



**HYBRID TRACTOR TUG "RALPH"**  
*Harbor/Escort Tug*

**CATERPILLAR MARINE** - A 'stem-to-stern' CAT content hybrid propulsion system. The hybrid propulsion system includes 3512E (2550 HP @ 1800 RPM) main engines, two C18 (565 KW) generator sets, a C7.1 (200 KW) generator set, shaft lines, MTA 628 azimuth drives (Cu-Ni-Al bronze 2800 mm propellers) and water-cooled thruster motors. The system also includes the switchgear, VFD's, and a fully-integrated control system. The two CAT 3512E main engines power the main thrusters via a composite shaft line. Between the main engine and the thruster there is a main clutch mounted in a bell housing attached to the engine. On the aft end of each thruster there is an electric 560 KW thruster motor operated by a VFD controller.

#### **HYBRID PROPULSION SYSTEM WITH FOUR MAIN OPERATIONAL MODES**

**Electric - Standby/Transit** - The main thrusters are run via the thruster motors in variable speed mode. Electric Power is generated by a diesel electric power plant consisting of two Caterpillar C18's, and one C7.1. Transit speed is variable up to 10.5 knots. **Diesel** - Main engines drive the thrusters mechanically in variable speed mode with electric power coming from one of the generator sets. **Hybrid** - Main engines drive main propellers together with thruster motors powered by the generator sets. **Bollard Pull** 85 metric tons.

**FIFI** - Firefighting pump is powered from the starboard main engine PTO. Maneuvering is done with main thrusters operating in electric mode powered by generators. The off-ship firefighting system meets FIFI 1 requirements relating to water output. It utilizes one clutched FFS model SFP 300x400CW-NCl pump driven by the starboard main engine. Two FFS 1200 remote controlled fire monitors are mounted on the aft end of the O1 deck controlled by the FFS control panel in the pilot house. A deluge system is supplied to cover the tug with water spray.

**A MARKEY DEPCF-52-75HP ELECTRIC HAWSER WINCH** with level wind is installed on the fore deck. Controls are located in the pilothouse, with an emergency brake release/brake hold button located on the forward deckhouse bulkhead.

**AN E.B.I. MARINE CRANE** is installed on the main deck built into the aft corner of the port stack. The crane has a telescoping boom with full extended length of 30 feet. Lifting capacity is 4000 lbs. at a 30 foot radius. A boom support is fitted to the starboard stack for storage.

**BOW FENDERING** consists of two upper rows of 24" cylindrical fender, a middle 16" soft loop fender, and a lower laminated fender. Twelve inch black rubber "D" fenders are fitted at the main deck on the sides and around the stern. Between the D fender and the middle bow fender there is a double row of soft loop fender, with the aft end of the soft loop fender tapered to approximately the depth of the D fender.

**ACCOMMODATIONS** are available for six crew members in four state rooms.

*Powered by Innovation.*

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