

INTERNATIONAL TOWING TANK CONFERENCE CATALOGUE OF FACILITIES
TOWING TANKS, SEAKEEPING AND MANOEUVRING BASINS

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<p>ROTATING ARM BASIN (1961)</p>	
<p style="text-align: center;">ELEVATION VIEW OF ROTATING ARM & BASIN (see reverse side of this sheet for other illustrations)</p>	
<p>DESCRIPTION OF BASIN: Circular indoor basin 79.2 m (260 ft) in diameter and 6.1 m (20 ft) deep; models are towed in circular paths through still water by a rotating arm; model rigging is facilitated by a moveable dry dock with inside dimensions of 6.7 m (22 ft) long, 4.4 m (14.5 ft) wide, and 5.5 m (18 ft) deep, which can be rolled radially on tracks from a niche in the side wall to almost the center of the basin; large underwater viewing windows are located in the basin wall; recirculation filters keep water photographically clear; overhead traveling cranes are located in the fitting room areas & over the path of the moveable dry dock.</p> <p>BEACH TYPE & LENGTH: Around the periphery of the basin a 15 degree slope wave absorber is installed consisting of two layers of permeable bar type concrete resting on an impermeable shelf, an impermeable 15 degree slope beach is installed around the center pivot pedestal.</p>	
<p>DESCRIPTION OF ROTATING ARM: The rotating arm is a bridge-like structure with a span of 39.3 m (129 ft), a width of 6.1 m (20 ft) and a weight of 196 kN (44,000 lbs); the arm pivots on a pedestal in the center of the basin.</p> <p>DESCRIPTION OF UNDER CARRIAGE: Model towing struts & model positioning apparatus is attached to a carriage which can be moved radially on tracks located beneath the arm structure, strut spacing can be varied from 1.1 m (3.5 ft) to 3 m (10 ft) to accommodate different length models, submerged models can be automatically positioned in yaw (± 30 degrees), pitch (± 15 degrees), and roll (10 degrees outboard & 40 degrees inboard) from a remote station at the operator's control console, likewise the struts can be automatically rotated into the flow as desired.</p> <p>TYPE OF DRIVE SYSTEM & TOTAL POWER: The rotating arm is driven by two wheels mounted on its outboard end which ride on a rail around the periphery of the basin, each drive wheel is direct coupled to a 298 kW (400 hp), 700 rpm DC motor capable of 250 percent overload during acceleration.</p> <p>MAXIMUM ARM SPEED: Steady-state speeds up to 15.4 m/s (50.7 ft/s, 30 knots) can be obtained in one-half revolution at a radius of 36.6 m (120 ft); speeds up to 25.7 m/s (84.5 ft/s, 50 knots) at the same radius can be obtained in about two revolutions.</p>	
<p>INSTRUMENTATION: Digital readout of submerged model pitch, yaw & roll angles, and towing strut angles; 6-component force balance dynamometer to measure forces & moments acting on submarine models, model propeller torque & thrust transmission dynamometers, magnetic tape & computerized data collection systems, Pitot tube rakes for wake surveys, model motor power supplies: (1) 30 kW variable voltage DC, 0-400 volts, 75 amps max. (2-units); (2) 5 kVA, 3-phase solid state variable frequency, 15-400 hz, 7.5-200 volts AC, 14 amps.</p> <p>MODEL SIZE RANGE:</p> <ul style="list-style-type: none"> • Submerged models up to 6.1 m (20 ft) in length • Surface models up to 9.1 m (30 ft) in length 	
<p>TESTS PERFORMED:</p> <ol style="list-style-type: none"> (1) captive model stability & control experiments with submarines & surface ships (2) propulsion evaluations in a turn (3) hydrofoil performance studies (4) towed body evaluations in a turn 	
<p>PUBLISHED DESCRIPTION:</p> <ul style="list-style-type: none"> • Brownell, W. F. "Two New Hydromechanics Research Facilities at the David Taylor Model Basin," DTMB Report 1690 (Dec 1962) 	

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