



- 1 *Field exposure test rig in List on Sylt.*
- 2 *Exposure to splash at the Westmole breakwater on Helgoland.*
- 3 *Test rig for atmospheric weathering near the Westmole breakwater on Helgoland.*

## MATERIAL TESTING IN A MARITIME ENVIRONMENT

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Materials are exposed to extreme climatic conditions when used in a maritime environment. These conditions and the resulting degradation processes considerably reduce the service life of those materials. Alternating environmental loads or combined load sets (e. g. temperature fluctuations, salt-containing atmospheres, UV radiation, mechanical loads, etc.) are important factors that have to be taken into account when designing components and coatings and when determining their service lives. In order to validate the suitability of a material or component for a particular application, laboratory tests are performed in accordance to various standards. However, final validation must be undertaken in field studies as only then can the real set of physical, chemical, and biological loads act on the specimens simultaneously.

Furthermore, marine fouling changes the chemistry at the material interface and can lead to unexpected corrosion phenomena. The aquadynamic properties also change and hard-shelled organisms can cause

coatings to peel off and sealing layers to lose adhesion.

For maritime applications of materials it is hence imperative to differentiate between exposure in the splash, tidal, and submerged zones and in the atmosphere. Only then is qualified evaluation possible. Test sites in the splash, tidal, and submerged zones are available on Helgoland on the harbor side of the Westmole breakwater and on Sylt (List) on the harbor breakwater.

Additional test facilities for atmospheric weathering in category C5 (DIN EN ISO 12944) are available on Helgoland near the Westmole breakwater. Other sites are available for special requirements.

The different characters of the various test locations allow different environmental conditions such as the current, fouling, salt content, etc. to be considered.



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## Services

Atmospheric weathering and field exposure:

On Helgoland (Westmole):

- ➔ Field exposure testings in splash, tidal, and submerged zone
- ➔ Atmospheric weathering test sites at corrosivity categories C4, C5 or CX (according to DIN EN ISO 12944)
- ➔ Specific fouling tests (on request)

Further field exposure test sites:

- ➔ Sylt (List)
- ➔ Lighthouse »Alte Weser« (for public research projects)

Corrosion tests in laboratory (accredited according to DIN EN ISO/IEC 17025):

- ➔ Salt spray test DIN EN ISO 9227
- ➔ Condense water climate test DIN EN ISO 6270-2
- ➔ ISO 20340 and DIN EN ISO 12944-9 performance requirements for protective paint systems for offshore and related structures
- ➔ Further corrosion tests on request

Planning, coordination, and placing of test objects and components

Regular evaluation and documentation

Evaluation using specific test parameters, for example:

- ➔ Degree of blistering, degree of rusting, infiltration according to DIN EN ISO 4628
- ➔ Degree of gloss, HAZE, color analysis, etc. laboratory for microbiological cultivation and analysis (S2)
- ➔ Determination and evaluation of the biodiversity, biological fouling, and degree of coverage to estimate the potential biological-related damage

4 Field exposure test rig in List on Sylt.

5 Fouling on specimens in the submerged zone on Helgoland.