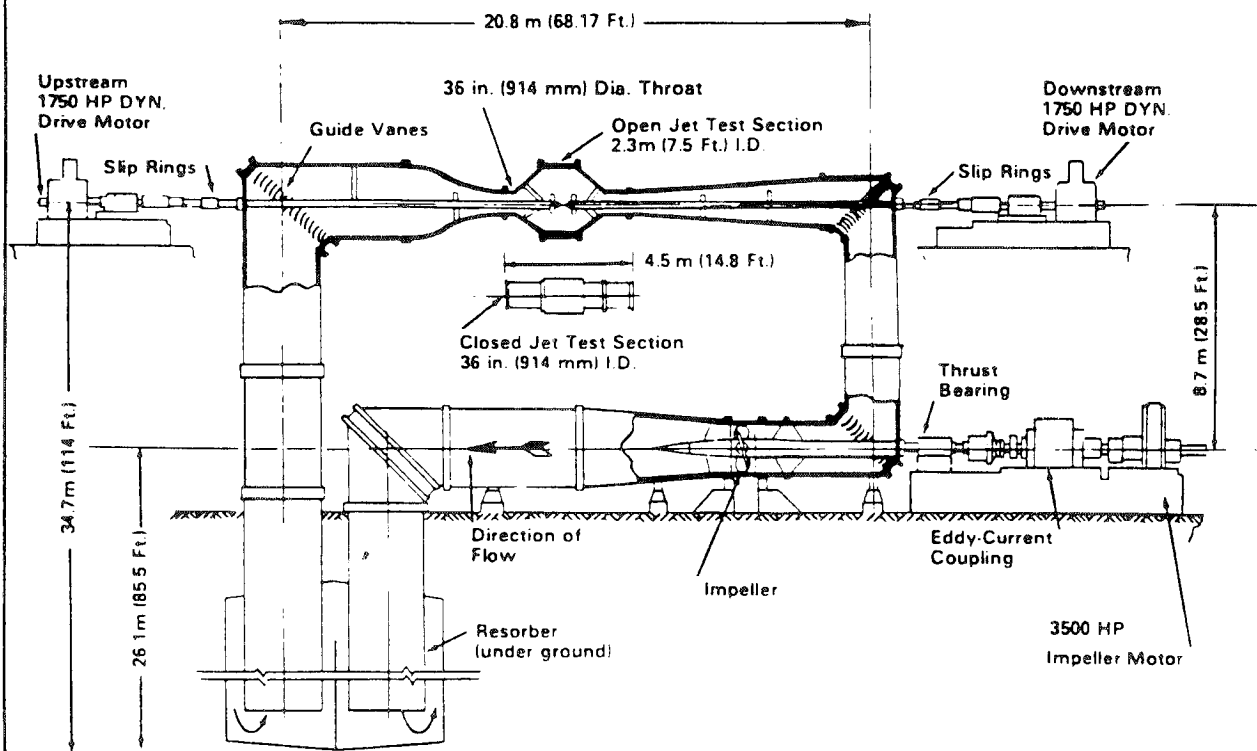


INTERNATIONAL TOWING TANK CONFERENCE CATALOGUE OF FACILITIES
CIRCULATING WATER CHANNELS AND CAVITATION TUNNELS

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UNITED STATES

36-INCH VARIABLE-PRESSURE CAVITATION TUNNEL (1962)



DESCRIPTION OF FACILITY: Vertical plane, closed recirculating with resorber, variable-speed, variable-pressure, two interchangeable circular test sections - an open jet and a closed jet, deaerator, filter system (5-micron).

TYPE OF DRIVE SYSTEM: 1.98 m (78 in.) diameter adjustable pitch four-bladed axial flow impeller.

TOTAL IMPELLER MOTOR POWER: 2610 kW (3500 hp), 300 rpm (driving eddy current coupling)

TOTAL INPUT POWER TO PUMP: 2153 kW (2887 hp), 272 rpm

WORKING SECTION MAX. VELOCITY: 25.7 m/s (84.5 ft/s, 50 knots)

MAX. & MIN. ABS. PRESSURES: 414 kPa (60 psia), 14 kPa (2 psia)

MIN. CAVITATION NUMBER: Sigma = 0.034 (at 2 psia & 50 knots)

INSTRUMENTATION: Propeller dynamometers on up and downstream shafts, right angle drive dynamometer, inclined shaft dynamometer, transverse bearing force dynamometer, 6-component force balance, pressure sensors, hydrophones, computerized data collection system, strobe lights, high speed photographic system.

TYPE & LOCATION OF TORQUE & THRUST DYNAMOMETERS:

(1) Propeller force transmission dynamometers - three interchangeable measuring elements, 2-component waterproof strain gaged units located either upstream or downstream in the tail shaft housing approx. 660 mm from the propeller hub.

• Drive motor ratings - both upstream & downstream: 1305 kW (1750 hp), 4600 rpm max. direct drive, 10,000 rpm max. with gear unit installed, torque = 3390 Nm (2500 lb-ft) at 2100 rpm.

	Measuring Element No. 1	Measuring Element No. 2	Measuring Element No. 3
• Thrust range	- 1779 to +16,014 N (- 400 to + 3600 lbs)	- 3559 to + 32,027 N (- 800 to + 7200 lbs)	- 5338 to + 48,041 N (- 1200 to +10,800 lbs)
• Torque range	- 136 to +1220 Nm (- 100 to + 900 lb-ft)	- 271 to + 2440 Nm (- 200 to +1800 lb-ft)	- 407 to + 3661 Nm (- 300 to + 2700 lb-ft)

PROPELLER OR MODEL SIZE RANGE:

Propellers: 680 mm (27 in.) dia. max. in open jet test section
450 mm (18 in.) dia. max. in closed jet test section
450 mm (18 in.) dia. max. contra-rotating dual propellers

Fixed models: Length ≤ 1.07 m (42 in.), dia. ≤ 450 mm (18 in.)

TESTS PERFORMED:

(1) propeller/propulsor evaluations: single shaft upstream or downstream, contra-rotation, inclined shaft, cavitation inception, thrust breakdown, noise measurements, flow field measurements, erosion, supercavitation, ventilation, transverse bearing forces, pressure distributions, wake simulations.

(2) studies on: single & compound open propulsors, ducted propulsors, waterjets, hydrofoils (supercavitating & ventilated), fairings, ship appendages, etc.

PUBLISHED DESCRIPTION:

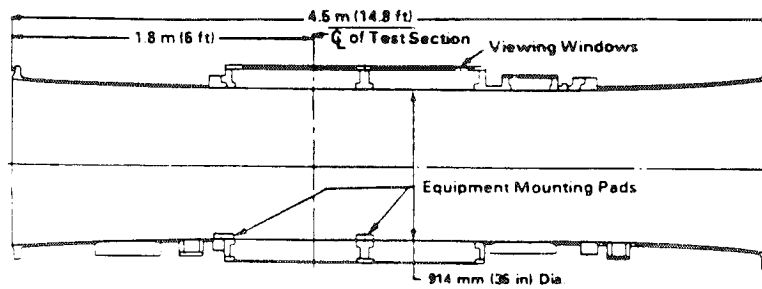
• Brownell, W. F. "Two New Hydromechanics Research Facilities at the David Taylor Model Basin," DTMB Report 1690 (Dec 1962)

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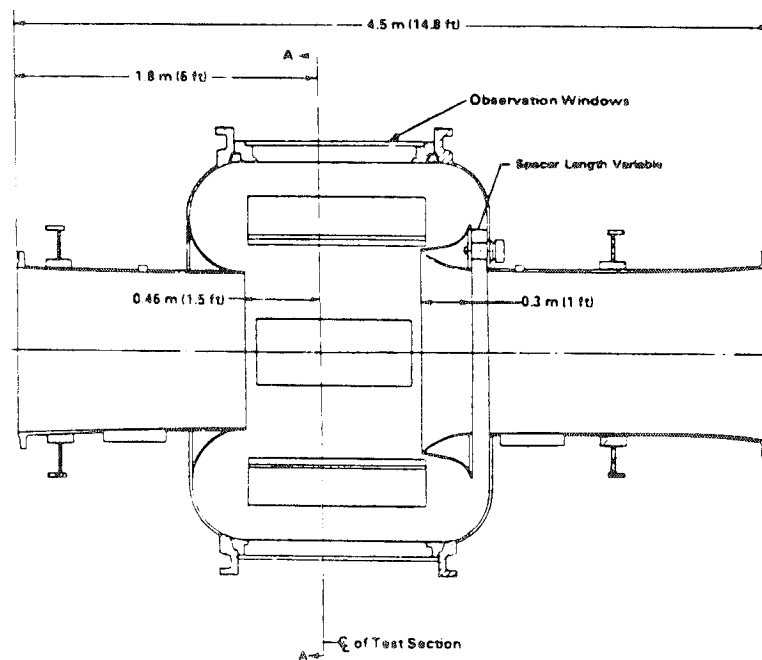
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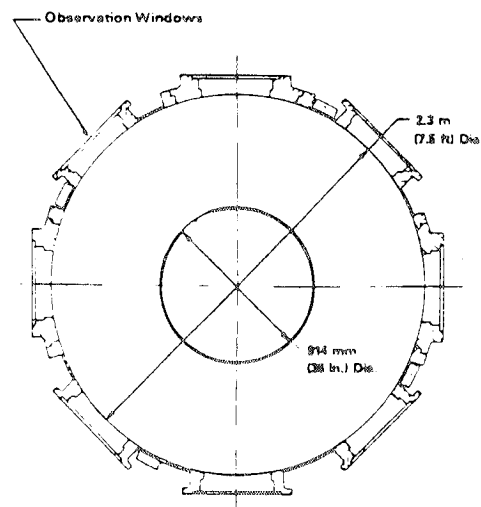
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Detail View of 36-Inch VPWT Closed Jet Test Section



Detail View of 36-Inch VPWT Open Jet Test Section



Section View A-A of Open Jet Test Section