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Tensar AR-G

AR-G is composed of an asphalt reinforcement grid factory bonded to a backing fabric, which aids installation and can also provides a stress relieving membrane effect. AR-G should be installed on relatively smooth surfaces, from asphalt regulating course to finely milled asphalt concrete substrate.

Installation of AR-G should be carried out by an experienced team or will require team field training prior to installation on a road construction site:

Do:	Do not:
 Apply on a firm, even, dry, dust free swept substrate If a regulating course is specified, use a mix of 5mm maximum aggregate size Use a 1kg/m² bituminous bond coat If emulsion based, adjust spray rate to take water content into account Make sure the emulsion is sufficiently viscous to avoid run offs Leave sufficient time for the bond coat curing if it is emulsion based Lay a minimum asphalt layer thickness of 70mm in one pass above the grid 	 Apply on loose, porous or crumbling substrate Apply on wet surface or when raining Reduce bond coat to below 0.8 kg/m² of bitumen without a preliminary trial, it may lead to layer de-bonding Use a standard tack coat emulsion for AR-G bond coat; they are not intended to deposit 1kg/m² range of residual bitumen Pave directly on un-cured bond coat, it would leave emulsion water trapped. Lay a asphalt layer thickness of less than 60mm in one pass above the grid. Use cutbacks, solvents can affect polymer's physical properties

Storage

Tensar AR-G should be stored on site under cover to prevent water ingress. The protective polyethylene sleeve should be left in place around the roll until the product is to be used. Rolls should be stacked no more than 3 rolls high.

Installation equipments and tools

The following tools are required to install AR-G

- 1. A disk saw to cut rolls to width
- 2. A properly calibrated bond coat sprayer. Depending on situation, the sprayer can be;
 - hot bitumen sprayer
 - an emulsion sprayer
 - Or, if available, a foamed bitumen sprayer
- 3. For large sites, a mechanical grid installation machine capable of handling full roll width 3.8 meters. On small sites, AR-G can easily be laid by hand
- 4. One nail gun and nails with clips to hold the grid in place at start and when the grid needs to be secured (i.e. curves, all corners before opening to site traffic on the grid)
- 5. A number of cutters, carpet strength

Surface Preparation

The surface onto which the Tensar AR-G is to be laid should be even, dry and free of dust and other loose materials. Cracks wider than 10mm should be filled with a suitable sealant. Finely milled surfaces are acceptable for installation of AR-G; however, coarse or unevenly milled or broken surfaces should be regulated with a suitable fine (maximum aggregate size: 6mm) sand asphalt mix.

If installing on coarse graded asphalt base mix, the surface may be quite open, reducing the amount of bitumen available for soaking the backing. It is suggested that a fine; washed sand less than 1mm should be brushed-in to prevent emulsion from draining into the voids.



Bonding Coat Application

AR-G requires a bituminous bond coat to hold it in place during construction and work as a partial stress relief layer once in place.

The bonding coat should be sprayed onto the surface at a uniform rate to deposit $1.0 \, \text{kg/m}^2$ of pure, residual bitumen.

The bond coat can be applied either as;

Hot sprayed bitumen if the local practice is to use a 160/200 pen bitumen,

A run-off proof surface dressing emulsion such as C69B4, according to EN13808:2005 (rapid setting cationic emulsion with 69 to 70% bitumen content).



- a. Emulsions below 65% bitumen not intended for surface dressing application should be checked for run-off performance first at the specified spray rate.
- Emulsion spray rate is calculated based on binder content (i.e. to reach 1kg/m2 bitumen, a 70% bitumen content emulsion will be sprayed at 1.43kg/m²)
- 2. If locally available, sprayed foamed bitumen can be considered
- The surface onto which the bonding coat is applied must have been allowed to cool to ambient temperature (if newly laid).
- The application rate should be corrected on porous or cracked surfaces for the binder that may penetrate the surface and therefore not be available to soak the fabric backing.
- The minimum air temperature at the time of applying the bitumen bonding coat should be +5°C and rising for pure bitumen and +10°C for bitumen emulsion.
- The bonding coat should extend 100mm wider than the width of the Tensar AR-G roll.
- Cut back bitumen's (i.e. bitumen mixed with a volatile liquid, e.g. kerosene) should be avoided. Solvents can affect polymer's mechanical properties and are not recommended for the installation of Tensar AR-G.



Laying of Tensar AR-G

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Cut roll to width if required; trim off any twisted filaments on edge and end of roll

- 1. Unroll the AR-G, **immediately** after spraying the bond coat either by hand or mechanically.
 - a. **By hand onto the sprayed surface**. This should involve light tension to ensure that no wrinkles are formed. The AR-G should be fully bonded by firm brushing with stiff brooms applying a downward pressure on the AR-G.
 - b. **By mechanical lay down equipment**. This should involve the use of a purpose-built lay down frame. It must ensure that the AR-G is held under tension and is pressed firmly onto the sprayed surface.
 - c. On curves, **Tensar AR-G** should be laid as chords. Chord lengths will be dependent on the curve radius.

If the grid curls at ends or roll edges then a nail gun may be required to fix it down locally, particularly in cold weather.

- 1. It is recommended to avoid overlapping AR-G grids, on either transverse or longitudinal joints
 - a. On straight sections, abut the adjacent rolls with
 - i. a maximum joint gap between rolls equal to $\frac{3}{4}$ of the mix aggregate maximum size (~ 10 to 15mm for a 0/20mm mix).
 - ii. Secure the starting end of each roll (in direction of paving) by nailing in place to the substrate.
 - b. When working on tight curves, it is suggested to
 - i. lay first AR-G avoiding overlaps and wasteful cuts,
 - ii. then use AR1 'patches' nailed above AR-G to join AR-G individual sheets; AR1 being the same grid as AR-G but without backing.
 - iii. gritting of the AR1 naked sections may be required to avoid bond coat adhesion to construction equipment tyres during overlaying.
 - c. The longitudinal joints between adjacent lengths should not be coincident with a wheel path, a longitudinal construction joint or a longitudinal crack.
 - d. Wherever practical, AR-G should be laid across the entire width of the pavement prior to paving.



Trafficking

Although the grid surface is not intended for trafficking, site trafficking can be acceptable -provided the end corners of the grid have been secured with nails for safety.



Paving

- \checkmark Can commence as soon as the bitumen has fully cured and the AR-G is fully bonded to the pavement.
- If the AR-G is seen to move or lift during paving then operations must stop and corrective measure taken to prevent this happening. Two methods to deal with grid movement include padding with asphalt mix itself (maximum thickness no greater than the maximum aggregate size) or with single size chippings, 6 to 10mm placed to just clear the ribs of the grid



8mm single size grit

Single size asphalt padding

The bituminous material covering the AR-G should be placed and compacted by a mechanical paver to a recommended minimum rolled thickness of 70mm in one pass* and at a recommended maximum paving temperature of 180°C, above which bitumen aging may jeopardize the durability of the surfacing course.

*: This layer thickness may require adjustments depending particularly on the consistency of the hot asphalt mix.

Quality control

It is recommended to calibrate the sprayer at the start of each new project and then once a day. Approximately 300 by 300mm square samples of housing carpet are used for control purpose. After weighting the samples, they are positioned across the sprayer path. Once sprayed with bitumen, the samples are weighted again and the spray rate in kg/m2 is recorded. Bitumen spray rate shall be of 1000g/m2 of residual bitumen, excluding water or solvents.

As it is often difficult to enforce actual control of the spray rate, there are two visual clues on site to know if the spray rate is appropriate:

- 1. A 1 kg/m2 bitumen film will be thick enough to have a mirror effect,
- 2. Once AR-G is installed, footsteps and tires should leave a black print.



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