CONICA

INSTALLATION GUIDE

PLAYGROUND SURFACING

www.conica.co.uk

Disclaimer.

All CONICA Ltd. products and systems are designed to deliver exceptional performance and durability. Failure to follow the guidelines in this installation manual could adversely affect your safety surface, resulting in a deterioration in aesthetics, accelerated wear or even safety surface failure.

CONICA Ltd. cannot be held responsible for loss, or damage resulting from a failure to follow these guidelines. The information in this document has been provided in good faith and is believed to be correct.

This version dated 01/03/22 supersedes all previous versions.

Notices.

The formulations and technical information contained in this installation manual are to be treated as confidential and remain the intellectual property of CONICA Ltd. who reserves the right to review and amend these instructions as required. It is the responsibility of the installer to ensure compliance with the latest version.

All materials specified by CONICA Ltd. have been certified under current and proposed REACH regulations and have also been tested for both user and environmental compliance.

Any variance to these instructions that may be necessary during an installation must be agreed, in writing, by CONICA Ltd. before proceeding. Failure to do so may invalidate the materials warranty.

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1 Safety surfacing overview.

This guide specifically covers the best practice installation of all CONICA Ltd. wet pour, rubber mulch and CONIPAVE RA products. Each product range has been developed to provide high quality, market leading safety surface solutions.

CONICA Ltd. provides a high quality and traceable source of SBR which is used in our wet pour base layer, rubber mulch and CONIPAVE RA. CONICA Ltd. also provides the highest quality EPDM, high performance PU binders, primers, SMOOTHING AGENT and cleaners. All of these constituents, when procured together, will enable you to achieve a stunning, tried and tested installation.

Certificates can be provided to the customer as evidence and assurance that the installed system is of the highest quality and meets the desired requirements. However, in order for the installed system to comply to the relevant certification, the installation guidance within this document, must be followed.

Persons handling CONICA Ltd. products should be informed of any risks and trained in the appropriate methods for both handling and installing these products.

1.1 Safety surfacing components.

There are multiple components which make up an impact absorbing safety surface. This section explains these components in more detail.

SBR (styrene butadiene rubber) is mixed with natural rubber and is commonly derived from the recycling of end of life tyres. CONICA Ltd. only recycles and granulates truck and bus tyres which contain more rubber and less textile than the equivalent car tyre.

SBR granules are typically mixed with a PU (polyurethane) binder and are extensively used as a playground or safety surface base layer.

EPDM (ethylene propylene diene monomer rubber) is a synthetic man-made rubber and like SBR, is mixed with a PU binder and installed as the top wearing layer, usually on top of an SBR base layer, of a playground or safety surface. EPDM granules come in an array of bright and vibrant colours which means that any design can be fulfilled.

Rubber mulch is a homogenous blend of SBR rubber granule and ‘shaved’ tyre buffings which are commonly colour coated and installed either bound using a flexible, single part, moisture curing PU binder, or in loose form. Rubber mulch, due to its resemblance to natural bark or wood shavings, can provide a more natural looking play or decorative safety surface.

CONIPAVE RA is a homogenous blend of SBR rubber granule and a variety of decorative aggregates. This permeable surface is bound with a specially formulated single part, moisture curing PU binder. CONIPAVE RA is fully porous and meets the requirements for SUDS (Sustainable Urban Drainage Solutions).

Moisture curing Polyurethane (PU) binders are commonly used to create impact absorbing playground surface areas. Polyurethane is a polymer which consists of organic units joined by urethane links and are traditionally formed by reacting a di- or poly- isocyanate with a polyol.

There are two main types of PU binder readily available on the market, namely the non-UV stable, which is otherwise known as an 'Aromatic' type and the UV stable, otherwise known as an 'Aliphatic', type.

The chemical formulation and structure of aromatic binders is different to more expensive aliphatic binders, and, as a result, they can yellow making the surface appear to be a different colour (e.g. blue surfaces can appear green). This 'yellowing' occurs when an aromatic binder is exposed to strong UV light causing a reaction within the polymer chains at the surface of the binder. Over time the affected polymer chains are removed through use and natural weathering. Once removed the original colour will again be visible.

CONICA also offers hybrid PU aliphatic binders, which provide better UV resistance than a standard aromatic binder, but not quite as good as a 100% aliphatic binder.

1.2 CONICA Ltd. Safety surfacing systems.

Wet pour surfacing is typically installed using two layers; a base layer of SBR rubber granule and a top layer of coloured EPDM rubber granules. Both are bound using a flexible, single part, moisture curing PU binder.

Rubber mulch is typically installed as a single layer system and is bound using a flexible, single part, moisture curing PU binder. However, there is an increasing tendency to install rubber mulch over a base layer of SBR, and we have recently introduced this option.

CONIPAVE RA is installed as a single layer system and is bound with a specially formulated high tensile, flexible, single part, moisture curing PU binder.

1.3 Playground standards and testing methods.

There are two standards (one European and the other British) that currently apply for playground safety surfaces. This section gives an overview of the two main playground testing requirements:

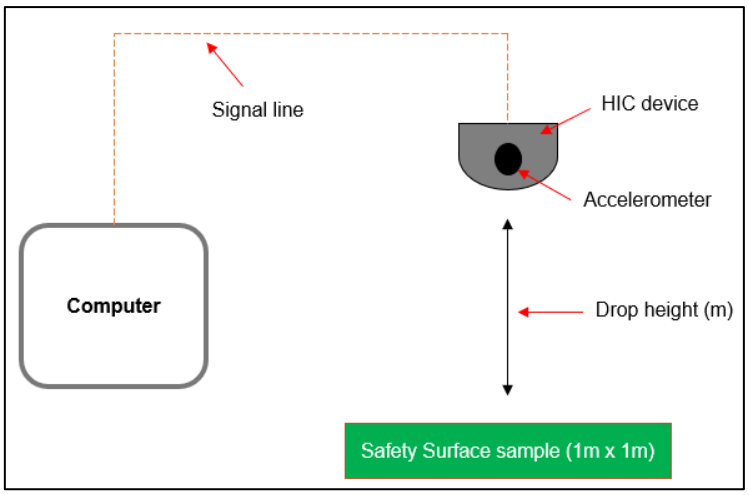
- BS EN 1177 (2018) - Impact Absorbing Surfacing: Safety Requirements and Test Methods.
- BS 7188 (1998)+A2:2009 - Impact Absorbing Playground Surfacing: Performance Requirements and Test Methods.

Testing against each of the standards mentioned above must be conducted by an independent UKAS registered test laboratory.

CONICA Ltd. has tested and certified both wet pour and rubber mulch to both of these playground standards.

1.3.1 BS EN 1177 (2018) - Impact Absorbing Surfacing: Safety Requirements and Test Methods.

The Critical Fall Height (CFH) for a specific surface thickness calculated by dropping an accelerometer from various heights. Many labs and field testers are now using wireless devices which can be connected to any tablet or smart phone. Below is a schematic diagram of how the test is conducted.



For any additional information on Critical Fall Height Testing and for the latest EN 1177 certificate, please contact CONICA Ltd. customer services.

1.3.2 BS 7188 (1998)+A2:2009 – Impact Absorbing Playground Surfacing: Performance Requirements and Test Methods.

BS 7188 (1998)+A2:2009 comprises of 5 tests, all of which qualify the performance of the materials used in the safety surface. These are as follows:

- Section 4 – Determination of Resistance to Abrasive Wear
- Section 5 – Determination of Slip Resistance
- Section 6 – Determination of Resistance to Indentation
- Section 7 – Determination of Ease of Ignition (hot nut)
- Section 8 – Tensile Properties

For any additional information on the performance requirements and test methods testing, and for the latest BS 7188 certificate, please contact CONICA Ltd. customer services.

2 Health and safety.

This section provides guidance on the safe and correct handling and storage of CONICA PU products.

Persons handing CONICA PU products should be informed of the risks and trained in the appropriate methods to handle these substances.

2.1 Health effects.

CONICA PU products are considered to be hazardous.

The health hazards which are associated with CONICA PU products are; skin irritation, allergic skin reactions, eye irritation and respiratory irritation. However, when PPE (personal protective equipment) is used, any health risk is significantly reduced / eliminated.

Please see the CONICA safety data sheet (SDS) for each respective product. These can be obtained by contacting CONICA Ltd. customer services.

2.2 Firefighting products.

For any fires which may break out in storage areas or when in use, use a suitable extinguishing product such as; alcohol resistant foam, powder, sand, CO2 or water. It is also advised that when putting out a fire, that respiratory protection is worn.

3 Stock rotation and storage.

This section covers how to correctly store materials, dispose of empty containers and what to do in the unfortunate event of leak or spill.

3.1 Stock rotation.

Each batch of PU product has a use by date and should be used within the specified time frame. When new product has been ordered, ensure that all stock is rotated so the oldest product is used first.

Our rubber and rubber/aggerate mix products do not have use by dates, but stock rotation is still recommended.

3.2 Returns from site and part used materials.

Drums: Remove taps, lightly grease threads and re-insert lids/caps

Kegs and buckets: Ensure all lids are correctly fitted to ensure the container is air tight

Rubber products: Use duct tape (or similar) to close any opened bags to retain the contents and protect from moisture ingress

Materials should be stored in a dry and well-ventilated area. Ensure materials are not placed in direct contact with the floor to minimise the risk of frost or rodent damage. If materials need to be stored outside, please ensure they are fully covered with a waterproof tarpaulin (or similar) and place binders out of direct sunlight.

Part used materials should be placed in front of unopened materials so that they are used first.

3.3 Drum and keg disposal.

Empty drums and kegs must be emptied and the residue left to cure. Once cured, the container is now inert and may be disposed of according to local authority waste procedures for standard industrial/household waste.

3.4 Product leakage and spillages.

In the unfortunate event of a leak or spillage of a PU product, CONICA Ltd. recommends the following:

1. Contain the leaked or spilled product by pouring sand or as a last resort, SBR or EPDM granules on top of the spill.
2. Pour water onto the leak or spill which will accelerate the curing the process and prevent it from bonding to the existing surface.

3. Scrape up the material with a shovel and place into an empty bag, bucket or container. If a bag has been used, leave it open, if a bucket or container has been used, leave the lid off so the material can cure and become inert.

4. Wipe up any residue with a rag and place into an empty bag, bucket or container, with the lid off so it can cure and become inert.

5. Dispose along with all other site waste.

6. Pressure wash the surface to remove any excess that wasn't cleared by the above steps.

Following the guidance listed above will ensure that the spill is controlled and the site is left in a clean and tidy manner.

4 Site inspection and project management.

Before starting the installation, the installer should call the main contractor to discuss and re-confirm the work scope, access to site, site size, project status and to request a final drawing and photos of the site. If it is feasible to do so, the installer should conduct a site inspection to confirm the following details:

- Site assessment. Measure the area and depths. Assess the sub-base or existing surface.
- Fall zones. Are all the required fall zones and depths identified on the drawing and marked out correctly on site?
- Chases. If a chase cut is required, ensure there is sufficient room and extra materials have been allowed.
- Play equipment. Check all existing play equipment and confirm what is fixed and what is removable.
- Extraction. When working with products which exert fumes, appropriate action needs to be taken. If working indoors check to ensure there is sufficient ventilation. When working outdoors, for example in a courtyard, consider any air intake points to ensure fumes cannot be drawn into adjacent buildings.
- Working notices. Any project is likely to cause disruption for local residents and businesses. Therefore, consider whether notice should be given to local residents, informing of them when the works will start and when they will finish.
- Working area. This must be clearly defined and protected using temporary fencing (Heras fencing), demarcation barrier tape or any other suitable method.
- Delivery access. This must be clearly defined. If there are any restrictions or special requirements, CONICA Ltd. recommends informing us, so that the delivery can be made using an appropriate vehicle.

After completing the site inspections and pre-requisite checks, you should ensure that all materials ordered are sufficient to complete the job, including any extras for chases.

For all projects CONICA Ltd. recommends ordering +10% of all materials needed.

To conclude, the safest means of access and general site conditions for mixing and installing need to be assessed. All site personnel and, where appropriate, any other visitors need to be informed of the proposed plan of operations. These should include, but are not limited to; how to safely unload materials and tools, where will these be stored during the installation, the distance from the mixer to where the surface is being installed, and finally any obstacles such as steps and gates.

5 Site access, storage, material storage and waste.

Throughout the planning and implementation phases of the project, there are many variables and obstacles that need to be considered and a plan of action put in place for each. This section provides guidance on what should be checked prior to starting any safety surface installation.

5.1 Site Access.

Any obstacles within the area such as steps, will need scaffold boards to provide suitable wheel barrow access. If there are any gates, these should be measured and checked that a wheel barrow and any other large equipment can pass though.

If the installation is within a courtyard, building access may be required. If this is the case, there needs to be adequate floor protection, signage and barrier tape segregating the general public and the installation team. If the only option is to barrow mixed material through the building, the barrow would need covering with a plastic sheet to prevent any spillage and fumes from lingering within the building. All nearby windows must be closed to prevent the fumes from entering a living or workspace.

If the installation is at a hospital, or at any premises with air conditioning intakes, care must be taken so that any fumes are not able to enter the air conditioning system.

5.2 Delivery access.

Before any materials are delivered to site, the access to site needs to be pre-defined and agreed with the end client or site owner. Here are some examples:

- Narrow roads
- Height restrictions, such as low bridges or archways
- Security access, such as a coded gate or barrier
- One-way roads
- No parking zones

Once the delivery access has been defined, all parties need to be made aware and adequate instructions must be provided to CONICA / the courier so that an appropriate vehicle can be used.

5.3 Material storage on site.

Materials delivered to site should be stored in a manner that protects them from damage and extreme weather; rain, sun, frost and snow.

Correct component and material storage on site are just as important as correct installation or having the appropriate tools for the job.

Incorrect or inadequate storage can cause issues before, during and after the installation has been completed, such as having wet rubber and too viscous or too runny binder.

If materials have to be left outside, whether at a warehouse or on site, always cover them with a waterproof sheet / tarpaulin or, if possible, store them in a covered area where the materials are not in direct sunlight and where rain and snow cannot settle on them.

5.4 Site waste.

It is recommended that before the installation commences, skips are ordered and placed on site. Throughout the installation, CONICA Ltd. also recommends that all site and general waste is sorted into clean and soiled, so that it can easily be recycled or disposed of correctly.

All used drums and IBCs must be emptied and the lids left off so any residue can cure fully. CONICA playground polyurethane binders are moisture curing, so the natural moisture in the air will cause the residue to cure inside the drum within 24 hours, making it inert.

This then allows them to be disposed of in accordance with local authority waste procedures for standard industrial/household waste.

Uncured polyurethane should not be disposed of alongside normal household waste.

6 General installation guidance and points of best practice.

6.1 Tools list.

Before undertaking a safety surface installation, it is crucial that all the tools needed for the job are loaded into the van prior to starting. Failure to do so will lead to inefficient working practices and delays could occur.

Below is a list of equipment that is typically required for any installation:

- Force action pan mixer
- Wheel barrow
- Wooden screed rails
- Aluminium straight edge
- Spazzle
- Various shaped hand float/trowels
- Roller(s)
- Digital thermometer
- Drum stand
- Drum tap
- Scales
- Buckets for measuring binder and cleaning floats
- PPE; gloves, protective sleeve covers, safety glasses, respirator

Ensuring that you have the majority, if not all of the above at hand for any installation, will enable you to complete the project efficiently and safely. Along with this guidance, it will also help to guarantee that the installation will be of the highest standard.

A full tools list can be provided. Please contact CONICA Ltd. technical services on uktechnical@conica.com.

6.2 Release agent.

Many installers within the surfacing sector use diesel or soapy water as a release agent, which ensures that tools do not get sticky and drag material during the installation. CONICA Ltd. recommends that both of these products are avoided for the following reasons:

- Diesel is not only hazardous to the environment, but it also leaves a residue which can make the surface slippery and it can also impair the adhesion between each layer, or to the sub-base.
- CONICA Ltd. binders are moisture curing. Therefore, the use of soapy water can accelerate the curing time and cause inconsistencies which can affect system performance and / or result in surface defects, such as cracking.

CONICA Ltd. offers an environmentally friendly SMOOTHING AGENT. This product has been designed and tested to act as a release agent during installations. An added benefit is that it is also an excellent tool cleaning product.

Failure to use CONICA SMOOTHING AGENT could affect the guarantee and CONICA Ltd.'s ability to assist and resolve any complaints.

6.3 Tool cleaning.

All of the tools used to install and mix materials can be cleaned with SMOOTHING AGENT. Simply soak a rag in some SMOOTHING AGENT, wring the rag out and wipe all tools which have PU products on them. Once the PU residue had been removed, wipe the tools dry with a clean rag and store away, ready for the next job.

At the end of the working day, the mixer should be cleaned by following the steps below:

1. Turn the mixer off and cut the power.
2. Scrape with a 'paint scraper' to remove any excess rubber.
3. Turn the mixer back on and fill with SBR (2 bags for a two-bag mixer etc.) and add a capful of CONICA Smoothing Agent (use the keg cap / lid). The SBR will pick up all the left-over residue.
4. Leave it running whilst the rest of the site is tidied.
5. Empty the SBR back into the bags for re-use either the next day or the next SBR base job.
6. Once the mixer is empty, pour some SMOOTHING AGENT into the mixer and wipe clean with a rag.
7. Leave the trap door open to prevent it from seizing shut.

Alternatively, if you have no SBR available:

1. Turn the mixer off and cut the power.
2. Scrape the with a 'paint scraper' to remove any excess rubber.
3. Once the mixer is empty, pour some SMOOTHING AGENT into the mixer and wipe clean with a rag.
4. Leave the trap door open to prevent it from seizing shut.

6.4 Weighing of components and cleaning of equipment.

With any installation, the importance of accurately measuring / weighing all of the components is essential in ensuring that the installation is completed correctly and that it is within specification and conforms to all safety standards.

If you do not have access to scales on site, CONICA Ltd. recommends that all buckets are pre-measured and marked and that, after use, they are cleaned out so they not only are kept in good condition, but this ensures that the correct quantities are being used each and every time.

The easiest way to clean a bucket after use is to leave it uncovered and then peel out the cured residual binder the next day.

If a bucket is damaged and beyond repair, then it should be replaced and re-marked, ready for use.

6.5 Climatic conditions.

Installations can, and will, be affected by extreme weather conditions. Therefore, it is recommended that installations are not attempted when:

- The ground surface temperature is 5oC or below.
- The ground surface temperature is 30oC or above.
- During periods of heavy rain, snow, sleet etc.
- In areas of standing water.
- When rain, sleet or snow is likely before the surface has fully cured.

The installer must ensure that the surface is only installed during acceptable climatic conditions. Where necessary, this may require the installation to occur in the early hours, late afternoon or overnight.

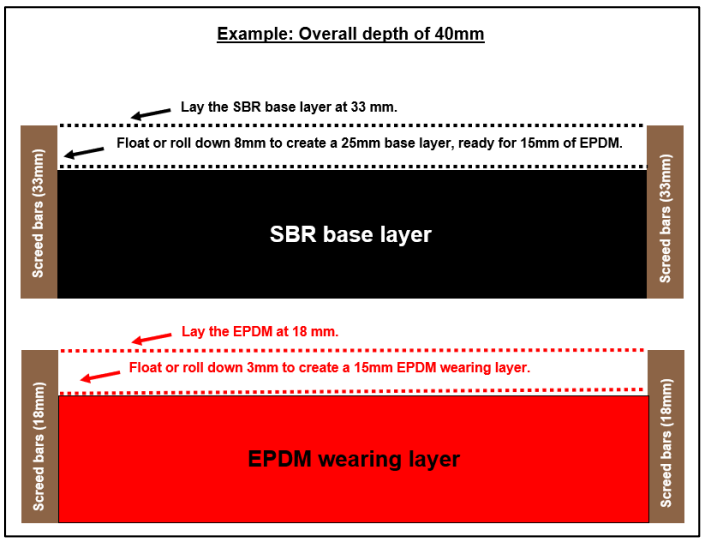
6.6 Screeding.

Screed rails are typically made from aluminium or timber and are used as a guide to ensure that the surface is installed at the correct thickness.

For example, for a two-layer system which is to be installed at an overall thickness of 40mm, CONICA Ltd. recommends the following:

- SBR base layer: using 33mm screed rails and a screed bar, screed the SBR base layer so it sits level to the screed rails. This can then be lightly compacted using a hand float or rolled, using a medium, 9.4kg roller, which compacts the SBR base-layer down to 25mm.
- EPDM wearing layer: using 18mm screed rails and a screed bar, you can screed the EPDM wearing layer so it sits level to the screed rails. This can then be hand floated down to 15mm.

Below is a diagram which shows this example.



Summary.

SBR.

Lay the SBR base layer to require thickness +8mm, and hand float or roll down to finish.

EPDM.

Lay the EPDM to the required finish thickness +3mm, and hand float or roll down to finish.

6.7 Mixing advice.

A neat and well organised mixing area should be established, including where viable, the use of plastic sheeting to protect the existing surface from contamination and damage.

CONICA Ltd. recommends that climatic conditions are taken into consideration when mixing material. For example, when it's hot and / or humid, mix in the shade or under cover to prevent an accelerated cure and to ensure that the material stays workable for as long as possible. Also, depending on the temperature, you may have to mix in smaller batches (2 bags as a minimum).

In order to achieve a homogeneous and even surface, materials must be accurately measured and thoroughly mixed in a forced action pan mixer for 3 minutes before application. Each mix must be mixed for the same time as this is crucial for consistency. Never mix only part of a bag and if multiple batches are delivered to site, always mix at a consistent ratio (1 from each batch number).

For example, if three (3) tonnes of coloured EPDM has been delivered to site and two (2) tonnes are from batch one and one (1) tonne is from batch two, then add to the mixer at a ratio of 2:1, each and every time.

This is even more crucial when installing CONIPAVE RA and colour coated rubber mulch. Even though the greatest care is taken by CONICA Ltd. when producing these products, as these are made from recycled materials, no two batches of CONIPAVE RA and colour coated rubber mulch are ever exactly the same. Therefore, any deviation from the recommended 3-minute mixing time, for each and every mix, may lead to the surface looking patchy or inconsistent in places.

Below is a copy of the CONICA Ltd. mixing ratios. A separate pdf. can be requested by contacting CONICA Ltd. technical services on uktechnical@conica.com.

Wet Pour Safety Surfacing												
Rubber granules	Binder	Binder % by weight	1 bag		2 bags		3 bags		4 bags		5 bags	
			25 kgs		50 kgs		75 kgs		100 kgs		125 kgs	
			Binder									
			kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag
CT 4010 (EN1177-2018 certified)	CP 4020	7.5%	1.88	1.75	3.75	3.50	5.63	5.25	7.50	7.00	9.38	8.75
CT 2060	CP 4020	10.0%	2.50	2.35	5.00	4.65	7.50	7.00	10.00	9.35	12.50	11.70
	CP 4051			2.40		4.75		7.15		9.50		11.90
Coloured EPDM	CP 4020	18.0%	4.50	4.20	9.00	8.40	13.50	12.60	18.00	16.80	22.50	21.05
	CP 4051			4.30		8.55		12.85		17.15		21.45
	CP 4080			4.25		8.50		12.75		17.00		21.25
	CP 4090			4.20		8.40		12.60		16.80		21.05
Black EPDM	CP4020	22.0%	5.50	5.15	11.00	10.30	16.50	15.40	22.00	20.55	27.50	25.70
	CP4051			5.25		10.50		15.70		20.95		26.20

Colour coated and plain black rubber mulch												
Colour coated and plain black Mulch	Binder	Binder % by weight	1 bag		2 bags		3 bags		4 bags		5 bags	
			10 kgs		20 kgs		30 kgs		40 kgs		50 kgs	
			Binder									
			kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag
Standard use (EN1177-2018 certified)	CP 4020	18.0%	1.80	1.70	3.60	3.35	5.40	5.05	7.20	6.75	9.00	8.40
	CP 4051			1.70		3.45		5.15		6.85		8.55
Heavy use	CP 4020	20.0%	2.00	1.85	4.00	3.75	6.00	5.60	8.00	7.50	10.00	9.35
	CP 4051			1.90		3.80		5.70		7.60		9.50

CONIPAVE RA												
CONIPAVE RA	Binder	Binder % by weight	1 bag		2 bags		3 bags		4 bags		5 bags	
			25 kgs		50 kgs		75 kgs		100 kgs		125 kgs	
			Binder									
			kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag	kgs / bag	Litres / bag
All colours	CP 610	13.0%	3.25	2.95	6.50	5.90	9.75	8.85	13.00	11.80	16.25	14.75

6.8 Binder selection.

CONICA Ltd. offers four different single component, moisture curing, wet pour and rubber mulch PU binders and two different single component, moisture curing, PU binders, suitable for rubber-aggregate blends such as CONIPAVE RA installations. These PU binders range from completely standard Aromatic binders (that can yellow), to fully Aliphatic binders (UV stable).

The table below shows each, with a brief description.

	Binder number					
	CP 4020	**CP 4051**	**CP 4080**	**CP4090**	**CP 610**	**CP 653**
Description	PU binder Aromatic Playground	PU binder Aromatic + UV enhancement Playground	PU binder Hybrid-Aliphatic Playground	PU binder Aliphatic Playground	PU binder Aromatic RA mix	PU binder Aliphatic RA mix
UV stability	None	Low	High	Full	None	Full
Use	SBR EPDM rubber mulch Black EPDM (Playmaker)	SBR EPDM rubber mulch	EPDM rubber mulch	EPDM rubber mulch	CONIPAVE RA	CONIPAVE RA
Ready for foot traffic (hours)	24	24	32	32	24	36

CONICA Ltd. recommends that if you have projects where the colour is crucial, you should use either the UV enhanced CONIPUR 4051, semi-Aliphatic CONIPUR 4080 or fully-Aliphatic CONIPUR 4090.

Please note that the yellowing of the binder which leads to the perceived discolouration of the surface is only temporary and over time (typically 4-12 weeks), subject to UV levels and use, it will settle and the original surface colour will return.

Finally, the yellowing does not affect the mechanical properties and the safety surface's performance is not jeopardised in any way.

To provide evidence that yellowing disappears and the original colour returns, tests were conducted using CONIPUR 4020 and Sky Blue EPDM.

The picture on the left shows that after 1 day, the binder yellows, making the surface appear a shade of green. The picture on the right was taken 6 weeks later and the original colour (Sky Blue) had returned.

7 Sub-bases (foundation layer) and suitability.

There are three main sub-base types; concrete, asphalt and MOT type 1 stone. A good quality sub-base is essential and whether it is newly installed or existing, it must be in a sound condition.

The sub-base for any surface should be designed to meet the following criterial:

- Capable of supporting the loads of all vehicles, plant, machinery and materials which are necessary for construction without causing any deformation.
- If a permeable sub-base has been installed, it should ensure that any water which falls onto it will drain away freely through the sub-base material, either into the natural soil underneath or into a specified drainage system.

Before any safety surface installation commences, CONICA Ltd. recommends that the sub-base is checked to ensure that it is suitable for the intended use.

7.1 Concrete sub-bases.

This is the most basic sub-base material. Generally, it is poured directly onto a gravel or a soil bed. It is strong, durable and extremely long lasting. Concrete is popular for high foot traffic areas.

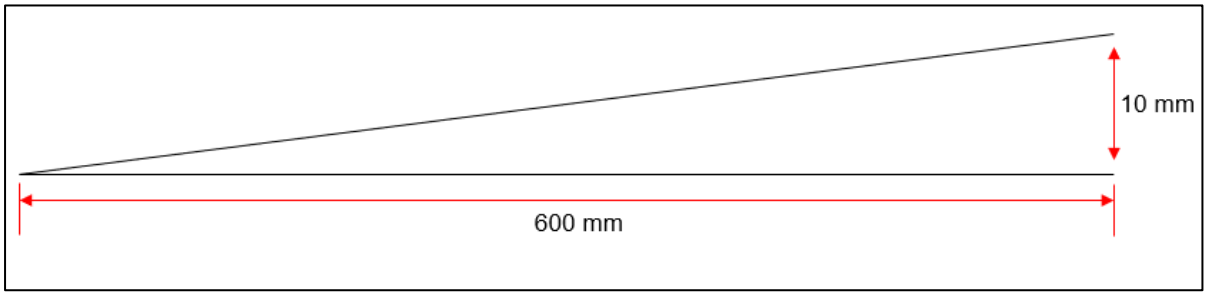
Concrete is constructed from fine or coarse aggregate such as crushed clean rock or washed gravel and mixed with cement to form an impermeable sub-base.

The thickness of a concrete sub-base can range from:

- 75mm - 100mm for garden paths
- 100mm - 150mm for driveways and public footpaths
- 150mm – 225mm for heavy use roads and highways

When an impermeable concrete sub-base has been installed, there needs to be a fall so any water can run off the surface. To allow the concrete sub-base to drain, a gradient (fall) of 1:60 is recommended. This means that there will be a 10mm change in the surface level over every 600mm of horizontal surface. The diagram below shows this.

Please note that this is not to scale.



7.1.1 Checking an existing concrete sub-base.

For an existing concrete sub-base, it is recommended that the surface is visually inspected for any cracks and a string line can be used to check for deviations such as dips and bumps throughout the surface. If any repairs are needed, they should be carried out in sufficient time to allow for adequate curing before the safety surface is installed.

7.1.2 Checking a new concrete sub-base.

As a general rule, the initial curing time of concrete is typically 24-48 hours, at which point it is safe for light foot traffic. After 1-2 weeks, concrete is typically cured enough to handle continued construction, including the use of machinery. Finally, concrete is recognised to have reached its full strength after 21 days.

Once the concrete is poured and cured, it should be visually inspected for any cracks and a string line or 3m straight edge bar can be used to check for deviations such as dips and bumps throughout the surface. If any repairs are needed, they should be carried out in sufficient time to allow for adequate curing before the safety surface is installed.

7.2 Asphalt.

Asphalt is primarily used in road and foot path construction.

Asphalt consists of aggregate which is mixed with bitumen. The bitumen should be a straight run, 200 penetration, without any cut-back oils. The materials should be laid and compacted to BS 594987:2007 and BS EN 13108-7 and the tolerance should be in the range of +0mm - 5mm of the design level.

The thickness of an asphalt sub-base can range from approximately 60mm – 75mm.

7.2.1 Checking an asphalt sub-base.

For an existing asphalt sub-base, it is recommended that the surface is visually inspected for any cracks and a string line or 3m straight edge bar can be used to check for deviations such as dips and bumps throughout the surface. If any repairs are needed, they should be carried out in sufficient time to allow for adequate curing before the safety surface is installed.

7.2.2 Checking a new asphalt sub-base.

Newly laid asphalt needs time to harden and cure, this process is called ‘oxidation’. This usually takes between 6-12 months, however, after 21 days, asphalt is cured to the point where a permeable safety surface can be installed.

The surface should be visually inspected for any cracks, and, when checked with a string line or 3m straight edge bar, there should be from no deviation from the underside greater than 5mm. If any repairs are needed, they should be carried out in sufficient time to allow for adequate curing before the safety surface is installed.

7.3 MOT Type 1.

MOT (Ministry of Transport) type 1 is generally a mix of granite, limestone, basalt or gritstone which is crushed to various sizes. The sizes range from 40mm down to dust, but must have no more than 10% fines (as this will affect porosity). It is used to create an easily compacted base layer.

MOT type 1, also known as DOT type 1, which is named after the Department of Transport (DOT) specification for granular sub-base material, is the most widely used and approved sub-base in the construction industry. MOT type 1 is a must for any high traffic or high use area.

An MOT type 1 sub-base can be installed in layers and each layer must not exceed 100mm and must be compacted before the next layer is installed such that, upon completion, there is no detectable movement and that the surface level tolerance is within the range of 0mm to -10mm of the design level.

The thickness of the MOT type 1 sub-base will depend on the site ground conditions and can vary from 100mm up to 300mm.

7.3.1 Checking an existing MOT type 1 sub-base.

Check the surface for any major deviations and soft spots. Finally pour a litre of water on to the surface to check that it drains and does not stay standing on the surface.

7.3.2 Checking a new MOT type 1 sub-base.

Once the MOT type 1 is delivered to site, visually assess the material for the fines content and check if it looks to be conforming to the requested specification. Also check the paperwork to ensure that it corresponds accordingly.

Once the stone has been installed, ensure that it has been sufficiently compacted and check for any major deviations and soft spots. Finally pour a litre of water on to the surface to check that it drains and does not stay stand on the surface.

7.4 Natural turf or soil sub-bases.

Natural sub-bases can either be turf (grass) or soil. Installing onto natural turf or soil is not recommended because all deviations or irregularities within the natural sub-base are likely to be mirrored through to the final surface. i.e. sub-base saturation through excessive rainfall or sub-base shrinkage due to excessively dry weather will impact on the surface regularity, causing the safety surface to move and become less ‘flat’.

7.5 Sub-base preparation.

Correct sub-base preparation is just as important as the surface installation. A prepared sub-base will ensure that the poured in place material; wet pour, rubber mulch or CONIPAVE RA adheres to the sub-base sufficiently and reduces the likelihood of any future issues.

Before an installation commences onto concrete or asphalt, CONICA Ltd. recommends the following:

1. Remove all moss and weeds. Please refer to **'Appendix 2 – Cleaning'**
2. Repair any cracks
3. Jet-wash the sub-base and allow too thoroughly dry
4. Sweep and remove all loose debris

If installing a two-layer system, CONICA Ltd. also recommends ensuring the SBR is clean and free from dirt and debris.

In addition to all the guidance in section 7, following the above suggested steps will help to ensure that the sub-base is fit for purpose.

For a type 1 MOT sub-base, please follow the guidance provided in section **7.3 – MOT type 1**.

7.6 Priming.

When installing a single 20mm layer of EPDM, the sub-base should be primed. Priming ensures the EPDM bonds to the sub-base sufficiently and reduces the likelihood of any future issues such as surface lifting and delamination.

The sub-base does not need to be primed when installing a two-layer wet pour system, rubber mulch (single layer or a two-layer hybrid system) or CONIPAVE RA. All of these systems are secured by their own weight.

Once the concrete or asphalt sub-base has been prepared and is clean and free from dirt and debris, it needs to be primed using CONIPUR 4710.

When priming a sub-base, CONICA Ltd. recommends using a short pile roller and paint tray (for the larger areas) and a paint brush for all difficult / hard to reach areas e.g. kerbs and adjoining walls.

There should be limited overlap and no 'pools' of primer on the sub-base. CONICA Ltd. recommends installing the single 20mm EPDM layer whilst the primer is still wet or tacky. Do not let the primer dry as it will offer no better adhesion vs. an un-primed surface, so working in manageable areas is key.

Please refer to **'11.1 working and screeding in rows'** for further guidance.

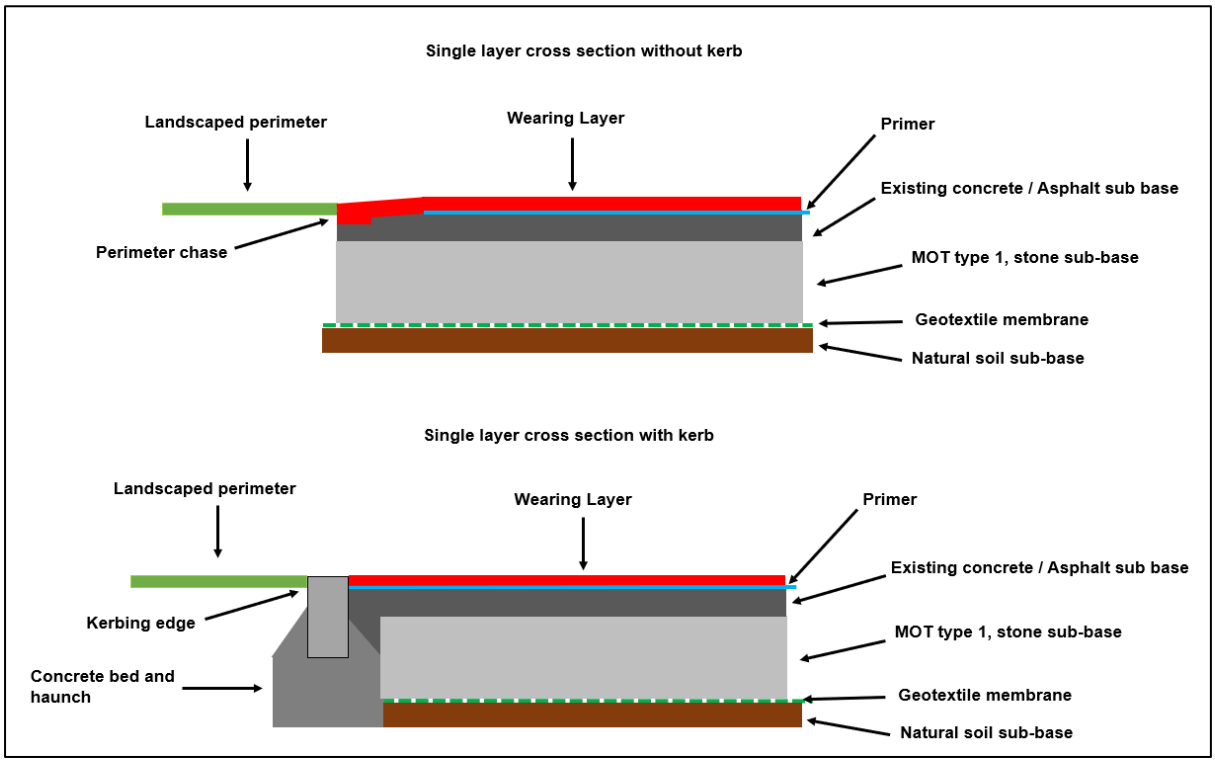
CONICA Ltd also recommends that all perimeter edging, colour to colour transitions and day joint edges are primed.

The average consumption rate for CONIPUR 4710 is 0.2 kg p/m^2.

8 Safety surface build up.

This section shows the typical build-up of a single and two-layer safety surface and covers wet pour, rubber mulch and CONIPAVE RA.

The diagram below shows a typical cross section of a single layer system.



8.1 Geotextile membranes.

In order to aid the future recycling of an end of life playground surface, CONICA Ltd. recommends laying a geotextile fabric membrane; non-woven, T1000 or equivalent onto an MOT type 1 sub-base, prior to installation of 2 layer safety surfacing.

The geotextile membrane acts as a separation layer and ensures that the clean stone sub-base is not contaminated by the safety surface materials on top. By following this recommendation, it ensures that once the playground surface reaches the end of its life and it is lifted, it can more easily be recycled.

In addition to laying a membrane over the MOT type 1 sub-base, one can also be installed over the soil, before the installation of the stone sub-base. The benefit is that this geotextile not only acts as a stabilisation layer but also a separation layer between the stone and soil. During periods of heavy rain this can prevent the MOT type 1 from sinking into the soil sub-base which can lead to voids within the safety surface being created. These voids can cause cracks, soft spots and can cause the surface to pull away from the perimeter edge.

Whenever a geotextile membrane is installed, any joints should be overlapped by 300mm.

9 Installing a safety surface – general guidance.

Before commencing with the installation, the team leader should re-check the specified thicknesses against the contract details. In addition to this, checking the condition of the guide timbers, screed bars, depth gauges and all other installation tools is strongly advised. This is to ensure that they are both suitable for the job and the thicknesses to be installed. Please refer to section '**6.6 – Screeding'** for more information.

When installing a safety surface, CONICA Ltd. recommends working in rows. (please see '11.1. Working and screeding in rows').

Below is a summary of what needs to be completed before the installation commences. This will ensure that the job will be completed as effectively and efficiently as possible.

1. Check the weather looks adequate for the day in which the installation will occur.
2. Make sure the latest drawing revision has been provided.
3. Re-confirm all requirements and discuss any details of which you are unsure.
4. Check the sub-base is fit for purpose, consistent and free from undulations and low points
5. Check all site markings and that all critical fall and play zones are clearly identified.
6. Check that all materials needed for the job have been delivered. An additional 10% is recommended to cover any unforeseen circumstances and issues which may result is more material being consumed.
    a. Rubber; SBR, EPDM, CONIPAVE RA and / or rubber mulch (as required).
    b. Binder
    c. SMOOTHING AGENT
    d. Primer, top coats, pore sealers etc.
7. Check that all materials are stored correctly and are in good condition.
8. Check that all tools and equipment needed for the job are in a clean condition and ready to be used.
9. Check that you have adequate quantities of all sundry items; gloves, rages, sleeve protectors etc.
10. Allocate a mixing area and place appropriate ground cover where necessary.
11. Ensure that there is adequate site protection in place (for example, Heras fencing) once you leave site, especially during the curing period.

9.1 Quality control measures.

The installer is responsible for recording relevant information, which will be required in the unlikely event of an installation issue occurring, or in the event of a complaint and/or warranty claim. Please note that only complaints supported by a record of this information can be considered.

- Temperature log (°C or °F).
- Humidity log (%).
- Batch numbers on all rubber products.
- Lot numbers on all chemical and PU products.

If any issues occur, CONICA Ltd. will need this information to be able to provide accurate advice and feedback. It is also useful for your own knowledge to look at how the material reacts under different climatic conditions. Ideally, please record the time, temperature and humidity at the start, mid-point and end of each shift.

CONICA Ltd. has created an installation record, an example can be found in '**Appendix 1 – site inspection record**'. This has been created to highlight what must be recorded before, during and after each project so that in the unfortunate event of an issue, complaint or claim, all of the relevant information has been recorded and is at hand. Copies can be requested by contacting CONICA Ltd. technical services on uktechnical@conica.com.

9.2 Installing a single layer of wet pour (EPDM).

When installing a single layer, CONICA Ltd. recommends a minimum thickness of 20mm and this can be installed directly onto an asphalt or concrete sub-base.

The sub-base and all edges must be 100% primed with CONIPUR 4710. If the safety surface is being laid onto a new concrete or asphalt sub-base, it must be cured fully as any excess moisture (from concrete) and oils (from asphalt) will affect the primer and break the bond between the sub-base and EPDM layer. (please see '**7. Sub-bases (foundation layer) and suitability**').

CONICA Ltd. does not recommend installing a 20mm layer over MOT type 1.

9.2.1 Step by step installation guide.

Below is a simple step by step guide on how to install a single layer of wet pour:

1. Prime the concrete / asphalt sub-base with CONIPUR 4710.
2. Set up the mixing area and place appropriate ground cover where necessary.
3. Turn the force action pan mixer on.
4. Empty the EPDM into the mixer.
5. Measure / weigh off the binder (please see '6.7 Mixing advice').
6. Pour the binder into the mixer and leave it to mix until the rubber is fully and evenly coated. CONICA Ltd. recommends 3 minutes.
7. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screeded.
8. Screed and level the EPDM at a thickness of 23mm (20mm +3mm).
9. Float the EPDM down by 3mm, using either a hand float or a medium, 9.4kg roller.
10. Repeat steps 8 – 10 until you finish or stop at a planned break point.
11. Once finished, leave the EPDM wearing layer to cure fully.

Throughout the installation, CONICA Ltd. recommends using CONICA SMOOTHING AGENT to lubricate and clean all tools.

Finally, at the end of each working day, all tools and the mixer should be cleaned and left in a tidy and useable condition. All unused materials should be covered to protect against the elements, drum taps are to be removed and cleaned, ready for reuse and drum lid threads covered in grease and resealed.

The finished top EPDM wearing layer must be allowed to cure fully before any site protective measures are removed and the surface is subjected to any kind of use. The curing time is defined as the point in which the surface can accept light foot traffic, without damage. However, for more accurate times, please refer to the relevant binder TDS (technical data sheet).

9.3 Installing a two-layer wet pour safety surface.

When installing a two-layer system, CONICA Ltd. recommends a variable thickness of SBR base rubber and a 15mm EPDM wearing layer. The SBR base layer can be installed on either an asphalt, concrete or a MOT type 1 sub-base. Please note that when installing a two-layer system, the thickness of the SBR base layer is dependent on the CFH requirements.

Any appropriate 'ramping down' at the perimeter must be beyond the critical fall height area. The base layer should be reduced in thickness down towards the perimeter chase. In order to ensure no tripping hazards are created, the required gradient between the full thickness and the perimeter chase should not be steep, but a controlled decline (please see '**11.2. Gradients'**).

The installer or Contracts Manager should mark out the external edge of the chase by referring to the site and/or project drawings, or any other relevant information that has been provided.

9.3.1 Step by step installation guide.

Below is a simple step by step guide on how to install the SBR base layer:

1. Set up the mixing area and place appropriate ground cover where necessary.
2. Turn the force action pan mixer on.
3. Empty the SBR into the mixer.
4. Measure / weigh off the binder (please see '**6.7 Mixing advice'**).
5. Pour the binder into the mixer and leave it to mix until the rubber is fully and evenly coated. CONICA Ltd. recommends 3 minutes.
6. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screeded.
7. Install the SBR base layer using guide timbers to the appropriate thickness required. This is dependent on Critical Fall Height requirements so revert back to the drawing if you are unsure.
8. A screed bar should be laid across the screed rails and used to achieve an evenly distributed layer, which can be finished by hand float or a medium, 9.4kg kg roller.
9. Create an 'edge wedge' around the perimeter, between the kerb and SBR. For more information, please refer to '**section 12.1 – Edge Wedge**'.
10. Leave the SBR base layer to cure sufficiently.

Throughout the installation of the SBR base layer, installed thickness should be regularly checked by using a depth gauge or another adequate measuring device. The base layer should be installed to accommodate the 15mm top EPDM wearing layer. However, at a minimum of 50mm from any perimeter, the base layer should be graded down to allow for an increased top EPDM wearing layer thickness at the kerb face, chase or other edging to create a strong 'edge wedge' detail. Difficult areas should be installed by hand and finished using a hand float only. For more information on detailing, please refer to '**section 12 – Detailing**'.

Before installing the top EPDM wearing layer, the SBR base layer should be given adequate time to cure. The curing time is defined as the point in which the surface can accept light foot traffic, without damage. However, for more accurate times, please refer to the relevant binder TDS (technical data sheet). The installer must also inspect the condition of the base layer and any defects, if found, should be rectified immediately, before commencing with the EPDM layer installation.

After the base layer has cured sufficiently, you can install the EPDM wearing layer:

1. Set up the mixing area and place appropriate ground cover where necessary.
2. Turn the force action pan mixer on.
3. Empty the EPDM into the mixer.
4. Measure / weigh off the binder (please see '**6.7 Mixing advice'**).
5. Pour the binder into the mixer and leave it to mix until the rubber is fully and evenly coated. CONICA Ltd. recommends 3 minutes.
6. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screeded.
7. Screed and level the EPDM at a thickness of 18mm (15mm +3mm).
8. Float the EPDM down by 3mm, using either a hand float or a medium, 9.4kg roller.
9. Repeat steps 8 – 10 until you finish or stop at a planned break point.
10. Once finished, leave the EPDM wearing layer to cure fully.

Throughout the installation, CONICA Ltd. recommends using CONICA SMOOTHING AGENT to lubricate and clean all tools.

At the end of each working day, all tools and mixer should be cleaned and left in a tidy and useable condition. All unused materials should be covered to protect against the elements, drum taps are to be removed and cleaned, ready for reuse and drum lid threads covered in grease and resealed.

The finished top EPDM wearing layer must be allowed to cure fully before any site protective measures are removed and the surface is subjected to any kind of use. The curing time is defined as the point in which the surface can accept light foot traffic, without damage. However, for more accurate times, please refer to the relevant binder TDS (technical data sheet).

9.4 Installing a single layer rubber mulch safety surface.

For some installations onto an engineered sub-base, a perimeter chase may be required. For these installations, the wet pour base layer should be installed to the full defined thickness in areas where critical fall height requirements apply.

The installer or Contracts Manager should mark out the external edge of the chase by referring to the site and/or project drawings, or any other relevant information that has been provided.

Where an engineered edging is in place, or is to be installed, it should be brushed clean of any loose material or debris and dried, if required, and primed with CONIPUR 4710 solvent free primer.

Throughout the industry, rubber mulch is sometimes installed onto a natural turf or soil sub-base. CONICA Ltd. does not recommend this as the sub-base may not drain correctly which leads to water retention, 'ponding' or mud travelling up to the surface.

9.4.1 Step by step installation guide.

Below is a step by step guide on how to install rubber mulch:

1. Set up the mixing area and place appropriate ground cover where necessary.
2. Turn the force action pan mixer on.
3. Empty the rubber mulch into the mixer.
4. Measure / weigh off the binder.
5. Pour the binder into the mixer and leave it to mix until the rubber is fully and evenly coated. CONICA Ltd. recommends 3 minutes.
6. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screed.
7. A screed bar should be laid across the screed rails and used to achieve an evenly distributed layer (required thickness + 5mm), which can be finished by hand float or a medium, 9.4kg roller.
8. Install the rubber mulch using guide timbers to the appropriate to the thickness required. This is dependent on Critical Fall Height requirements so revert back to the drawing if you are unsure.

Colour coated rubber mulch is a blended product, there may be some variation between batches. Therefore, batch numbers should be checked and recorded prior to starting the installation. When mixing, it is crucial to ensure that the correct ratios is mixed, each and every time, to ensure a uniform finish. For example, if three (3) tonnes of Colour coated rubber mulch has been delivered to site and two (2) tonnes are from batch one and one (1) tonne is from batch two, then add to the mixer at a ratio of 2:1, each and every time. The same logic is applied for blends.

Rubber mulch is installed using screed rails, appropriate for the thickness required. For example, a single 120mm layer system, we recommend the following:

Using 125mm screed rails and a screed bar, you can screed the rubber mulch so it sits level to the screed rails. This can then be lightly compacted using a hand float or rolled, using a medium, 9.4kg roller, which compacts the rubber mulch down to 120mm.

Throughout the installation, installed thickness should be regularly checked by using a depth gauge or another adequate measuring device.

Hand float or use a medium, 9.4kg roller to roll the surface to finish using CONICA SMOOTHING AGENT.

The installed safety surface must be allowed to cure fully before any site protective measures are removed and the surface is subjected to any kind of use. The curing time is defined as the point in which the surface can accept light foot traffic, without damage. However, for more accurate times, please refer to the relevant binder TDS (technical data sheet).

At the end of each working day, all tools and mixer should be cleaned and left in a tidy and useable condition. All unused materials should be covered to protect against the elements, drum taps are to be removed and cleaned, ready for reuse and drum lid threads covered in grease and resealed.

9.5 Installing a two-layer (hybrid) rubber mulch safety surface.

When installing a two-layer system, CONICA Ltd. recommends a variable thickness of SBR base rubber and a 30mm rubber mulch wearing layer. The SBR base layer can be installed on either an asphalt, concrete or a MOT type 1 sub-base. Please note that when installing a two-layer system, the thickness of the SBR base layer is dependent on the CFH requirements.

Any appropriate 'ramping down' at the perimeter must be beyond the critical fall height area. The base layer should be reduced in thickness down towards the perimeter chase. In order to ensure no tripping hazards are created, the required gradient between the full thickness and the perimeter chase should not be steep, but a controlled decline (please see '**11.2. Gradients**').

The installer or Contracts Manager should mark out the external edge of the chase by referring to the site and/or project drawings, or any other relevant information that has been provided.

9.5.1 Step by step installation guide.

Below is a simple step by step guide on how to install the SBR base layer:

1. Set up the mixing area and place appropriate ground cover where necessary.
2. Turn the force action pan mixer on.
3. Empty the SBR into the mixer.
4. Measure / weigh off the binder (please see '**6.7 Mixing advice'**).
5. Pour the binder into the mixer and leave it to mix until the rubber is fully and evenly coated. CONICA Ltd. recommends 3 minutes.
6. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screeded.
7. Install the SBR base layer using guide timbers to the appropriate thickness required. This is dependent on Critical Fall Height requirements so revert back to the drawing if you are unsure.
8. A screed bar should be laid across the screed rails and used to achieve an evenly distributed layer, which can be finished by hand float or a medium, 9.4kg kg roller.
9. Create an 'edge wedge' around the perimeter, between the kerb and SBR. For more information, please refer to '**section 12.1 – Edge Wedge'**.
10. Leave the SBR base layer to cure sufficiently.

Throughout the installation of the SBR base layer, installed thickness should be regularly checked by using a depth gauge or another adequate measuring device. The base layer should be installed to accommodate the 30mm rubber mulch wearing layer. However, at a minimum of 50mm from any perimeter, the base layer should be graded down to allow for an increased rubber mulch wearing layer thickness at the kerb face, chase or other edging to create a strong 'edge wedge' detail. Difficult areas should be installed by hand and finished using a hand float only. For more information on detailing, please refer to '**section 12 – Detailing**'.

Before installing the rubber mulch wearing layer, the SBR base layer should be given adequate time to cure. The curing time is defined as the point in which the surface can accept light foot traffic, without damage. However, for more accurate times, please refer to the relevant binder TDS (technical data sheet). The installer must also inspect the condition of the base layer and any defects, if found, should be rectified immediately, before commencing with the rubber mulch layer installation.

After the base layer has cured sufficiently, you can install the rubber mulch wearing layer:

1. Set up the mixing area and place appropriate ground cover where necessary.
2. Turn the force action pan mixer on.
3. Empty the rubber mulch into the mixer.
4. Measure / weigh off the binder (please see '**6.7 Mixing advice**').
5. Pour the binder into the mixer and leave it to mix until the rubber is fully and evenly coated. CONICA Ltd. recommends 3 minutes.
6. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screeded.
7. Screed and level the rubber mulch at a thickness of 35mm (30mm +5mm).
8. Float the rubber mulch down by 5mm, using either a hand float or a medium, 9.4kg roller.
9. Repeat steps 8 – 10 until you finish or stop at a planned break point.
10. Once finished, leave the rubber mulch wearing layer to cure fully.

Throughout the installation, CONICA Ltd. recommends using CONICA SMOOTHING AGENT to lubricate and clean all tools.

At the end of each working day, all tools and mixer should be cleaned and left in a tidy and useable condition. All unused materials should be covered to protect against the elements, drum taps are to be removed and cleaned, ready for reuse and drum lid threads covered in grease and resealed.

The finished top rubber mulch wearing layer must be allowed to cure fully before any site protective measures are removed and the surface is subjected to any kind of use. The curing time is defined as the point in which the surface can accept light foot traffic, without damage. However, for more accurate times, please refer to the relevant binder TDS (technical data sheet).

9.6 Installing CONIPAVE RA.

For some installations onto an engineered sub-base, a perimeter chase may be required.

The installer or contracts manager should mark out the external edge of the chase by referring to the site and/or project drawings, or any other relevant information that has been provided.

Where an engineered edging is in place, or is to be installed, it should be brushed clean of any loose material or debris and dried, if required, and primed with CONIPUR 4710 solvent free primer.

9.6.1 Step by step installation guide.

Below is a step by step guide on how to install CONIPAVE RA:

1. Set up the mixing area and place appropriate ground cover where necessary.
2. Turn the force action pan mixer on.
3. Empty the CONIPAVE RA into the mixer.
4. Measure / weigh off the binder (CONIPAVE RA must only be mixed with CONIPAVE 610 binder).
5. Pour the binder into the mixer and leave it to mix until the CONIPAVE RA is fully and evenly coated. CONICA Ltd. recommends 3 minutes.
6. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screed.
7. A screed bar should be laid across the screed rails and used to achieve an evenly distributed layer (required thickness + 5mm), which can be finished by hand float or a large, 16.6kg roller.
8. Install CONIPAVE RA using guide timbers to the appropriate to the thickness required.

CONIPAVE RA is a blended product, there may be some variation between batches. Therefore, batch numbers should be checked and recorded prior to starting the installation. When mixing, it is crucial to ensure that the correct ratios is mixed, each and every time, to ensure a uniform finish. For example, if three (3) tonnes of CONIPAVE RA has been delivered to site and two (2) tonnes are from batch one and one (1) tonne is from batch two, then add to the mixer at a ratio of 2:1, each and every time.

In addition to the above, each mix must be mixed consistently in a force action pan mixer for 3 minutes. If there is any deviation, aggregate/SBR separation could occur and the installation could look patchy.

CONIPAVE RA is a single layer system and can be installed directly onto concrete or asphalt at a thickness of 25mm, or new or existing MOT type 1 (40mm to dust with no more than 10% fines stone) sub-base at a thickness of 35mm.

CONIPAVE RA should be installed using screed bars at the desired thickness, which is dependent on the sub-base. For example, when installing directly onto concrete or asphalt, 25mm screed rails should be used, once the mixture has been screeded, you can then hand floated to finish, using SMOOTHING AGENT.

Throughout the installation, installed thickness should be regularly checked by using a depth gauge or another adequate measuring device.

Hand float or use a large, 16.6kg roller to roll the surface to finish using CONICA SMOOTHING AGENT.

The installed safety surface must be allowed to cure fully before any site protective measures are removed and the surface is subjected to any kind of use. The curing time is defined as the point in which the surface can accept light foot traffic, without damage. However, for more accurate times, please refer to the relevant binder TDS (technical data sheet).

At the end of each working day, all tools and mixer should be cleaned and left in a tidy and useable condition. All unused materials should be covered to protect against the elements, drum taps are to be removed and cleaned, ready for reuse and drum lid threads covered in grease and resealed.

10 Departure from site.

Upon completion, the installer should conduct a visual inspection to confirm that the works are complete, all tools, unused materials and any packaging have been cleared and, if applicable, correctly disposed of. The site must be left in a safe, clean and tidy condition.

The installer must ensure appropriate measures are taken to protect the surface from damage during curing. Some examples of this are to ensure that barrier tape is in place, Heras type fences are erected and the gates to the site are locked.

The client or site representative should be asked to visually inspect the installation to confirm the condition and that the work has been completed to the desired specification and requirements. By doing this, it will provide protection against any claim, should any damage be incurred after site departure. If the client or site representative is unavailable, it is prudent to take photographs as evidence that the work has been completed and that the site is being left in a safe, clean and tidy condition. These should then be issued to the client or site representative for reference and filing.

It is also recommended that the client or site representative confirms, in writing, that they are happy with both the installation and how the site is being left at handover.

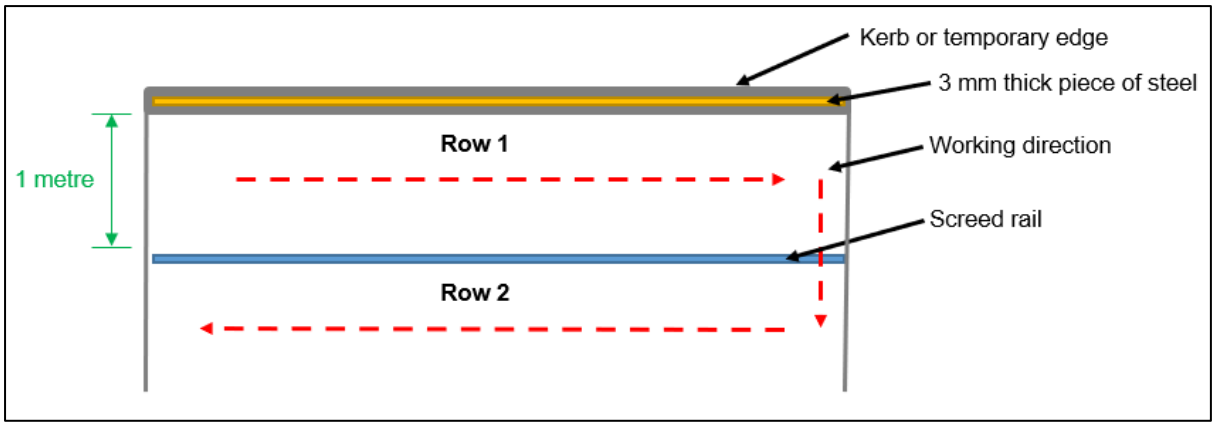
11 Detailing and general guidance.

This section covers guidance on safety surface detailing; screeding in rows, edges, colour transitions, graphics and show to install around play equipment feet.

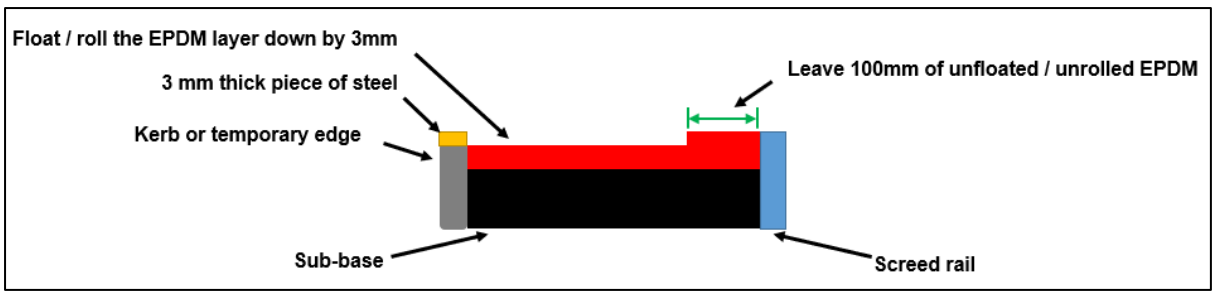
11.1 Working and screeding in rows.

When screeding our surfacing products, CONICA Ltd. recommends working in rows. Please see the diagram below.

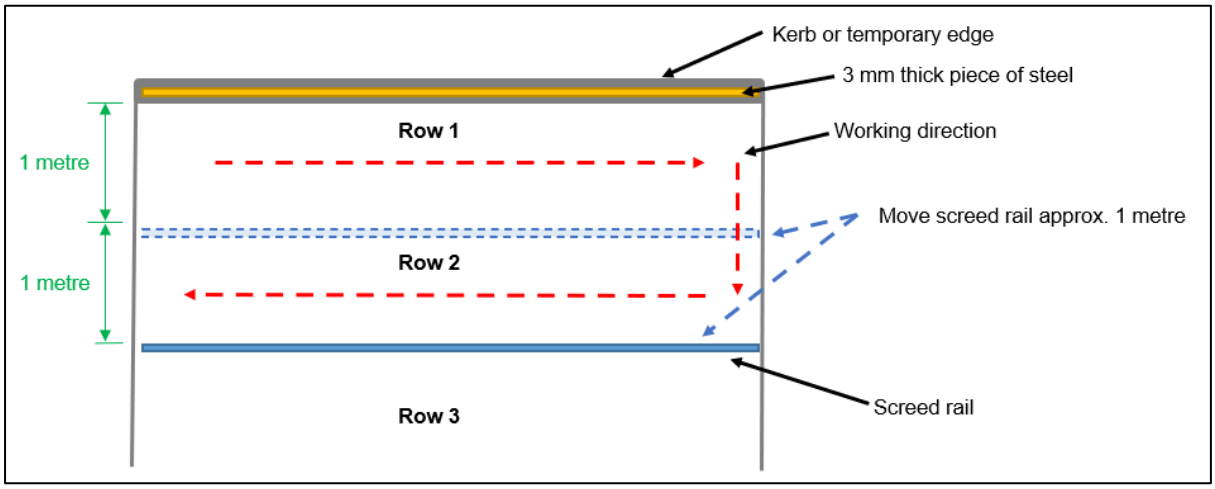
1. Lay out the screed rail(s) approximately 1 metre, or a distance that is comfortably within reach from the kerb or temporary edge.
2. Place a 3 mm piece of steel on top of the kerb or temporary edge.



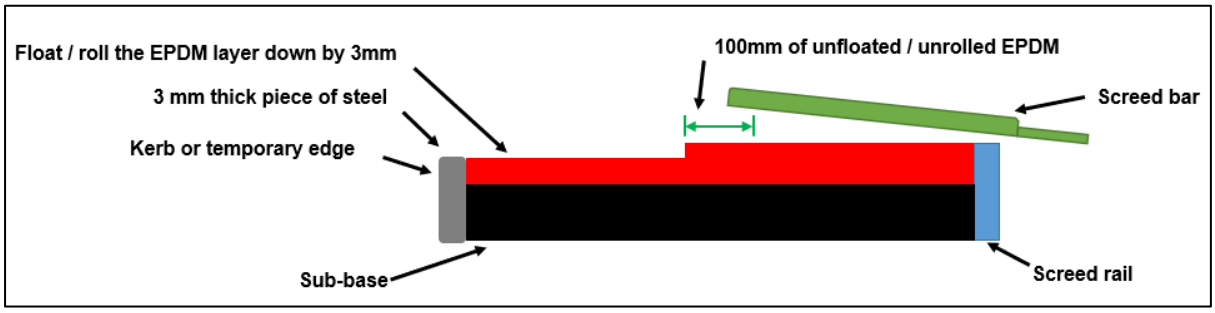
3. Mixed materials should be transported to the working area by wheel barrow and poured out in small piles, ready to be screeded.
4. A screed bar should be laid across the screed rails and used to achieve an evenly distributed layer
5. Float the rubber down (SBR +8mm, CONIPAVE RA +5mm, mulch +5mm and EPDM +3mm), using either a hand float or a medium, 9.4kg roller.
6. Do not float the rubber that is approximately 100mm from the screed rail as this will be used to screed the next row. Please see the diagram below. EPDM has been used as an example.



7. Move the screed bar approximately 1 metre away from the first row of rubber. *Please see the diagram below.*



8. Using the 100 mm of unfinished rubber from row 1, start to screed the next row. *Please see the diagram below. EPDM has been used as an example.*

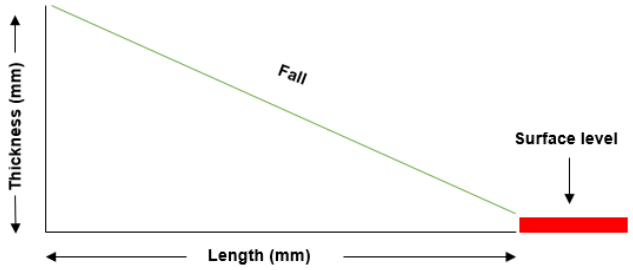


9. Repeat steps 3–8 until you finish or stop at a planned break point.

11.2 Gradients.

CONICA Ltd.'s recommended maximum gradients can be seen in the table below. A gradient is typically required when a playground safety surface is being installed on top of an existing concrete or asphalt sub-base. This will result in raised fall zone areas where the play equipment is situated and the gradients are required to safely ramp down to the surrounding surface. When a new sub-base is required and the ground is being excavated, any areas where fall zones are specified will usually be excavated deeper, therefore the subsequent playground surfacing can be installed completely flat, so gradients are not required.

Starting thickness (mm)	Fall	Distance (mm)	Finish
140	1:2.5	350	Surface level
100	1:2.5	250	
80	1:2.5	200	
60	1:2.5	150	
50	1:2.5	125	
40	1:2	80	
20	1:2	40	

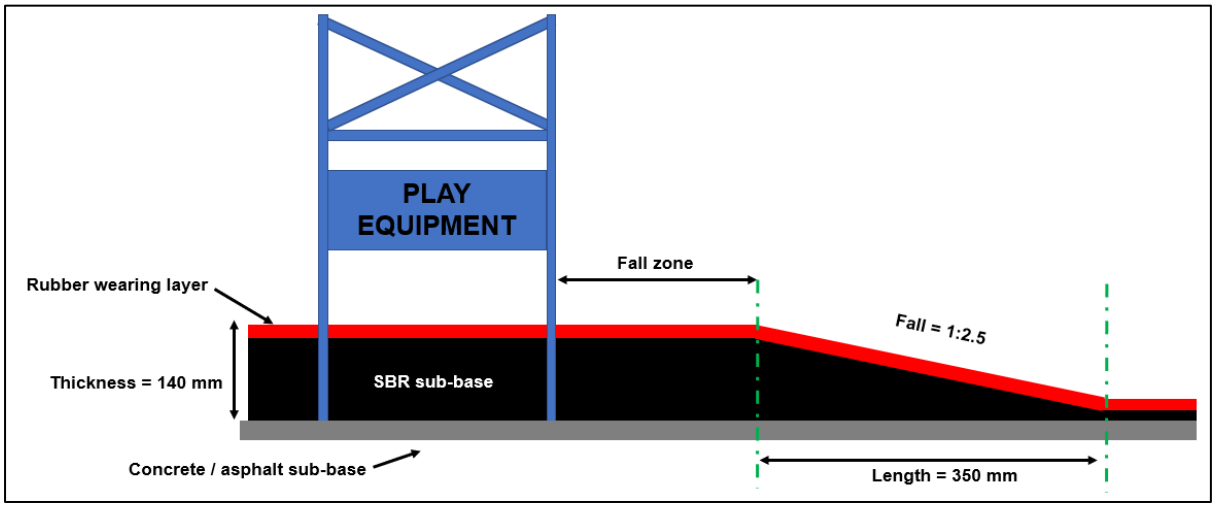


For example, a piece of play equipment is installed on an existing concrete / asphalt sub-base. Due the height of the play equipment, there is a requirement for 140mm thickness of safety surfacing with a surrounding fall zone of 2m.

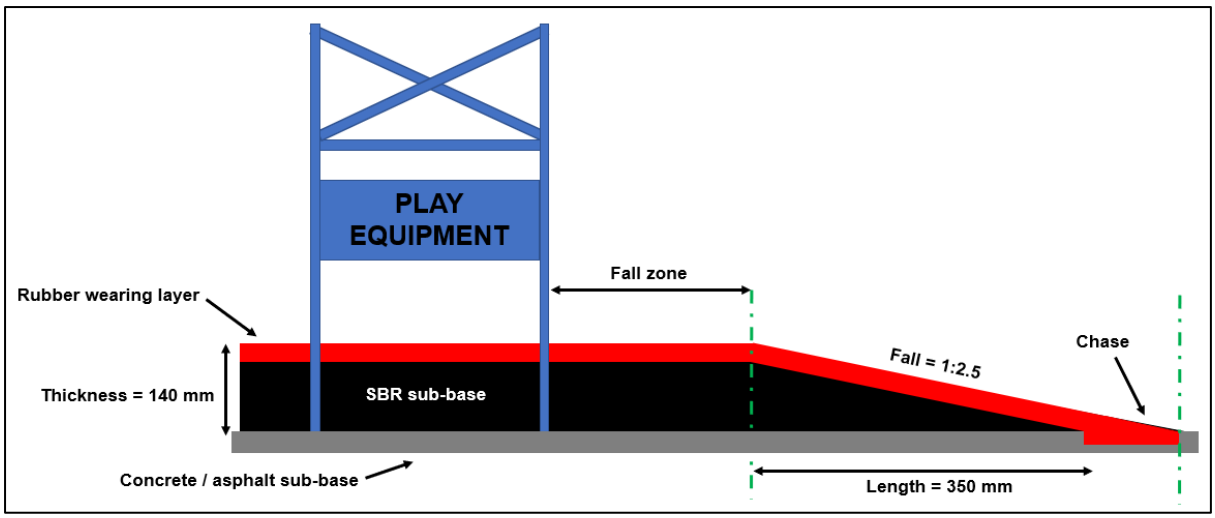
Once the safety surface has been installed at a thickness of 140mm over 2m, it must be graded down to the surface level.

Looking at the table above, 140mm of surfacing has a recommended maximum fall of 1:2.5 over a 350mm distance. This means that for every 2.5mm, the surface is graded down (falls) by 1mm. *Please see the diagrams below*. **Please note that these are not to scale**.

This diagram shows a fall leading into a wider safety surface installation.



This diagram shows a fall leading into a chase. This is only required when a safety surface is being installed around a single piece of play equipment and no further safety surfacing is required.



11.3 Edges and chases.

The chase should be cut into the existing sub-base, to a minimum depth of 25mm, doing this will produce a straight and uniform edge or design detail. Before installing the top EPDM wearing layer, the chase should be brushed clean of any loose material or debris and dried, if required, and primed with CONIPUR 4710 solvent free primer.

On a two-layer system, the top wearing layer must be installed to the full 15mm specified thickness and follow the gradient of the base layer to the external edge of the chase. The edge detail should be installed and finished by a hand float.

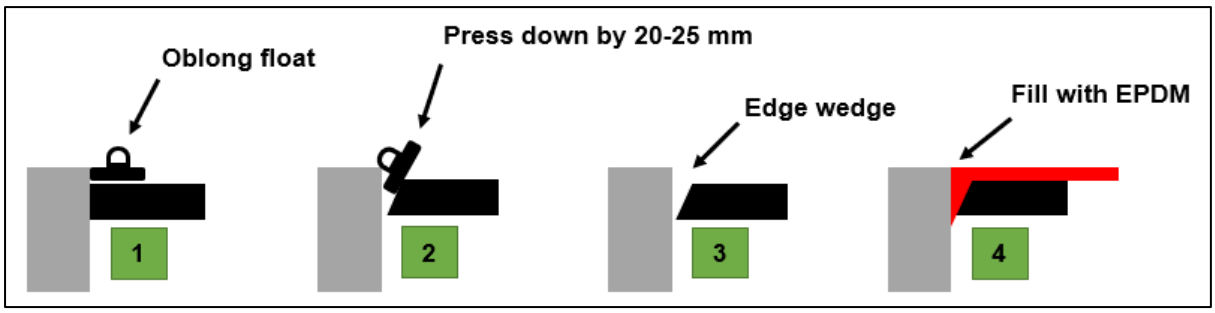
Where an engineered edging is in place, or is to be installed, it should be brushed clean of any loose material or debris and dried, if required, and primed with CONIPUR 4710 solvent free primer.

11.3.1 Edge wedge.

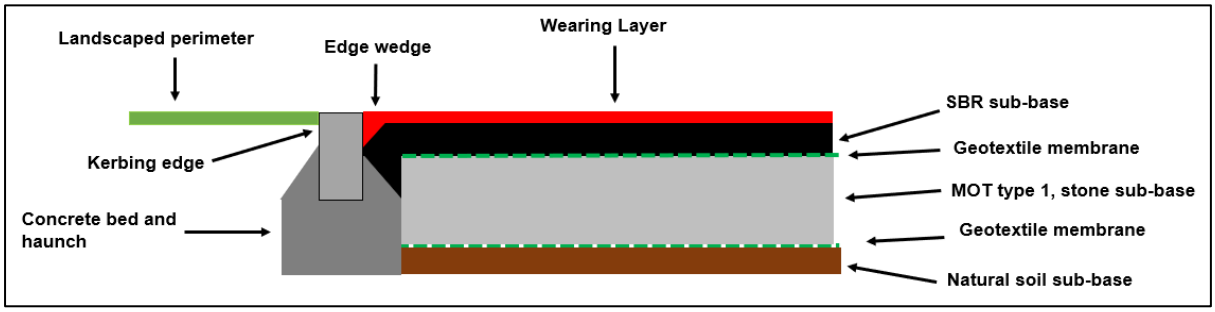
When installing the SBR base layer, it is crucial that at the perimeter, an edge wedge is created. An edge wedge enables more EPDM to be installed where it abuts the kerb face, which creates a stronger bond between the kerb and the safety surface. To further aid adhesion, CONICA Ltd. recommends priming the kerb face with CONIPUR 4710.

An edge wedge is created by the following process (as seen in the diagram below):

1. Using an oblong float, push it up to the edge of the kerb.
2. Press down on the edge against the kerb by approximately 20-25mm, which creates a wedge.
3. Remove the oblong float and prime the kerb face.
4. Fill the edge wedge in with EPDM and float to finish.



Below shows a cross section including the edge wedge detail.



11.4 Colour transitions.

Colour transitions are typically formed when the material is either wet, (which is known as a 'wet to wet joint') or when the material has cured, (this is known as 'wet to cured joint'). Below is CONICA Ltd.'s guidance on how to achieve a perfect colour transition.

11.5 Wet to wet joints.

To create a wet to wet joint the best tools to use are shown in the picture below.

These are made from HDPE (High-density Polyethylene) sheets. HDPE sheets are readily available and come in variety of thicknesses, CONICA Ltd. recommends 15mm. HDPE can easily be cut into any size or shape. A handle can also easily be attached and the tool is used the same way as a float. For more information, please contact CONICA Ltd. technical services on uktechnical@conica.com.

Here is a step by step guide on how to use the tools:

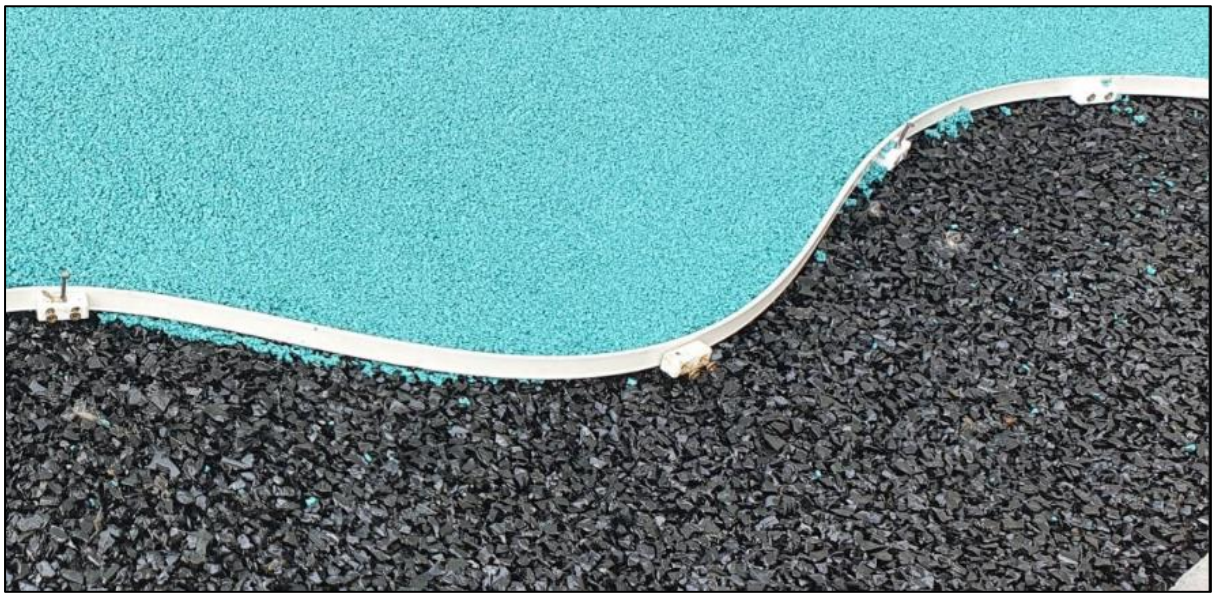
1. Wipe the HDPE tool with SMOOTHING AGENT to prevent the safety surface from sticking.
2. Push the HDPE tool up to the EPDM and float the material so that it is level with the tool.

3. Carefully slide the tool away from the EPDM, do not lift it, as this will disturb the edge. Each time you move the tool you must wipe it clean with SMOOTHING AGENT.
4. Pour the new colour up to the wet joint, ensuring that you leave a small (3mm) gap between the two colours.
5. With the tip of your float pull the EPDM back slightly from the joint, this is to prevent any colours being transferred and then float it in the direction towards the joint. You must ensure the float is kept clean with SMOOTHING AGENT at all times or you will get a transfer of coloured granules when you float over the joint.

11.6 Wet to cured joints.

When creating an edge for a cured joint there are two good ways of doing this:

The first method is to form a 15mm deep temporary edge, this can be done using a piece of flexible curtain rail / plastic beading as shown below.



As it is malleable, it can be bent into various shapes and gently nailed into the SBR base layer as a temporary measure (as depicted above).

If this method is used, leave the temporary edge in place until the EPDM has cured. Once it has cured, pull the nails out of the SBR base layer and run a Stanley knife along where the EPDM touches the temporary edging and gently pull it away.

Another method is to use the HDPE edging tool as shown in section '**12.3 – wet to wet joints**' and leave in place until the edge has cured.

Finally, all cured joints must be 100% primed with CONIPUR 4710 before installing the adjoining area. CONICA Ltd. recommends that the wet material is applied as soon as the primer starts to become tacky.

11.7 Graphics.

Graphics can be installed by using either a stencil or pre-formed EPDM.

11.7.1 Stencilled graphics.

Stencilled graphics can be made from either laser or hand cutting wood (MDF) to a specific design. Here is a step by step guide on how to lay a stencilled graphic.

1. When using a stencil, place the stencil (15mm deep) on top of the sub-base and lay material up to the stencil.
2. Once the material is cured, run a Stanley knife around the cured EPDM and stencil face which will enable the stencil to be removed without damaging the EPDM.
3. Prime the cured EPDM edge using CONIPUR 4710 and you can then either repeat the process for another stencil shape within, or fill the void with another colour to create your graphic.

11.7.2 Pre-formed EPDM graphics.

Pre-formed EPDM graphics are supplied glued to a reinforcing backing net (similar to mosaic tiles) and a tube of adhesive is provided to stick the graphic down to the sub-base. Please ensure that the graphic is not accidentally stained with any PU or adhesive.

1. Outline the position of the graphic, including the reinforcement net and apply the PU adhesive to the marked area with a toothed trowel.
2. Place the EPDM graphic into the marked spot and press down evenly to achieve a consistent and adequate adhesion to the sub-base.
3. Prime the edges of the EPDM graphic and lay your EPDM or other safety surface wearing layer up to the primed graphic.
4. Upon completion, the installer must ensure that the all joints are properly compacted and there are no trip hazards or open areas at the joint.
5. Allow to cure.

11.8 Installing around equipment feet.

When installing up to a piece of play equipment's legs / feet, ensure that the SBR or EPDM does not touch the post above the required finish level, as this will create staining on the post. If this cannot be avoided and / or material does touch the post above the finish level, wipe it off with some SMOOTHING AGENT with a clean rag immediately.

11.9 Areas that are difficult to access.

When installing in any area that is difficult to access, for example, under a roundabout, the surface can be installed and levelled using a piece of timber and then floated using a clean piece of timber lubricated with SMOOTHING AGENT. Lightly tap to achieve a uniform and level finish.

In any area that is difficult to access, the surface finish doesn't have to be perfect, but it must be completed in a manner that ensures the surface integrity isn't compromised.

11.10 Working in small areas.

If the area is very small (if the area can be reached by hand from all sides without stepping on or applying any pressure to the area) and the full installation can be completed without the need to

walk on the SBR base layer, then the top EPDM wearing layer may be installed before the base can accept light foot traffic. Special care must be taken to ensure that the uncured SBR base layer's level and integrity is not disturbed. If the top EPDM wearing layer is applied prior to the SBR base layer fully curing, it is done at the installers risk.

12 Unforeseen circumstances and climatic changes.

This section provides guidance on what should be done in the event of some unforeseen circumstances which can delay or bring the installation to an abrupt standstill.

12.1 Unexpected rain.

If at any point throughout an installation it starts to rain, precautions must be taken.

If installing the SBR base layer, finish installing the row, then wait until the weather clears up before re-commencing.

If installing the EPDM layer, place a piece of 15mm timber up against the wet EPDM and float the material in a straight line, then wait until the weather clears up.

If the rain persist and the wet edge of the surfacing cures, it is recommended that the cured edge is 100% primed using CONIPUR 4710 prior to recommencing.

It is also recommended that all open materials and equipment are covered as wet materials can cause installation issues. For example, foaming, accelerated cure and milking of the binder.

12.2 Temperature fluctuations.

During some months, the temperature and climatic conditions can fluctuate and vary greatly throughout the day. When this happens, there is a risk that the surface will rapidly contract and expand which could create cracks within the EPDM layer.

CONICA Ltd. recommends checking the weather prior to commencing the installation and it is at the sole discretion of the installer to either proceed as planned or re-arrange as necessary.

12.3 Avoiding cracks.

Cracking can be an issue. The common causes are large temperature and humidity fluctuations, using soapy water as a release agent or misting with too much water to accelerate the cure.

12.4 Works get delayed (priming to aid adhesion).

If the works are delayed and upon the return to site the surfacing has fully cured, CONICA Ltd. recommends cleaning the surface of all debris and re-priming all edges, SBR and any other surface that was originally primed.

This will ensure sufficient adhesion and prevent the surface from cracking, lifting or pulling away from the perimeter. It will also ensure the integrity of any joints within the safety surface.

Appendices

Appendix 1 Site inspection record.

Project Name		
Sales Order Reference (SOR…)		
Date		
BASE LAYER		
Site Inspection	Substructure and approximate surface area to specification	Y / N
	Play equipment location and fixing to specification	Y / N
	Site depth, regularity and assessment of the substructures or existing surface	Y / N
	Layout conforming to appropriate standards; EN, BS, ASTM etc.	Y / N
Surface preperation	Chase complerted to specification (where applicable)	Y / N
	Sub structure cleaned and primed	Y / N
Mixing Operation	Correct binder meaure selected	%
Intallation	Correct roller and float technique used	Y / N
Departure from site	Base layer complete	Y / N
	Site left clean, tidy and safe	Y / N
Supervisor Signature and Date		
TOP LAYER		
Site Inspection	Base layer cleaned and checked	Y / N
Mixing Operation	Correct binder measure selected	%
	Are the colours correct	Y / N
	If mixing more than 1 colour, are they been added into the mixer consistently	Y / N
Top Layer	Site samples taken and labelled	Y / N
Departure from Site	Top layer complete	Y / N
	Site lft clean, tidy and safe	Y / N
Supervisor Signature and Date		Y / N
BATCH / LOT NUMBER RECORD		
Base Layer (size and batch no.)		
Top layer (colour and batch no.)		
Binder (product and lot no.)		

INSTALLATION SIGN OFF	
Duration (days)	
Supervisor Signature	
Date	

CLIMATE RECORD						
Date:						
Temperature (°C or °F)	**Start**					
	Mid-Shift					
	Finish					
Humidity (%)	**Start**					
	Mid-Shift					
	Finish					

Appendix 2 Cleaning.

Cleaning Guidance.

There is no such thing as a maintenance free surface, all safety surface installations will require some degree of routine maintenance throughout its life. CONICA Ltd. recommends a regular planned maintenance and cleaning schedule for all installations. This will prolong the life of the safety surface and maintain its aesthetic appearance, whilst also reducing the risk of slips, trips and falls.

General cleanliness.

The top wearing layer will become contaminated with dirt from children's shoes, wind-blown dust, leave debris and various contaminates such as chewing gum, soft drinks, etc. The most effective method of cleaning is by use of a jet wash, though chewing gum is best dealt with by using a freezing spray to embrittle the gum and make it easier to remove. All loose rubber, litter, leaves and surface debris should be removed regularly using a leaf blower and sweeping brush. Accelerated wear may occur if this is not carried out.

If the top wearing layer is not cleaned regularly, the slip resistance will be impaired and the safety surface could become hazardous.

Moss and Algae.

In certain situations, and in some seasons, algae or moss can become established on the surface. Since prevention is very much more effective than cure, it is important to treat the affected areas of the surface with a good proprietary moss killer and algicide at least once a year.

Moss is not usually found on the parts of the surface that are trafficked by play, and although it may not be essential to treat these areas it is still a wise precaution to do so. However, particular attention should be paid to the perimeter and other areas that are not trafficked, especially if they are shaded by walls or buildings, overhung by trees or are under equipment. Any good proprietary product should be satisfactory, provided it is not oil based.

Where moss becomes established, it should be treated immediately. The application being repeated after the dead spores are removed, until eradication is complete. The dead moss may be removed by using a jet wash, but with care being taken as this can damage the safety surface.

CONICA Ltd.'s guidance when jet washing is to have the jet / rotary head no closer than 25mm from the surface and an angle of 45o. The max pressure should be no more than 2000 psi. Before jet washing CONICA Ltd. recommends that the surface integrity is assessed; to ensure it is free from cracks, soft spots and any damage before proceeding. If any repairs are required, it is recommended that these are carried out prior to jet washing.

It should be emphasised that moss is only a serious problem if it is allowed to become established.

Weeds.

No matter how much care is taken, weeds may occasionally appear on the surface, usually as a result of windblown seeds. Small numbers of weeds can be removed by hand without damaging the surface. If the weeds are removed by hand, it is important to ensure that the full root of the weed is extracted, not broken off. Some weeds are more prolific if they are simply cut off at the surface level.

If the weeds are deep rooted, it is advisable to kill them using an appropriate weed killer.

Localised areas of weed infestation can be treated with domestic weed killers without causing damage to the top wearing layer. Oil based weed killers should not be used.

Winter care.

During the colder winter months, the surface may be subjected to snow, ice and /or frost which usually melts as the temperatures rise.

To remove heavy falls of snow or significant ice, CONICA Ltd. recommends using Ice Melt, as it is non-abrasive and the least harmful option, both to the surface and the environment. Metal shovels or scrapers may damage the surface and should not be used. Rock salt should not be used as it can cause unsightly stains.

Once the winter passes CONICA Ltd. recommends sweeping the surface with a stiff bristled brush to remove any built-up residue then jet washing the surface to restore its water permeability and slip resistance.

Please note: whilst snow, ice and frost are not harmful, if the play area is used during the winter without being cleared, then injury may occur. Not only will the surface be harder and lose some of its shock absorbing performance, a user could slip or injure themselves in other ways.

Appendix 3 Repairing cracks and damage.

In area where cracks have appeared (paying special attention to where the rubber is bonded to an edge, curb, play equipment or at colour transitions) or where there are any holes or damage to the surface, repairs should be completed as soon as possible.

CONICA Ltd. recommends using a jigsaw with a rough-cut blade (wood blade) to cut out defective areas as this leaves a rough edge for the new material to key into, a Stanley knife or a fine cutter leaves a smooth edge with nothing for the new material to key into.

Below are the steps which CONICA Ltd. recommends when undertaking a safety surface repair:

1. Identify the area that needs repairing and mark this out with some chalk.
2. Insert the blade into the jigsaw and pull the blade out to its fullest extent, you then cut the blade down to the required length i.e. 15mm if just cutting through the wearing course, or longer if cutting through the EPDM and the SBR. A Stanley knife can be used for inaccessible areas.
3. Once you have cut the blade down to size, place a piece of timber along the cut on the side that is not being removed and apply weight to prevent the wet pour from lifting and disturbing the stone sub-base, then cut as required.
4. To remove the cut material, push a flat ended screw driver or pry bar into the cut and pull towards you whilst applying weight to the piece of timber. This will help to ensure that the surface which is sound, is not disturbed or damaged. During this process, if the SBR sub-base is disturbed, then the MOT type 1 stone sub-base underneath could become dislodged. This can create a soft area and the repair may not last, so extra caution must be taken when pulling away the damaged material. If the SBR or base is disturbed, please remove and re-install to ensure longevity for the repair.
5. Clean the area of any loose granules and dirt. The joint needs to be dry so this may need drying with a blower. The edge of the repair must then be 100% primed with CONIPUR 4710 also including the SBR if you've removed both layers.
6. Mix the rubber and binder, using the recommended quantities stipulated in section '**6.7 Mixing advice**' with a twin paddle mixer, until the binder has completely coated all of the material.
7. Pour the rubber into the repair area and float in at the edges, using SMOOTHING AGENT, ensuring enough material is installed once floated leaving a level joint with no dips or high points.
8. Once installed the material should be left to cure naturally, under no circumstances should water be used to accelerate the curing time, the material should be allowed to cure naturally and be protected until fully cured.

Appendix 4 Technical statement: Use of recycled black rubber-based products.

Black rubber granules, typically used as the base layer of playground surfaces and commonly known in the industry as SBR, are normally a mixture of styrene butadiene rubber (SBR) and natural rubber, and are typically derived from the recycling of used tyres. Conica only recycle truck and bus tyres which contain more natural rubber and less textile than an equivalent car tyre.

Black EPDM granules (extensively used in the final top layer of playground surfaces) are typically derived from the recycling of molded and extruded EPDM industrial and automotive production waste.

Neither of these rubbers are totally UV stable and are usually protected by free ranging stabilisers which travel out to the surface of the rubber to shield against UV degradation. This, combined with high levels of carbon black in the rubber compounds, can cause staining of any items that come into contact with an SBR or recycled EPDM surface.

CONICA rubber mulch is a mix of colour coated SBR granules and SBR shred. Whilst the colour coating does provide some protection against staining, once the surface is worn the same risk applies.

Therefore, it is strongly recommended that any product containing SBR or black recycled EPDM granules is not used as the wearing course in areas where seating, crawling or any other application where regular bodily contact with the surface is likely.

We would also recommend that the customer be warned of the risk of staining so that full consideration of the nature of use can be discussed before installation is approved.

CONICA Ltd. cannot accept liability or responsibility for staining issues associated with the use of any non-virgin black rubber products (SBR, rubber mulch or black recycled EPDM).

CONICA Ltd. can supply clean, virgin black materials which are considered to be non-staining, but they are significantly more expensive than non-virgin equivalents.

Appendix 5 Colour charts.

Please note that any sample CONICA Ltd. has supplied is to provide an indication of look, feel and colour only. If the colour is critical, CONICA Ltd. recommends completing a trial area which should be signed off before continuing with the full installation.

Note: RAL numbers are approximate. The colour and texture of the materials laid on site may differ from the samples provided.

CONIPAVE.


Red


Silver


Yellow


Grey and Red


Grey and Yellow


Black

Mulch.


Forest Green


Spring Green


Earth Brown


Acorn Brown


Harvest Beige


Mahogany Red

Appendix 6 How to order materials.

Please can all orders be sent electronically to orders@conica.com. This will ensure that the order is seen and processed as quickly as possible.

If you don't already have an account with CONICA Ltd. please contact orders@conica.com. You will then be sent a credit account application form.