CHROMO SEAL

Underground Waterproofing Systems

Made in Germany

ChromoSeal™ | **Underground Waterproofing**

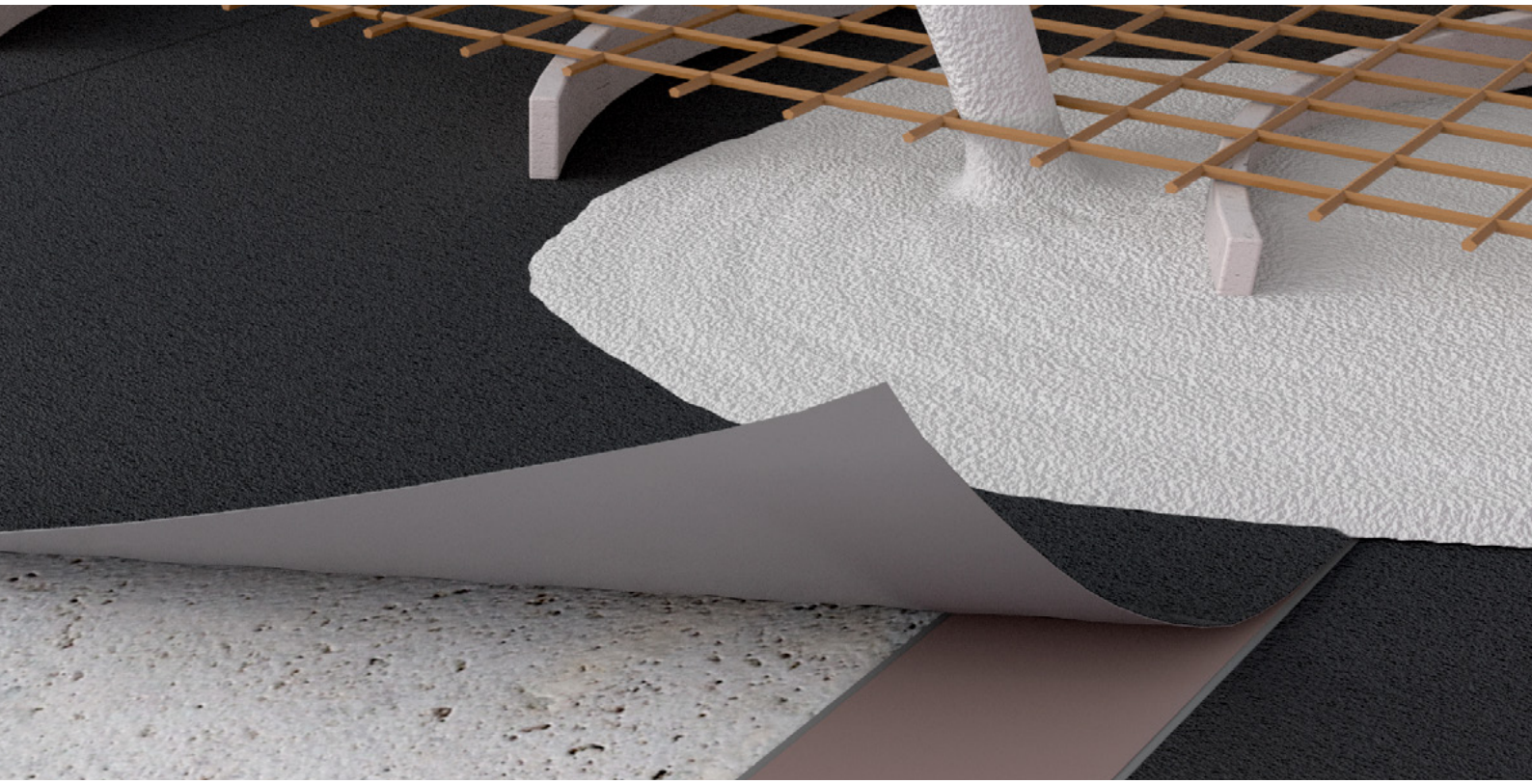
System Description

Scope of Installation Guidelines

The Installation Instructions cover the system and setup of ChromoSeal's Doubleflex Fully Bonded Sheet Membrane.

Overview and Range of Application

ChromoSeal is a pre-applied waterproofing membrane for below-ground structural waterproofing, designed for easy, fast installation without chemical materials. It forms a full seal when combined with freshly poured concrete (classes F4-F6). The fleece side faces the concrete, while the FPO layer contacts the substrate, preventing moisture ingress and water seepage. The bond between the concrete and fleece stops lateral water flow, ensuring a durable, waterproof barrier.



Application Areas

Doubleflex FBV offers damp-proofing, waterproofing, and concrete protection for basements and other below-ground concrete structures exposed to groundwater. It is suitable for:

- Basement buildings
- Concrete-based ground structures
- Below-ground spaces like parking garages and pools
- Large buildings, including server farms, malls, libraries, and hospitals
- Waterproofing methods like open excavation, bottom-up, top-down, and sheet piling

ChromoSeal is recognized for use in construction under the following standards:

Standard	Certificate
German Building Standard	AbP No. 16/116/1201-MPA BS dated 1st June 2016
CE Mark	CE Approval No 0761-CPR-0514
Below structures British Standard regulation A-B-C	BS 2009 - 8102

For buildings requiring superior performance, an extra waterproofing system should be implemented to protect the below-ground structure.

Performance level	Example	Additional Information
1 **Low Performance** ChromoSeal suggested	• Parking areas • Mechanical rooms (excluding electrical equipment) • Workspaces	Some seepage and damp Areas tolerable
2 **Medium/high performance** ChromoSeal required	• Plant rooms and workshops requiring a drier environment (higher than grade 1) • Storage facilities	No water penetration acceptable, Damp areas tolerable, ventilation Might be required
3 **High performance** ChromoSeal required and mandatory	• Ventilated residential and commercial spaces, such as offices and restaurants • Leisure centers	No water penetration acceptable, Ventilation, dehumidification or air Conditioning necessary, appropriate To the intended use

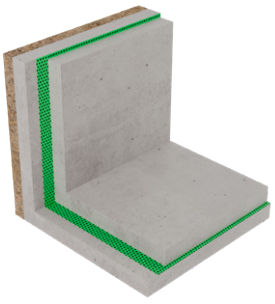
There are currently three distinct waterproofing solutions available for purchase.

Type A

External waterproofing system

Type B

Concrete with inherent structural resistance to water



Type C

Cavity wall construction with drainage
(sump not included)

ChromoSeal is classified under **Type A** waterproofing, but it can also be used in conjunction with a **Type B** system (watertight concrete with an internal admixture).

ChromoSeal™ | **Underground Waterproofing**

Components

System consists of the following system components:

ChromoSeal™ UG 200 WP Membrane

3-ply waterproofing membrane protects floors and walls under thin-set tile installations from substrate cracks and moisture migration.

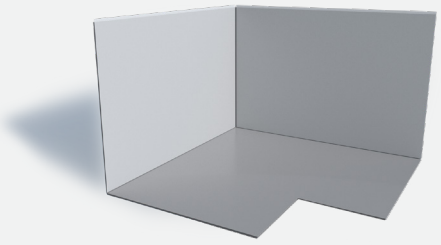
Accessory Products

ChromoSeal™ UG 200 Overlapping Tape

Special coated non-woven: extension in cross direction and rigid lengthwise, thin.

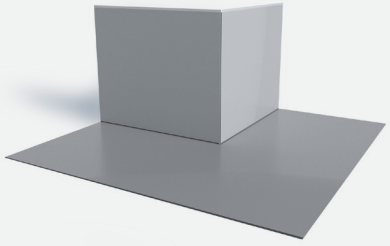
ChromoSeal™ UG 200 Corner Tape 90⁰ I

Special inside corner made from non-woven and a flexible coating.



ChromoSeal™ UG 200 Corner Tape 90⁰ A

Special outside corner made from non-woven and a flexible coating.



Concrete Quality

Concrete quality is crucial for a successful waterproofing system, ensuring a fully bonded, mechanical solution that prevents lateral water migration between the ChromoSeal™ UG 200 Corner Tape 90⁰ I and the concrete structure.

It is essential to ensure that the concrete fully penetrates and embeds the fleece backing of the ChromoSeal™ UG 200 Corner Tape 90⁰ I. Concrete quality varies by region based on available raw materials. We recommend locally defining and testing the concrete mix to confirm it works effectively, ensuring a fully bonded system with the ChromoSeal Corner Tape 90° I.

ChromoSeal™ UG 200 Corner Tape 90⁰ I is designed for use in a Type A waterproofing system with standard concrete but can also be used in a Type B system (concrete + admixture).

Concrete Classes

to be discussed during the "Project Design".

The strength class of concrete measures its ability to withstand compression stress. "RCK CHARACTERISTIC STRENGTH" is the value below which no more than %5 of test results are expected to fall, based on statistical analysis of sample breakage values. Reference standards provide the characteristic strength classes (in N/mm² or MPa) for use in structural calculations.

Strength Class	Concrete Category	Special Provisions
C 8/10 C 12/15	**Non-structural**	None
C 16/20 C 20/25 C 25/30 C 28/35 C 32/40 C 35/45 C 40/50 C 45/55	**Ordinary**	Mandatory FPC certification if produced outside the work site
C 50/60 C 55/67 C 60/75	**High performance**	Mandatory preventive experimentation and FPC certification
C 70/85 C 80/95 C 90/105	**High strength**	Mandatory experimentation and authorisation of the Higher Committee for Public Works

The strength class depends on the water/cement ratio and environmental exposure class. Concrete strength also relies on proper pouring, compacting, and curing; improper methods can reduce strength significantly.

Consistency Class

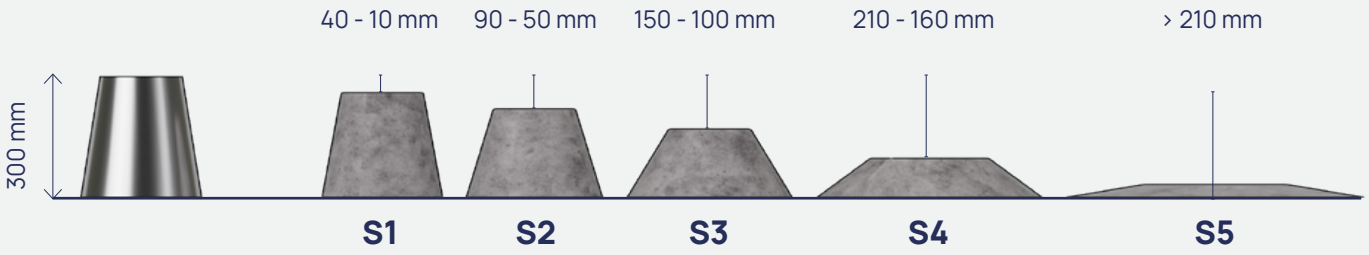
Workability refers to a concrete mix's ability to be compacted and worked, chosen based on the structure and compaction methods. The "SLUMP TEST," using Abrams cone, is typically used on-site. A higher slump value indicates lower consistency and greater workability. This method classifies mixes into five categories based on the slump caused by the mix's weight.

This method classifies mixes into five categories based on the slump of the wet concrete cone under its own weight.

Consistency Class	Slump (mm)	Current Name	Applications
S1	10 - 40	Damp	kerbs
S2	50 - 90	Plastic	kerbs, steep slopes, drains
S3	100 - 150	Semi-Fluid	stairs, inclined roofs, ramps
S4	160 - 210	Fluid	walls, attics, beams, foundations, coulumns
S5	› 210	Super-Fluid	heavily reinforced structures, horizontal pours

*It is recommended, when possible, to size concrete with a consistery class **greater than or equal to S4**

Abrams Cone



Consistency Class	Slump Range (mm)
S1	10 - 40
S2	50 - 90
S3	100 - 150
S4	160 - 210
S5	› 210

Flow Class	Flow Range (mm)
F1	‹340
F2	350 - 410
F3	420 - 480
F4	490 - 550
F5	560 - 620
F6	›630

We suggest to use a concrete with these minimum values:

≥ C/25 – 20

F4 – F6

S4

In any case these specifications must be decided during the "Project design" and locally tested to be sure about its compatibility with Doubleflex FBV.

Application Notes

Substrate preparation

The surface for the sheet membrane must be stable, strong, and clear of loose materials or sharp edges. Repair any cavities, cracks, or voids before applying the membrane. The surface should be dry, clean, and free of debris, with any moisture or rainwater removed.

Preparation and General Tips

All adhesion surfaces must be clean and dry. The material should be applied smoothly, without wrinkles or excess that could cause rolling. Conduct visual inspections carefully and document the application. The base sheet can be used for cracks and standard joints but should not be used for expansion joints. For normal cracks or working joints, a 200 mm overlap is required.

Working temperature: +5°C / +35 °C

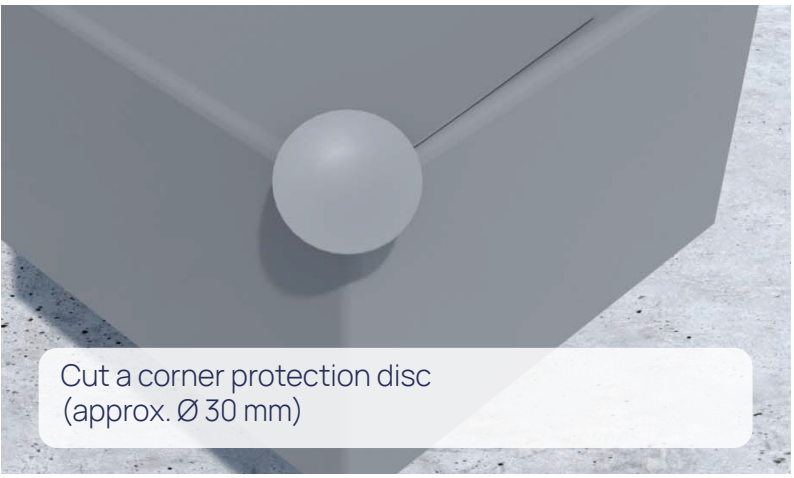
Resistance to temperature : -30°C / +60°C

Laying of ChromoSeal™ UG 200 WP Membrane

Step 1 Installation of Corners

Position the formed corner pieces correctly at the corners, ensuring the self-adhesive edge faces outward, towards the area to be concreted.

If prefabricated corners are not used, corners can be formed on-site using self-adhesive tape products (as shown).



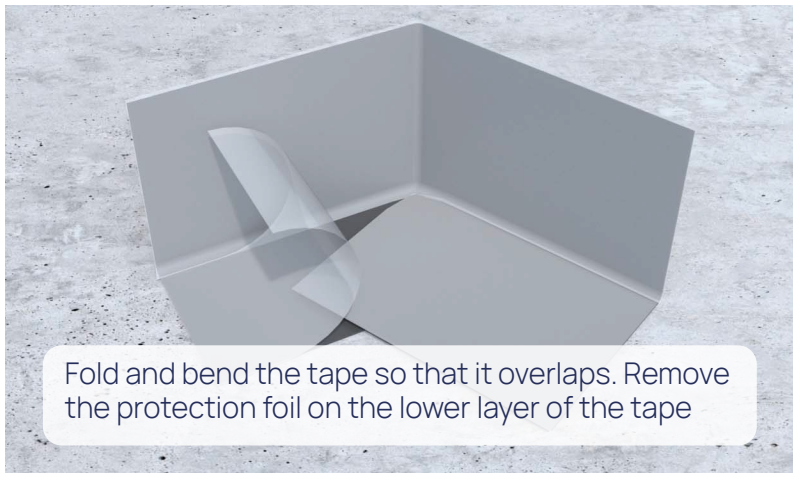
Cut a corner protection disc (approx. Ø 30 mm)

Cut the sealing tape to a length of 300 mm approx.

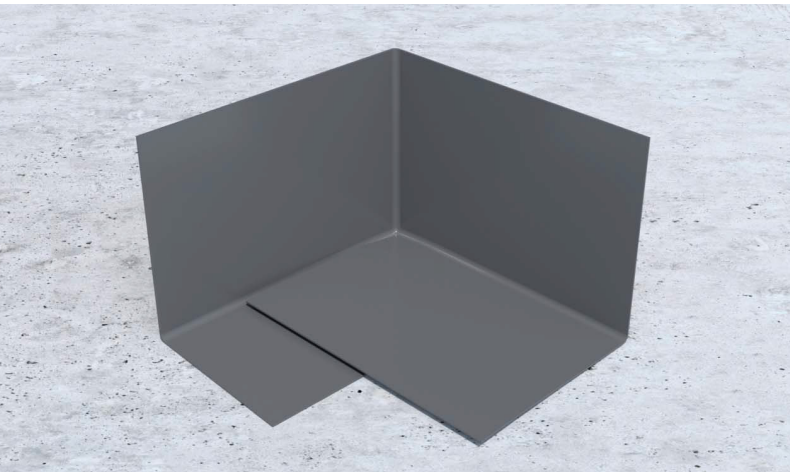
Cut a corner protection disc (approx. Ø 30 mm)

Form a cut halfway through the tape in the middle of the section

Press the corner piece gently, forming it into position

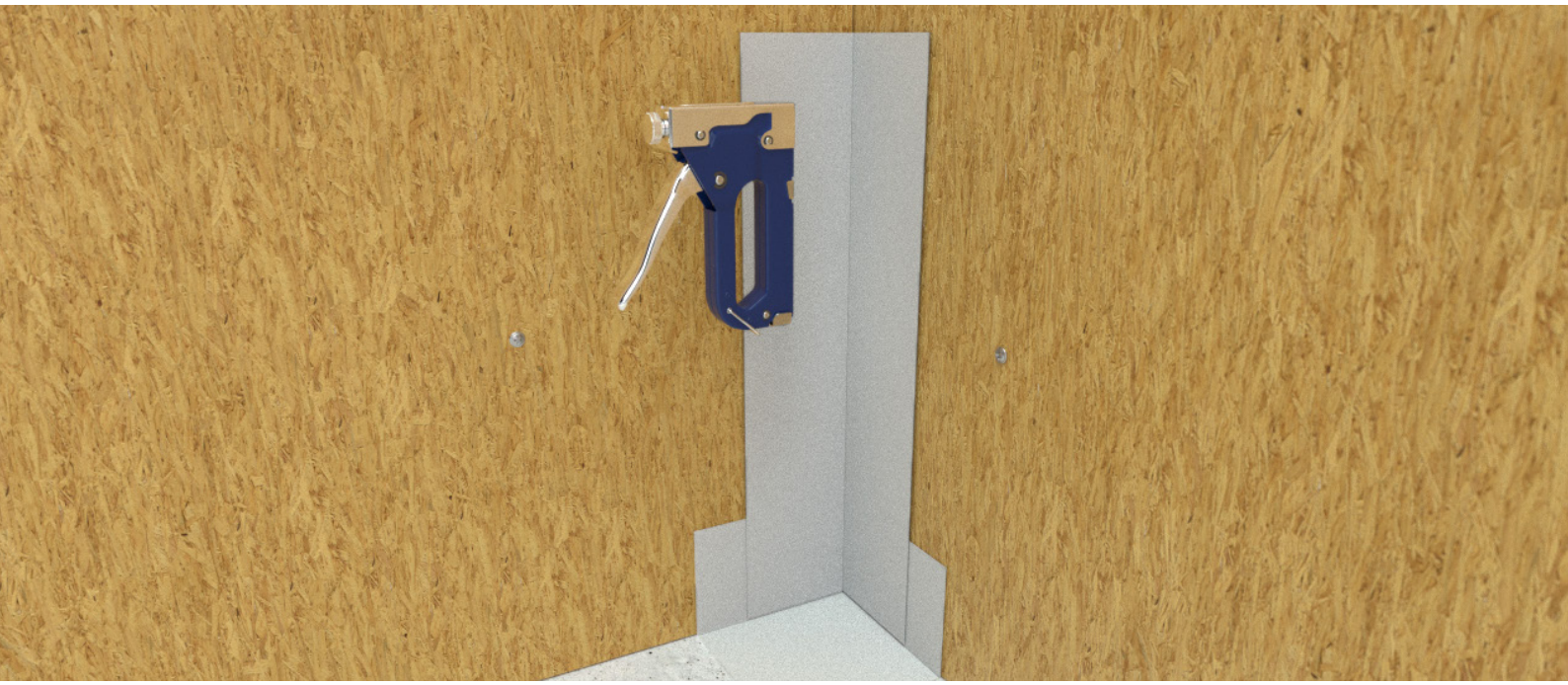


Fold and bend the tape so that it overlaps. Remove the protection foil on the lower layer of the tape



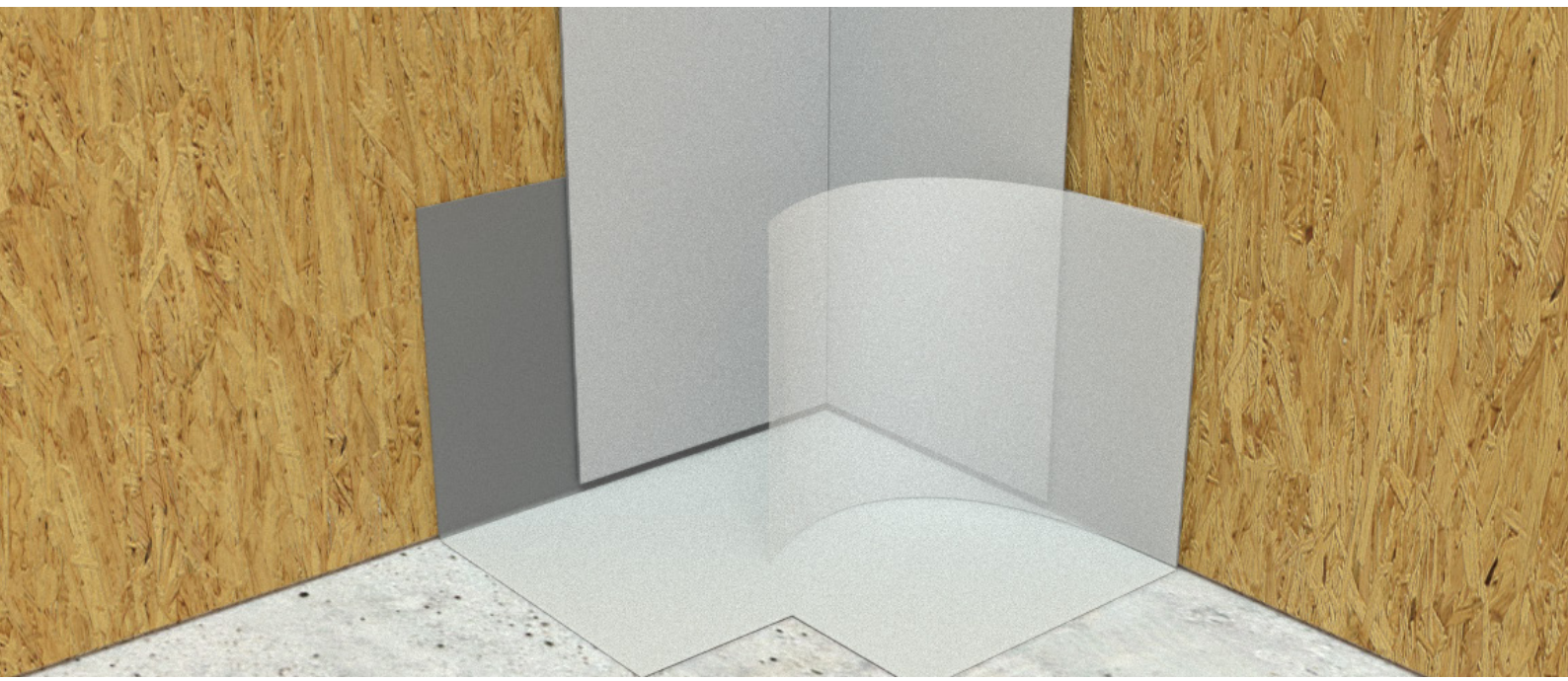
Step 2 Installation of Vertical Corner Membranes

Attach the self-adhesive tape vertically in the corners with the adhesive side facing outwards (towards the concreting area). Secure the tape with a single staple at the top of each corner side. Avoid excessive tacking to prevent moisture penetration; if needed, space staples 50 cm apart. For overlaps, use a 10 cm overlap and press firmly with a roller. Use minimal tacks/staples



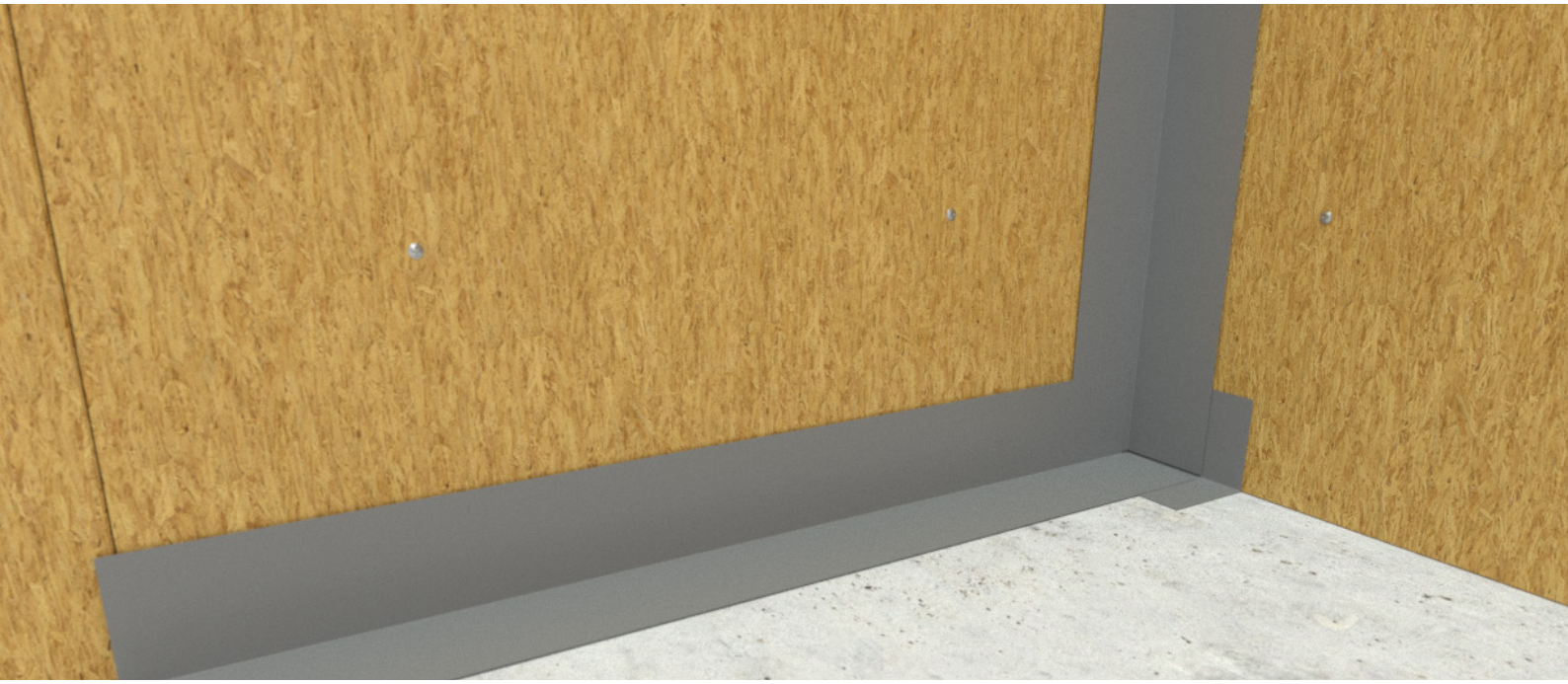
Step 3 Forming of Corners to Edge Membranes

Remove the protective foil from the self-adhesive corner piece, then align and position the parts before adhering. Once the butyl parts bond, separation is nearly impossible, so handle carefully after removing the foil.



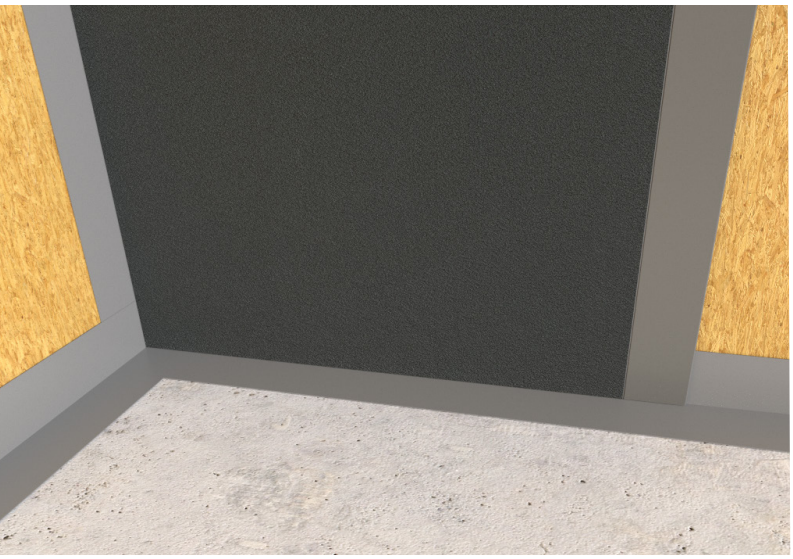
Step 4 Installation of Horizontal Edge Membranes

Place the horizontal sealing tapes (as shown).
Caution: Inspect visually to ensure there are no wrinkles or folds, and that the installation is done correctly.



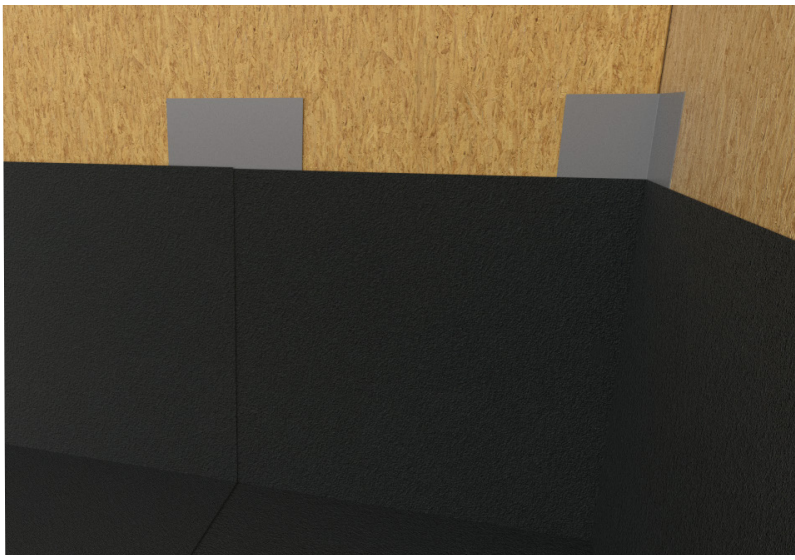
Step 5 Installation of Membrane to Walls

Ensure the FPO side faces the water ingress source, with the black fleece coating towards the concrete side. Start vertical installation at a corner. Overlap longitudinal joints with butyl strips or sealing tape, extending past any staples, tacks, or clamping rails on the formwork. The vertical membrane should extend at least 200 mm above the floor plate and be securely fixed. It must be installed vertically and at least 200 mm above the formwork. Caution: Do not damage the membrane during installation or use staples for fixing.



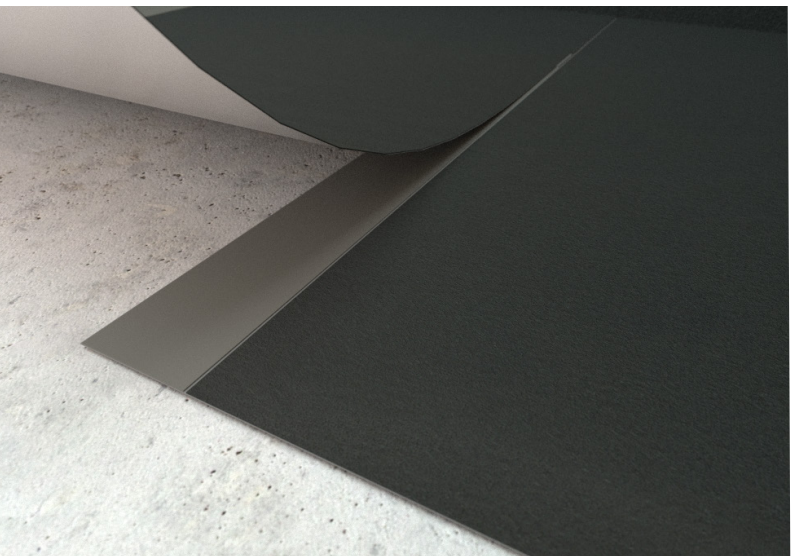
Step 6 Running Joints in Membrane

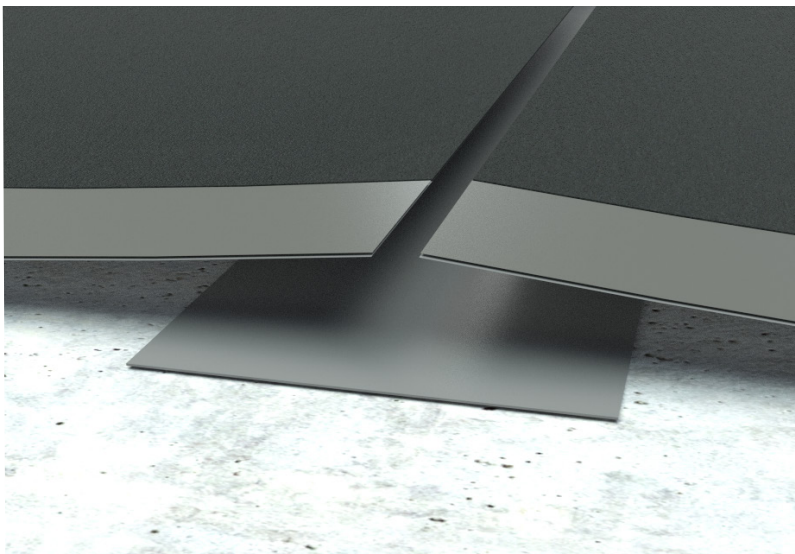
Ensure the FPO side faces the water ingress source, with the black fleece coating towards the concrete side. Start vertical installation at a corner. Overlap longitudinal joints with butyl strips or sealing tape, extending past any staples, tacks, or clamping rails on the formwork. The vertical membrane should extend at least 200 mm above the floor plate and be securely fixed. It must be installed vertically and at least 200 mm above the formwork.
Caution: Do not damage the membrane during installation or use staples for fixing.



Step 7 Installation of Membrane on the Floor

The Doubleflex Fully Bonded Sheet Membrane should be placed around the building's outer perimeter and laid loosely. Each lateral edge has a self-adhesive overlap. Butt or running joints should use 200 mm sealing tape, with edges meeting within a 5 mm tolerance. Avoid overlapping the membrane sheets and ensure seams are staggered. Use 200 mm sealing tape with a 100 mm underside overlap for all joints. Release the protective foil when attaching the tape to the membrane. Ensure the membranes fit closely, with up to a 5 mm gap permissible.
Caution: Check for wrinkles, folds, and proper installation.



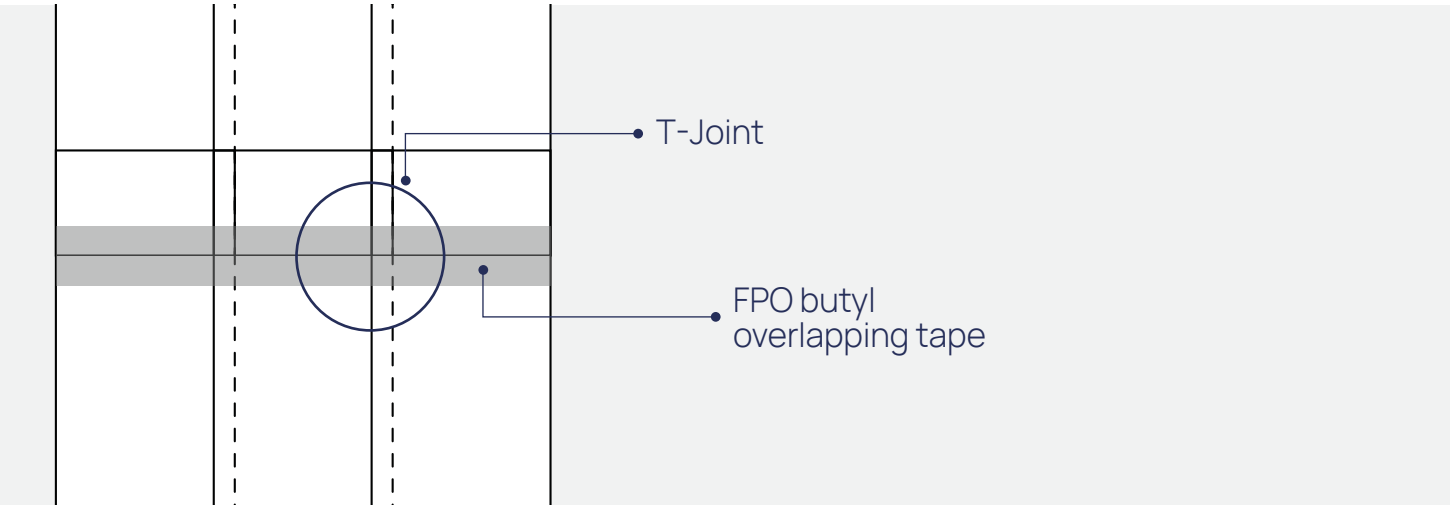


Advice for Overlapping:

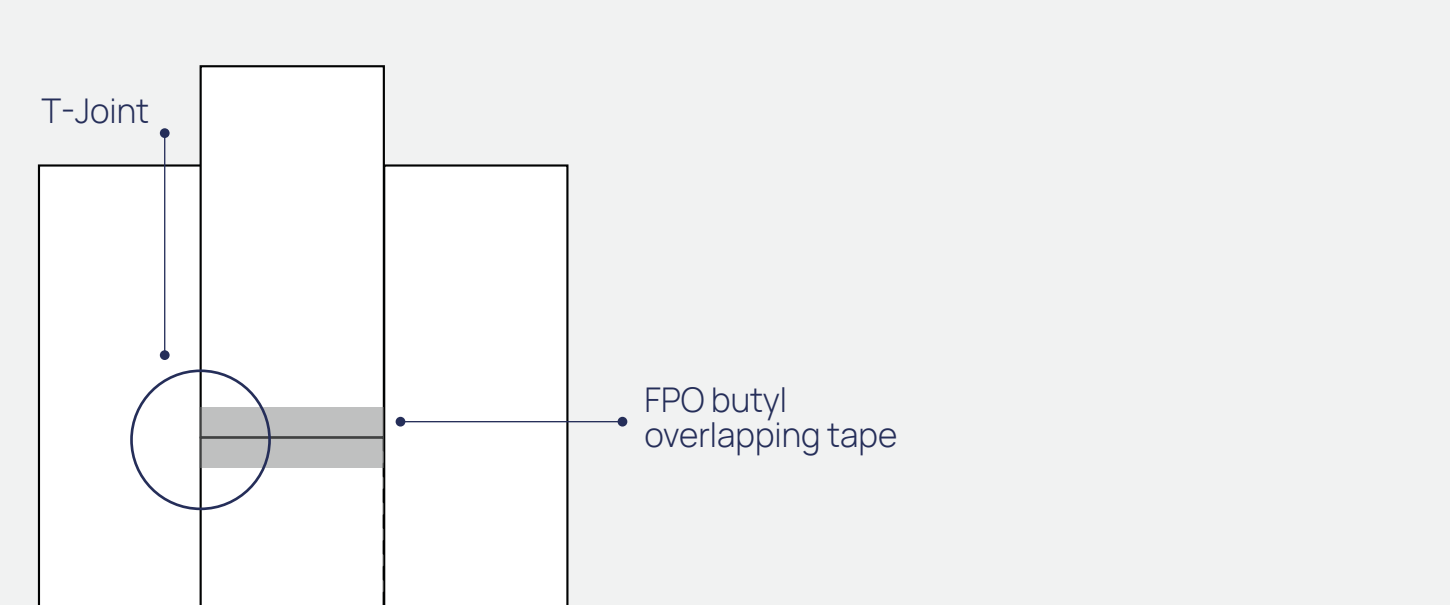
- The release strip is designed for easy separation from the butyl
- Start removing the strip from the internal edge with a quick, continuous motion (stopping may cause the strip to stick to the butyl).
- If removal is difficult, use a cutter to make a small cut and repeat the process.
- Use a roller to firmly press the overlapping areas for a strong bond.

Possible FBV's laying systems

Standard Laying System



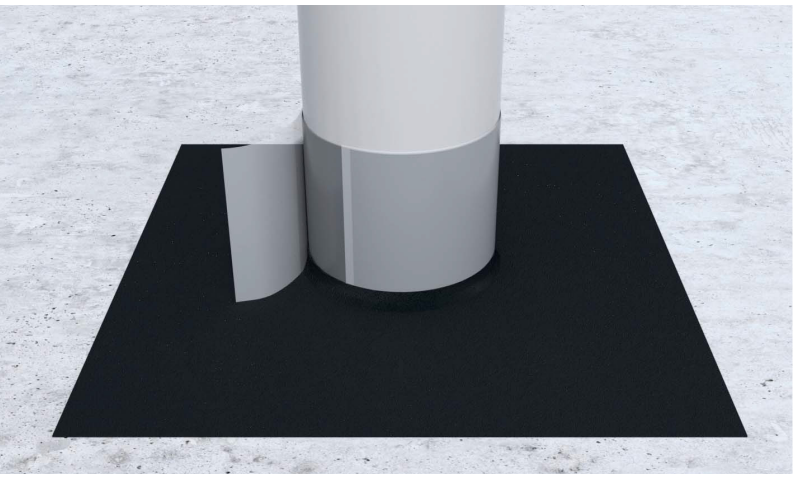
Alternative Laying System



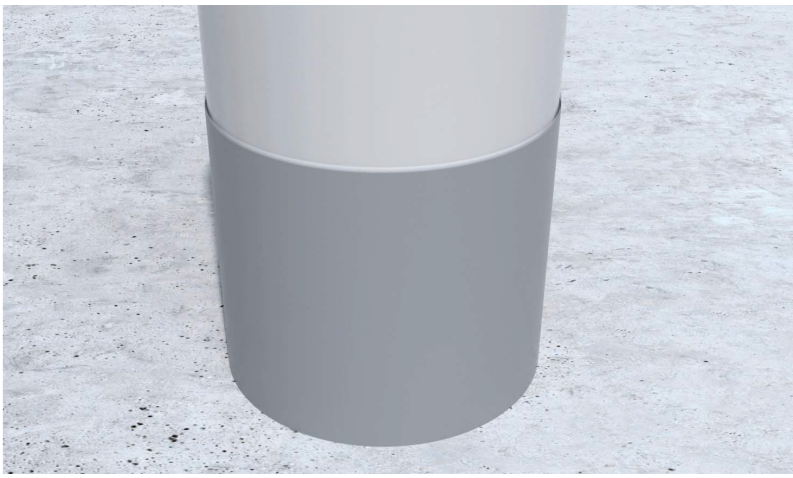
T-Joint water tightness has been tested as per CE mark request ≥ 5 bar.

Step 8 Forming Membranes around Pipes & Ducts of varying sizes etc.

Mark the diameter of the pipe onto a piece of membrane, then cut the opening slightly smaller than the measurement, so that a 5mm collar forms when the membrane is placed over the pipe. Before pulling the membrane over the pipe, make sure all surfaces are clean and the double-sided self-adhesive sealing tape is properly attached around the pipe. Then, pull the membrane over the pipe and press it firmly into place with a roller. For added protection, a suitable bracket can be used to stabilize the pipe.

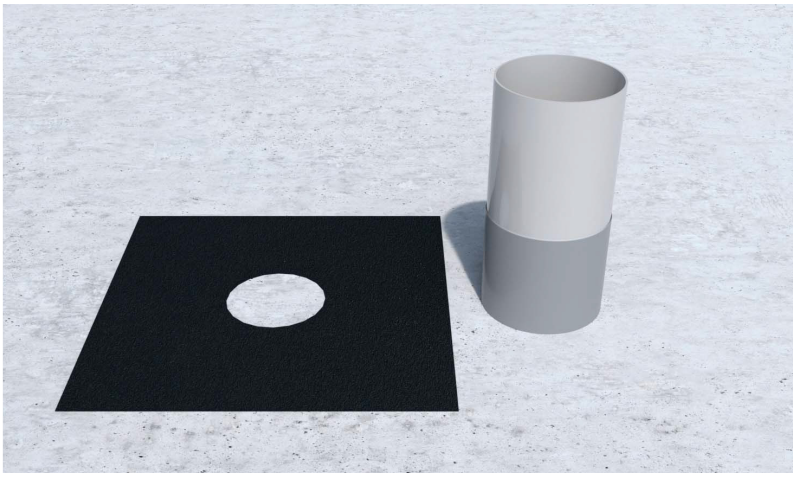


Carefully pull the membrane over the pipe, leaving a small collar pointing up. Remove the protective foil from the sealing tape to allow the collar to stick to the pipe.

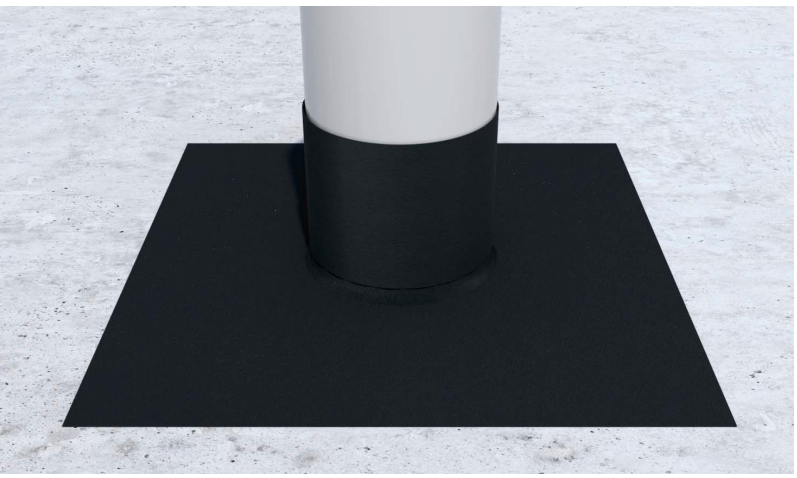


Double-side butyl tape around pipe

Cut a piece of membrane to the right size and wrap it around the pipe (as shown).



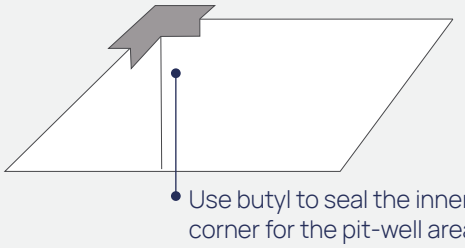
Measure the pipe diameter and cut an opening in the membrane, slightly smaller than the actual size.

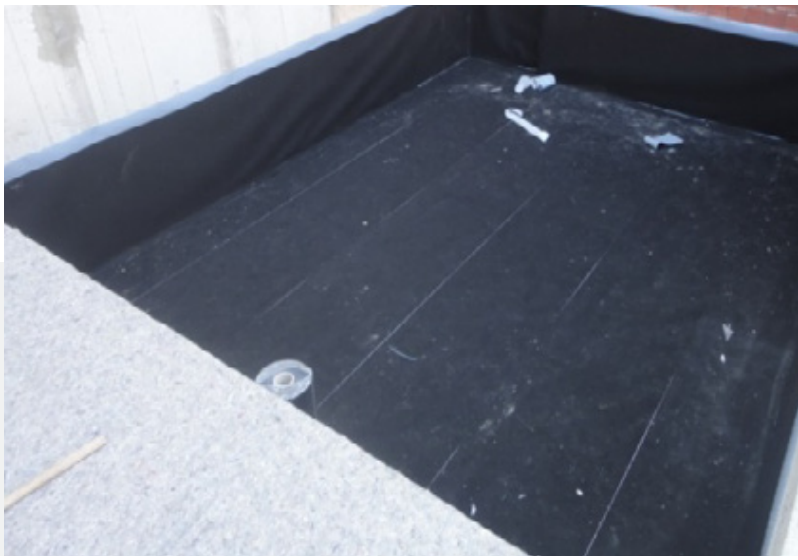


Complete!

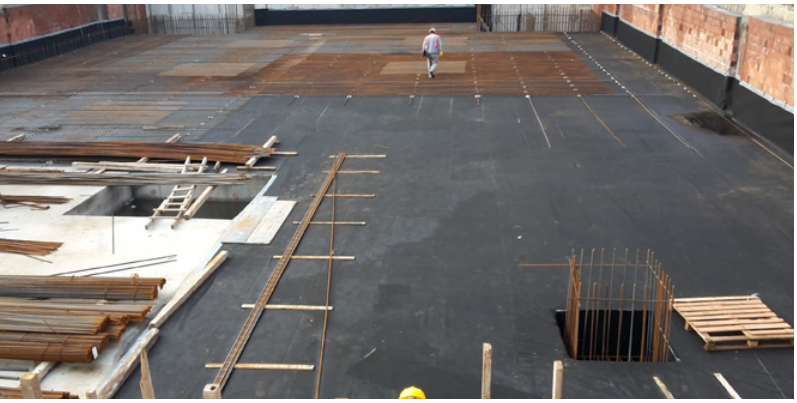
Step 9 Installation of membranes in a Pit or Well

Apply the same principles to the entire pit/well area, including the pit walls. Caution: After sealing and installing the ChromoSeal™ UG 200 WP Membrane Systems, thoroughly inspect the entire pit/well and repair any defects or damage.





Step 10 Reinforcement Steel, Distancer Spacers, Concrete Pouring



The reinforcement steel, spacers, and (F4 – F6) concrete are now ready for installation. During setup, ensure the membrane seal is not damaged. Use only suitable spacers when placing the steel for the bottom plate.

Pile Caps

This detail for pile heads can also be applied to similar penetrations. Chromo Building Solutions offers pre-shaped collars for this application, or they can be built on-site using ChromoSeal™ UG 200 WP Membrane. A procedure similar to the one used for pipes can be followed.

The concrete surface around the pile should be stable and smooth.
Pile heads must be finished and properly shaped.

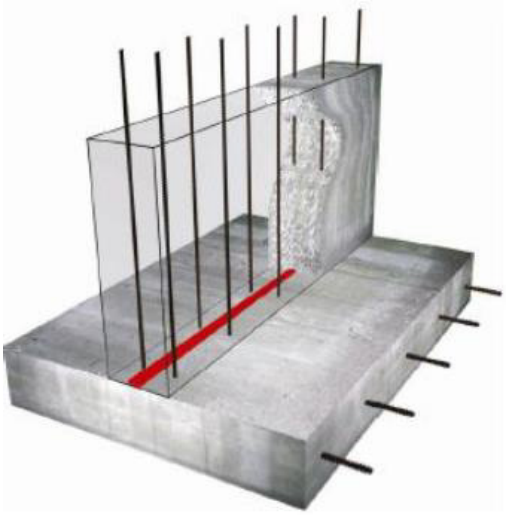
Epoxy sealants can also be applied to the top of the pile heads.

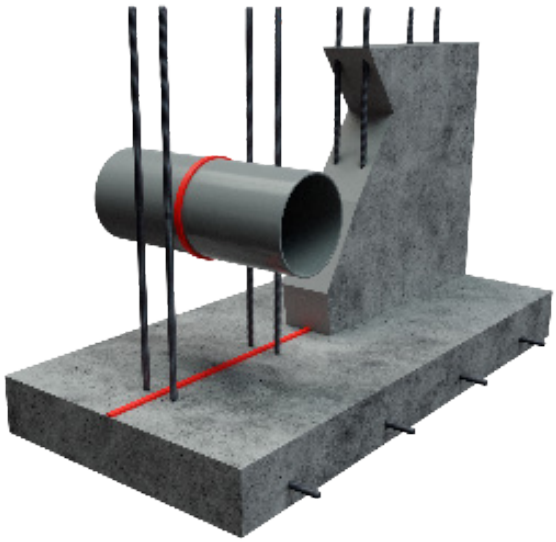
Pre-installed Joints sealing

All designed joints or connections in or from the structure must be sealed with appropriate pre-installed joints. This should be addressed during the project design phase based on the project requirements. Water can easily enter the structure through any joints or gaps, so all such areas must be pre-sealed.

Construction joins

ChromoSeal Swell Tape, a water-swelling waterbar, is an effective solution for this type of application.





Expansion joints

To ensure secure sealing of expansion joints, it is crucial to use external waterstop tapes for additional pre-sealing and optimal movement accommodation. This should be addressed during the project design phase, based on the specific project requirements.

Formwork tie-bar holes (post installed)

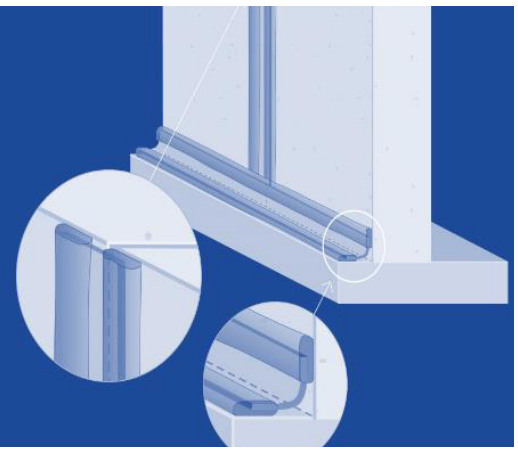
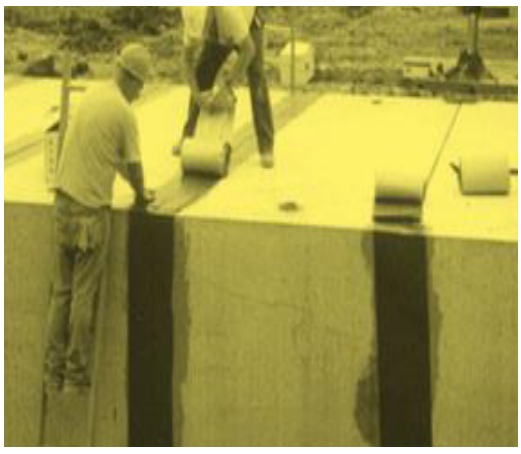
To ensure secure sealing of expansion joints, it is crucial to use external waterstop tapes for additional pre-sealing and optimal movement accommodation. This should be addressed during the project design phase, based on the specific project requirements.



External joints sealing (post installed)

All external joints must be sealed in accordance with the project requirements, which may involve additional solutions. The common external situations include:

- Construction joints
- Sealing of joints in precast concrete elements
- Expansion joints


Chromo Building Solutions can collaborate with customers to create a customized solution for each of these scenarios. However, we typically suggest using one of the following products:

ChromoSeal™ UG 200 Repairing Tape

ChromoSeal™ UG 200 Overlapping Tape

in combination with the epoxy sealant

Protection, repair and cleaning

Protection

Once the ChromoSeal™ UG 200 WP Membrane System is fully installed, it is recommended to protect the membrane if it will be exposed for more than one month before the concrete is poured. The membrane can be protected using:

- UV-resistant plastic film/foil
- UV-resistant geotextile
- Or other equivalent materials

Please note that all membrane protection layers are temporary and **MUST BE REMOVED** before pouring the concrete.

Cleaning

Before starting the concrete pour, it is recommended to clean the membrane surface of dust, dirt, soil, sand, or any other materials that could cause debonding or separation. It is advised to use water or air pressure to clean the surface. Avoid directing the spray too close to the joints to prevent detachment. A wet surface will not impact the bonding of the concrete.

Repair work during the installation

Any damage to the ChromoSeal™ UG 200 WP Membrane must be repaired to maintain a waterproof seal, even though the full bond prevents lateral water migration. The black fleece makes it easy to spot damage. If damage is found during installation, follow these steps:

- Mark a 150x150mm square around the damaged area.
- Use a hot air gun to burn the fleece until the FPO layer is exposed.
- Apply ChromoSeal™ UG 200 Repairing Tape, ChromoSeal™ UG 200 Overlapping Tape and ChromoSeal™ UG 200 WP Membrane(150x150mm) to the area.

Protection, repair and cleaning

Protection

The success of the ChromoSeal™ UG 200 WP Membrane system relies on proper on-site application. The final performance can be influenced by the main contractor and other trades outside the waterproofing contractor's control. Therefore, it's essential to consider the following aspects during the early design and planning stages:

- Excavation
- Formwork/Shuttering
- Reinforcement
- Concrete work
- Backfilling
- Other related tasks

These activities must be planned based on local construction methods and requirements, ensuring that they do not disrupt the system's full bond to the reinforced concrete structure.

Inspection and quality control

Continuous monitoring throughout the application process is recommended, with the installation contractor documenting all important details and observations in written reports, accompanied by photos. This oversight should occur during the following construction phases:

- **Pre-installation:** Assess and approve the condition of the substrate.
- **Post-membrane installation:** Inspect for any damage and perform necessary repairs.
- **Before concrete pouring:** Confirm the membrane is fully bonded for optimal waterproofing.
- **After formwork removal:** Inspect the membrane externally and repair any damages.

Quality Assurance and Responsibility

Chromo Building Solutions products adhere to rigorous standards certified by an independently verified management system, ensuring compliance with our quality, environmental, and occupational health and safety standards, as outlined in Chromo Building Solutions ESHQ recommendations.

Properties listed are based on laboratory controlled tests.
® = Registered trademark of the Chromo Building Solutions.

Statement of Responsibility

The technical information and application advice provided in this Chromo Building Solutions publication are based on our best scientific and practical knowledge. However, given its general nature, we do not assume responsibility for specific product suitability or warranty beyond legal requirements. Users must verify product suitability for their intended use.

Disclaimer

This technical data sheet offers general application guidance, considering the diverse site conditions and application fields of our products. While based on our knowledge and experience, customers are required to conduct thorough testing for suitability. Any use beyond stated fields of application, without prior consultation with Chromo Building Solutions, and resulting damages, are the sole responsibility of the customer.

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Underground Waterproofing Systems

Made in Germany

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