Keeping it cool

Effective heat exchangers are vital to the performance and durability of marine electric propulsion systems

WORDS: **PHIL ALLMAN**

When it comes to temperature increases, electrical propulsion systems are more tolerant than traditional combustion engines, but in one crucial area, higher temperatures can have a damaging effect on a drivetrain's components. Tests undertaken by leading manufacturers show that to maintain performance and extend components' operating life temperatures must be as low as possible.

A universal principle of electronics says that a 10°C (50°F) lower temperature will double the life expectancy of electrical components, and that is certainly true for electric marine propulsion systems.

However, while component lifespan is of real importance, there is another issue to consider – in many electric propulsion systems, sophisticated sensor-based controls are used to monitor system health and performance. If the water temperature within the cooling circuit rises beyond specified levels, this will be identified by the sensors and power to the drivetrain will be reduced, to protect the system components. For users, the implications of this switch into 'limp mode' could range from simply frustrating to downright dangerous, depending on water and weather conditions.

One company, however, is overcoming this problem by designing the cooling circuit of its 100kW drivetrain to operate at a maximum temperature of 60°C (140°F), based on a maximum cooling water intake temperature of 35°C (95°F) and by using Bowman heat exchangers to ensure consistent and accurate cooling of all components.

The rapid development and growth of higher powered (60kW plus) drivetrains has also created the need for more efficient component cooling circuits to manage the heat loads generated. Companies are now designing this into their ranges.

Primary cooling requirements for these systems include the battery pack and onboard charger (where fitted), AC-DC converter, DC-DC converter, and the electric drive motor itself.

For over 60 years, Bowman has worked with the marine industry to provide highly efficient heat exchangers for cooling engine jacket water, engine lubrication systems, turbo intercoolers and transmissions. Its shell and tube heat exchangers are renowned for their excellent heat transfer performance and long-life reliability, especially with challenging cooling media such as sea water.

Now, as the industry moves into an era of eco-friendly propulsion, Bowman is working with both electric and hybrid motive power system manufacturers to provide the levels of system cooling required for their equipment.

Bowman will be exhibiting examples of its marine heat exchanger range at Electric & Hybrid Marine World Expo, June 25-27, 2019, in Amsterdam. Visitors to Stand E1120 will be able to discuss their cooling requirements with Bowman engineers.

Bowman is at the forefront of cooling technology, working with manufacturers to meet the demands of new eco-friendly propulsion