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DECEMBER 2 - 5 | PALM DESERT, CALIFORNIA

Track Systems 101

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Main Components Of The Surface



- **Primer**

- The Primer prepares the pavement to receive surface materials and provides an additional bond between the pavement and the surface.

- **Rubber**

- **EPDM** (ethylene-propylene-diene)
- **SBR** (styrene-butadiene-rubber)

- **Binder**

- The component that adheres the rubber together.
 - **Latex**
 - **Polyurethane**

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Main Components Of The Surface

• Rubber

SBR (styrene-butadiene-rubber)

- One of the most used products in construction of track surfaces.
- Makes up most of the materials used in the surface.
- Made from post-industrial byproducts. (tires, technical parts, molded goods, etc....)
- The quality of the black rubber granules depend on the care taken in separating the different types of feedstock before grinding them.
- Chemical composition may vary with feedstock and may affect their compatibility with the binder.



- ❖ Specific gravity ranges from 1.15 – 1.50.

Main Components Of The Surface

• Rubber

EPDM (ethylene-propylene-diene)

- Designed for application in recreational surfaces.
- Important to have a blend of various granule sizes to ensure development of dense mat or structural spray.
- From virgin compounds.
- Used because of their resistance to weathering and outdoor aging.
- Resistance to ozone, oxidation and water is excellent.
- Available in many colors.
- ❖ Polymer content no less than 20%.
- ❖ More meaningful for quality are tensile strength and elongation at break of material.
- ❖ Specific gravity between 1.40 – 1.60.
- ❖ Hardness (shore A) within 55 – 70.



Classifying Track Surfaces

- **Permeable (porous)**

Allows water to pass through the surface to the asphalt or concrete pavement below.

- **Impermeable (nonporous)**

Allows the water to drain and/or evaporate off the surface.



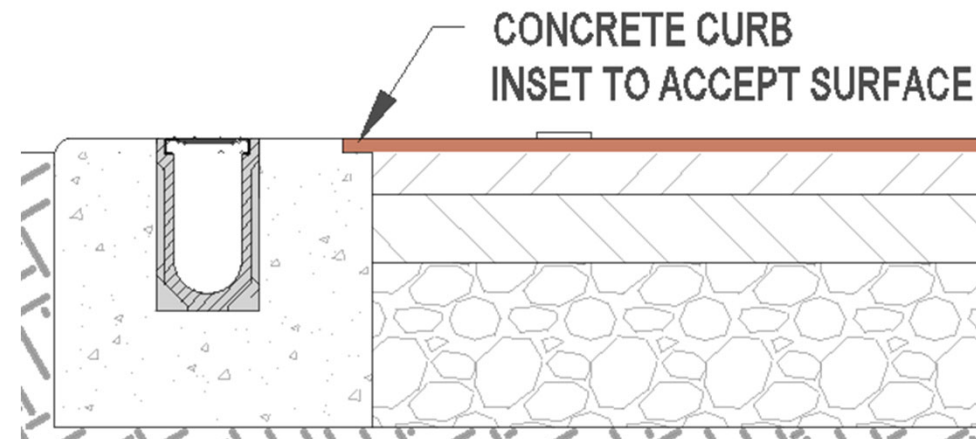
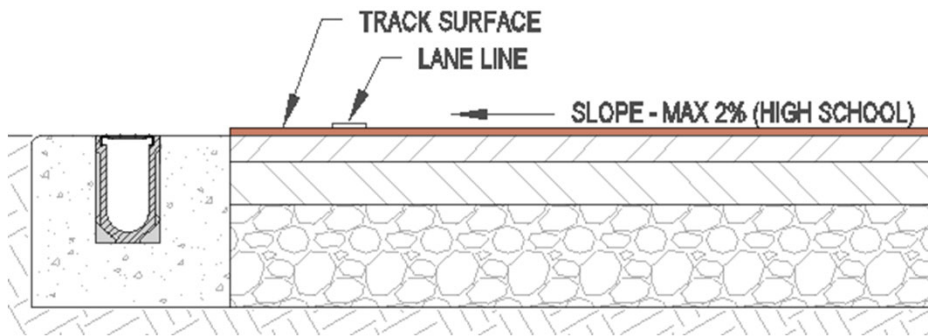
Permeable Track Surfaces

- Permeable (porous) track surfaces are designed so that water will flow through the surface to the asphalt or concrete pavement below while allowing moisture vapors to escape vertically.
- In some cases, the track will incorporate permeable asphalt pavement for the water to continue to rapidly move to the drainage system installed in the aggregate base.

Permeable Track Surfaces

- **Design Considerations**

- Cross slope of the asphalt or concrete base can achieve drainage
- Drainage obstructions



Permeable Track Surfaces



- **Design Considerations**

- Highly sandy environment
- Flood prone environment



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Permeable Track Surfaces

- Latex
- Urethane – Base Mat (BM)
- Urethane – Base Mat Structural Spray (BMSS)

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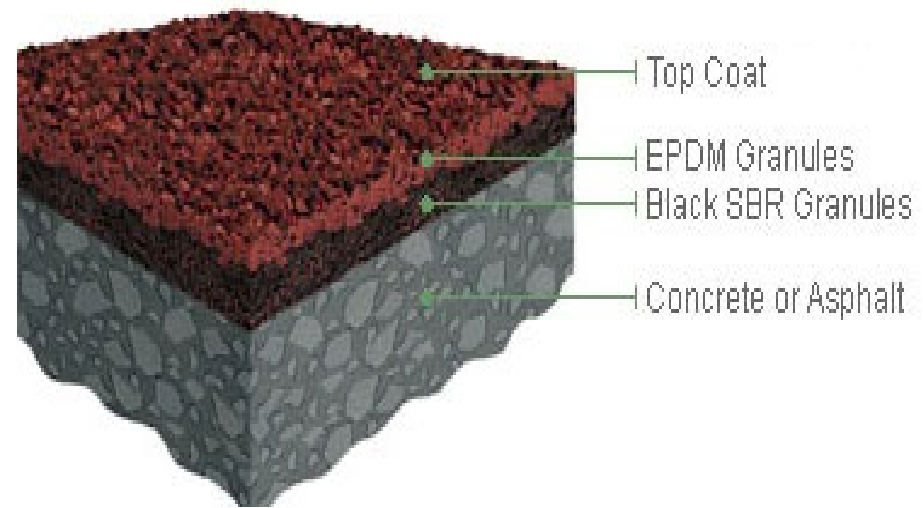
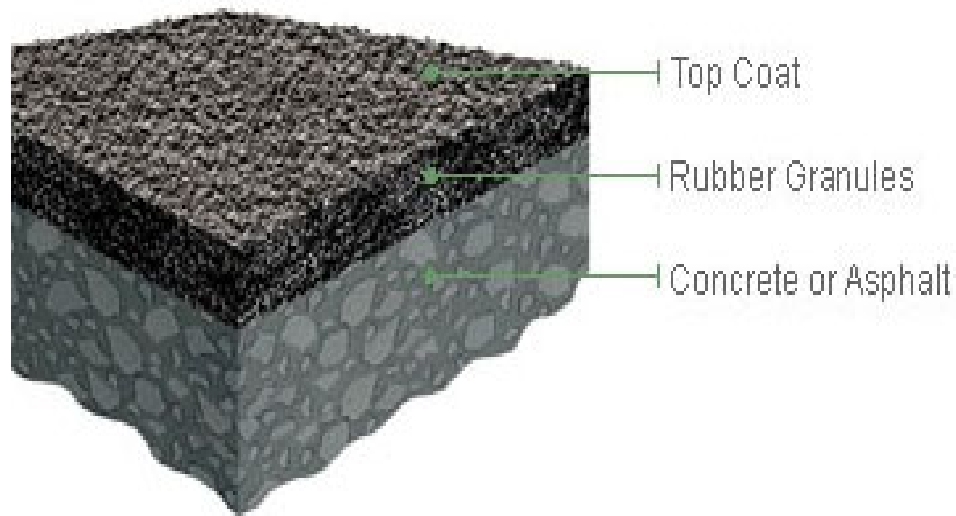
Latex Surfaces

- A latex surfacing system is semi-permeable and generally consists of rubber particles of a specific size, shape, and composition, bound together by water-based latex binder.
- Most latex systems will be applied in layers.
- Finished surface will be textured.
- Thickness is normally 12.7mm (1/2").

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Latex Surfaces



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Latex Surfaces



- Because water is used as a dispersing agent for the latex, most latex systems will be applied in layers.
- Latex track surfaces are frequently installed using the pavement extension method of construction. After the 6" extension of the surface from the inside and outside lane lines, the layers are feathered to the edge of the asphalt. This eliminates an abrupt termination of the surface
- Black SBR or EPDM rubber particles bound by a latex binder.
- Surface coating is a highly pigmented black acrylic latex.
- Surfacing installed in layers
- Latex track surfacing is dependent on evaporation for drying and curing
- Extremely important that no binders freeze.



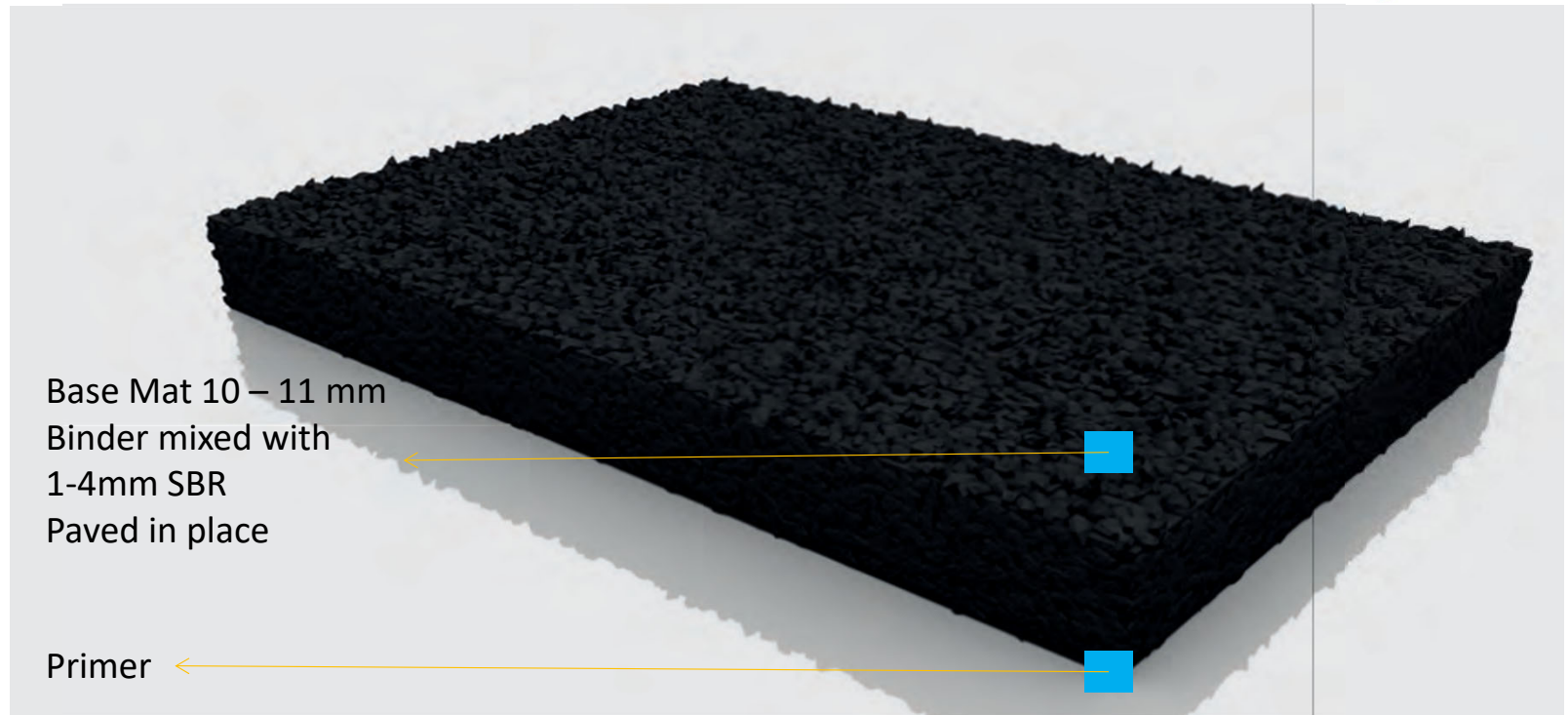
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Polyurethane Base Mat Surface (BM)

- A polyurethane base mat system is a homogenous blend of EPDM or SBR granules and polyurethane binders that is evenly spread and screeded in a single-layer application over the prepared pavement.
- The surface has a smooth finish and may be used either indoors or outdoors.
- Normal surface thickness is 12.7mm (1/2")

Polyurethane Base Mat Surface (BM)



Base Mat 10 – 11 mm
Binder mixed with
1-4mm SBR
Paved in place

Primer

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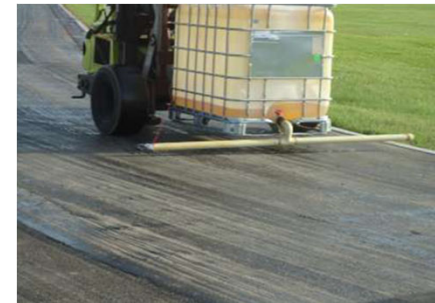
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Polyurethane Base Mat Surface (BM)



Primer

- Can be spray applied or or poured with a drop spreader bar.
- *Latex primer* is a low-viscosity latex binder that allows for a light film application.
- *Polyurethane primer* is a low-viscosity polyurethane binder that allows for a light film application.



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Polyurethane Base Mat Surface (BM)



Mixing

- Many ways to mix, but common practice includes continuous mixing machines.
- Rubber granules and polyurethane binder are first measured accurately, placed in a mixing container and mixed until all the granules are covered with binder.
- Pot life of the product is limited, as site conditions can affect it greatly.
- Prepared material is then placed in front of the paving machine
- Supply of material must be constant so that the paving machine does not have to stop and wait for material.



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Polyurethane Base Mat Surface (BM)



Paving

- Paved with specialized paving equipment.
- Electric or fuel-powered, should be operated at a speed and with the screed bar at an angle to provide a tight and smooth surface, free of chatter marks and voids.
- Screed bar itself should be constantly heated and should oscillate.
- These conditions are ensured, the material is placed at the specified depth.
- Edges should be straight and rounded
- Cold seams, such as those from previous work, should be cut in a straight line at an inward angle and primed



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Polyurethane Base Mat Structural Spray (BMSS)

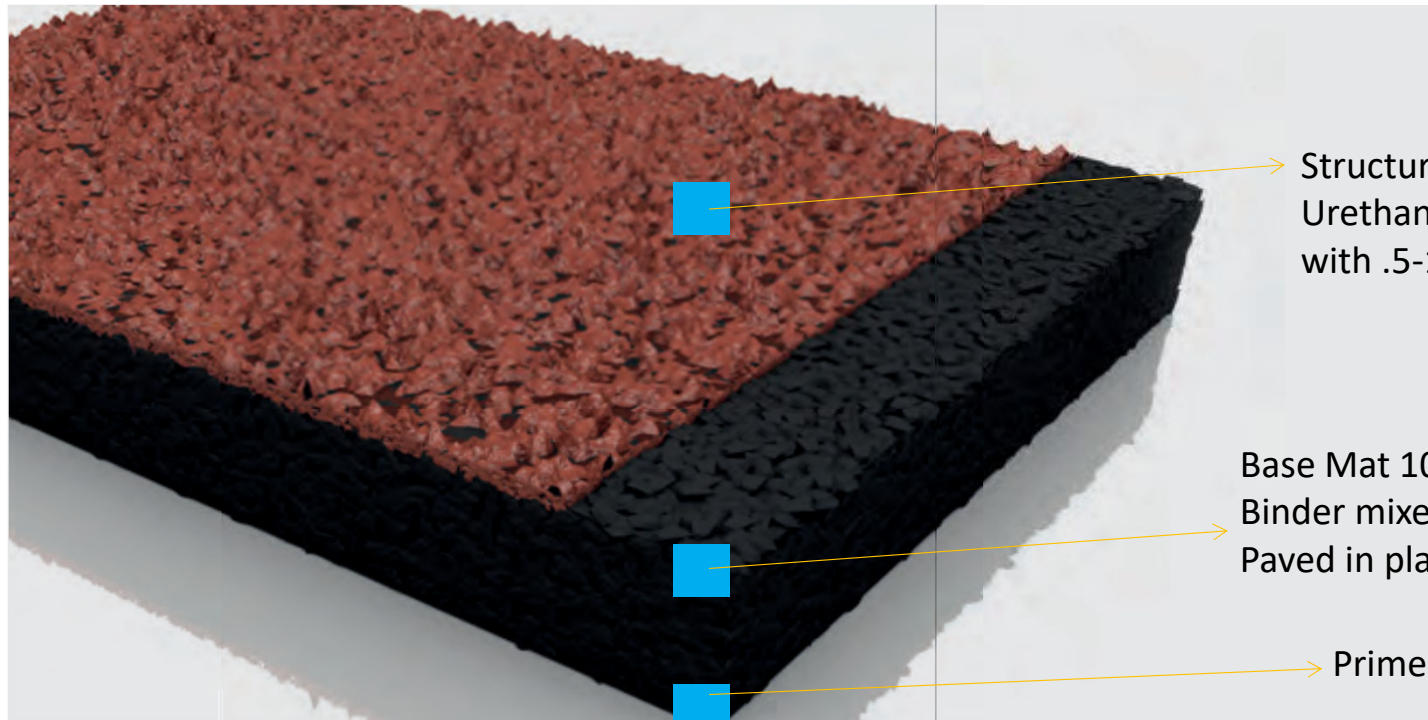


- A polyurethane base mat with a structural spray is a homogenous blend of EPDM or SBR granules and polyurethane binders that is evenly spread in a single-layer application over the pavement
- Followed by a pigmented and rubber structural spray coating.
- The surface has a textured finish.
- Finished surface thickness is normally 12.7mm (1/2")

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Polyurethane Base Mat Structural Spray (BMSS)



Structural Spray 1-2mm
Urethane spray mixed
with .5-1.5mm EPDM

Base Mat 10 – 11 mm
Binder mixed with 1-4mm SBR
Paved in place

Primer

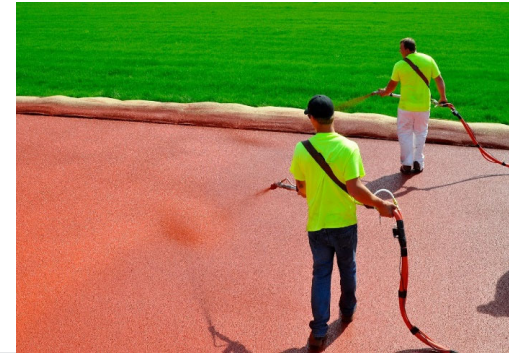
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Polyurethane Base Mat Structural Spray

Spray Coat

- Spray Coat applied using specialized spray machine.
- Pigmented polyurethane and rubber.
- Components of the structural spray are weighed and mixed.
- Colored EPDM rubber granules is added to the mixed material
- Mixed material is then placed into a spray machine and sprayed over the base mat
- Generally, two coats are applied in opposite direction



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Impermeable Track Surfaces

- Impermeable (non-porous) track surfaces are designed so that water does not penetrate the surface. Water is removed by slope and by gravitational flow to a surface drain system. Evaporation will also occur.
- Usually, an impermeable surface will drain more quickly and freely than its permeable counterpart.

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Impermeable Track Surfaces

- **Design Considerations**

- It is critical that impermeable surfaces have adequate drainage and base designs to eliminate water from beneath the surface. Trapped moisture beneath the surface will not allow vapor to escape and will cause failure.
- If installed outdoors on concrete substrate, may require additional moisture mitigation system.



Impermeable Track Surfaces

- Urethane – Sealed Base Mat Structural Spray
- Urethane – Sandwich (SW)
- Urethane – Full Pour (FP)
- Pre-Fabricated Rolled Surface

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Polyurethane Sealed Base Mat Structural Spray



- A polyurethane sealed base mat with a structural spray is a homogenous blend of EPDM or SBR granules and polyurethane binders that is evenly spread in a single-layer application over the pavement
- Followed by the sealing of the mat with polyurethane and, in some cases, with rubber dust. The top layer is a pigmented polyurethane and rubber structural spray coating.
- The surface has a textured finish and is used primarily in outdoor applications.
- Finished surface thickness is normally 12.7mm (1/2")

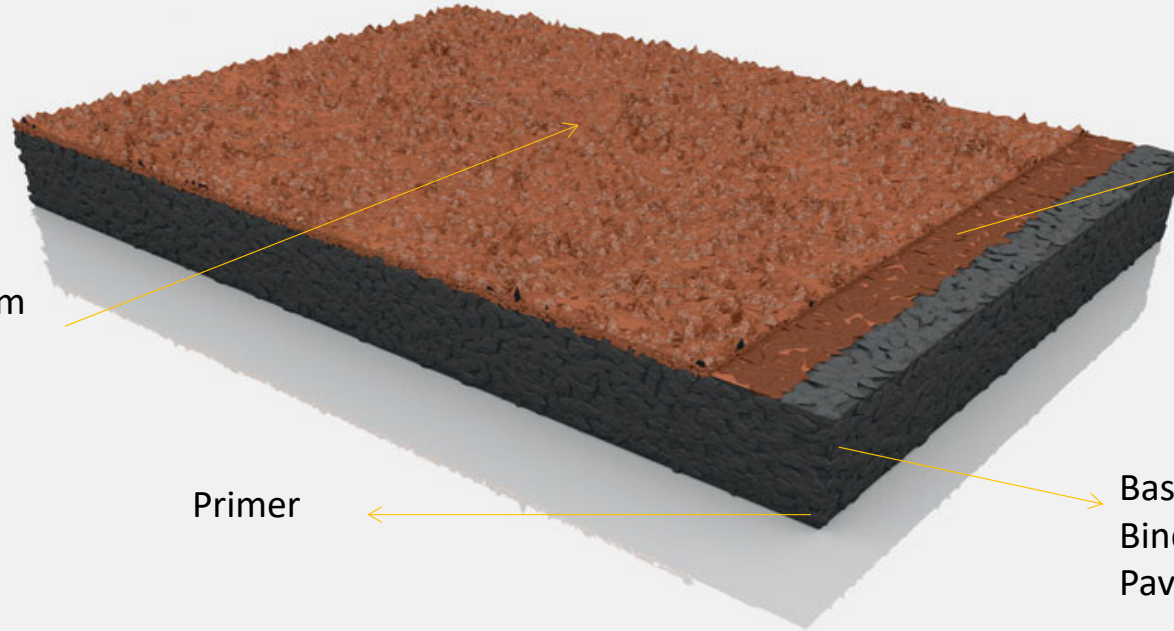
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Polyurethane Sealed Base Mat Structural Spray



Structural Spray 1-2mm
Urethane spray mixed
with .5-1.5mm EPDM



Pore Sealer

Primer

Base Mat 10 – 11 mm
Binder mixed with 1-4mm SBR
Paved in place

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Polyurethane Sealed Base Mat Structural Spray



Pore Sealer

- Sealing of the base mat with polyurethane.
- Sufficient material must be used to render the surface completely impermeable.
- Extremely important that the base mat and pavement are completely dry before applying the seal coat
- Some systems may require EPDM dust to be applied.



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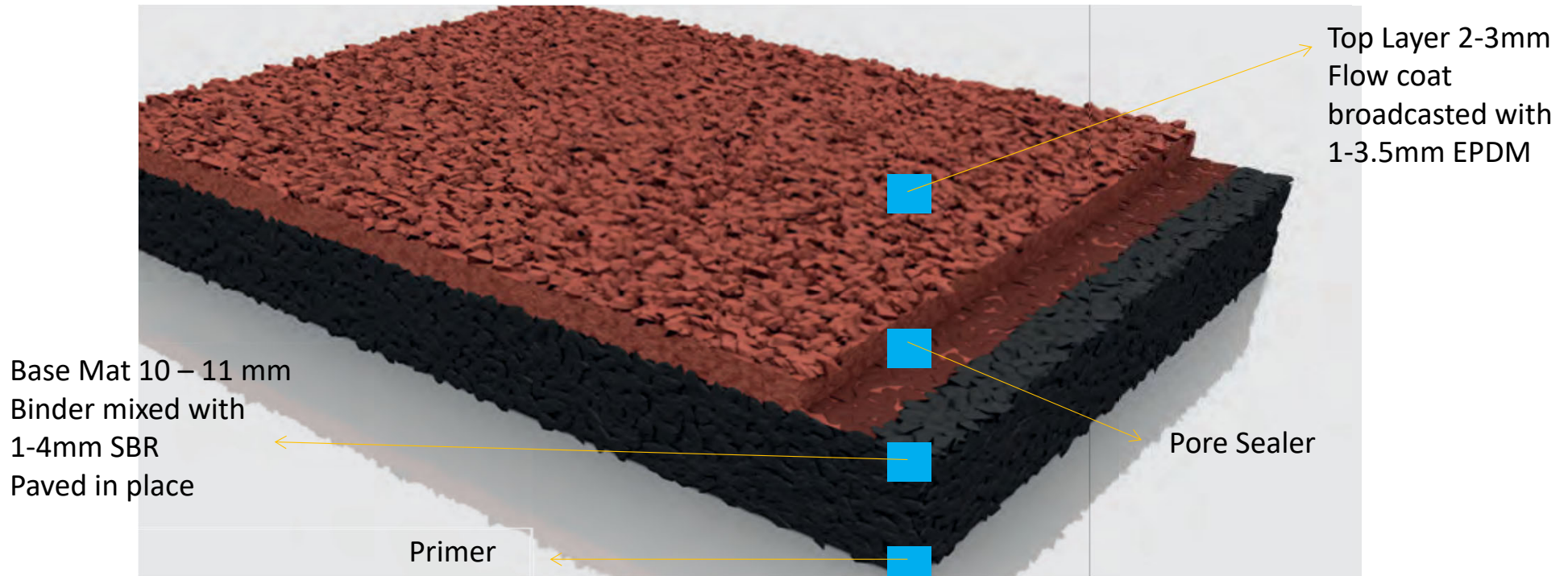
Polyurethane Base Mat Sandwich (SW)

- A polyurethane base mat is a homogenous blend of SBR granules and polyurethane binders that is evenly spread in a single-layer application over the pavement
- Followed by sealing and by a massive application of polyurethane coating with either embedded or encapsulated colored EPDM granules.
- The surface has a textured finish and can be used for either indoor or outdoor applications.
- Finished surface to meet the specified thickness.

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Polyurethane Base Mat Sandwich (SW)



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Polyurethane Base Mat Sandwich (SW)

Flood Coat

- Topcoat in this system is a massive flow application of a one- or two component coating
- Generally self-leveling
- Must be level and free of ridge
- Before the coating sets, colored EPDM rubber granules are broadcast over the surface.
- Excess of granules is applied to assist in the embedding process.
- All loose granules are then removed after initial cure.



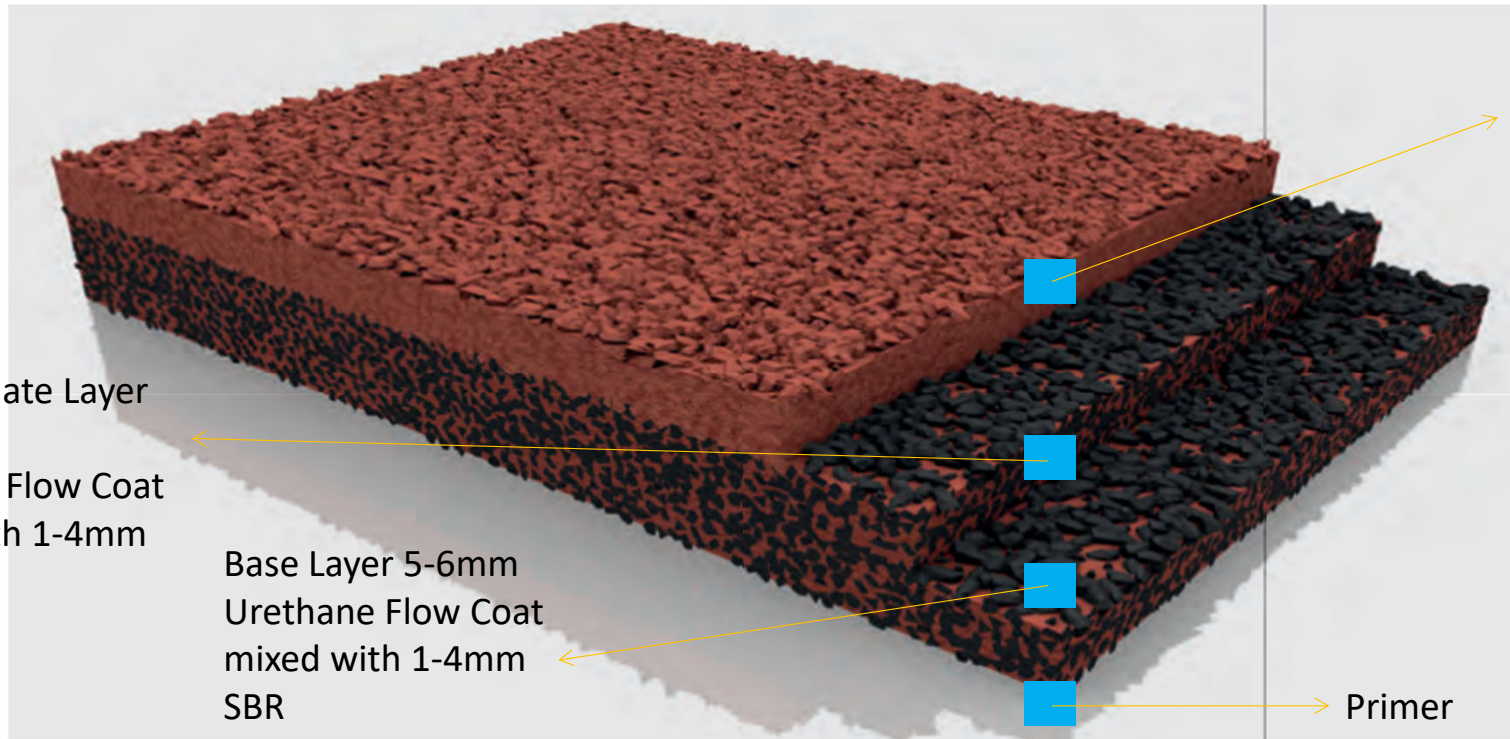
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Polyurethane Full-Pour Surface (FP or Flood and Chip)

- A full-pour polyurethane surface is the application of multiple layers of colored polyurethane coating and either SBR or EPDM rubber dust and/or granules.
- The top layer is a massive application of polyurethane coating with either embedded or encapsulated colored EPDM granules.
- The surface has a textured finish and can be used for either indoor or outdoor applications.
- Finished surface to meet the specified thickness.

Polyurethane Full-Pour Surface (FP)



Top Layer 4-6mm
Flow coat
broadcasted with
1-3.5mm EPDM

Intermediate Layer
4-5mm
Urethane Flow Coat
mixed with 1-4mm
SBR

Base Layer 5-6mm
Urethane Flow Coat
mixed with 1-4mm
SBR

Primer

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Premanufactured Tracks (Rollout Mat)

Can be classified into three categories:

- Premanufactured base mat with a seal and a polyurethane structural spray top coating
- Premanufactured base mat with a seal and massive polyurethane coating applied to the base mat with embedded colored EPDM rubber granules
- Premanufactured vulcanized rubber product that is installed in a single layer and does not require any further finishing for use.

Premanufactured Tracks (Rolled Surface)



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Premanufactured Tracks



Premanufactured System

- Vulcanized rubber product that is installed in a single layer and does not require any further finishing for use.
- Installed only when dry conditions are present.
- Material to be laid out and relaxed prior to installation.
- Adhesive is then mixed and troweled in place using a notched trowel.
- Adhesive should only be applied to the area which will be worked on immediately.
- When the adhesive is tacky, the mat is placed onto the surface, making sure that each sheet is placed in a straight line or around a curve at a constant radius.
- Head joints should be staggered.
- Seams and joints should be level and not pinched.
- Placing weights on seams and Joints will help the mat to lie flat while the adhesive sets.



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Product Certifications



The Certification System has been developed in response to the need for better quality products in top level competitions and the rapid developments in athletics equipment. It also recognises the growing trend towards international standardisation of product specifications, as well as the need to prevent unauthorised usage of the World Athletics name. World Athletics has a world-wide responsibility to guarantee validity and accuracy of performances and to support any initiative to improve athletics goods. Not only will the Certification System serve and protect athletics manufacturers around the world, but the innovation will also give vital support to World Athletics' mission in helping and protecting athletes at the top levels of the sport worldwide. This will encourage a higher standard of improving technique through using better-quality equipment and implements in international and other competitions.



Not to be confused with World Athletics Facility Certification

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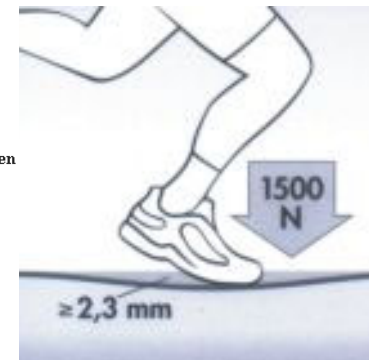
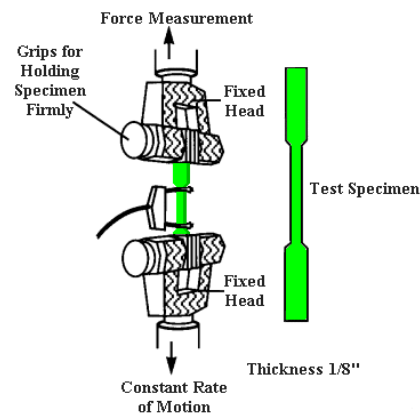
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Product Certifications



Testing Specifications:

- Force Reduction
- Vertical Deformation
- Friction
- Tensile Strength



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Product Certifications (Indoor Tracks)



Industry-independent, non-profit organization, also called the Greenguard Environment Institute (GEI). The GEI offers certification programs for products and buildings. The Greenguard Certification is accepted by sustainable building programs and in building codes worldwide.

Greenguard Gold products emit lower VOCs than standard Greenguard products. In 2005, this certification was developed as the Greenguard Children and Schools Certification Program, certifying products for daycares, schools, and hospitals. In 2011, the name was changed to Greenguard Gold for a broader appeal.



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Cost Considerations



Surface pricing is directly affected by color selection.

Many colors are only available in a water-based system

There is usually more flexibility in available colors with the urethane manufactures, but usually limited by available EPDM rubber.

Some colors require additional UV protection.

Color patterns can greatly affect the price



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Cost Considerations



Typically, the lowest cost colors are:

Latex	Black
Urethane	Red
Pre-Fabricated	Red



9004 Signal Black



3009 Oxide Red

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Cost Considerations



Permeable Systems	
Latex	\$
Urethane – Base Mat	\$ \$
Urethane – Base Mat Structural Spray	\$ \$ \$
Impermeable Systems	
Urethane – Sealed Base Mat Structural Spray	\$ \$ \$ \$
Urethane – Sandwich	\$ \$ \$ \$ \$
Urethane – Full Pour	\$ \$ \$ \$ \$ \$
Pre-fabricated – Rolled Surface	\$ \$ \$ \$ \$ \$ \$

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Common Delays And Contingencies



Weather Conditions

- Rain
 - Rain causes delays with all surface types.
 - Often a single rain event can delay the project for several days by waiting for the surface to fully dry out.
 - Always schedule surfacing in the dryer months.
- Temperature
 - Most surfaces require temperatures to be 50 degrees and rising.
 - Temperatures must be above freezing at all times.
- Wind
 - Winds must be below 10 MPH to apply spray coats and for striping.
 - Projects located at coastal regions are subject to this type of delay.
- Humidity
 - Low humidity causes longer curing times, resulting in longer installations.
 - High humidity causes curing times to be quick and may results in more cold joints.



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Common Delays And Contingencies



• Scheduling Conflicts

- Athletic Programming
 - Often tracks are surfaced during football and/or soccer season with many fields located within the track.
 - Activities within the facility must not be allowed during track surfacing.
- Field Maintenance and Watering
 - Primarily in the summer months watering of the field becomes an issue.
 - There must be careful scheduling with the surfacing contractor if sprinklers are going to be utilized.
 - Grass mowing is an issue because of crossing the track to access the field and grass clippings getting into the installed track surface.
 - Fertilizing fields must not be allowed during track surfacing.
- Summer Installations
 - Most schools schedule track surfacing during the summer break.
 - Surfacing contractors are fully booked during the summer and often widespread weather causes a domino effect with installation schedules. Early springs weather creates delays throughout the summer.
 - Schedule in the off season for better odds of completion on time.



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Common Delays And Contingencies



- **Animals and Vandalism**

- **Animals**
 - Frequently animals and people will track through the newly installed surface creating footprints that have to be cut out and replaced.
 - Common animals that cause this issue are deer, birds, cats, dogs, and people.
- **Vandalism**
 - Usually not intentional, many people are curious and excited to check out the new surface.
 - Many times, the surface will initially feel fully cured, but once they walk onto it, they will leave footprints that have to be cut out and replaced.



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Common Delays And Contingencies



Asphalt Conditions

- Re-surfacing projects do not allow the existing asphalt to be inspected until after the existing track surface has been removed.
- Asphalt remediation could include full replacement of the asphalt, typically asphalt requires 30 days for the cure process.



Aged asphalt will:

- Loses its ability to be flexible and begin to crack
- Shrink creating a gap between the concrete curbs and the asphalt
- Loses the small aggregate in the finish layer
- Loses the ability to maintain the required slopes



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More information for these track systems
can be found in the

ASBA Running Track Construction Manual

Questions?

