



Power Profile.

RAstar 3500 - "Clessie L. Cummins" Tug Boat



Vessel Specifications:

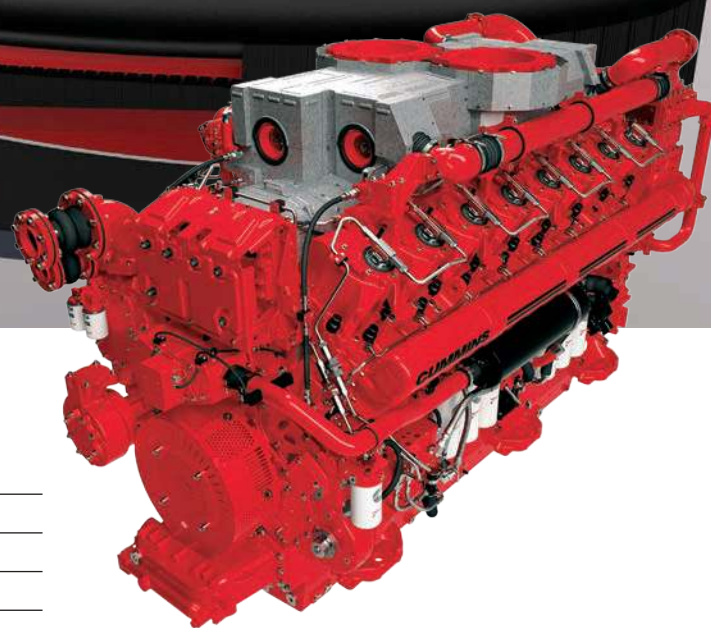
Class	RAstar 3500	
Length Overall	114.83 ft	35.00 m
Beam	41.90 ft	12.77 m
Loaded Draft	14.76 ft	4.50 m
Summer Freeboard	6.51 ft	1.98 m
Fuel Oil	48,344 USG	183.00 m ³

Performance:

Maximum Speed	14.2 Knots
Bollard Pull Ahead	102 Tons
Bollard Pull Astern	96 Tons

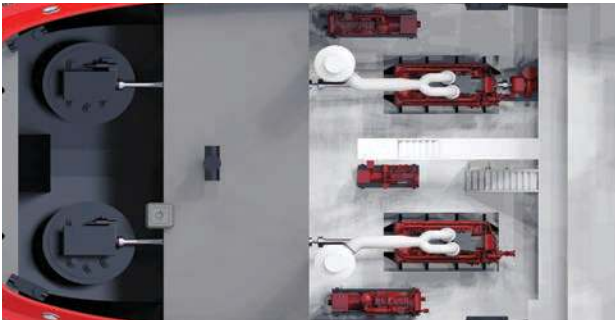
Electronics and Controls:

Engine/Gear Controls	C Command Elite Plus
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Machinery:

Main Engines	2 - Cummins QSK95 Rated 4200 hp (3132 kW) IMO Tier II Engines
Brake Horsepower	4200 hp
Ratio	8.476:1
Propulsion	Controllable Pitch Azimuthing 3200 mm Diameter Propellers
Generators	2 Paralleling Cummins QSK19 1 Cummins QSB6.7



Cummins QSK95-Powered RAstar 3500 Tug Boats.

This project demonstrates how modern high-performance engines can be custom designed and installed to meet the formidable environmental conditions and demanding operational requirements of the world's busiest bulk commodity ports.

Robert Allan Ltd. has worked with Cummins to upgrade their popular RAstar 3500 tug design using two Cummins QSK95 marine engines for main propulsion, with auxiliary power provided by two Cummins QSK19 engines and one QSB6.7 engine.

The result is a powerful escort tug projected to deliver 102 tons bollard pull ahead, and 96 tons bollard pull astern. The estimated speed with a full load is 14.2 knots.

When The Going Gets Rough, The Tough Get Tougher.



Robert Allan Ltd.'s RAstar 3500, with its unique sponsoned hull form, provides significantly enhanced escort towing and seakeeping performance. Guided by an extensive computer-based

Computational Fluid Dynamics (CFD) analyses, a large foil-shaped escort skeg was designed for the hull along with a well aft-biased "Wide-A" escort staple positioned to ensure the tug generates the required steering forces. It is capable of handling high air and water temperatures, strong currents in a narrow channel, and wave heights of up to 3 meters with 35-knot wind speeds. The unique design of this high-performance escort tug hull minimizes roll motions and accelerations to less than half of comparably sized "standard" wall-sided tug hulls. It is only fitting that this innovative vessel design is named after diesel engine pioneer Clessie L. Cummins.

The Most Powerful Tug Under 500 Gross Tons Powered By High-Speed Engines.

The two Cummins QSK95 engines are rated at 4200 hp (3132 kW) @ 1800 rpm. This provides the RAstar with superb pulling power as the QSK95 is the strongest high-speed marine diesel that can be spec'd. Its 60-degree V block with nested cylinders delivers best-in-class power density, weighing just 28,660 lb (13,000 kg). That's between 25 percent and 70 percent less than medium-speed engines of similar power output.



The compact size of the QSK95 (144x63x93 inches) also allows easier serviceability in crowded engine rooms. Extensive service tool and procedure validation for safety, ergonomics, durability, reliability and repair robustness as well as progressive damage prevention are projected to significantly reduce service needs and repair times, with a considerable payback over the life of these engines.

Performance is enhanced through the use of a proprietary Modular Common Rail (MCR) fuel system in combination with unique air handling technology that uses a single turbo per four cylinders. Dry turbo housings and dry exhaust manifolds maximize available energy to the turbochargers, enabling quick acceleration when a tug captain needs it most.

All Cummins engines onboard this vessel are certified to International Maritime Organization (IMO) Tier II emissions standards.



Cummins Inc.
4500 Leeds Ave., Suite 301
Charleston, SC 29405
U.S.A.

Phone: 1-800-CUMMINS™ (1-800-286-6467)
Internet: cumminsengines.com

Twitter.com/CumminsEngines
YouTube.com/CumminsEngines

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