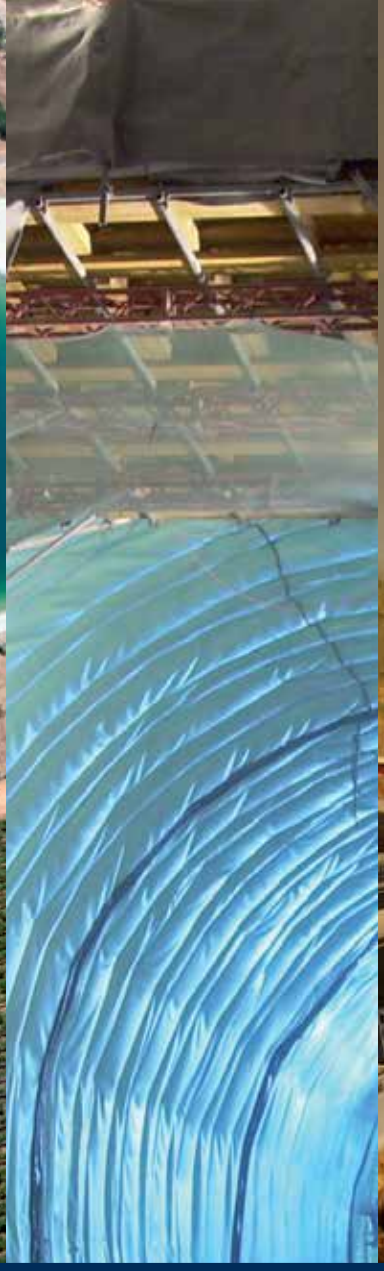
CIVILROCK

Solutions for waterproofing civil engineering works



Civil Engineering

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hydraulic works

SOPREMA GROUP

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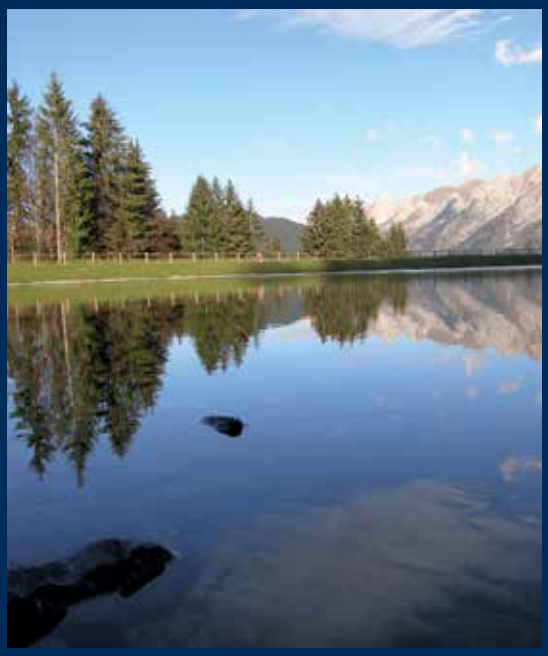

unique expertise

SOPREMA introduction

An independent group since its creation over 100 years ago, **SOPREMA** is firmly established as one of the world's leading waterproofing companies, producing more than 150 million square metres of membranes a year.

SOPREMA has a global industrial presence with a workforce of over 4 300 individuals and a turnover exceeding 1.2 billion Euros. With 15 production facilities, including 11 in Europe, 18 subsidiaries and 40 distributors, 4 training centres and 5 research and development laboratories which are heavily focused on sustainable development, we operate in more than 80 Countries around the World.

Close collaboration between a dedicated team of specialists and the research and development laboratories, means that our product portfolio is innovative and perfectly in step with the demands of the market and current standards.

Thanks to its acquisition in 2007 of **FLAG SPA**, an Italian company producing synthetic membranes, **SOPREMA** has strengthened its expertise in the field of synthetic waterproofing.

FLAG develops high performance synthetic membrane made of both PVC and TPO for waterproofing tunnels, underground structures, retention ponds, canals, etc.

A leader in this market, **FLAG** has over 40 years experience and has accompanied its clients everywhere in the world, to lay over 100 million square metres of waterproofing membranes.

for all civil engineering projects

SOPREMA has a wide range of products to meet the needs of all types of civil engineering structures:

- Bituminous waterproofing
- Synthetic waterproofing (PVC and TPO)
- Liquid waterproofing

In order to meet the specific demand, **SOPREMA** has created the **CivilRock®** range, which offers products designed to support the requirements of civil engineers for all types of structures:

- Civil engineering structures, bridges and cars parks
- Tunnels, underground & basement structures
- Basins, hydropower dams, canals, lakes, ponds and tanks including those to be used to store potable water

CivilRock® covers all the activities connected to these structures, which were previously covered by the group's different brands: **SOPREMA**, **FLAG**, **Alsan®**… This has given us the chance to offer a more complete range which better matches the requirements of clients, project managers and contractors.

With its different types of products, **CivilRock®** offers waterproofing or sealing solutions adapted to virtually all built structures.

All the **SOPREMA** group's factories are certified ISO 9001 with some also certified ISO 14001, ISO 16001, ISO 18001.

STORING LIQUIDS

Whether for agricultural, industrial or leisure purposes, modern society has numerous liquid storage requirements: potable water, salt water, liquids containing chemical substances, leachates…

It is essential to waterproof these structures to ensure they function correctly, avoid soil contamination and guarantee long service.

Furthermore, the integration of such storage facilities in the urban or rural landscape has become a major issue.

CivilRock® provides answers to these issues for retention structures (ponds, tanks, dams…) and rainwater harvesting or water transport structures (canals...).

PVC and TPO membranes offer the possibility of realising waterproofing systems, visible or not, in different colours and which are easy to install whatever the shape of the structure.

HOW SHOULD HYDRAULIC STRUCTURES BE WATERPROOFED?

For this type of structure, **CivilRock®** offers synthetic liners. These membranes are particularly suited to the specific constraints of this type of structure:

- Lightweight, flexible and easily welded, they are simple to install
- 2.10 m wide rolls can be adapted to varied shapes
- They are strong enough to meet all the mechanical requirements of the structure, with or without a reinforcement mesh
- A variety of colours are available for better integration of the structure into the landscape.

CivilRock's® complete range of synthetic membranes meet the technical and normative requirements across Europe.

To effectively waterproof a hydraulic structure, it is necessary to choose the right membrane. The main points to consider are:

Technical:

- UV resistance if the membrane is exposed
- Chemical resistance
- Mechanical resistance if the banks slope steeply or if the substrate is unstable
- Possible drinking water compatibility

Architectural:

- Shape of the structure (the more complicated the structure, the more it is preferable to use narrow membranes),
- Integration to the landscape (colours, appearance…).

Depending on the type of construction, the role of the waterproofing may vary and its composition may be adapted.
As well as the synthetic liners themselves, **CivilRock®** offers its clients a vast range of complementary accessories:

- Geotextiles with different weights
- Fastening items (washers, edge strips, laminated sheets, …)
- Manual and automatic welding equipment (SALDAMAX)
- Pre-fabricated **Flagon®** accessories: inside and outside corners, rainwater outlets, aerators, etc...
- Adhesives, glues and cleaners
- Liquid PVC (**PASTA Flagon®**) for finishing.

Thanks to the numerous projects achieved **CivilRock®** has acquired a level of experience that enables its teams to offer the best systems for clients' structures and budgetary constraints.

As well as choosing the right waterproofing system, it is essential to choose a qualified installation contractor and to set up an appropriate quality control system.

CIVILROCK® ANSWERS

CivilRock® offers two types of synthetic liners:

- PVC-P (plasticised polyvinyl chloride)
- TPO (thermoplastic polyolefin).

These membranes are manufactured by co-extrusion to make both PVC and TPO membranes with thicknesses between 1,0 mm and 3.0 mm.

The co-extrusion system allows membranes to be produced with different chemical characteristics on each side, whilst still ensuring complete homogeneity between the films.

Reinforcements (polyester or fibre glass mesh) or geo-synthetic protections may be incorporated into the membranes during the process.
The thickness of the liner is automatically adjusted by electronic equipment that controls the opening of the extrusion head and the calender.

The material produced is a homogeneous single-ply membrane, with high tensile properties and high static and dynamic puncture resistance.
This process can also produce two colour single-ply membranes with a very thin signal layer.

PLASTICISED PVC MEMBRANES

These are particularly flexible at low temperatures, with good mechanical strength. These membranes also have the following advantages, among others, which vary in degree according to the additives in the membrane:

- Unaffected by hot-cold cycles
- Static and dynamic puncture resistance
- Self-extinguishing
- Rot-proof
- Resistant to perforation by roots and attack by micro-organisms
- UV resistant
- Safe, flame-free working
- Unlimited choice of colours available to order, subject to minimum quantities
- Wide width (2.10 m or 2.10 m), standard length (20 or 40 m depending on the product; other lengths available on request).

CivilRock® offers three membranes with different compositions and therefore areas of application: **Flagon® CSL, Flagon® E, Flagon® AT.** None of these areas of application are limitative.

This is why for any specific use or in the presence of various products, the **CivilRock®** laboratory is on hand to guide you towards the membrane best suited to the particular use you wish to make of it. You can also consult our technical data sheets on each product.

	Flagon ® CSL	Flagon® E	Flagon® AT
Intended use	Basins for storing water (irrigation, artificial lakes…) Reservoirs, dams, canals, hillside dams	Basins and tanks for waste water Liquid manure tanks Waterproofing in contact with bacterial agents Anti-pollution basins	Water towers Tanks for drinking water or liquid foodstuffs
Description	Non-reinforced PVC-P membrane	Bio-stabilised non-reinforced PVC-P membrane	Non-reinforced PVC-P membrane
Colour	Light grey on the surface and dark grey on the underside	Dark grey	White or Dark Grey
Thicknesses (mm)	1.2 mm, 1.5 mm, 2 mm	1.2 mm, 1.5 mm, 2 mm	1.2 mm, 1.5 mm, 2 mm
Main qualities	Very good UV resistance	Resistance to attack from biological organisms, (fungus, bacteria,spores)	Suitable for drinking water UV and weather resistance
Certifications	CE marking		
	CCT Basins - Tanks - Canals Water towers and similar structures, NORISKO (France) Approval UNE53-402-84 CEDEX (thick.: 1.2 mm, 1.5 mm) (Spain) NPO Fire Centre (Russia)	CCT Basins - Tanks - Canals Water towers and similar structures, NORISKO (France) Physical and mechanical tests CERISIE (thick.: 1.2 mm) (Italy)	CCT Basins - Tanks - Canals - Water towers and similar structures, NORISKO (France) Health certificate of compliance (ASC France) Health certificate of compliance USSL 75/III (Italy) Health certificate of compliance LGAI (Spain)

TPO MEMBRANES

These membranes contain no plasticiser, their mass per unit area is 25 % less than plasticised PVC and requires less energy for transport limiting CO_2 emissions. This makes it an environmentally-friendly material, respectful of people and the environment and easily recyclable.
Furthermore, it is very resistant to UV degradation and weathering.
TPO membranes also have the following characteristics and advantages, among others, which vary in degree according to the additives in the membrane:

- Flexible at low temperatures
- Unaffected by hot-cold cycles
- High mechanical resistance
- Static and dynamic puncture resistance
- Self-extinguishing
- Rot-proof
- Resistant to perforation by roots and attack by micro-organisms
- Safe, flame-free working
- Excellent membrane weldability
- Compatible with bitumen
- Unlimited choice of colours available to order (subject to minimum order quantities).
- Wide width (2.10 m), standard length (20 or 40 m depending on the product and other lengths available on request).

	Flagon® GEO P	Flagon® GEO P AT
Intended use	Basins and tanks for waste water Basins for water storage Sprinkler tanks Artificial lakes Liquid manure tanks Waterproofing in contact with bacterial agents Decantation basins Storage of liquid with low hydrocarbon content	Basins for drinking water storage Tanks for liquid foodstuffs
Description	Reinforced or not reinforced TPO membrane	
Colour	Green surface on the underside and black or black on both sides	
Thickness	1.2 mm, 1.5 mm, 1.8 mm, 2 mm	1.5 mm, 1.8 mm
Main qualities	Excellent UV resistance Excellent dimensional stability and excellent puncture resistance	Excellent dimensional stability and excellent puncture resistance Suitable for drinking water
Certifications	CE marking	
	CCT Basins - Tanks - Canals - Water towers and similar structures, NORISKO (France) ASQUAL (thick.: 1.2 mm) (France)	WRAS (UK)

Two TPO membranes are offered by **CivilRock®**: **Flagon®** GEO P and **Flagon®** GEO P AT.
None of these areas of application is limitative. This is why for any specific use or in the presence of various products, the **CivilRock®** teams are on hand to guide you towards the membrane best suited to the particular use you wish to make of it.
You can also consult our technical data sheets on each product.

THERMOFUSION WELDING

CivilRock® membranes are welded using hot air or by heated contact, either by hand or mechanically. It is preferable to use manual welding only for the ends of the joints between membranes. Careful use of the welding nozzle and good rolling will ensure correct assembly of the membranes. It should be noted that the quality of the welding depends on many factors: temperature, speed, rolling, the operator's attention… This is why it is preferable to use a mechanised method.

The heat welding machine (the SALDAMAX) consists of two heating cones which weld the membranes to each other to produce a double seam and a central groove. The machine allows a maximum overlap of 100 mm, but 80 mm is recommended.

The machine is self-guided. As well as producing regular welds, the double welding technique allows the quality of the weld to be tested. Simply apply pressured air to the central groove and wait to see if the pressure diminishes. The quality of the weld can therefore be checked along all its length.

major references

hydraulic works

major references

REFERENCES - HYDRAULIC STRUCTURES

France:

- Méribel dam - 30,000 m²
- Ferraiz basins - La Clusaz - 16,000 m²
- Les Gets golf course - 6,500 m²
- Achères sewage tanks - 19,000 m²
- Fos Sur Mer coke works - 18,000 m²

Italy:

- Aosta hydroelectric canal - 45,000 m²
- Cavanella dam - 35,000 m²
- Mucone basin - 75,000 m²
- Ismolas golf course - 10,000 m²
- Orbetello seawater fish farm ponds - 250,000 m²

Spain:

- Almansa basin - 30,000 m²

United Kingdom:

- Grand Turks drinking water - 5,000 m²
- London Golf Club - 15,000 m²
- Hartlepool nuclear cooling - 2,000 m²

Bulgaria:

- Petrohan dam

Greece:

- Thessaloniki irrigation canal - 50,000 m²

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Communication department, DC-14/202_EN, replacing DC-12/108_EN