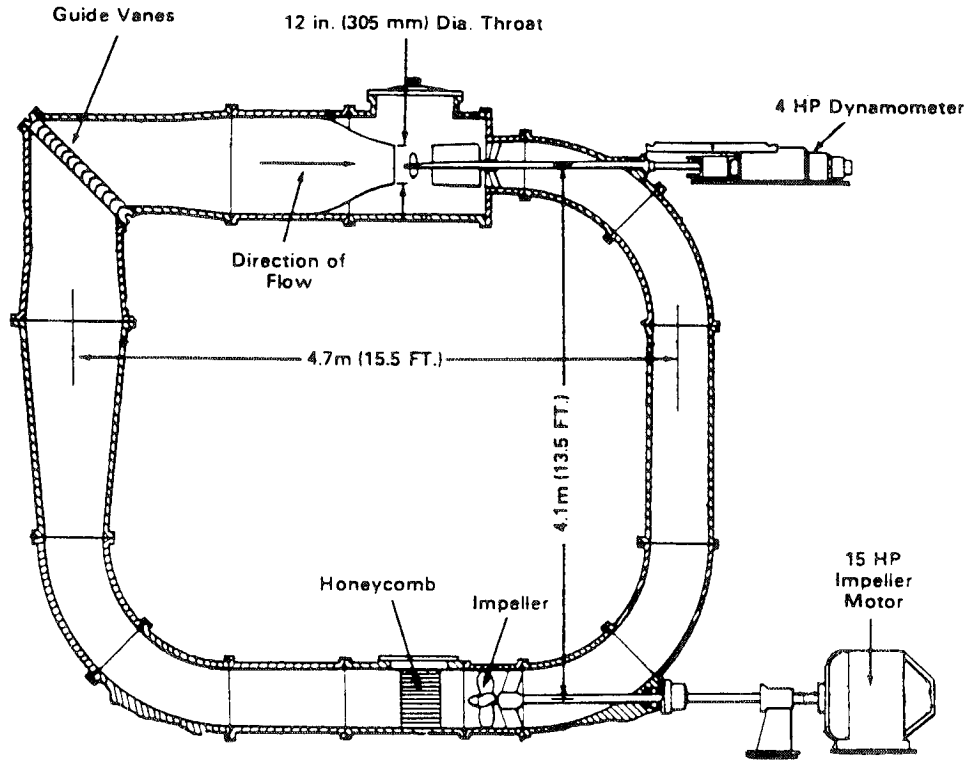


INTERNATIONAL TOWING TANK CONFERENCE CATALOGUE OF FACILITIES
CIRCULATING WATER CHANNELS AND CAVITATION TUNNELS

DAVID TAYLOR MODEL BASIN, Carderock Division, NSWC
BETHESDA, MD 20084-5000, Phone: (301) 227-1578, FAX: (301) 227-3679

UNITED STATES

12-INCH VARIABLE-PRESSURE CAVITATION TUNNEL (1929)



DESCRIPTION OF FACILITY: Vertical plane, closed recirculating, variable-speed, variable-pressure, circular throat with open jet and semi-rectangular closed jet working sections.

TYPE OF DRIVE SYSTEM: 0.46 m (18 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: 11.2 kW (15 hp), 850 rpm

WORKING SECTION MAX. VELOCITY: 7.3 m/s (24 ft/s, 14 knots) with open jet

MAX. & MIN. ABS. PRESSURES: 206 kPa (30 psia), 10 kPa (1.5 psia)

MIN. CAVITATION NUMBER: $\Sigma = 0.27$ (at 1.5 psia & 14 knots)

INSTRUMENTATION: Propeller dynamometers on downstream shaft, pressure sensors, hydrophones, strobe lights, high speed photographic system.

TYPE & LOCATION OF TORQUE & THRUST DYNAMOMETERS:

- (1) Electric-cradle dynamometer located downstream outside the tunnel.
 - Drive motor rating = 3 kW (4 hp) at 3000 rpm
 - Thrust rating = 445 N (100 lbs)
 - Torque rating = ± 13 Nm (± 9.5 lb-ft)
- (2) Transmission dynamometer located downstream outside the tunnel
 - Drive motor rating = 3.7 kW (5 hp) at 2000 rpm
 - Thrust rating = 1112 N (250 lbs)
 - Torque rating = 45 Nm (33 lb-ft)

PROPELLER OR MODEL SIZE RANGE:

- Propellers: 225 mm (9 in.) dia. max.
- Fixed foil models: 300 mm (12 in.) strut length max.
250 mm (10 in.) chord length max.

TESTS PERFORMED:

- (1) cavitation characterizations of propellers, headforms, foils, & appendages.
- (2) acoustic studies on bubble noise.
- (3) studies of nuclei and chemical effects on cavitation.

PUBLISHED DESCRIPTION:

- Mumma, A. G. "The Variable-Pressure Water Tunnels at the David W. Taylor Model Basin," SNAME Transactions Vol. 49 (1941)
- Bowers, W. H. "The 12-inch Variable Pressure Water Tunnel Propeller Testing Procedure," DTMB Report 505 (Nov 1943)

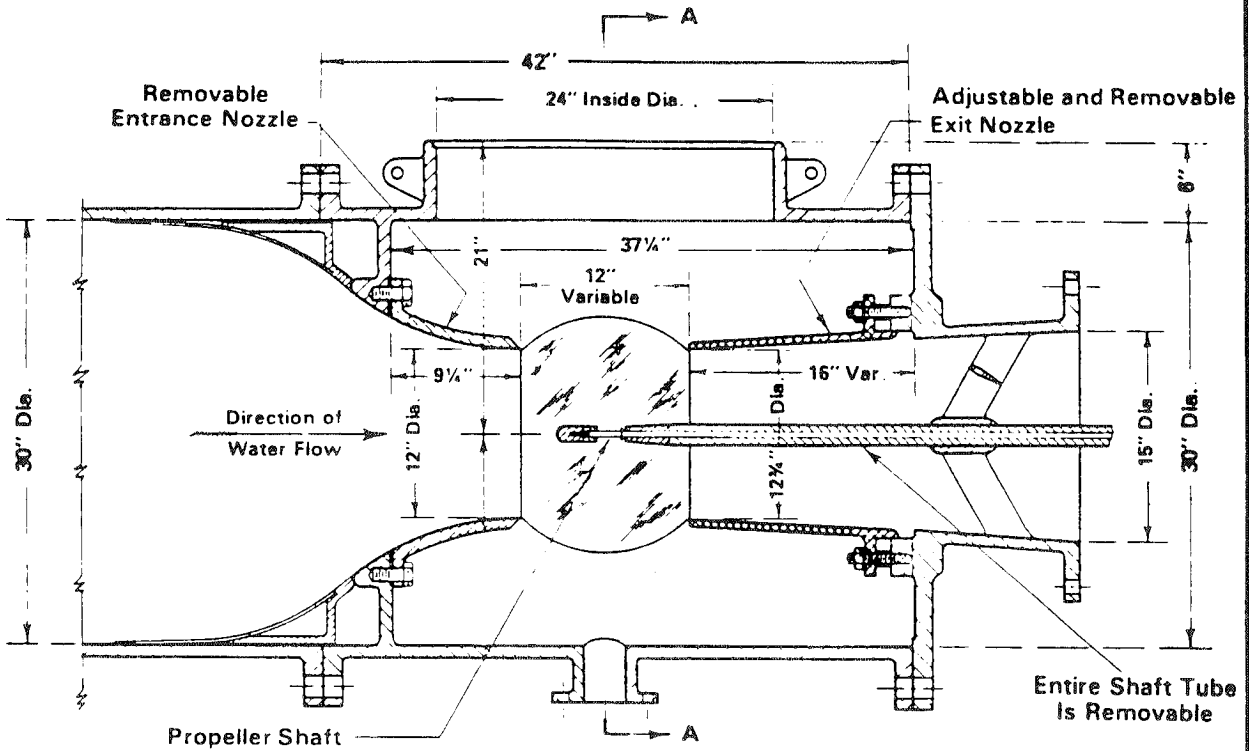
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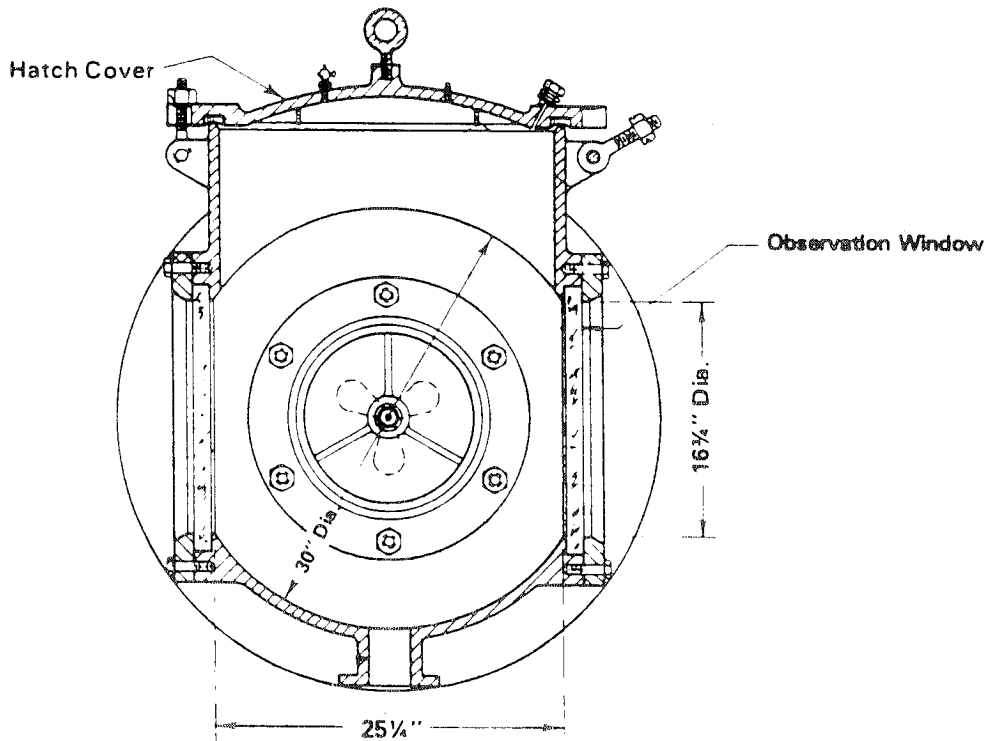
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Detail View of 12-Inch VPWT Test Section



Section View A-A of Test Section
 (Looking Downstream)