

Chapter 12

Interlayers

From... Maintenance Technical
Advisory Guide (MTAG)

Manager's Overview

From... Maintenance Technical
Advisory Guide (MTAG)

Introduction to Interlayers

- What are they?
- Why use them?
- Where to use them?
- When to use them?



What are Interlayers?

Pavement interlayers are materials, or combinations of materials, which can be placed within a pavement during

- new construction,
- rehabilitation or
- preservation

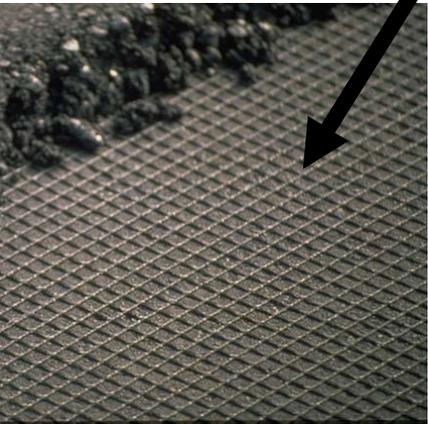
in conjunction with an overlay or surface treatment



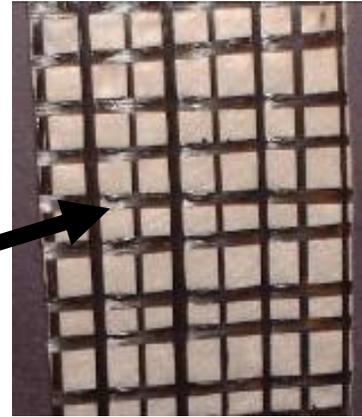
Types of Interlayers



- ❖ Fabric - Polypropylene
- ❖ Mat - Polyester/Fiberglass
- ❖ Grids
 - ❖ Non Composite
 - ❖ Composite



- ❖ Chip or Cape Seals
 - ❖ ARCS
 - ❖ PMA
 - ❖ Scrub Seal



- ❖ Peel & Stick Membranes



Why Use Interlayers?

To provide an extension of pavement life by doing one or more of the following:

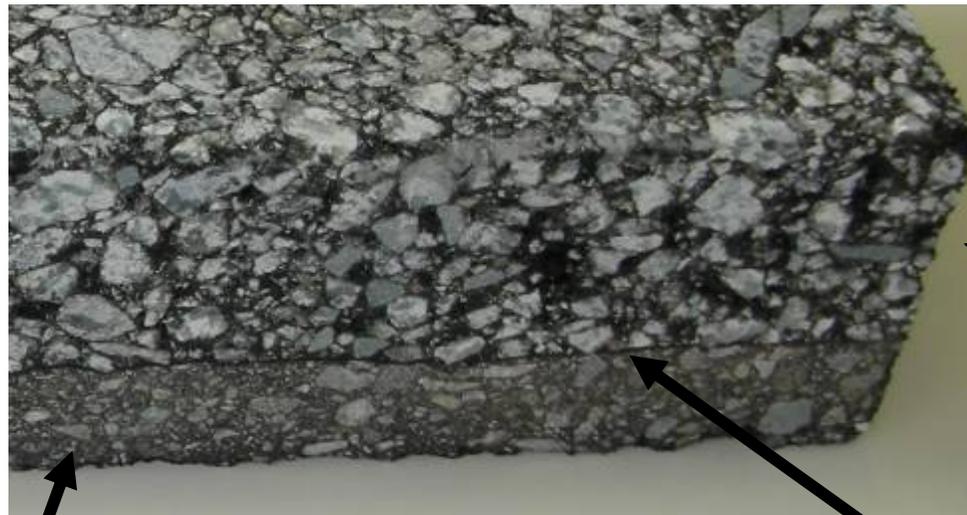
1. Reduce reflective crack mitigation
2. Reduce the pavement permeability by creating a moisture barrier
3. Provide stress relief
4. Provide strain relief



Why Use Interlayers?

Extension of new pavement surface life with the following benefits:

1. smoother ride
2. less maintenance
3. more cost effective final pavement surface.



Leveling
Course

Overlay

Interlayer

Where to Use?

On projects using Hot Mix overlays or Chip Seals as the final surface, interlayers should be considered.

Use and justification of interlayers is determined by the existing distresses and the expected service life of the treatment.

When NOT to Use?

- On structurally deficient pavements
- When pumping and rutting are occurring



Module 12-1

Design, Materials & Specifications

From... Maintenance Technical
Advisory Guide (MTAG)

Interlayer Design, Materials and Specifications

- Types of Interlayers
- Material Specifications
- Design Criteria
- Application Rates

Overview



❖ Fabric - Polypropylene

❖ Mat - Polyester/Fiberglass

❖ Grids

❖ Non Composite

❖ Composite

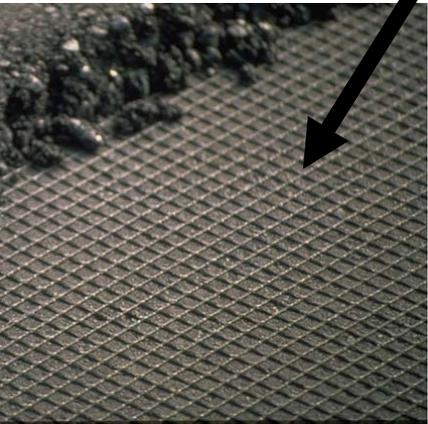
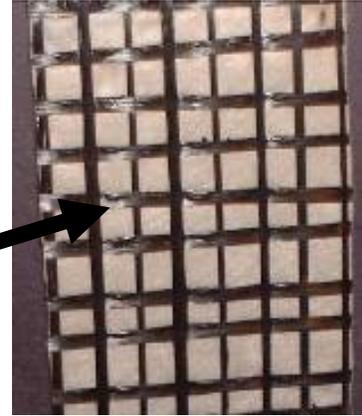
❖ Chip or Cape Seals

❖ ARCS

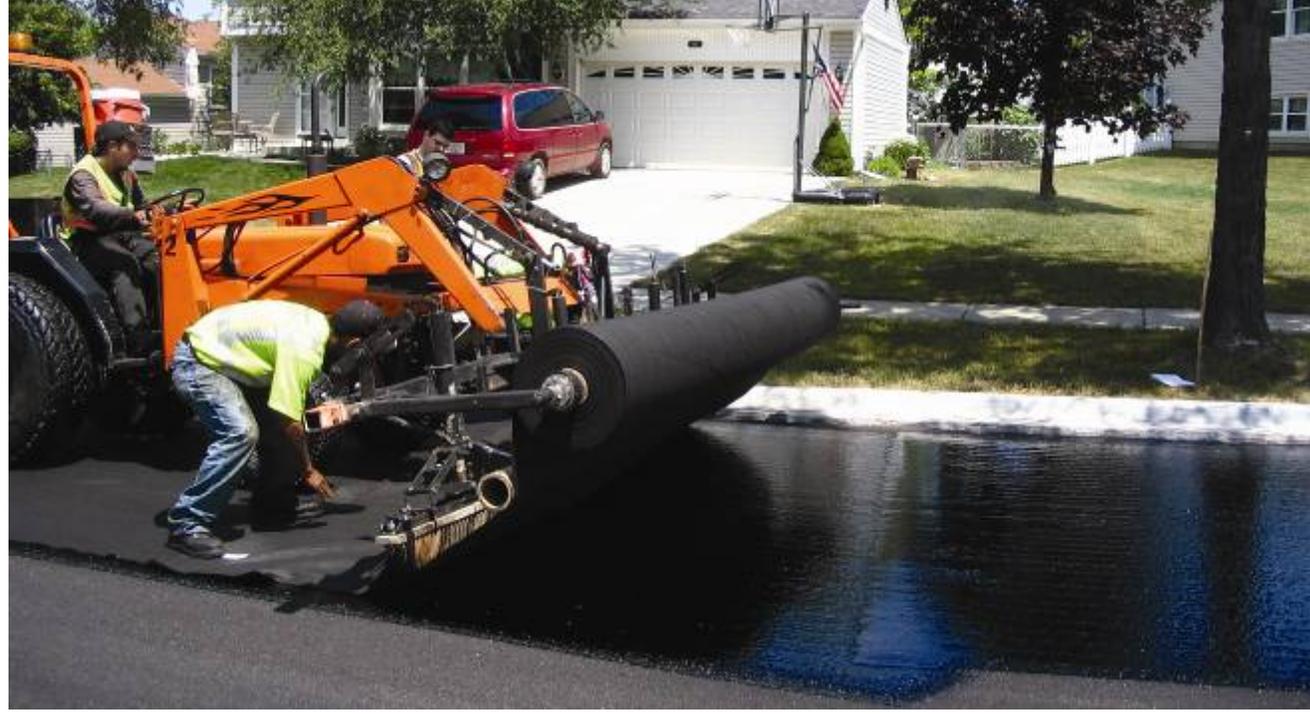
❖ PMA

❖ Scrub Seal

❖ Peel & Stick Membranes



Paving Fabric



- **Paving Fabric:** A non-woven geotextile fabric that is saturated with asphalt cement and placed with an overlay or chip seal.

Paving Fabric Specifications

Property	Test Method	Value
Elongation, minimum in each direction, %	ASTM D4632	50
Grab breaking load, 1-inch grip, minimum in each direction, lbs	ASTM D4632	100
Hydraulic bursting strength, minimum, psi	ASTM D3786	200
Mass, minimum, oz/yd ²	ASTM D5261	4.1
Asphalt retention, minimum, gal/yd ²		0.2

- **Binder Requirements for Overlay Installation –**
 - PG grade 64-XX or 70-XX
 - PG 70 – XX should be used in higher ambient temperatures to reduce the chances of bleeding under construction traffic.
 - Binder application shall be 0.25 Gallons per Square Yard (GSY) +/- 0.03 GSY.
 - Binder Application rate shall be increased in milled areas by .05-.10 GSY to account for the increased surface area and voids.

Paving Fabric with Chip Seal

Paving Fabric can also be placed under chip seal operations. In this case the binder requirements differ from that of overlay

- **Binder Requirements for Chip Seal Installation –**
 - PG 64 – XX or PG 70 – XX
 - Application rate shall be increased to 0.30 GSY +/- .03.
 - In addition, the fabric shall be rolled to ensure that the fabric is completely saturated prior to the chip seal application.



Paving Mat

- **Paving Mat** - A non-woven fiberglass/polyester hybrid material that is saturated with asphalt cement and placed prior to a thin asphalt concrete overlay.

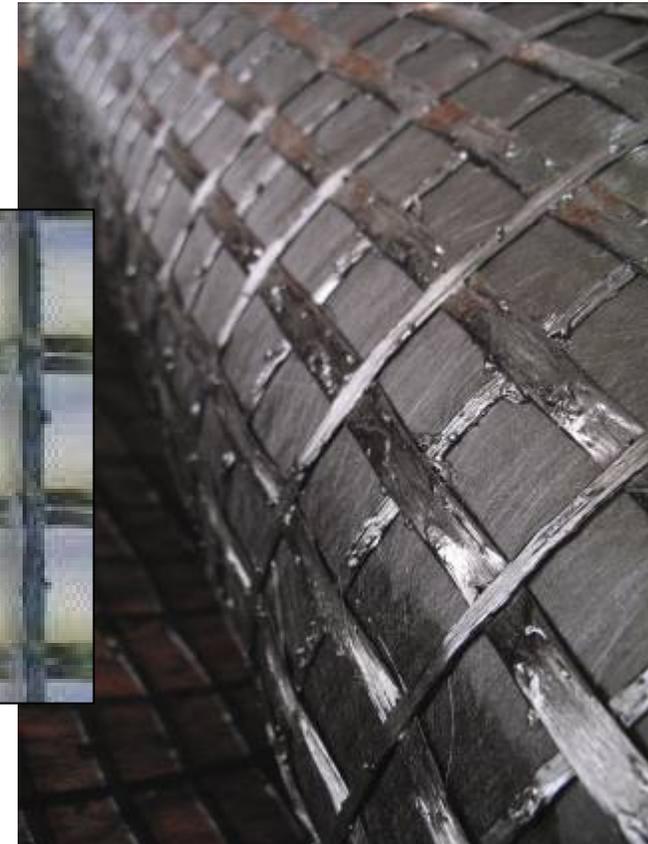
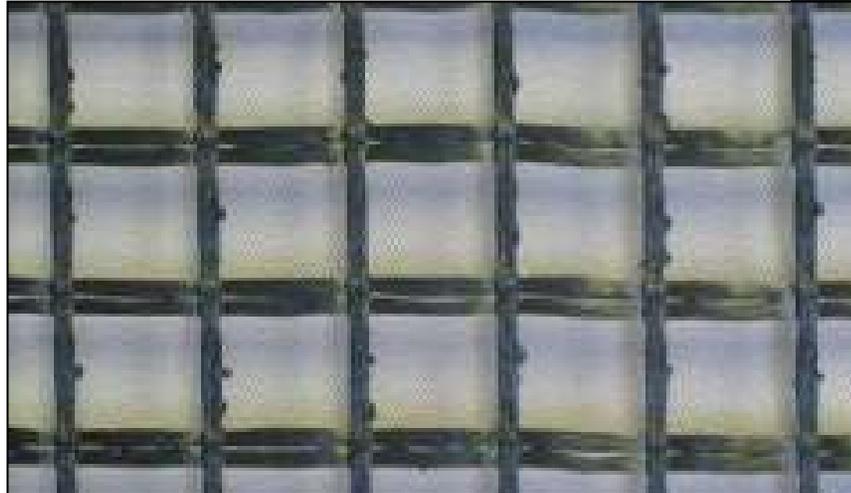


Paving Mat Specifications

Property	Test Method	Value
Ultimate Elongation, %	ASTM D5035	≤5
Breaking Strength, lb/2 IN	ASTM D5035	45
Mass per Unit Area, oz/sy	ASTM D5261	3.7
Melting Point, °F	ASTM D276	>400
Asphalt retention, minimum, gal/yd ²	ASTM D 6140	.10-.18*
* Dependent upon Manufacturing of Mat		

- **Binder Requirements for Overlay Installation –**
 - PG grade 64-XX or 70-XX
 - PG 70 – XX should be used in higher ambient temperatures to reduce the chances of bleeding under construction traffic.
 - Binder application shall be .15 - .20 Gallons per Square Yard (GSY) +/- 0.03 GSY.
 - Binder Application rate shall be increased in milled areas by .05-.10 GSY to account for the increased surface area and voids.

- **Paving Grids** – A material formed into a grid by a regular network of integrally connected elements with openings greater than or equal to 1/2” minimum to allow interlocking with the surrounding asphalt concrete materials.
 - This material is applied either with a self-adhesive or via a lightweight scrim (a non-woven material <1.2 oz/SY attached to the grid) and/or tack application and is placed with an overlay.



Paving
Grid

Paving Grid Specifications

Property	Test Method	Grid Type		
		Class P1	Class P2	Class P3
Aperture size, inches	Callipered	>0.5	>0.5	>0.5
Elongation, maximum, %	ASTM D4632	5	5	10
Mass, minimum, oz/ sq yd	ASTM D5261	16	10	5.5
Tensile strength @ ultimate, minimum, lb/in	ASTM D6637	560 x 1,120	560 x 560	280 x 280

Binder Requirements for Overlay Installation with Scrim Backed Material–

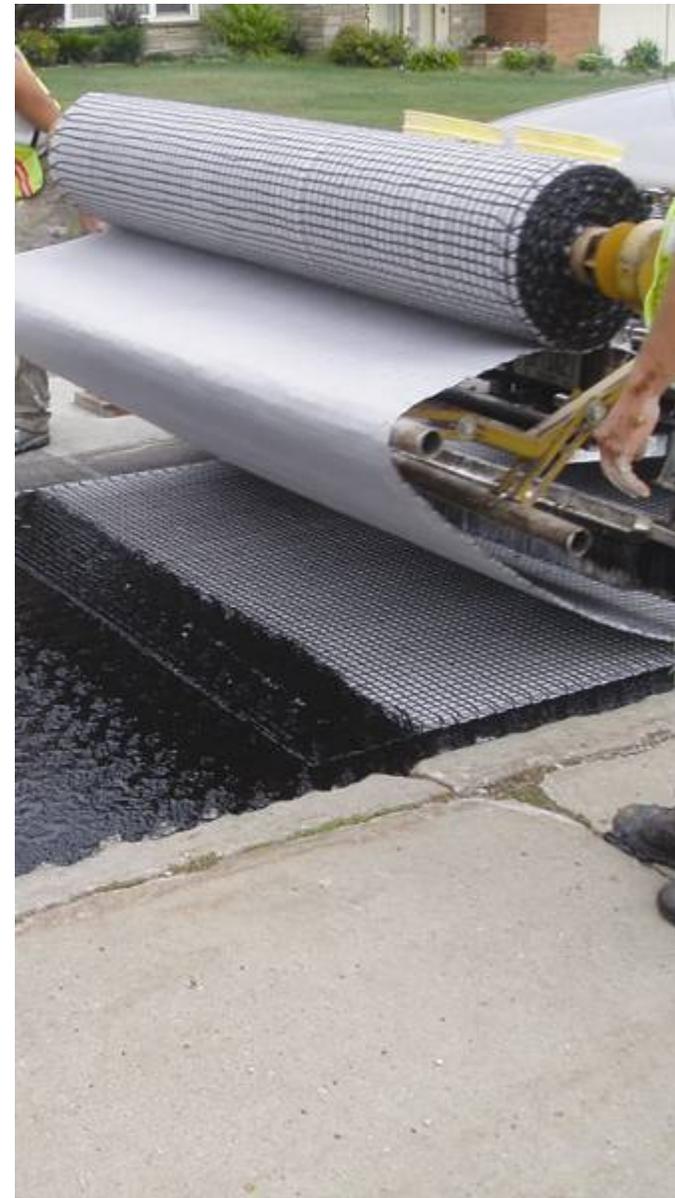
- PG grade 64-XX or 70-XX
- PG 70 – XX should be used in higher ambient temperatures to reduce the chances of bleeding under construction traffic.
- Binder application shall be 0.06- 0.10 Gallons per Square Yard (GSY) +/- 0.03 GSY.

Self Adhesive Grid Binder Requirements

- Self adhesive grids may require a tack coat for installation
- If a tack coat is specified and approved by the manufacturer or their representative, the tack coat shall be:
 - Emulsified asphalt or PG graded binder
 - If emulsified asphalt is used ensure a binder solids content of minimum 65% and a residual asphalt application rate of 0.02 – 0.05 gal/yd². See the manufacturer's recommendations for details.

Paving Composite Grid

Paving Composite Grids –
A Paving Grid, as defined previously, laminated, bonded or integrated with a paving fabric which is saturated with asphalt cement and placed with an overlay.



Paving Composite Grid Specifications

Properties of Grid	Test Method	Grid Type		
		Class P1	Class P2	Class P3
Grid Aperture size, range, inches	Callipered	>0.5	>0.5	>0.5
Elongation, maximum, %	ASTM D6637	5	5	10
Mass, minimum, oz/ sq yd	ASTM D5261	16	10	5.5
Tensile strength @ ultimate, minimum, lb/in	ASTM D6637	560 x 1,120	560 x 560	280 x 280
Property of Fabric	Test Method	Value		
Grab Tensile Elongation, maximum in each direction, %	ASTM D4632	50		
Grab breaking load, 1-inch grip, minimum in each direction, lbs	ASTM D4632	90		
Hydraulic bursting strength, minimum, psi	ASTM D3786	180		
Mass, minimum, oz/yd ²	ASTM D5261	3.6		
Asphalt retention, minimum, gal/yd ²		0.2		

Binder Requirements for Overlay Installation –

- PG grade 64-XX or 70-XX
- PG 70 – XX should be used in higher ambient temperatures to reduce the chances of bleeding under construction traffic.
- Binder application shall be 0.25 Gallons per Square Yard (GSY) +/- 0.03 GSY.

Composite Membranes



- **Composite Membranes** – Strips of various widths comprised of rubberized and/or polymerized asphalt and geosynthetic materials applied either with a self-adhesive or an asphalt tack application and placed prior to an overlay.

Composite Membrane Specifications

Property	Test Method	Value
Thickness, mills	ASTM D5147	65
Grab Tensile Strength lbs	ASTM D4632	200
Grab Tensile Elongation, %	ASTM D4632	40
Puncture Strength, lbs	ASTM D4833	200
Permeance, perms, max	ASTM E 96, Method B	0.1
Strip Tensile, lbs/in	ASTM 882 Modified	50
Pliability	1/4" Mandrel 180 @ -25°F	No Cracks

PRIMER PLACEMENT-The purpose of a primer is to improve adhesion of the strip membrane under "marginal" conditions that tend to reduce bonding. Such conditions include moisture, dust, cold temperatures and irregular surfaces. Use only primers recommended by the manufacturers of the products.

Scrub Seals



Scrub Seals – A polymer modified rejuvenating emulsion applied with a layer of aggregate prior to an overlay or slurry or microsurfacing. Material specifications can be found in Chapter 6, Chip Seals and Chapter 7, Fog and Rejuvenating Seals.

Asphalt Rubber Chip Seal

AR Chip Seal - Formerly called SAMI-R, Asphalt Rubber Chip Seals (ARCS) are an application of Hot Applied, Site Blended Asphalt Rubber covered with a pre-coated, pre-heated aggregate placed prior to an overlay or slurry seal or microsurfacing. ARCS Specifications are discussed in detail in Chapter 6, Chip Seals.



Polymer Modified Asphalt Chip Seal

A PMA Chip Seal is an application of hot applied asphalt and polymer or asphalt, polymer and crumb rubber materials followed by an application of pre-coated, pre-heated aggregate placed prior to an overlay or slurry seal or microsurfacing.

Construction and materials are discussed fully in Chapter 6, Chip Seals.



Design Considerations for Interlayers

Once the decision has been made to use an overlay or chip seal as a wearing surface, consideration should be given to using an interlayer to improve the performance of the chosen surface treatment. Use of and type of interlayer is based on several factors including:

- Existing distresses - including types and severity levels. (Section 12.2.1 and Tables 12.x and 12.y)
- Moisture or water damage - which will accelerate the distresses, weaken the subgrade, and can cause premature failure of the new treatment. (Section 12.2.2 and Table 12.y)
- Interlayer costs - which will vary greatly depending on the type of interlayer. (Section 12.2.3 and Table 12.z)
- Project design life or life extension benefits. (Section 12.2.4)

Design Considerations Continued

For the purpose of the following tables, if active pumping is present in addition to the listed distresses, this indicates a poor subgrade condition which will require treatment prior to the use of an interlayer.



Distress Tables

Table 12.x Distresses vs Interlayer Effectiveness					
Interlayer	Alligator Cracking			Block/ Longitudinal / Transverse (non Thermal)	
	Load Related	Age Oxidation (L to M)	Age Oxidation (M to H)	Low to Medium (CW < 1/2")	High (1/2" < CW < 1")
Paving Fabric w/ Overlay	N	E	G (1)	F	F (2)
Paving Fabric w/ Chip Seal	N	E	G (1)	G	F (2)
Paving Mat	N	E	E (1)	G	G (2)
Paving Grid	N	E (1)	E (1)	E (1)	E (1)
Paving Composite Grid	N	E	E (1)	E	E (2)
Composite (Strip) Membranes	N	N	N	E	E
AR- Chip Seals	N	E	E	E	E (2)
PMA - Chip Seals	N	E	E	E	E (2)
PMRE - Scrub Seals	N	E	E	E	E
Note 1: With Leveling Course first					
Note 2: With Crack Filling					

E = Excellent

G = Good

F = Fair

N = Not Recommended

L = Low Severity

M = Medium Severity

H = High Severity

CW = Crack Width

Distress Tables

Table 12.y Distresses vs Interlayer Effectiveness				
Interlayer	Thermal Cracking			Moisture Intrusion
	Low (CW < 1/4")	Medium (1/4" < CW < 1/2")	High (1/2" or greater)	
Paving Fabric w/ Overlay	G	F	N	E(3)
Paving Fabric w/ Chip Seal	F	N	N	E(3)
Paving Mat	E	G	N	G(3)
Paving Grid	E	E(1)	E(1)	N
Paving Composite Grid	E	E	E (2)	E(3)
Composite (Strip) Membranes	E	E	G	E
AR- Chip Seals	F	N	N	E
PMA - Chip Seals	F	N	N	E
PMRE - Scrub Seals	G	F	N	E
Note 1: With Leveling Course first				
Note 2: With Crack Filling				
Note 3: Dependent on binder application rate				

E = Excellent

G = Good

F = Fair

N = Not Recommended

L = Low Severity

M = Medium Severity

H = High Severity

CW = Crack Width

Interlayer Costs

See MTAG (Table 12.z) or Handout with Costs and Factors affecting cost

Interlayer Life Extension Benefits