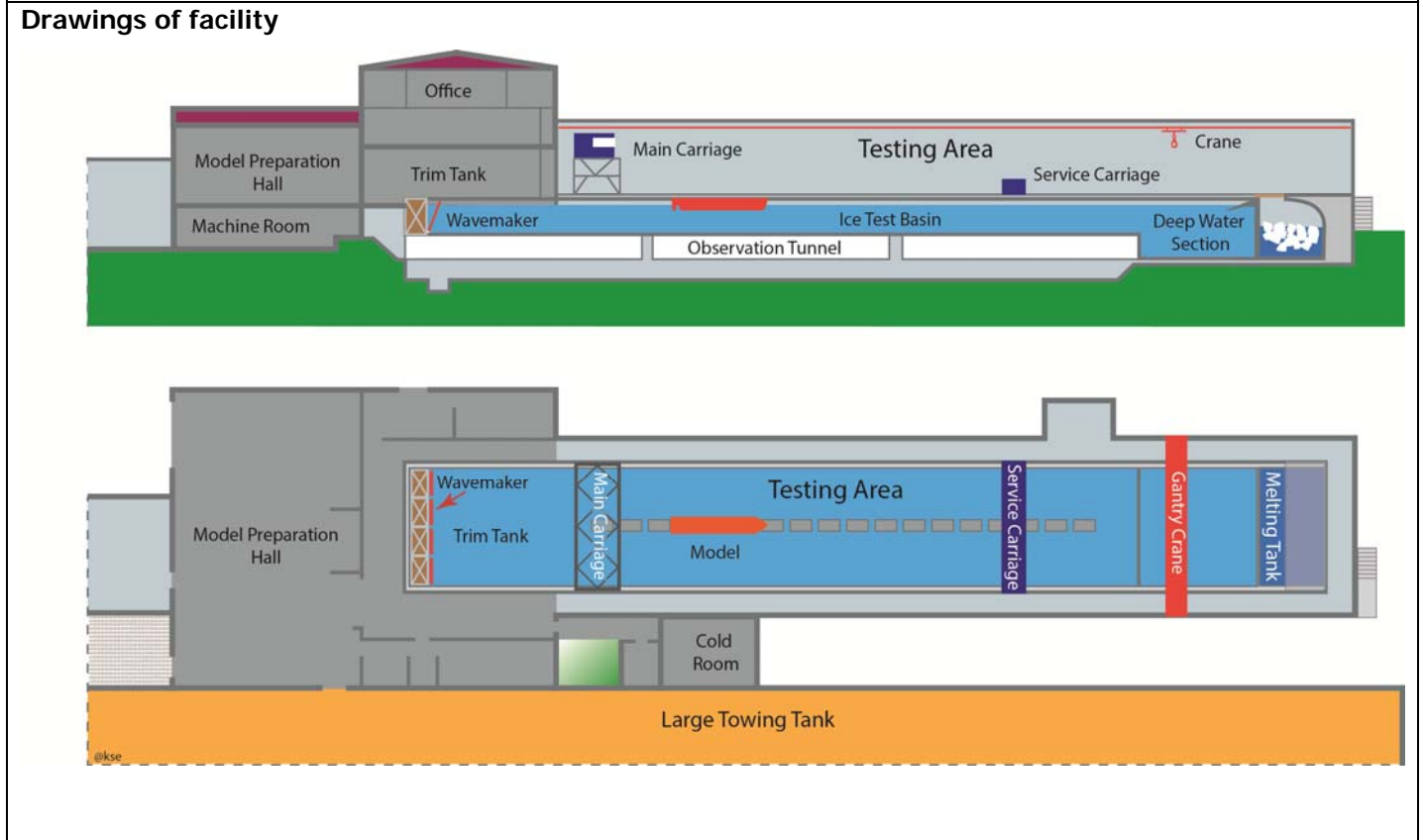


Name of organization Hamburgische Schiffbau-Versuchsanstalt GmbH (HSVA)	Year of information updating 2016
Year established 1913	Year of joining the ITTC since its foundation
Address Bramfelder Strasse 164, 22305 Hamburg	Status in the ITTC Advisory council member
Contact details (phone, fax, e-mail) Phone: +49 40 69203 0 Fax: +49 40 69203 345 Email: info@hsva.de	Website www.hsva.de

Type of facility Ice Basin	Year constructed/upgraded 1984 / continuously
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Name of facility Large Ice Model Basin, LIMB	Location (if different from the above address)
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Main characteristics (dimensions of tank/basin/test section; for simulators: full mission, part task or desk top)
Main dimension LxBxD 78 m x 10 m x 2.5/5.0 m; test section length 60 m
Bottom observation windows at the basin centre line



Detailed characteristics (carriages, wave/current/wind generators, instrumentations, etc.)

Cooling system:
Refrigeration capacity: 400 kW
Room temperature: +5 to – 25 °C
Freezing rate: typical 2.3 mm/h

Ice type: Density adjustable natural grown columnar grained ice frozen from a 7ppt sodium chloride solution
The following ice conditions can be simulated in the tank:

- Level ice, 10-80 mm, 10 – 80 kPa
- Rafted ice
- First- & multi-year pressure ridges
- Natural broken floe ice
- Managed ice
- Rubble ice & pack ice
- Brash ice channel
- Marginal ice zone conditions, ice and waves

Shallow water bottom: Adjustable over length and depth

Towing carriage:

Total power: 128 kW, friction drive system, 8 electric engines (4 large, 4 small)

Speed range: 1 mm/s <-> 3000 mm/s

Towing capacity: 50 kN

Transverse carriage: (mounted at the back of the towing carriage)

Speed range: 1 mm/s <-> 500 mm/s

Static Load capacity (horizontal, vertical): 5 kN, 10 kN

Load application on vertical lever: up to 1.2 m

Maximum driving force : 3 kN

Above water service carriage: (can be either self-driven or pushed by towing carriage)

Speed (pushed): 1 – 1500 mm/s

Speed (self-driven): 0.2 m/s & 0.75 m/s

Underwater rail system:

Two independent systems, one on the basin bottom at the centre line, a second one at the basin walls; both capable to carry test setups or measuring and documentation equipment (sensors, underwater video, etc.)

Mobile Wavemaker:

Type: Flap, 4 elements of 4 x 2.5 m width

Max. wave height: 250 mm (at a wave period of 1.8 s)

Max. wave period: 3 s

Total power: 10 kW

DP-System: (Interfacing of customer DP-system possible)

Number of actuators: 16

Modes: manual, tracking, station keeping

Motion tracking system Qualisys:

Number of cameras: 6

Degrees of freedom: 6

Cold room for property testing:

Refrigeration capacity: 40 kW

Room temperature: +5 to -30 °C

Test equipment:

- Simple supported beam test frame
- Uniaxial compression test frame
- Friction table
- Universal stage
- Microtome

Applications (Tests performed)

Icebreaking ships:

- Resistance tests & Self-propulsion tests as towed propulsion tests
- Free running propulsion tests
- Maneuvering tests
- Brash ice channel tests
- Dynamic positioning tests

Structures in Ice:

- Ice forces and dynamic behavior of fixed structures
- Mooring loads and dynamic behavior of floating structures
- Global and local loads on structures
- Global ice forces on artificial islands
- Ice forces on offshore loading terminals
- Ice accumulation and ice pile-up on artificial islands and arctic harbor piers

Published description (Publications on this facility)

www.hsva.de

Karl-Ulrich Evers, (2015),

Modelling Ice Processes in Laboratories and Determination of Model Ice Properties
Cold Regions Science and Marine Technology, [Ed. Pat Langhorne], in Encyclopedia of Life Support Systems (EOLSS),
Developed under the Auspices of the UNESCO, Eolss Publishers, Paris, France, [http://www.eolss.net]

Schröder, C., Kerkeni, A., Jorde, J. (2015)

Challenges of Ice Model Tests on Moored DP Assisted Structures
ATC 2015, Copenhagen, Denmark

Evers, K.-U., Reimer, N. (2015)

Wave Propagation in Ice – A Laboratory Study
POAC 2015, Trondheim, Norway

Jochmann, P., Evers K.-U., Haase, A. (2014)

Best Practice in Ice Model Testing on Moored Floaters
ATC 2014, ATC, Houston, Texas, USA

Haase, A., Jochmann, P. (2013)

Free Running Model Technology for Dynamic Positioning in an Ice Model Basin
AMT2013, Gdansk, Poland

Evers, K.-U., Jochmann, P., (2011)

Experiences at HSVA with Model Testing of Moored Structures in Ice-covered Waters
POAC 2011, Montréal, Canada

Evers, K.-U., Jochmann, P. (1993)

An Advanced Technique to Improve the Mechanical Properties of Model Ice Developed at the HSVA Ice Tank
POAC 1993, Hamburg, Germany