

# ANECHOIC ACOUSTICALLY INSULATED BASIN



*At TNO The Hague a large (8x10x8m) anechoic basin that is ideally suited for a large variety of underwater measurements is available*

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for life

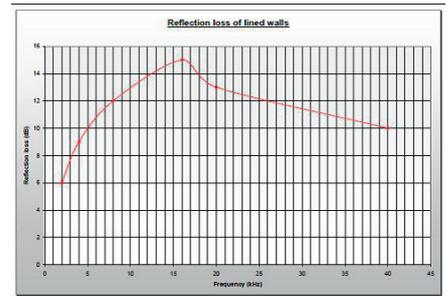
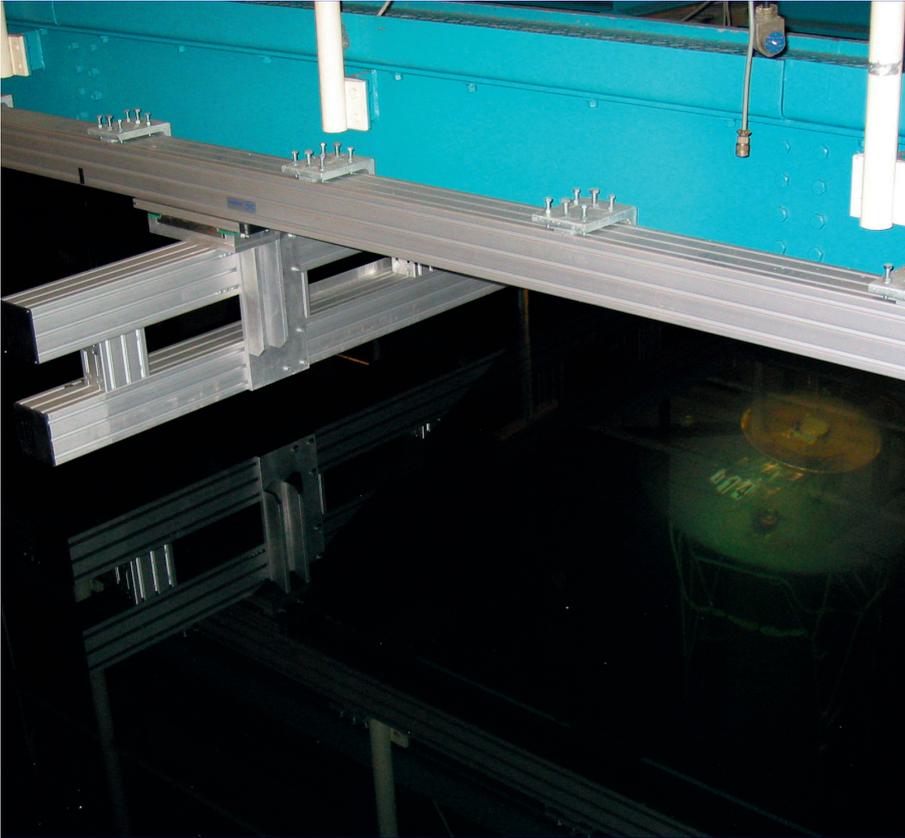
The large anechoic basin can be made available for your measurements. We can do the measurements for you or you can rent the basin. The basin is primarily designed for acoustic measurements, such as calibration of hydrophone arrays and streamers, acoustic holography measurements, single hydrophone and transducer calibrations, measurements of echo strength of submerged objects, etc.

Boundary reverberations were limited by providing the walls and bottom inside the tank with an anechoic lining. The tank lining consists of panels. Each panel comprises a stainless steel frame (dimensions 1000 x 1000 mm) with 81 (9 x 9) square meshes. In these meshes, except the center one, sound absorbing pyramids are mounted, formed by stacks of wedges. The wedges are made of cork-elastomer. There are three types of panels, which differ only in the height of the wedges. The highest wedges are used at half the water depth (3 - 5 m), where the reflection reduction is most important. The panels are mounted with a mutual rotation of 90°. After the tank was completed and the wedges were water saturated, the reflection loss of the lining was measured. The reflection loss is defined as the amount of reduction (in dB) of the echo from a perfectly reflection plane in the same place.

The definition gives a reflection loss of 0 dB for the boundary of water and air and nearly 0 dB for an uncovered concrete wall (see detailed graph).

A large variety of acoustic sources and receivers covering a wide frequency range are available, as well as all the associated data acquisition and recording equipment.

Besides the acoustic measurements, the basin is also perfectly suitable for other types of underwater measurements. In the recent past it was used for calibration of radio-active oil well measurement equipment, for the testing of underwater radar applications, for measurements on sediment types, for testing and calibration of fishery equipment, etc.



The reflection loss in dB as a function of Frequency

### LARGE APERTURE RECONNAISSANCE SIGNATURE SCANNER

LARSS is an integrated measurement system of TNO's Anechoic Test Basin. LARSS is designed to measure the acoustic target strength of underwater objects such as sea-mines and mine like objects. Using a horizontal scanframe with a large 2-dimensional range and very high accuracy, a near-field acoustic reflection signature of the object can be acquired. Using sophisticated software algorithms, the near field signals can be transformed to far field signals, yielding target strength values of unsurpassed accuracy, resolution and reliability.

Besides the determination of target strength, the scanframe can be used for numerous other applications, such as the determination of transducer beam patterns and scale measurements.

### SPECIFICATIONS

- Measuring range: 6 x 4 meters
- Position accuracy: 0.1 mm
- Maximum dimension of objects: 1.5 x 0.5 x 0.5 meters
- Bandwidth: 40-440 kHz
- Maximum frequency: 440 kHz
- Sample frequency: 1.3 MHz
- Smallest wavelength: 3.4 mm
- Data processing and visualization in Matlab

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### TNO

TNO is an independent innovation organisation that connects people and knowledge in order to create the innovations that sustainably boost the competitiveness of industry and wellbeing of society.

TNO focuses its efforts on seven themes including Defence, Safety and Security: TNO works on a safe and secure society by creating innovations for people working in defence organisations, the police, emergency services and industry.

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