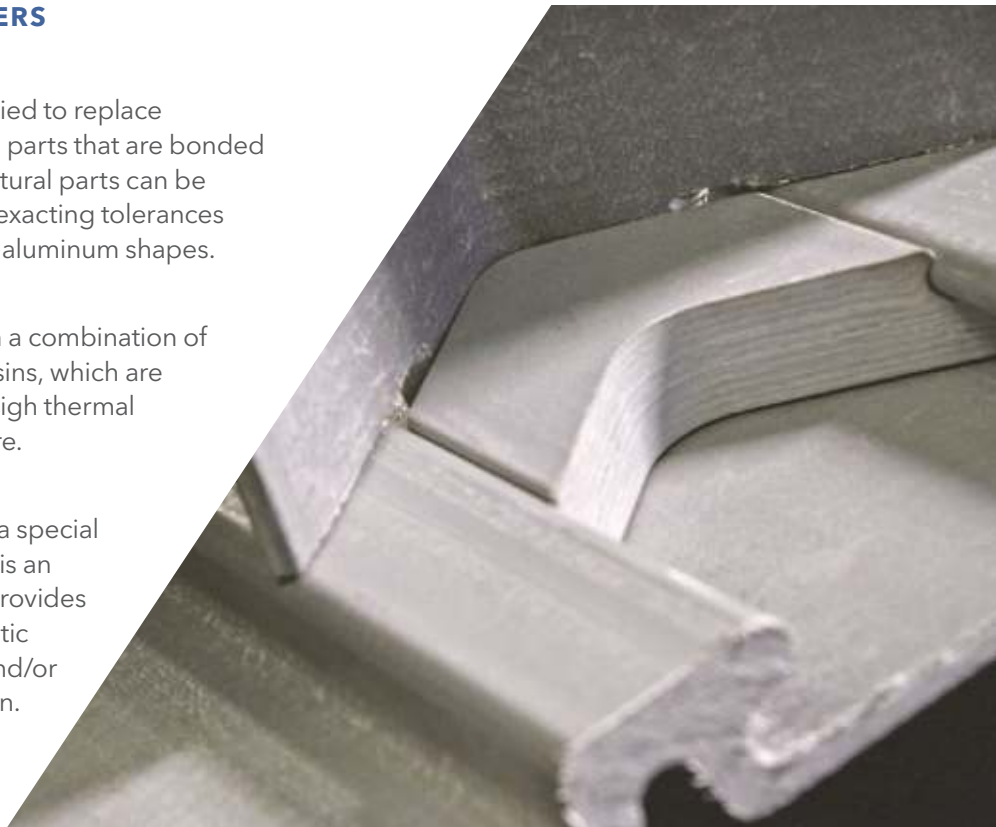
Advanced manufacturing techniques are applied to replace traditional welded structures with interlocking parts that are bonded together with epoxy material. These FRP structural parts can be molded or pultruded to develop shapes with exacting tolerances commensurate with formed steel or extruded aluminum shapes.

Reduces maintenance time

Our composite louvers are manufactured with a combination of E-class fiberglass and isophthalic polyester resins, which are found to exhibit low wear, UV resistance and high thermal oxidative stability due to its molecular structure.

Increase survivability

When our E-class fiberglass is combined with a special carbon fiber veil, the resulting FRP composite is an extremely lightweight, nonwoven fabric that provides protection against corrosion, abrasion and static discharge while at the same time absorbing and/or selectively reflecting electromagnetic radiation.

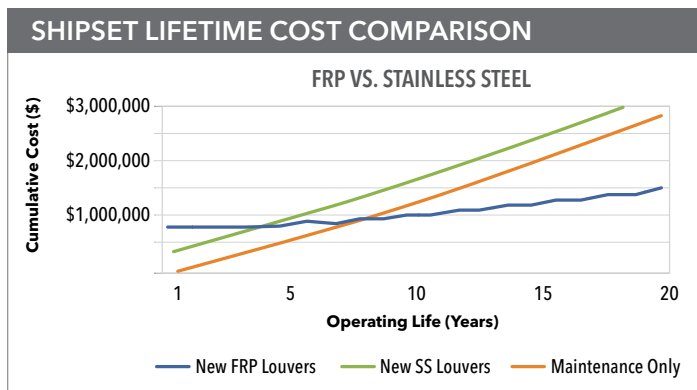


CECO PEERLESS COMPOSITE LOUVERS OFFER A CLEAR ADVANTAGE OVER STAINLESS STEEL OR ALUMINUM.



LPD CLASS WEIGHT SAVINGS		
	LOUVERS	PAYLOAD
LPD-24	89	20,000 kg
LPD-25	130	28,750 kg
LPD-26	51	17,150 kg

T-AKE CLASS WEIGHT SAVINGS		
	LOUVERS	PAYLOAD
T-AKE-14	38	8,575 kg



- MIL-S-901D ~ SHOCK
- MIL-STD-167-1 ~ VIBRATION
- ASTM-E-162 ~ FLAME SPREAD
- ASTM-E-662 ~ SMOKE GENERATION
- ASTM-E-1534 ~ IGNITION & HEAT

WE BELIEVE A GOOD LOUVER SHOULDN'T COST A SHIP ITS ABILITY TO DEFEND ITSELF.

That's why CECO Peerless created a composite louver, which is specifically meant to absorb radar. A unique application of radar-absorbing materials was utilized for shipside louvers on the U.S. Navy's LPD-Class ships. This initiative by the Naval Surface Warfare Center, Carderock Division, developed louvers to integrate without compromising the stealth properties of this ship's composite hull structures.

This patented CECO Peerless design was developed to integrate special fibers into the pultrusions to achieve the required performance characteristics. Online testing of pultruded parts is evaluated by U.S. Navy personnel to confirm consistent radar absorption characteristics before the louvers assembly. Available for all NATO ships.



CECO Peerless

CECO Peerless is an experienced and reliable global leader in designing and supplying a wide range of compact, high-efficiency, separation and filtration equipment. Founded in 1933, Peerless also serves the oil and gas production, gas pipeline transmission and power generating industries around the world.

