

The ICEPRONAV Hydrodynamic Laboratories comprise two towing tanks and a closed-loop cavitation tunnel, located within purpose-built laboratory buildings on ICEPRONAV's established engineering site in Galati, Romania, adjacent to the Danube River. The laboratories are currently inactive.

An adjacent 8,000 sqm office building is occupied by ICEPRONAV Engineering for its ongoing ship design and offshore engineering business and also includes office space rented to Lloyd's Register and RINA, together with a canteen, shared meeting rooms and 24/7 site security.



Aerial View of ICE's Laboratory and Design Office Complex

The towing tank facilities comprise a deep-water towing tank and a secondary towing tank. The facilities support a wide range of hydrodynamic investigations, including resistance, propulsion, seakeeping and manoeuvring tests.

Deep-Water Towing Tank

The primary towing tank is designed for resistance, propulsion and seakeeping investigations.

Principal Dimensions

- Length: 280 m
- Width: 12 m
- Depth: 6 m

Model Limits

- Maximum model length: up to 12 m
- Maximum model weight: up to 12 t

Towing Carriage and Drive System

- Towing carriage based on a design by Mitsui Engineering & Shipbuilding
- Carriage mass: approximately 45 t
- Eight electric drive motors (one per wheel)
- Total acceleration power: 440 kW
- Automated operation via MAP-16 P processing computer

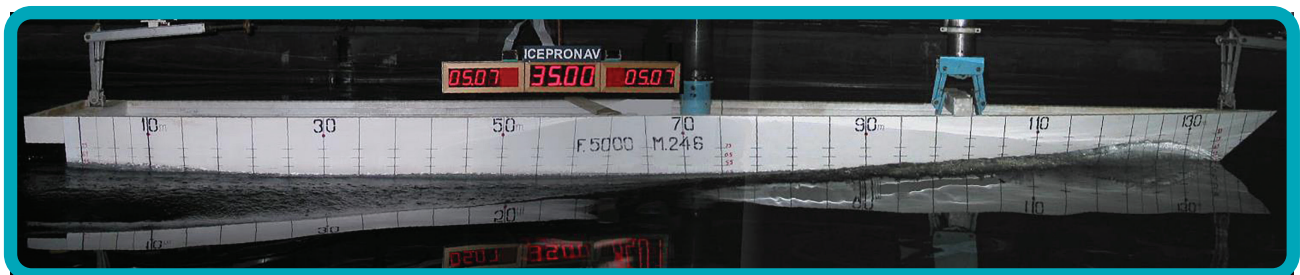
Performance

- Speed range: 0.012 – 12.0 m/s
- Acceleration range: 0.001 – 0.1 g (nominal)

Wave Generation and Seakeeping Capability

The towing tank is equipped with an electro-hydraulic wave generation system designed to support seakeeping and manoeuvring tests in controlled regular and irregular wave conditions.

- Electro-hydraulic flap-type wave generator spanning the full tank width (12 m)
- Generation of regular and irregular waves using amplitude modulation
- Wave period range: 0.5 – 5 s
- Wave height range: 0.04 – 0.60 m
- Wavelength range: 0.40 – 25.0 m



Type 5000 Light Frigate Undergoing Tests in ICE's 280 m Long ITTC-Approved Towing Tank

Testing Capability

The towing tank supports a wide range of hydrodynamic tests, including:

- Resistance and self-propulsion tests in calm water and waves
- Seakeeping investigations, including ship motions and loads in regular and irregular waves
- Manoeuvring tests using a Planar Motion Mechanism (PMM), including steering gear and X-Y dynamometers
- Advanced flow analysis:
 - Three-dimensional wake measurements using five-hole Pitot tubes
 - Flow visualisation using underwater camera systems

Instrumentation and Specialised Equipment

The facility is supported by a range of precision measuring instruments and mechanical systems, including:

- Resistance dynamometers covering force ranges from 10 kgf to 100 kgf
- Self-propulsion dynamometers (Kempf & Remmers and Krylov types) for torque and thrust measurement
- DC propulsion motors ranging from 0.75 kW to 5.5 kW
- Propeller shafting, stern tubes with Teflon bearings and adjustable Krylov-type gear transmissions to support a range of model configurations

Secondary Towing Tank

A secondary towing tank is available for smaller-scale and supplementary investigations.

Principal Dimensions

- Length: 120 m Width: 4 m Depth: 3 m

Model Limits

- Maximum model length: up to 4 m

This facility is suited to manoeuvring studies, model development work and supplementary hydrodynamic testing.

Cavitation Tunnel

The cavitation tunnel is a closed-loop facility intended for controlled cavitation and propulsion-related hydrodynamic testing. The facility is currently inactive.



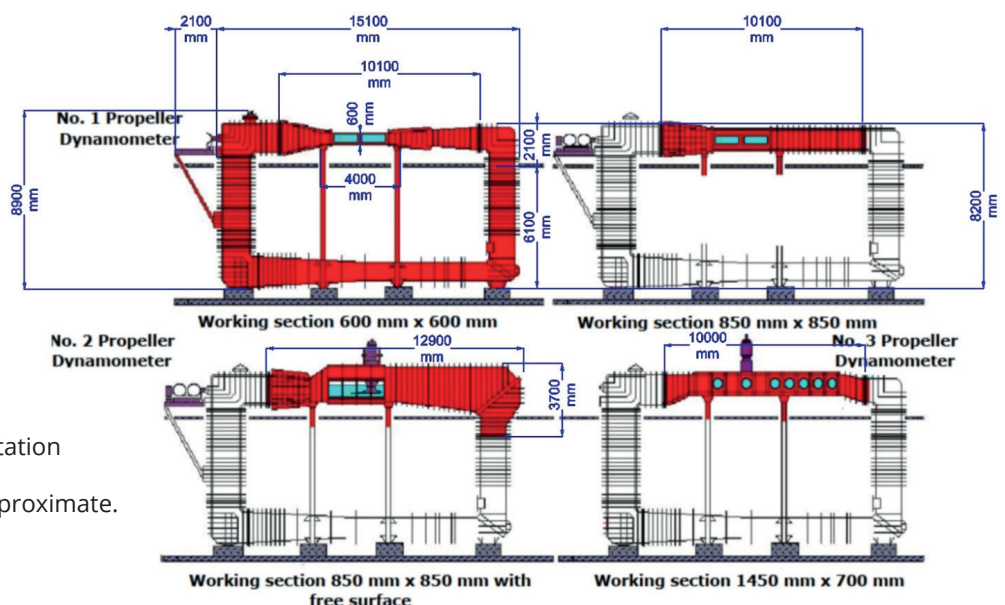
Cavitation Tunnel

General Configuration

- Stainless-steel construction
- Kempf & Remmers design
- Closed-loop, vertical-plane recirculating tunnel
- Closed re-circulation system powered by a 110 kW electric motor (1500 rpm) driving a four-bladed axial-flow impeller with Ward Leonard control

Principal Dimensions

- Overall length: approximately 18 m
- Overall height: approximately 9 m



General overview of the Cavitation Tunnel, working sections. All shown dimensions are approximate.

Operating Parameters

- Maximum test-section speed: up to 12 m/s (configuration dependent)
- Absolute pressure range: 6–200 kPa
- Cavitation number range: 0.2–170

Propeller Specifications

- Maximum propeller diameter: 350 mm
- Optimum propeller diameter: approximately 200 mm



Cavitation test

Interchangeable Test Sections

The cavitation tunnel incorporates four interchangeable working sections to support different test configurations.

Section	Dimensions (mm)	Max Speed	Particular Features
No. 1	600 x 600	12.0 m/s	Designed for high-speed testing
No. 2	850 x 850	6.5 m/s	Standard square section
No. 3	850 x 850	6.0 m/s	Features a free surface for specialised investigation
No. 4	1450 x 700	4.5 m/s	Large rectangular section used with ship dummy models

Testing Capability

- Propeller performance testing in uniform and non-uniform flow for fixed pitch (FPP), controllable pitch (CPP), ducted, contra-rotating (CRP) and high-speed propellers
- Cavitation investigations, including cavitation inception, erosion assessment and analysis of cavitation effects on efficiency and dynamic forces
- Wake and pressure investigations, including wake simulation, propeller-induced pressure fluctuation measurement and load measurement in obstructed flows
- Specialised testing, including inclined flow investigations, free-surface effects and force measurements on rudders and nozzles

Instrumentation and Specialised Equipment

- Main dynamometer (Type J25) for rotational speeds up to 4000 rpm, with maximum thrust of ± 3000 N and torque of ± 150 Nm
- Inclined shaft dynamometer (Type H44) supporting shaft inclination angles up to $\pm 12^\circ$
- Dummy model dynamometer (Type R46) for ship dummy model testing in Test Section No. 4
- Six-component strain gauge balance for force and moment measurement on profiles and rudders (force range 500–800 N)
- Instrumentation including five-hole Pitot tubes for wake measurement, stroboscopic lighting for cavitation visualisation and Van Slyke apparatus for water quality testing.

The information contained in this document is believed to be correct as at February 2026 but is provided without guarantee.