

# Product Specification

## Subbase Preparation for Regupol® Athletic Tracks

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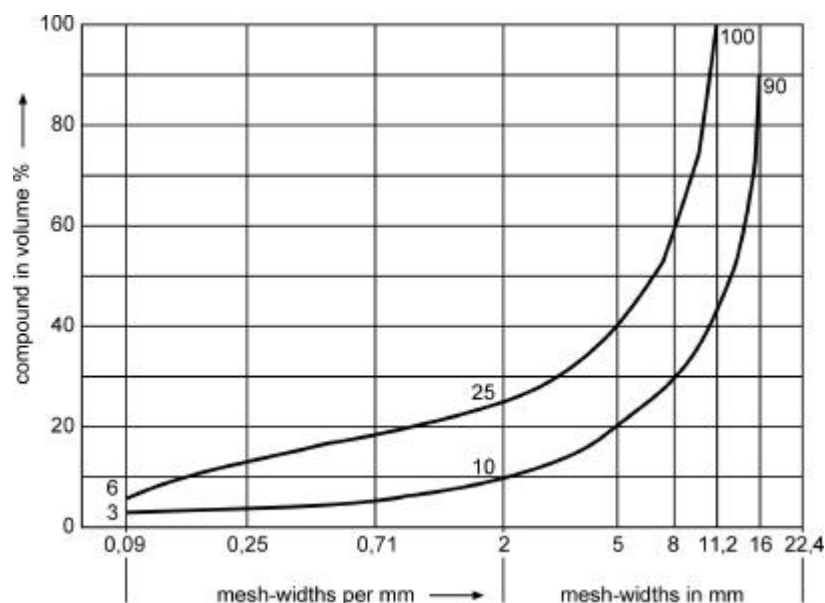
<b>1. Subbase Requirement</b>	
<b>1.1</b>	The subbase shall be constructed from asphalt or concrete in accordance to DIN 18 035, part 6. Even though local circumstances may require minor changes, it is important to follow the major guidelines of this standard.
<b>1.2 Impermeable (non-porous) concrete</b>	Impermeable (non-porous) concrete subsurfaces shall be constructed by implementing a reinforcing steel mesh. Total thickness of concrete layer shall be no less than 150 mm unless otherwise specified by local engineers according to the individual site conditions.
<b>1.3 Permeable (porous) concrete</b>	Permeable (porous) concrete subbases shall be constructed according to the instructions of a local engineer, considering the individual site conditions. The water permeability of all porous subbases shall be = 0.01 cm/s or 0.01 ltrs/m <sup>2</sup> /s.
<b>1.4 Compaction</b>	The finished subbase shall be smooth and compacted to = 93 % for water permeable bases and = 96 % for water impermeable bases.
<b>1.5. Deviations</b>	Deviations shall not be more than +/- 4 mm under a 4 m straight edge.
<b>1.6. Slope</b>	Running track subbases shall be constructed with an inside slope of maximum 1.0 %. Tennis courts with a maximum slope of 0.5 % of the gradient parallel of the surface, other athletic facilities according to DIN 18 035, part 8 and max. 40 m in length.
<b>2. Drainage</b>	
<b>2.1 Water Channels</b>	Prefabricated or cast in place water channels to be installed along the track / field edge to take surface water. Water channels shall be connected with the main sewage system.
<b>2.2 Drainage System</b>	If the substructure of the existing subsoil requires a drainage system, it shall be installed according to site engineer's instructions. All drainage pipes to be connected with the main sewage system. All track / field edges where no channel is installed should be surrounded by prefabricated or cast in place concrete curbs. The outside curbing should preferably be installed 50 mm higher than the finished REGUPOL® athletic surface will be.

<b>2.2.1 Note</b>	All base works should be carried out by an experienced, major civil engineering contractor. Local circumstances may require slight changes of the a.m. specifications as well as the following procedures which should be in the discretion of an experienced construction engineer.
<b>2.2.2 Preparation of Substrate</b>	Existing subsoil to be excavated in the necessary depth. Drainage pipes to be installed in drainage ditches specified by the site engineer. Ditches to be filled with further gravel to the top.
<b>2.2.3 Drainage Channels</b>	<p>Prefabricated or poured at site drainage channels to be installed on a sufficient concrete foundation. The elevation of these channels must be exact and the upper edge should be set about 1 to 2 mm lower than the final REGUPOL® athletic surface.</p> <p>Drainage pipes to be connected with the water channel and the main sewage system.</p>
<b>3. Filling of excavated Substructure</b>	Crushed gravel according to DIN 18 035, part 6 and local engineer's specifications to be filled onto the excavated substructure.
<b>3.1 Final Thickness</b>	Final thickness according to DIN 18 035, part 6 and/or local engineer's instructions depending on the condition of existing subsoil, climate conditions and other specific requirements. The compaction of the crushed gravel layer should be carried out to meet DIN 18 035, part 6 (degree of compaction) (D Pr) = 1.0. Deformation modulus (Ev) 2 of minimum 60 N/mm <sup>2</sup> .
<b>3.3 Slope</b>	The slope of the compacted gravel layer should be at least 0.7 % towards the water channels. The gravel layer should be levelled to a maximum deviation of +/- 15 mm under a 4 m straight edge. Compaction ridges should be avoided.
<b>4. Bound Subbase</b>	
<b>4.1 Asphalt Layers</b>	<p>The bound subbase (asphalt layers) should be installed in two layers, first layer min. 40 mm with deviation of maximum 6 mm +/- 6 mm under 4 m straight edge, second layer minimum thickness 30 mm with maximum deviation of +/- 4 mm under a 4 m straight edge.</p> <p>Exact mineral/bitumen types and mixtures according to DIN 18035.</p> <p>The bituminous concrete surface shall have a 1 % inclination toward the inside track.</p>

	<p>Bituminous structural layers for water permeable synthetic surfaces must have a water absorption factor of not less than 0,1 cm / s.</p> <p>The bituminous structural subbase should be installed in 2 layers due to the requirements for evenness and flatness.</p>																					
<b>4.1.1 Hot bituminous upper Structural Layer</b>																						
<b>4.1.1.1 Binder Type</b>	Bitumen B 80 or B 200 as used in road construction																					
<b>4.1.1.2 Amount of Binder</b>	Not less than 4.5 % by weight																					
<b>4.1.1.3 Additives</b>	Additives are allowed if they do not adversely affect the technical requirements set forth herein.																					
<b>4.1.1.4 Aggregate screen Analysis</b>	<p><b>Wearing Course, water permeable</b></p> <p>Asphalt mix makadam, 2-5 mm or 2-8 mm crushed stones in accordance to DIN 18035. Construction is equivalent to ASTM E 11-61 mesh No. 10-4 or mesh No. 10-5 / 16.</p>																					
<b>4.1.1.4.1 Sieve Curve hot bituminous upper structural Open-Pore Layer</b>	<table border="1"> <caption>Sieve Curve Data</caption> <thead> <tr> <th>Mesh-Widths (mm)</th> <th>Compound in Volume (%) - Upper Curve</th> <th>Compound in Volume (%) - Lower Curve</th> </tr> </thead> <tbody> <tr> <td>0.09</td> <td>7</td> <td>4</td> </tr> <tr> <td>0.25</td> <td>~15</td> <td>~5</td> </tr> <tr> <td>0.71</td> <td>~25</td> <td>~10</td> </tr> <tr> <td>2</td> <td>30</td> <td>15</td> </tr> <tr> <td>5</td> <td>100</td> <td>~40</td> </tr> <tr> <td>8</td> <td>~100</td> <td>90</td> </tr> </tbody> </table>	Mesh-Widths (mm)	Compound in Volume (%) - Upper Curve	Compound in Volume (%) - Lower Curve	0.09	7	4	0.25	~15	~5	0.71	~25	~10	2	30	15	5	100	~40	8	~100	90
Mesh-Widths (mm)	Compound in Volume (%) - Upper Curve	Compound in Volume (%) - Lower Curve																				
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	<p><b>Wearing Course, water impermeable</b></p> <p>Mixture of minerals: Mixture of asphalt 0/5 or 0/8 mm out of 45 5 of mass (broken stone 0 to 5 mm or 0 to 8 mm), minimum 8 % of mass fill-up with dust material below 0,09 mm, reminder (47 %) scaled sand 0.09 mm to 2 mm (broken sand or broken and natural sand), according to the sieve curve range.</p> <p>Contents of binding agents (bitumen): min. 7.5 to 10 % according to the aptitude test. admixtures are possible if the properties resulting from the admixtures comply with the requirements of the standard.</p>
<b>4.1.1.5 Compaction</b>	At least 95 % if installed by machine, 94 % if installed manually, in relation to the Marshall core test.
<b>4.1.1.6 Thickness</b>	At least 25 to 35 mm depending on the largest aggregate size of the mixture.
<b>4.1.2 Hot bituminous lower Structural Layer</b>	
<b>4.1.2.1 Binder Type</b>	Bitumen B 80 or B 200 as used in road construction
<b>4.1.2.2 Amount of binder</b>	Not less than 3.5 % by weight
<b>4.1.2.3 Additives</b>	Additives are allowed if they do not adversely affect the technical requirements set forth herein.
<b>4.1.2.4 Aggregate screen Analysis</b>	Asphalt mix makadam, 2-11 mm or 2-16 mm broken stones in accordance to DIN 18035. Construction is equivalent to ASTM E 11-61 mesh No. 10-4 or mesh No. 10-5 / 16. <b>(For water impermeable base: 2.8 mm or 2-11 mm).</b>

#### 4.1.2.4.1 Sieve Curve hot bituminous lower structural Open-Pore Layer



#### 4.1.2.5 Compaction

At least 95 % if installed by machine, 94 % if installed manually, in relation to the Marshall core test.

#### 4.1.2.6 Thickness

At least 40 to 50 mm depending on the largest aggregate size of the mixture

#### 4.1.3 Note

It is extremely important that the asphalt subbase is well compacted and smooth without any rolling ridges and with a gradient slope of maximum 1.0 %. Allow curing for abt. 10 - 14 days before starting the installation of synthetic REGUPOL® materials.

These specifications are intended as a guidance only. Before proceeding with the installation of the subbase for synthetic surfaces it is mandatory to have thorough soil tests performed, as the above specifications may be affected by the results of such tests.

#### 4.2 Concrete Subbases

Concrete subbases must be constructed with expansion joints with sections no larger than 25 m<sup>2</sup> per piece unless otherwise specified by the local site engineer. The maximum section joint length should be no more than 5 l.m. unless otherwise specified. Expansion joints must be filled with a sufficient joint filling material specified by the local site engineer.

#### 5. Ground sleeves

If ground sleeves for sports equipment are required they should be installed after the completion of the subbase. Foundations to be constructed according to manufacturer's specifications.

## 6. Overview track, subbase and drainage system

**1** Regupol<sup>®</sup> synthetic track surface, refer to Regupol<sup>®</sup> specification sheet

**2** Hot bituminous asphalt layer  
B 80 or B 200 (50-70 kg/m<sup>2</sup>)  
Compaction ~ 95 % , binder content ~ 4.5 %\*

**3** Hot bituminous asphalt layer  
B 80 or B 200 (90-110 kg/m<sup>2</sup>)  
Compaction ~ 95 % , binder content ~ 4.5 %\*

**4** Fine crushed gravel 100-150 mm (4"-6" thick) 16-22 mm (Mesh No. 5/8-7/8) ASTM E 11-61

**5** Crushed gravel layer 150-200 mm (6"-8" thick) 45-55 mm (Mesh No. 1 3/4 -2.12) ASTM E 11-61

**6 + 9** Filter layer, crushed stone (if required, depending on subsoil conditions)

**7** Perforated drainage pipe

**8** Main drainage pipe (collector pipe)

**10** Game court

**11** Water channel

**12** natural subsoil

\* pos. 2 and 3 can be build in concrete also

