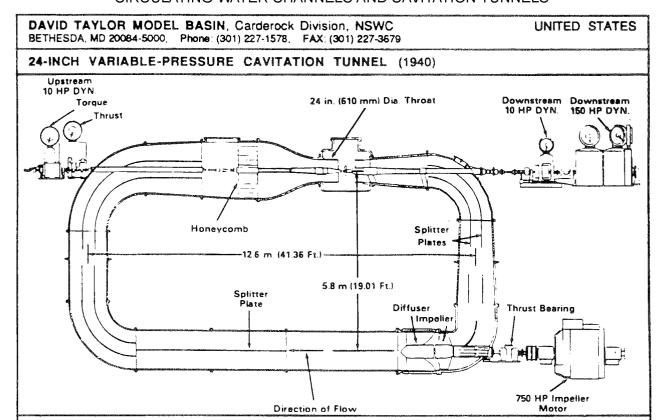
INTERNATIONAL TOWING TANK CONFERENCE CATALOGUE OF FACILIYIES CIRCULATING WATER CHANNELS AND CAVITATION TUNNELS



DESCRIPTION OF FACILITY: Vertical plane, closed recirculating, variable-speed, variable-pressure, open jet test section, closed jet test section, and semi-rectangular test section.

TYPE OF DRIVE SYSTEM: 1.22 m (48 in.) diameter three-bladed axial flow impeller with direct drive 6-pulse solid state variable speed DC drive system with digital closed loop control.

TOTAL IMPELLER MOTOR POWER: 559 kW (750 hp), 340 rpm WORKING SECTION MAX. VELOCITY: 17 m/s (55.8 f/s, 33 knots) MAX. & MIN. ABS. PRESSURES: 241 kPa (35 psia), 14 kPa (2 psia)

MIN. CAVITATION NUMBER: Sigma = 0.08 (at 2 psia & 33 knots)

INSTRUMENTATION: Dynamometers for measuring steady & unsteady propeller forces on up and downstream shafts, 2-component force balance, hydrophones, pressure sensors, strobe lights, high speed photographic system.

TYPE & LOCATION OF TORQUE & THRUST DYNAMOMETERS:

- (1) Electric-cradle dynamometer located downstream outside the tunnel
 - . Drive motor rating = 112 kW (150 hp) at 3600 rpm max.
 - Thrust range = ± 13,344 N (± 3000 lbs)
 - Torque range = ± 415 Nm (± 306 lb-ft) at 3600 rpm and ± 1424 Nm (± 1050 lb-ft) at 1050 rpm
- (2) Electric-cradle dynamometers located upstream & downstream outside the tunnel
 - Drive motor rating = 7.5 kW (10 hp) at 3600 rpm max.
 - Thrust range = ±1334 N (± 300 lbs)
 - Torque range = ± 24 N m (± 18 lb-ft) at 3600 rpm
- (3) Unsteady propeller force transmission dynamometer, 6-component waterproof strain gaged sting-balance located either upstream or downstream in the tail shaft housing approx. 76 mm (3.0 in.) from the propeller hub.

Drive motor rating = 7.5 kW (10 hp), 1800 rpm max, with this dynamometer

	Steady Load Range	(double amplitude)
• Thrust	0-1334 N (0-300 lbs)	133 N (30 lbs)
• Torque	0-47 Nm (0-35 lb-ft)	4.7 Nm (3.5 lb-ft)
 Side Forces (vert. & horz.) 	0-67 N (0-15 lbs)	13 N (3 lbs)
 Moments (vert. & horz.) 	0-17 Nm (0-12.5 lb-ft)	1.7 Nm (1.25 lb-ft)

*Blade frequency limitation of the sting-balance: 12 hz min., 200 hz max.

Optimum propeller size range: Diameter = 250-300 mm (10-12 in.); Weight = 9-44 N (2-10 lbs)

PROPELLER SIZE RANGE: Diameter = 450 mm (18 in.) max.

TESTS PERFORMED:

- cavitation characterizations on propellers, appendages, headforms, foils, etc.
- (2) 5-component unsteady propeller force measurements in simulated wakes
- (3) acoustic measurements on cavitating propellers, bodies, etc.
- (4) flow field measurements
- (5) contrarotating propeller performance tests with synchronized shafts & indexed rotation
- (6) unsteady force measurements with modulated speeds

PUBLISHED DESCRIPTION:

Murmma, A. G. "The Variable-Pressure Water Tunnels at the David W. Taylor Model Basin," SNAME Transactions Vol. 49 (1941).

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