

Emerson Cavitation Tunnel



Emerson Cavitation Tunnel - Blyth Campus

The Emerson Cavitation Tunnel was originally installed at Newcastle University in 1949 and entered service in 1950-51. The tunnel was completely modernised in 1980, and was further equipped with modern flow measurement systems in 2000. An enhanced measuring section with higher speed capability and matching control systems was installed during 2007. The tunnel has been re-located to a purpose built facility at the Blyth Campus as part of a £2 million investment.

The Emerson Cavitation Tunnel provides an efficient service to the marine sector, including ship owners, shipyards and propeller manufacturers. As well as commercial consultancy services, the Emerson Cavitation Tunnel offers background research and development services to academia for cavitation, noise, propulsion, turbines, coatings and hydrodynamics related activities.



This image shows the placement of the Cavitation Tunnel in its new building at Blyth

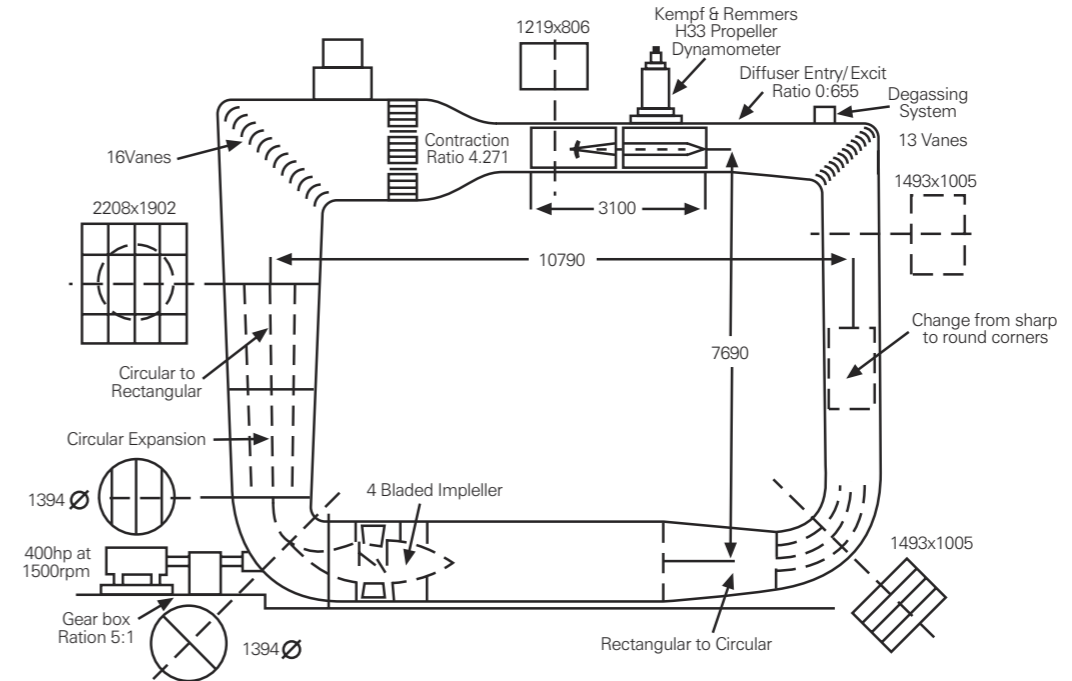


Specification:	
Flume length	11m
Test section size (L x B x H)	3.10 x 1.22 x 0.81 m
Test section area	0.99 m ² (0.64m ² with insert)
Contraction ratio	4.271
Type of drive system	4 bladed axial flow impeller with thyristor control
Main pump power	300 kW
Main pump speed	294 rpm
Impeller diameter	1.4 m
Maximum velocity	10 m/s (20 knots) with insert (0.81m x 0.81m)
Absolute pressure range	7.6 kN/m ² (min) to 106 kN/m ² (max)
Cavitation number range	0.5 (min) to 2 (without insert)
Model propeller size	150 mm to 400 mm depending on scaling



Testing Capability:

- Conventional and unconventional propeller performance tests, including shaft inclination in three axes
- Cavitation and noise tests in uniform and non-uniform streams
- Wake simulation using wake screens and flat plate pressure pulse measurements
- Wake simulation using dummy hull model including hull surface pressure measurements
- Tidal/current turbine performance, cavitation and noise tests
- Flow measurement and analysis using 3D LDA/PDA and stereoscopic PIV systems
- Boundary layer and drag tests with flat planes, submersible bodies and propellers with coatings
- Load measurements with submerged bodies
- Propeller testing in simulated ice blocks
- Recording of nature and extent of cavitation using still and high-speed video cameras
- Performance testing of specialist coatings, including foul release coatings
- Assessment of noise reduction capabilities of coatings for improved environmental performance.



Projects

SeaFront – Synergistic Fouling Control Technologies.

SONIC – Suppression Of underwater Noise Induced by Cavitation.

TARGETS – Targeted and advanced research for global efficiency of transportation shipping

STREAMLINE – Strategic research for innovative marine propulsion concepts

Port of London Authority (PLA) – Propeller design, performance and cavitation testing for the harbour patrol vessel “Lambeth”

AMBIO – Advanced nano-structured surfaces for control of bio-fouling

Swirl-Jet – Study of swirling jets in fields of seabed excavations, vessel propulsion and underwater cleaning

Effect of cavitation on the performance of a podded propulsor during ice-milling. PhD research sponsored by Sumitomo Heavy Industries Ltd

FASTPOD – Fast ship applications for pod drives

An investigation of tidal stream rotor performance

OPTIPOD – Optimum design and implementation of azimuthing pods for the safe and efficient propulsion of ships



The Emerson Cavitation Tunnel forms one part of a suite of facilities available at Newcastle University including:

- **Newcastle Towing Tank**
- **Wind Wave Current Tank**
- **Flow Cell**
- **Multi Purpose Flume**
- **Slime Farm**

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