

HIGH-PERFORMANCE CORROSION PROTECTION COATINGS FOR HYDRAULIC STEEL STRUCTURES





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GUIDELINES AND COMPETENCIES

Steel constructions for hydraulic engineering are impressive and widely visible on our waterways, coastal reinforcements and harbour installations. They are exposed to highly corrosive elements.

In addition to wind and weather - water, constant water changes, salts, and other aggressive substances have a particular influence on the corrosion process.

Because these constructions are investments for decades, their maintenance, use and structural safety are an economic necessity for generations. This brochure is a guideline for the hydraulic engineering market segment. It should also give an overview of projects, rules and standards and protective coating systems with detailed information and attachments.

Please contact us if you are particularly interested in an object or system description. We will be pleased to advise you and give you detailed information about the entire range of Sherwin-Williams services. Our proven new construction and repair product systems prove our experience and understanding of **sustainability, durability and innovation.**

Important notice:

Following the transfer of the Industrial Coatings business from Sika to Sherwin-Williams on 1st April 2022, our entire product portfolio had to be rebranded in accordance with the Sherwin-Williams brand as of 1st July 2023.

Detailed information on product naming and a holistic overview of all old and new product names can be found in our new Product Reference Guide.

Download the brochure now at:
protectiveeu.sherwin-williams.com



OUR QUALITY PROMISE

Thanks to advanced technologies, exceptional service and decades of experience, Sherwin-Williams Protective & Marine Coatings is a reliable partner for corrosion protection coatings in steel construction.

Our competent sales team, our specialized application technology, the experienced experts in product management, our innovative development department, as well as the production team all contribute to our quality promise.



INSTRUCTION ON-SITE
during the coating works on request

Within the framework of control areas carrying out
SURFACE CHECKS

Consultation and sale by our experts,
tested as
**FROSIO INSPECTOR
LEVEL III**

**INDIVIDUAL
CONSULTATION**
in the choice of the optimal
coating system

APPLICATION AREAS

Safe – high quality – versatile – these are hydraulic steel structures. Due to their location and intended use, they have to withstand the highest demands, requiring high-quality coating systems that can withstand all types of water.



LOCKS AND LOCK GATES

Locks enable watercraft to overcome different water levels between several sections of waterways. Before any configuration, one differentiates between inland locks, sea locks or harbour locks, sea sluices or harbour sluices.

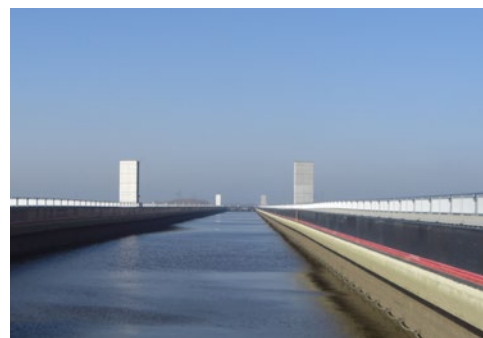
Application example:
Inner and outer areas of the locks or lock gates



WEIRS AND BARRAGES

Weirs have the primary function to dam up water in more or less high dimensions. Barrages and weirs have several essential functions. Weirs are vital for the navigability of canals and rivers, flood prevention, or containment of drinking water supply.

Application example:
Inner and outer parts of the weir



CANAL BRIDGES

Canal bridges or troughs cross over natural river courses, and also where rivers cross canals. Waterway interchanges prevent significant detours or wasted time navigating and travelling unnecessarily.

Application example:
Inner side of the troughs



SHIP LIFTS

Shiplifts have the same function as locks. They enable watercraft to move to much higher levels of waterways. Shiplifts overcome much more significant altitude differences than locks. The disadvantage is the necessity of high technical input and the limitation of ship spaces because of the enormous weight during lifting and descent.

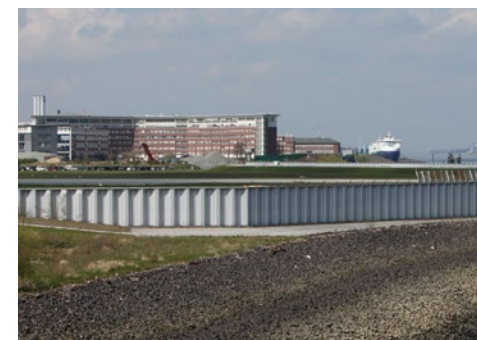
Application example:
Inner sides of the troughs and the lift gates



HYDROELECTRIC POWER PLANTS

A reliable and secure energy supply is an essential prerequisite for a functional industrial society. Besides wind, water is the most important source of energy. We utilise the power of water by transferring the energy of running water via turbines or running wheels. This high torque transformation from a transmission gear to a generator transfers mechanical power to electrical energy.

Application example:
Inner parts of penstocks, turbines and running wheels



STEEL SHEET PILING

Steel-sheet piles are used in versatile fields of application, such as dyke construction, canals, harbour areas or flood prevention walls. They are primarily used to seal against water or soil, giving permanent protection and stabilization.

Application example:
Sheet pile elements and sheet piles



HYDRO DAMS

Hydro dams are primarily used to dam running water to retaining or damming lakes. They have several functions, for example low water elevation, flood prevention, drinking water supply or energy generation.

Application example:
Inner areas of penstock dam outflows

RULES AND STANDARDS FOR THE PROTECTION OF HYDRAULIC STEEL STRUCTURES

The central regulatory standard for corrosion protection coatings international standard, DIN EN ISO 12944, is the main standard and test specifications for hydraulic steel and offshore structures.



Offshore windpark Butendiek

DIN EN ISO 12944

DIN EN ISO 12944 is a central set of regulations for corrosion protection by coating systems for infrastructure, hydraulic engineering and steel frame structures. Essential cornerstones of this standard are, in addition to the **four protection periods** described in Part 1, the **corrosivity categories C1 – CX** and **immersion categories Im 1 – Im 4** described in Part 2. These classifications describe the location and the expected loading of the coated project.

PART 1 | DURABILITY RANGES

Durability ranges	Abbreviation(s)	Time period
Low	I (low)	Up to 7 years
Medium	m (medium)	7 - 15 years
High	H (high)	15 - 25 years
Very high	vH (very high)	Over 25 years

PART 2 | CORROSIVITY CATEGORIES FOR ATMOSPHERIC LOADS

Corrosivity	Indoor areas	Outdoor areas
C1 – insignificant	Heated buildings with neutral atmosphere	-
C2 – low	Unheated buildings with risk of condensation	Atmosphere with low contamination
C3 – moderate	Production rooms with high humidity	Urban and industrial atmosphere
C4 – strong	Chemical plants, swimming pools	Industrial areas and coastal areas with moderate salt contamination
C5 – very strong	Buildings with constant condensation	Industrial areas, high humidity and aggressive atmosphere and coastal areas
CX – extreme	Industrial areas with extreme humidity	Offshore areas with high salt load, industrial areas with extreme humidity, tropical atmosphere

PART 2 | IMMERSION CATEGORIES FOR HYDRAULIC STEEL STRUCTURES (Depending on the load)

Immersion	Exterior
Im1	Freshwater: <ul style="list-style-type: none">• River structures• Hydroelectric power plants• Weirs
Im2	Salt or brackish water without cathodic corrosion protection: <ul style="list-style-type: none">• Locks, gates• Port areas with steel structures
Im3	Soil: <ul style="list-style-type: none">• Tanks• Steel sheet pile walls• Steel pipes
Im4	Salt or brackish water with cathodic corrosion protection: <ul style="list-style-type: none">• Offshore plant

HIGH PERFORMANCE AND PROVEN COATING MATERIALS

Mechanical, highly loadable coating systems are needed if steel is permanently exposed to particularly aggressive environments or ambient conditions. Our highly abrasion-resistant and high-performance coating systems offer long-lasting and durable protection for hydraulic steel structures, both for new construction and the repair of existing assets.



DURA-PLATE® SW-501

Tar and solvent-free, this 2-pack EP coating is harmless for the environment, marine wildlife and health. Its chemical reaction causes rapid drying and mechanical resistance, enabling rapid overcoatability and transportation. As a primer coating, Zinc Clad® R is used.

APPROVALS | TESTS:

- BAW: Approvals for Im 1 - 4 and ICCP compatibility
- Norsok M 501, rev. 5 and 6, system no. 7, 7a and 7b
- GL certificate
- MIC resistance
- Autoclave test pressure range up to 200 bar
- Offshore repair instructions



DURA-PLATE® 299 AIRLESS

This low-solvent 2-pack EP coating material not only has a robust and scratch-resistant surface, but it also has high chemical resistance. As a primer coating, Zinc Clad® R is used.

APPROVALS | TESTS:

- BAW: Approvals for Im 1 - 4 and KKS compatibility
- Autoclave test pressure range up to 200 bar



DURA-PLATE® POXICOLOR SW N

Robust and tar-free, this 2-pack EP coating with low solvent content can be used in low single-layer thicknesses and is, therefore, suitable for fine-textured constructions. It is a practical alternative in the same performance range as our solvent-free products.

APPROVALS | TESTS:

- BAW: Approvals for Im 1 - 4 (with and without Zinc Clad® R) and ICCP compatibility
- Norsok M 501, rev. 6, System No. 7a and 7b



COROTHANE™ PUR SW

This 1-pack moisture curing, tar-free PUR coating is highly abrasion-resistant and mechanically robust. It can be applied at low temperatures and high relative humidity and is also particularly suitable for renovating and revising old black coatings. As a primer coating, Corothane™ Zinc PUR is used.

APPROVALS | TESTS:

- BAW: Approvals for Im 1 - 4 and ICCP compatibility
- Norsok M 501, rev. 6, system No. 1
- Autoclave test pressure range up to 200 bar

OFFSHORE CORROSION PROTECTION

Because of maintenance periods of up to 20 years, the life cycle for protective coatings must be exceptionally long and durable under extreme conditions. Comprehensive and specially designed standards and regulations – such as DIN EN ISO 12944-9 or Norsok M 501 – simulate these harsh conditions. Compliance with standards gives the owner and operator reliability in choosing the correct protective coating.

EXTREME: OFFSHORE CONDITIONS

- Permanent underwater
- Strong UV exposure
- Tidal and splash zone water changes in marine atmosphere
- Permanent mechanic effects and abrasion
- Extreme temperature fluctuations



TEST METHODS

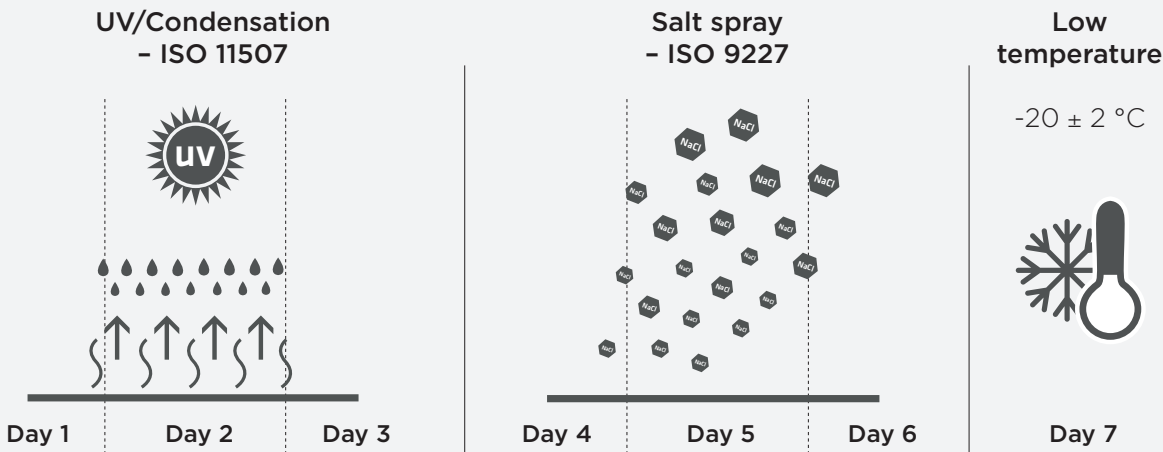
1 Electromechanical test method according to ISO 15711 Procedure A

In this laboratory test, cathodic disbonding of coatings used on objects in the offshore sector is tested for suitability and certification. Procedure A involves the use of a Cathodic protection system, which is monitored by potentiometer.

- The testpanels are placed into artificial seawater and are exposed to an cathodic potential at -1050 ± 5 mV relative to the saturated calomel or Ag/AgCl reference electrode.
- The total test period is at least 25 weeks or 4200 hours.
- The test requirements are met if the disbonding at the tested area is less than 20 mm.

2 Cyclic ageing test according to DIN EN ISO 12944-9:2018

The cyclic ageing test from the former ISO 20340 standard has been completely taken over into the revised DIN EN ISO 12944, Part 9 and comprises 25 cycles = 4,200 hours.



3 Immersion in sea water according to ISO 2812-2

This method is used to determine the resistance of coating materials to the effects of sea water by partial or complete immersion. The test duration is 25 weeks or 4,200 hours.

REPAIR COATING UV-RESISTANT AND TROWEL APPLIED

The 2-pack coating material RepaCor™ SW-1000 is a unique innovation that meets all requirements for touching up or repairing mechanically damaged coating surfaces in just one step. This outstanding repair product is solvent-free, UV resistant, and water-resistant during application. Available in a handy 2-pack cartridge, it can be easily applied as a one-coat putty.

APPLICATION AREAS

- All offshore wind turbines
- Onshore wind turbines
- Hydraulic steel structures such as Lock gates, sheet pile walls, etc.



Your benefits at a glance:

Easy to use

- 2-pack coating from the cartridge
- Low product weight for the applicator

Safe

- No waste
- No emissions
- Solvent-free coating made of 100 % solids
- As a unique innovation UV stable

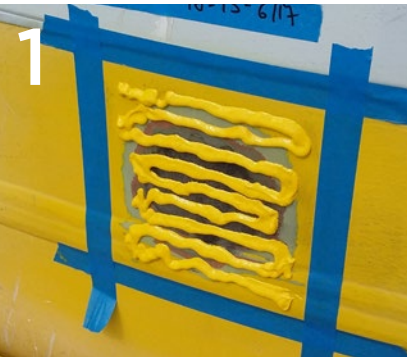
Fast

- Cures in record time in just one application*
- Water resistant during application

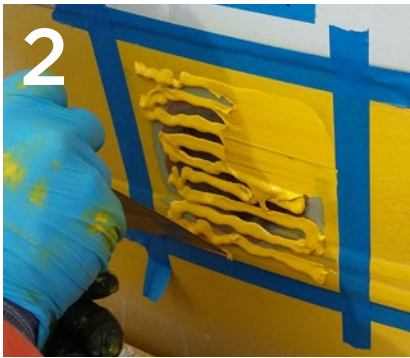


*an additional top coat is optional

REPAIR COATING IN ONLY 3 STEPS



Application of the coating material



Processing with a brush or a spatula



Repaired, reconditioned surface is cured after just a few hours

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THE SHERWIN-WILLIAMS DIFFERENCE

Sherwin-Williams Protective & Marine delivers world-class industry subject matter expertise, unparalleled technical and specification service, and unmatched regional commercial team support to our customers around the globe. Our broad portfolio of high-performance coatings and systems - including protective liquid and powder, fire protection and resinous flooring - excel at combating corrosion and help customers achieve smarter, time-tested asset protection. We serve a wide array of markets across our rapidly growing international distribution footprint, including Bridge & Highway, Energy, High Value Infrastructure, Manufacturing & Processing, Marine, Rail, Power and Water & Wastewater.

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