

MAPEPROOF AL AP SYSTEM

WATERPROOF PROTECTION FOR FOUNDATIONS

Fully-bonded waterproofing membrane for underground structures





**MAPEPROOF AL AP SYSTEM.
FULLY-BONDED HDPE MEMBRANE
FOR WATERPROOFING
UNDERGROUND STRUCTURES
IN TOTAL ADHESION.**

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The Mapeproof AL AP system



Underground structures waterproofed with Mapeproof AL AP

- 1 Levelling off the diaphragm
- 2 **Mapeproof AL AP**
- 3 Reinforced concrete foundation slab
- 4 Idrostop
- 5 Reinforced concrete wall

Guaranteed long-term protection

Over the last several decades, economic growth and the development of infrastructures has witnessed a high tendency to concentrate human activities into large metropolitan and suburban areas. This has led to an increasingly intense use of the spaces available.

The enormous progress in technology and construction methods has also enabled large **underground areas of cities** to be used more rationally and more intensively. **Underground sections of buildings** are often immersed in groundwater, sitting in damp ground or in contact with different types of soil or rocky ground: conditions that raise new problems in terms of design and durability of materials.

Mapei approaches these new construction challenges by means of a **protection system for underground structures** that safeguards against all the potential risks and hazards such as water, moisture, gas and contaminants contained in rock and soil.

This **waterproofing system** is designed to maintain its technical characteristics and performance properties over time, thereby significantly contributing to the durability of foundations.

Mapei Research and Development laboratories have developed **Mapeproof AL AP: a complete system of HDPE waterproofing membranes**. These membranes form a continuous bond (fully bonded) with the concrete substrate and can be installed simply and quickly.

Mapeproof AL AP is the evolution of pre-cast systems characterised by its extremely simple application, with proven strength and durability and guaranteed levels of protection, safety and reliability over time. **Mapeproof AL AP** is yet another example of how, day after day, **Mapei** is constantly committed to **product and industrial process innovation** with the aim of supplying **unique technologies** that enable construction work all around the world to evolve and become more simple.



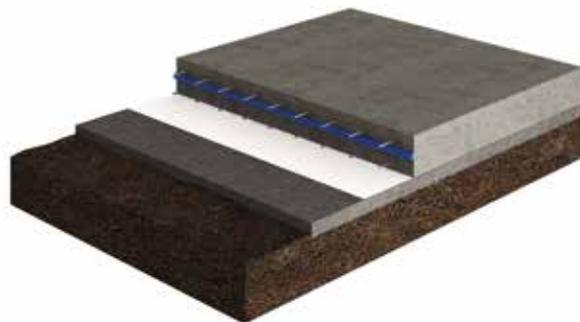
Fully-bonded waterproofing

The **Mapeproof AL AP system** creates an external shell that protects a structure from water, moisture, radon and methane, and any other substance contained in the ground. By being fully-bonded with the concrete, the membrane **inhibits lateral migration of water** in case of puncture or tearing. The **Mapeproof AL AP system** is completed by a series of accessory products:

- **Mapeproof AL Tape D10 AP** adhesive tape for joints and strengthening purposes.
- **Mapeproof Liquid Membrane** two-component, polyurethane liquid membrane for specific features and fillet joints.

To provide continuity in the waterproofing system on vertical walls, **Mapeproof AL 1200 AP** self-adhesive HDPE membrane may be applied or, as an alternative, **Mapeproof SA**, a waterproofing membrane consisting of a tough film of high-density cross-linked polyethylene (HDPE) or one of the self-adhesive bituminous membranes, **Mapethene HT** and **Mapethene LT**. In this way, a highly effective, fully-bonded waterproofing system can be created, either before placing concrete (confined excavation) or after placing concrete (open excavation).

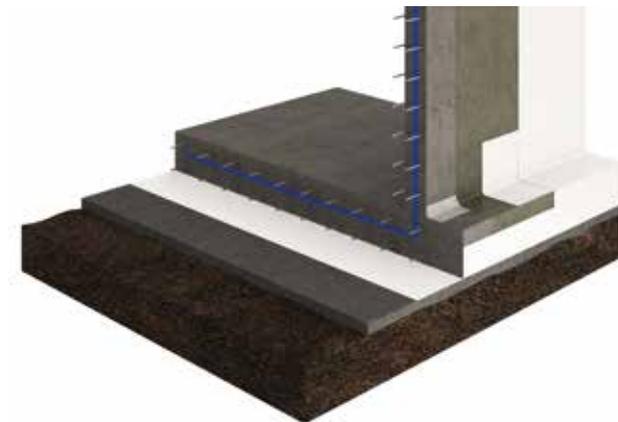
1 Mapeproof AL AP: waterproofing below foundations slabs before pouring concrete

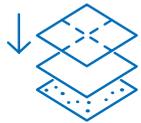


2 Mapeproof AL AP: waterproofing side walls before pouring concrete



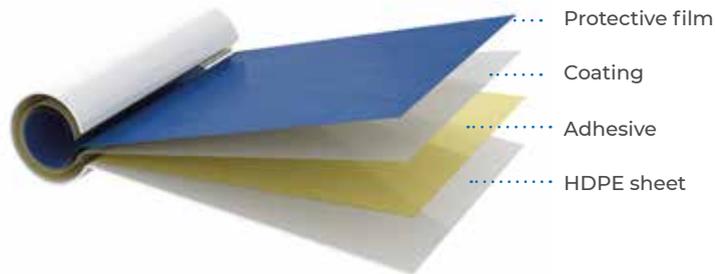
3 Mapeproof AL 1200 AP: used in combination with Mapeproof AL AP for waterproofing retaining walls after pouring concrete





Composition of a Mapeproof AL AP membrane

Mapeproof AL AP is a **waterproofing membrane** consisting of a tough **synthetic HDPE sheet**, with an **adhesive side** covered by a pressure-sensitive **protective coating**; when it comes into contact with concrete, it guarantees a tough, strong bond with the placed concrete itself (fully bonded). This composition guarantees that, when the sheet comes into contact with the placed concrete, the membrane forms a tough bond with the placed concrete.



Characteristics of Mapeproof AL AP

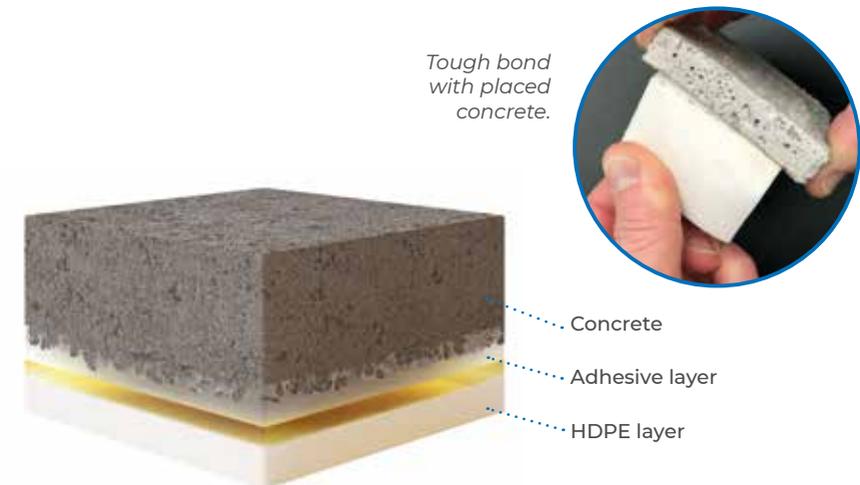
- Bonds monolithically with placed concrete and remains **permanently bonded over time**.
- **Waterproof up to a pressure of 70 metres** of water column.
- **Prevents water from migrating laterally** between the foundations and the membrane.
- **Capacity to absorb and bridge minor deformations** that may occur while in service.
- **Fully watertight** simple overlaps.
- **Cold-applied**, no heat and/or naked flames required.
- **Does not require a layer** of protective capping.
- Easy to apply: good workability and flexible, may be easily **shaped to suit during application**.
- **Guaranteed, constant thickness** of the HDPE membrane (1.2 mm).
- **Resistant to punctures** from rebar in foundations.
- **Resistant to pollutants and aggressive substances** present in the ground or subsoil.
- **Compatible** with other Mapei waterproofing products for underground structures.



In-depth analysis of the product

Chemical-physical bond with placed concrete

The **continuous and irreversible bond with placed concrete** is made possible by the latest-generation synthetic adhesive sensitive to both pressure and the alkalinity of concrete. Under the pressure of placed concrete, the adhesive on the surface of the membrane permeates the surface and micro-pores, remaining firmly bonded to the concrete.



During placing of concrete

The fresh concrete settles on the surface, permeates into the surface and bonds with the synthetic adhesive on the membrane.

During curing of the concrete

The concrete hardens and forms a tough, continuous and monolithic bond with the Mapeproof AL AP membrane.

Guaranteed and durable defence

Mapeproof AL AP protects and preserves the integrity of every concrete structure over time against the penetration of water, moisture, and gas present in the ground.

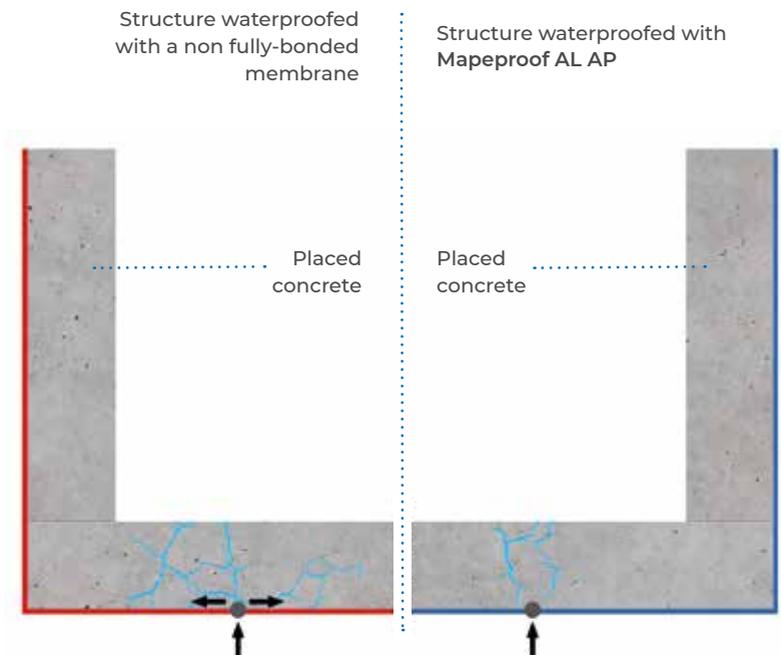


In-depth analysis of the product

No lateral migration of water

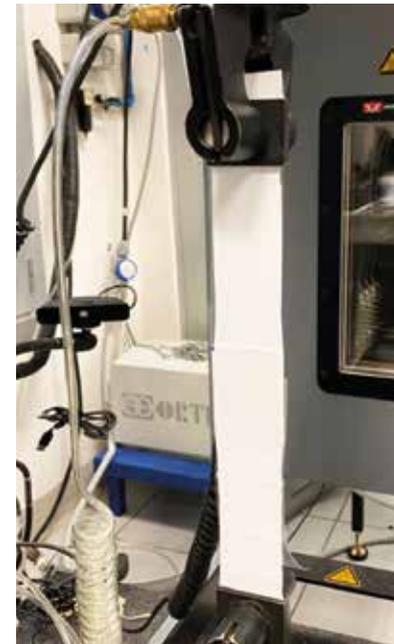
The main advantage of a **fully-bonded membrane** is that, if the waterproof system is accidentally damaged, there is **no lateral migration of water** at the membrane/concrete interface. This makes it **easy to identify any damage to the membrane** and, as a result, to repair it more easily.

This particular characteristic is evaluated according to the specifications of the **American standard ASTM D5385: Mapeproof AL AP** guarantees no migration of water up to a pressure of more than 7 bar.



High performance: watertightness of joints and extension

Mapeproof AL AP passes the most rigorous prescribed testing regimes to comply with **international standards** such as **EN** and **ASTM**. The use of **HDPE** as the main constituent element of the membrane guarantees outstanding mechanical properties that make it **suitable for resisting even the most critical environments** and every type of stress it is subjected to, such as tensile strength, puncture resistance, tear strength, watertightness at the joints and watertightness under hydrostatic pressure.



Mapei laboratory: testing the watertightness of joints.



Mapei laboratory: extension test on the membrane.



Advantages of the system

The **Mapeproof AL AP** system provides permanent, durable protection for any type of underground structure through installation guaranteed by the professionalism of the best teams of installers of synthetic membranes.



NO NAKED FLAMES
NO RISK FOR THE ENVIRONMENT
HIGHER SAFETY



QUICK, EASY APPLICATION
100% WATERTIGHT OVERLAPS
THE MEMBRANE HAS **EXCELLENT WORKABILITY**
AND IS VERY EASY TO HANDLE



COMPLETELY BLOCKS ALL WATER AND DAMP
NO LATERAL MIGRATION OF WATER
UP TO MORE THAN 7 BAR
PERFECT BOND WITH PLACED CONCRETE



PASSIVE BARRIER AGAINST RADON AND METHANE GASES
RESISTANT TO CHEMICAL AGENTS NORMALLY FOUND
IN SOIL AND GROUNDWATER



HIGHLY FLEXIBLE HDPE MEMBRANE
CAPACITY TO **ABSORB SETTLING** TYPICALLY FOUND
IN FOUNDATIONS



CE marking

Mapeproof AL AP and Mapeproof AL 1200 AP are CE marked according to **EN 13967** "Flexible sheets for waterproofing. Plastic and rubber damp-proof sheets including plastic and rubber basement tanking sheet".

CE marking is a further guarantee of the quality of the product and the consistency of its characteristics over time, and for every production batch.



Application of the system

The **Mapeproof AL AP** system consists of a waterproofing membrane applied prior to placing concrete (**Mapeproof AL AP**) and a membrane applied after placing concrete (**Mapeproof AL 1200 AP**, **Mapeproof SA** or **Mapethene**), along with a series of tapes and accessory items. The simplicity of how each component is used, combined with the application method that avoids the use of naked flames, enables the **Mapeproof AL AP** waterproofing system to be applied perfectly, quickly and in complete safety. All the various components in the system are easy and intuitive to apply and **do not require the use of naked flames** or sources of heat, leading to excellent productivity and safer working conditions on site.

Mapeproof AL AP system

- A** Mapeproof AL AP
- B** Placed concrete





Application of the system

The Mapeproof AL 1200 AP system

- A Concrete wall
- B Mapeproof SA Primer
- C Mapeproof AL 1200 AP

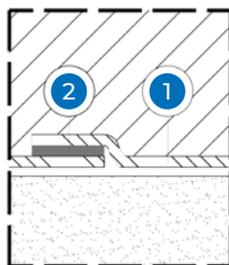


How to form joints and overlaps

Forming **longitudinal joints** between rolls is made easier and more secure thanks to the **self-adhesive side edgings**, while **joints between the ends** of adjacent rolls are formed by using **Mapeproof AL Tape D10 AP** to tape the ends together and make them perfectly watertight.



Longitudinal overlaps between rolls.



- 1 Mapeproof AL AP
- 2 Mapeproof AL Tape D10 AP

1. Preparation of the substrate

Mapeproof AL AP

Substrates must be solid and stable. Surfaces on which **Mapeproof AL AP** is to be applied must be even and have no large protrusions or hollows. **Mapeproof AL AP** may also be applied on damp substrates, as long as there is no standing water. **Mapeproof AL AP** may be applied on concrete substrates, rigid thermal insulation, formwork and wooden panels.

Mapeproof AL 1200 AP

Concrete substrates must be sound, flat and clean. Remove any traces of cement laitance, crumbling areas in the substrate and any traces of dust, grease and form-release oil using suitable tools and equipment. If the substrate needs to be levelled off, use a suitable mortar. Form fillet joints between the base of the foundations and the foundation slab and between contiguous walls.

Apply a coat of **Mapeproof SA Primer** one-component primer. **Mapeproof SA Primer** has a fluid consistency and is very easy to apply with a brush or roller.

2. Waterproofing system

Application on horizontal substrates

Apply a layer of lean concrete directly on the ground to create an even, solid surface for the membrane. Roll out the **Mapeproof AL AP** on the horizontal surface (with the HDPE in contact with the layer of lean concrete) and fasten it around the edges to the vertical sides of the formwork to a height lower (5-8 cm) than the thickness of the foundation slab. When applying the membrane, the sides of the different sheets can be overlapped and joined together easily using the self-adhesive edges (which are present on every roll), whereas the joints between the ends of the rolls are formed by placing two ends together and sealing the joint with **Mapeproof AL Tape D10 AP**.



Application of the system



Remove the protective film from the surface of the membrane to leave the clear adhesive side of **Mapeproof AL AP** exposed.



Before positioning the rebar and placing the concrete, make sure all the joints and overlaps are well sealed. If there are any joints that are not bonded correctly, or if the membrane has been torn or perforated, restore the continuity in its watertightness using **Mapeproof AL Tape D10 AP**.

Application on vertical surfaces before placing concrete

In the case of **diaphragm walls or micropiles**, hydro-blast the surfaces and level off the application surfaces for the membrane and the ends of tie-rods, which shouldn't have any particularly rough areas or large hollows, with **Mapegrout T60** thixotropic, sulphate-resistant, fibre-reinforced, controlled-shrinkage mortar for repairing and restoring concrete. Admix **Mapegrout T60** with 0.25% of **Mapecure SRA**.

Piles only need to be thoroughly hydro-blasted. Waterproof all the vertical surfaces by applying a **Mapeproof AL AP** membrane: start from the top and fasten the membrane in place at the ends and along the overlaps between the sides of each roll using mechanical fasteners. At the bottom of the vertical surfaces, join the **Mapeproof AL AP** to the sheet protruding from the foundation slab using **Mapeproof AL Tape D10 AP**.

Then remove the protective plastic film from the vertical surfaces. Once the **Mapeproof AL AP** has been applied, and before positioning the rebar and placing the concrete, inspect all the overlaps and joints to make sure they are all correctly bonded. If there are any joints that are not bonded correctly, or if the membrane has been torn or perforated, repair the surfaces and the watertightness of the joints using **Mapeproof AL Tape D10 AP**.



Projects completed with Mapeproof AL AP

Private villa



Hospital building



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