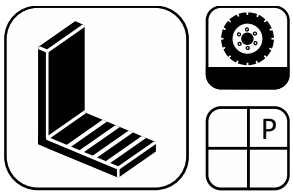
Installation guideline

WestWood Open space heating system



Brief description

The "WestWood Open space heating system" is a seamless, mechanically durable system for surfacing areas subjected to vehicle traffic. With the heating embedded in the surfacing, it offers reliable protection against hazardous winter driving conditions due to ice and snow. The surface can be finished in any colour and can also feature patterns or markings in a wide range of shades.
Its liquid application and high bonding strength on almost any standard substrate encountered in multi-storey and underground car parks make this system a cost-effective, durable and high-quality solution, particularly for the refurbishment of ramps in such buildings.

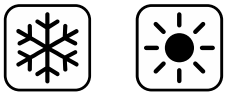
Properties and advantages

- Able to withstand high mechanical stress (e.g though heavy vehicle and pedestrian traffic)
- High abrasion resistance
- Resistant to mechanical stress through vehicle traffic
- Choice of various RAL colours
- Can be applied to almost all and variable substrates
- Permanently weather-resistant (resistant to high and low temperatures, UV rays, hydrolysis)
- Resistant to most commonly used acids and alkali solutions
- Unlimited design options (colour finish, tiled look, road markings etc.)
- Easy and fast application
- Fast-curing
- Solvent-free
- Plasticiser-free

Applications

- Surfaces subjected to vehicle traffic
- Designed specifically for ramps in multi-storey and underground car parks.
- Walkways, terraces, stairways and balconies
- Pedestrian and bicycle bridges

Application conditions



Temperatures

The system can generally be applied within an ambient temperature range between +3 °C and +35 °C. Some products are also suitable for application at sub-zero temperatures. Please refer to the table below for exact details.

Product	Temperature range, in °C		
Primer layer	Air	Substrate*	Material
Wecryl 110	+3 to +35	+3 to + 50	+3 to +30
Wecryl 171	+3 to +35	+ 3 to + 50	+3 to +30
Wecryl 123 K	+0 to +35	+0 to +30	+0 to +30
Wecryl 176	+3 to +35	+ 3 to + 50	+3 to +30
Wecryl 176 K	+3 to +35	+ 3 to + 50	+3 to +30
WMP 113	+3 to +35	+ 3 to + 50	+3 to +30

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Levelling	Air	Substrate*	Material
Wecryl 810	-5 to +35	+3 to +50*	+3 to +30
Wecryl 333 /-thix 10 /-thix 20	+3 to +35	+3 to +50*	+3 to +30
Wecryl 842	-5 to +35	+3 to +50*	+3 to +30
Wecryl 843	-5 to +35	-5 to +40*	+3 to +30
Wecryl 885	-5 to +35	+3 to +40*	+3 to +30
Waterproofing layer			
Wecryl R 230 /-thix /-TT /-thix HT	-5 to +35	+3 to +50*	+3 to +30
Wecryl 279	+5 to +35	+5 to +50*	+5 to +30
WeFleece			
Heating layer			
Wecryl 847	-5 to +25	-5 to +30*	+3 to +20
Protective layer			
Wecryl 333 /-thix 10 /-thix 20	+3 to +35	+3 to +50*	+3 to +30
Wecryl 333 Wi	-5 to +25	-5 to +30*	+3 to +20
Wearing layer			
Wecryl 419	-5 to + 42	+3 to + 45	+3 to + 30
Wecryl 413	-10 to +35	-5 to +40	+3 to +30
Wecryl 420	-10 to +35	-5 to +40*	+3 to +30
Wecryl 402	-5 to +35	+3 to +40*	+3 to +30
Wecryl 488	-5 to +35	+3 to +40*	+3 to +30

* The substrate temperature must be at least 3 °C above the dew point during application and curing.
The substrate temperature must not be less than +3 °C if a topping is applied to the surface. Reaction problems can occur at lower temperatures.

Moisture

The relative humidity must be ≤ 90%.
The surface to be coated must be dry and ice-free.
Avoid any exposure to moisture until the surfacing has hardened completely.

Consumption and reaction times

Product	Consumption [kg/m²]		
Primer layer	Substrate smooth	fine-sandy	coarse
Wecryl 110	approx. 0.5	approx. 0.6	approx. 0.7
Wecryl 171	approx. 0.5	approx. 0.5	
Wecryl 123 K			approx. 1.7
Wecryl 176	approx. 0.4	approx. 0.5	approx. 0.8
Wecryl 176 K	approx. 0.8	approx. 0.9	approx. 1.0
WMP 113	approx. 0.2	-	-

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Product	Consumption [kg/m²]
Levelling	
Wecryl 810	1.4 kg/m² per mm layer thickness
Wecryl 333 /-thix 10 /-thix 20	2.0 kg/m² per mm layer thickness (scratch coat and levelling coat with added quartz sand)
Wecryl 842	2.2 kg/m² per mm layer thickness
Wecryl 843	2.1 kg/m² per mm layer thickness
Wecryl 885	2.4 kg/m² per mm layer thickness

Waterproofing layer	Waterproofing of details (with fleece)	Waterproofing of continuous areas (without fleece)	Waterproofing of continuous areas (with fleece)
Wecryl R 230 /-thix /-TT /-thix HT	2.5 kg/m²		2.5 kg/m²
Wecryl 279	-	2.8 kg/m²	2.7 kg/m²
WeFleece	1.0 rm/m		1.05 m²/m²

Heating layer	Embedding layer	Levelling layer	
Wecryl 847	9.0 kg/m²	2.0 kg/m²	

Protective layer			
Wecryl 333 /-thix 10 /-thix 20/-Wi	4.0 kg/m²		

Wearing layer			
Wecryl 419	3.5 kg/m²		
Wecryl 413	6.0 kg/m²		
Wecryl 420	1.5 kg/m²		
Wecryl 402	0.8 kg/m²		
Wecryl 488	0.7 kg/m²		

The consumption rates relate to smooth, even substrates. Consumption is likely to be higher on rough surfaces.

Product	**Drying time (temperature-dependent)**			
	30 °C	20 °C	10 °C	+3 °C
WMP 113	min. 1 hour	min. 2 hours	min. 3 hours	min. 4 hours

Product	**Reaction time** (approx. values at 20 °C)			
	Pot life	Rainproof	Overlayable	Fully cured
Wecryl 110	12 min	30 min	45 min	3 hours
Wecryl 171	12 min	30 min	45 min	3 hours
Wecryl 123 K	12 min	30 min	60 min	3 hours
Wecryl 176	10 min	30 min	30 min	2 hours
Wecryl 176 K	10 min	30 min	30 min	2 hours
Wecryl 810	15 min	30 min	45 min	3 hours
Wecryl 333 /-thix 10 /-thix 20	15 min	30 min	1 hour	3 hours
Wecryl 842	12 min	30 min	1 hour	3 hours
Wecryl 843	20 min	30 min	1 hour	3 hours
Wecryl 885	12 min	30 min	1 hour	3 hours
Wecryl R 230 /-thix /-thix HT	15 min	30 min	1 hour	3 hours
Wecryl 279	15 min	45 min	1.5 hours	3 hours
Wecryl 847	15 min	30 min	1 hour	3 hours

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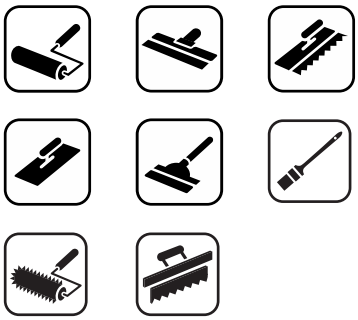
Product	**Reaction time** (approx. values at 20 °C)			
Wecryl 419	12 min.	30 min.	45 min.	2 hours
Wecryl 413	12 min	30 min	45 min	2 hours
Wecryl 420	10 min	30 min	45 min	2 hours
Wecryl 402	15 min	45 min	1 hour	3 hours
Wecryl 488	15 min	45 min	1 hour	3 hours

Product	**Reaction times** (approx. values at 3 °C)			
Wecryl R 230 TT	20 min	45 min	75 min	6 hours
Wecryl 333 Wi	20 min	45 min	75 min	6 hours

Application tools



Product	**Application tool**
Wecryl 110, 171, 176	Sheepskin roller
Wecryl 176 K	Smoothing trowel
WMP 113	Sheepskin roller or brush (alternatively spray-applied primer: WMP 174 S)
Wecryl 810	Smoothing trowel or finishing trowel
Wecryl 333 /-thix 10 /-thix 20	Coating trowel with triangular teeth (notch pattern 92) or smoothing trowel
Wecryl 842, 843, 885	Smoothing trowel
Wecryl 279	Application without fleece (single-layer): notched rubber squeegee (12 mm), then spiked metal roller Application without fleece (layer by layer): first layer: notched rubber squeegee (6 mm), then spiked metal roller second layer: notched rubber squeegee (6 mm), then spiked metal roller Application with fleece (wet-on-wet): first layer: sheepskin roller or notched rubber squeegee (5 mm), fleece reinforcement second layer: sheepskin roller
Wecryl R 230 /-thix /-thix HT	Sheepskin roller
Wecryl 847	Smoothing trowel
Wecryl 413, 419	Aluminium blade approx. 60 cm or smoothing trowel
Wecryl 420	Aluminium blade approx. 60 cm or smoothing trowel, go over wet surface with a sheepskin roller
Wecryl 402, 488	Finish roller or hard rubber blade (for surfaces with topping)

Substrate preparation and primer selection

Correct substrate preparation and a flawless primer coating are essential for ensuring the functional durability of the WestWood System.
Generally, the substrate must be sound, dry, and free from loose and adhesion-reducing particles. That is why coats of paint, cement slurry, dirt and grease, for instance, must always be removed completely. As a rule, this is done by shot blasting, scarifying or grinding and then vacuuming off the debris.
The primer coating then applied creates an ideal barrier and enables optimum adhesion between the substrate and the WestWood System.
Please refer to the Application Guidelines - Substrate for the correct substrate preparation and primer selection.

Primer layer

The primer is applied to the prepared substrate.

Avoid small air bubbles (pin holes) can be closed or prevented by an application of substrate stabiliser Wecryl 821 to the entire area.

Wecryl 176 – Primer for absorbent substrates
Wecryl 171 – Primer for composite waterproofing systems
Use the sheepskin roller to apply an even film-forming coat of primer. Avoid creating puddles. A second application may be required for highly absorbent substrates.

Wecryl 176 K – Primer / Scratch-coat for highly absorbent mineral substrates
Apply an even and film-forming coat of primer with the smoothing trowel, using the particle size as a guide to the thickness of the layer. Any build-up of material should be avoided. Once the coating has cured, a second coat is applied to cover any defects or patches that are not fully covered.

WMP 113 – Metal primer
WMP 174 S – Metal primer (sprayable)
Use a finish roller to apply an even coat of WMP 713 primer to the substrate. Avoid excess build-up of material in all areas, and especially in corners. If necessary, use the brush to spread the material evenly and avoid greater layer thicknesses.
The primer WMP 174 S is sprayed from a 15 - 20 cm distance to the surface.

Levelling

Any unevenness in the substrate must be levelled out carefully. Together with minimising roughness height, this creates the best possible preconditions and the lowest consumption rates for the subsequent layers. The equalising measures apply both to mineral substrates (e.g. concrete) and to bituminous substrates (e.g. asphalt).

Cracks and joints
Wecryl Surfacer may be used to fill small cracks and uneven patches, or to smooth out fleece overlaps for a better finish.

Scratch coat (roughness heights RH 0.5 - 1.0 mm)
To prepare a scratch coat, a specified amount of fire-dried quartz sand (maximum aggregate size 0.6 mm) is added to Wecryl 333 self-levelling mortar.
The amount of quartz sand added should not exceed 10 kg per 33 kg container of Wecryl 333 (mixing ratio 33:10).

Levelling surfacer (roughness heights RH > 1.0 - 10 mm)
To prepare the levelling coat, a specified amount of fire-dried quartz sand (maximum aggregate size 1.2 mm) is added to Wecryl 333 self-levelling mortar. The amount of quartz sand added should not exceed 17 kg per 33 kg container of Wecryl 333 (mixing ratio 33:17).

	Repair and levelling mortar (coarse/fine) Damaged and uneven patches can be made good with Wecryl 842 (coarse) or Wecryl 843 (fine). The layer thickness per application is 5 - 50 mm for Wecryl 842 and 2 - 50 mm for Wecryl 843 respectively. Two or more applications will be required if a thicker layer is required. Use Wecryl 885 for concrete repairs in in structural applications (not on horizontal surfaces).
Waterproofing of details	**Wecryl Waterproofing System** **Wecryl R 230 /-thix /-TT – Waterproofing** Apply a generous and even layer of the mixed material to cover the entire area (at least 1.5 kg/m²), then immediately embed the WeFleece and use a sheepskin roller to remove any air bubbles. Immediately apply the remaining material (approx. 1.0 kg/m²) wet in wet up to the required consumption rate. In each case a sheepskin roller is used to spread the material over the surface. Fleece overlaps must be installed with at least 5 cm overlap.
Waterproofing of continuous areas **Option 1a**	**Wecryl 279 – Waterproofing without fleece** Apply a generous waterproofing layer of the mixed material to cover the entire area, distribute with a notched rubber squeegee (12 mm)and then immediately go over the surface with a spiked roller.
Waterproofing of continuous areas **Option 1b**	**Wecryl Surface Protection System OS 10 – 2.0 (without fleece)** Apply a generous and even first waterproofing layer of the mixed Wecryl 279 to cover the entire area (at least 1.4 kg/m²), distribute with a rubber squeegee and then immediately go over the surface with a spiked roller. Once the first layer has cured (approx. 45 minutes), apply the second layer of Wecryl 279 waterproofing (at least 1.4 kg/m²) and distribute it over the surface using a rubber squeegee. Immediately afterwards – while this layer is still liquid – go over the entire area with the spiked roller.
Waterproofing of continuous areas **Option 1c**	**Wecryl Surface Protection System OS 10 – 2.0 (with fleece)** Use a sheepskin roller or notched rubber squeegee to apply a generous and even layer of the mixed Wecryl 279 to cover the entire area (at least 1.3 kg/m²), then immediately embed the WeFleece and go over the area with a sheepskin roller to remove any air bubbles. Immediately afterwards apply the remaining material (wet in wet, at least 1.4 kg/m²) up to the required consumption rate (total consumption at least 2.7 kg/m²). A sheepskin roller or notched rubber squeegee can be used to distribute the first layer. A sheepskin roller must be used for application of the second layer. Fleece overlaps must be installed with at least 5 cm overlap.

Waterproofing of continuous areas

Option 2

Wecryl Waterproofing System
Apply a generous and even layer of the mixed Wecryl R 230 to cover the entire area (at least 1.5 kg/m²), then immediately embed the WeFleece and use a sheepskin roller to remove any air bubbles. Apply the remaining material directly (wet in wet) up to the required consumption rate. In each case a sheepskin roller is used to spread the material over the surface. Fleece overlaps must be installed with at least 5 cm overlap.

Preparations before installing the heating mats

Positioning and function testing
The heating mats are numbered as shown on the installation plan supplied. Consequently, the position of each individual heating mat on the ramp can be determined by referring to the installation plan.
In addition, each heating mat has a label containing electrotechnical information. These data are important when carrying out the function test on the heating mats. The function test must be conducted by a qualified electrician and the operational capability of the heating system must be confirmed.

Ramp pitch
Since the pitch of the ramps can vary in line with site conditions, we recommend first carrying out small-scale tests with the self-levelling mortar. To ensure optimum application properties when embedding the heating mats, we advise adding WestWood 910 anti-flow additive when working with steep gradients.

Installation of sensors

Planning the cable layout and sensor locations
The layout of the PTC thermistor cables and the sensor locations must be planned before the heating mats are embedded and further surfacing layers are applied. This involves first laying out the heating mats as shown on the installation plan and then fixing them in position with adhesive tape. The exact position of the sensors and the routing of the cables is then determined, taking the information below into account.
The appropriate tools (core drill etc.) will be required.
Apply primer to the slots and channels before the embedding layer. Then embed the cable and sensors in the liquid resin. Completely fill any remaining cavities with PMMA surfacer to create a smooth surface. The surface of the sensors must be kept free from any coating.

Ice and snow sensor (5-core)
The ice and snow sensor must be fitted away from the heated surface and directly exposed to weather conditions (snow, rain, melt water, etc.).
Please ensure that the sensor away from the heated surface cannot be buried, e.g. as a result of snow clearing. Any foreign bodies or substances on the sensor will impair its function.
The sensor must be installed in a horizontal and level position so that residual moisture remains on the surface of the sensor.
Do not position the sensor near or on parts of the building that can heat up in the sun, thereby causing the snow to melt more rapidly.
Any remaining cavities must be filled with PMMA surfacer.

Combined temperature and moisture sensor (4-core)
The combination sensor is fitted inside the heated area. It monitors the ground temperature of the heated area irrespective of whether the heating is switched on or off. Heating cables must be routed past the combination sensor at a minimum distance of 2.5 cm.
Ensure that parallel heating cables do not touch.
The combination sensor must be installed so that it is exposed to the direct influence of the weather (snow, rain, melt water, etc.).
Any remaining cavities must be filled with PMMA surfacer.

Heating layer

(Embedding of the heating mat)

Wecryl 847 – Adhesive and Reinforcement Mortar
The embedding layer consisting of Wecryl 847 (9.0 kg/m²) is applied to the heating mats arranged as specified on the installation plan. A smoothing trowel is used to distribute the material over the area so that the entire heating mat is fully embedded in the mortar.

Levelling layer

Wecryl 847 – Adhesive and Reinforcement Mortar
The levelling layer is applied evenly to the hardened embedding layer using Wecryl 847 (2.0 kg/m²) and a smoothing trowel.

Drainage channel heating

Drainage channels must be heated to prevent the melt water freezing and consequently blocking up the gully.

Protective and wearing layer

Wecryl 419 – Textured surfacing Best Performane
Once mixed, the material is simply applied to the cured heating layer using an aluminium blade or smoothing trowel and evenly distributed, with the particle size acting as a guide that ensures a minimum layer thickness. Further applications are not required. For additional roughness or to avoid visible trowel marks in the finished surface, a roller can be passed over the textured coating while it is still wet. We must point out that this can result in increased wear (with the associated tyre marks).

Wecryl 413 – Textured Surfacing High Performance
Once mixed, the material is simply applied to the cured heating layer using an aluminium blade or smoothing trowel and evenly distributed, with the particle size acting as a guide that ensures a minimum layer thickness. Further applications are not required. For additional roughness or to avoid visible trowel marks in the finished surface, a roller can be passed over the textured coating while it is still wet. We must point out that this can result in increased wear (with the associated tyre marks).

Wecryl 333 /-thix – Self-levelling mortar + WestWood Hard Grain + Wecryl 402
A notched or smoothing trowel is used to apply an even layer (4.0 kg/m²) of the mixed self-levelling mortar to the hardened waterproofing for the continuous area. Hard Grain (grain size 1.0 - 3.0 mm; consumption 8.0 kg/m²) is broadcast over the protective layer while the resin is still wet.

Once the self-levelling mortar has cured, any loose particles are removed using a dust collector, before the transparent Wecryl 402 top sealer is applied over the entire area with a finish roller.

Wecryl 333 /-thix – Self-levelling mortar + quartz sand + Wecryl 488
A notched or smoothing trowel is used to apply an even layer (4.0 kg/m²) of the mixed self-levelling mortar to the hardened waterproofing for the continuous area.
Fire-dried quartz sand (grain size 0.7 - 1.2 mm; minimum consumption 7.0 kg/²) is then broadcast over the protective layer while it is still wet. Once the self-levelling mortar has hardened, any loose sand is vacuumed off and a finish roller used to seal the entire area with a final coating of finish.
For an enhanced appearance and faster application rate, a hard rubber blade can also be used to apply the sealer (finish) before laying off with a finish roller.

Wecryl 420 – Roll surfacing
So that the finished surface is as even as possible, a layer of self-levelling mortar is applied to the cured heating layer (minimum consumption 4.0 kg/m²). After this the roller-applied surfacing (minimum consumption 1.5 kg/m²), in the preferred colour, is spread evenly with an aluminium blade or smoothing trowel and laid off to particle thickness.
To achieve the desired texture, the surface must be finished with a sheepskin roller while the resin is still wet.

Design options

WestWood systems offer excellent scope for creative designs. Wecryl 488, Wecryl 419, Wecryl 413 or Wecryl 420 can be used to create surfaces in one or more colours. The products also allow any pattern or markings to be incorporated. In conjunction with topping materials, Wecryl Finish offers many additional design options.

Cleaning the tools

If work is interrupted or when it is completed, clean the tools thoroughly with WestWood Cleaning Agent within the pot life of the material (approx. 10 minutes). This can be done with a brush. The tools are ready to be used again as soon as the cleaning agent has evaporated fully.
Simply immersing the tools in the Cleaning Agent will not prevent the material from hardening.

Information on safety and risks

Please refer to the safety data sheets for the products used.

General information

The above information, especially information about application of the products, is based on extensive development work as well as many years of experience and is provided to the best of our knowledge.
However, the wide variety of requirements and conditions on site mean that it is necessary for the product to be tested to ensure that it is suitable for the intended purpose. Only the most recent version of the document is valid. We reserve the right to make changes to reflect advances in technology or improvements to our products.

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Appendix System drawings

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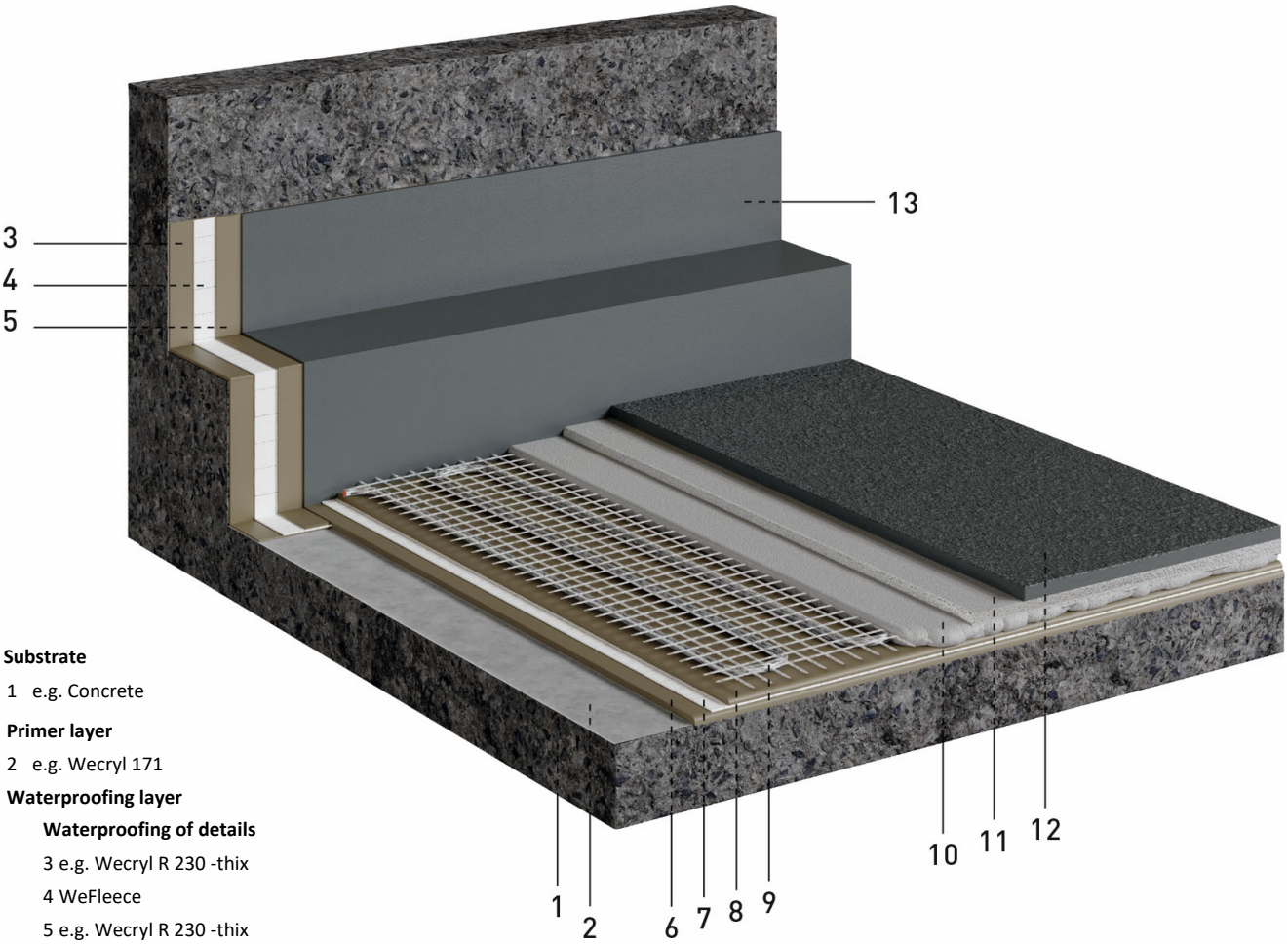
System drawing

WestWood Open space heating system

Open space heating in thin-bed PMMA



Substrate

1 e.g. Concrete

Primer layer

2 e.g. Wecryl 171

Waterproofing layer

Waterproofing of details

3 e.g. Wecryl R 230 -thix

4 WeFleece

5 e.g. Wecryl R 230 -thix

Waterproofing of continuous areas

6 Wecryl 279 / Weryl R 230

7 WeFleece / - perforated

8 Wecryl 279 / Wecryl R 230

Heating layer

9 Heat pad with protective mesh

10 Wecryl 847 Adhesive and Reinforcement Mortar (embedding layer)

11 Wecryl 847 Adhesive and Reinforcement Mortar (levelling layer)

Protective and wearing layer

12 a) Wecryl 333 + WestWood Quartz Sand topping 0.7 – 1.2 mm + Wecryl 488

12 b) Wecryl 333 + WestWood Hard Grain, fine 1.0 - 2.0 mm + Wecryl 488

12 c) Wecryl 333 + WestWood Hard Grain, coarse 1.0 - 3.0 mm + Wecryl 402

12 d) Wecryl 413

12 e) Wecryl 419

12 f) Wecryl 420

13) Wecryl 488

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