

The Dustex solution for gravel roads



THE CHALLENGE

Research in South Africa and the United States has shown that at least 0.2 tons/km/year of fine material is lost from a gravel road in the form of dust for every vehicle travelling on that road each day. So, on a road carrying 100 vehicles per day, at least 20 tons of fines will be lost per annum – with major economic, social and environmental consequences:

- » Loss of fines from the road leading to accelerated gravel loss and rapid deterioration in riding quality, with the formation of corrugations
- » Increased risk hazard for road users
- » Reduced quality of life for people living adjacent to the road
- » Reduced agricultural yields
- » Increased vehicle operating costs.

THE SOLUTION

Dustex is a lignosulphonate based binder for gravel roads, applied (cost-effectively) to various materials to minimise the negative effects of dust on provincial, urban, forest, farm and mine roads. Dustex is also effectively used on deviations and as an interim treatment on roads until they can be surfaced with a traditional bitumen seal. Primary applications include:

- » Streets and roads in rural and residential areas
- » Roads in game reserves
- » Road shoulders
- » Construction sites
- » Runways
- » Temporary bypasses
- » Sports fields and parking areas
- » Paddocks
- » Dust-sensitive agricultural and forestry roads

WHAT IS DUSTEX AND HOW DOES IT WORK?

Dustex is a lignosulphonate – a natural material that is a binding agent for gravel roads and other applications. Dustex is derived from lignin, which is a natural polymer found in wood. Applied to a road, Dustex binds the surface materials, thereby reducing the cost of maintenance and the need for other aggregates to be used. It enhances the visual appearance of the road, improves safety standards and provides a lasting, cost-effective solution to road surface deterioration. Dustex is available in liquid and powder form. It is harmless (non-toxic to humans, plants and animals), easy to use (requires no specialised equipment) and, because it is sourced from trees, it is environmentally friendly and derived from a renewable resource.

Areas to be prepared with Dustex should be protected from drifting sand eroded from untreated zones. Best results are achieved when large, continuous areas are prepared. Consideration should be given to the timing of the treatment (preferably after the rainy season) and for the best result, Dustex should be applied on a moist surface.

HOW TO USE DUSTEX IN GRAVEL ROAD APPLICATIONS

It is important to note that the road to be coated with Dustex should be well constructed – built using suitable materials, according to correct road construction methods and in line with TRH20 guidelines. Application rates and methods can be adapted to suit the particular situation. Raw materials should be selected as follows:

Material selection guidelines for unsealed roads:

Characteristic	Guideline		
	Rural	Urban	Haul
Maximum size	37.5mm	37.5mm	75 – 100mm
Oversize index	≤ 5 %	0	≤ 10%
Shrinkage product*	50 – 400	50 – 400	50 – 400
Grade coefficient**	16 – 34	16 – 34	16 – 34
CBR***	≥ 15	≥ 15	≥ 40
Hardness****	20 – 65	20 – 65	20 – 65

* linear shrinkage x % passing on 0.425mm sieve
 ** (% passing 26.5mm - % passing 2.0mm) x % passing 4.75mm/100
 *** California bearing ratio - soaked at >95% Mod AASHTO
 **** Treton impact value

DUSTEX DISSOLVING INSTRUCTIONS

The following procedure should be used for dissolving powdered Dustex regardless of what type of water truck and agitation is used:

Fill the water truck to about 50% of volume with water.

Add the powder slowly. Pour continuously with a fine and even powder stream to prevent lumps forming. Agitate the mix. After adding the powder, check that no lumps are floating on the surface – break any lumps up.

Add remaining water and mix thoroughly. You can do this by rocking the water truck backwards and forwards. Alternatively, dilute liquid Dustex to the desired concentration.

APPLYING THE PRODUCT

1. Surface treatment (spray on application)

Road structure: well compacted base and wearing coarse layer, density >95% MOD AASHTO. Ensure the road surface is firm, free of excess loose material and has sufficient camber to ensure proper lateral drainage.

Lightly water the road (0.5l/m²) to assist penetration. Apply the product in multiple applications over a period of 2-3 weeks (six applications over three weeks). Avoid run-off and pooling during application.

For haul roads, apply product continually at 0.01kg/m² as part of the normal water programme until the required level of dust suppression is achieved. Increase intervals between spraying as product takes effect.

2. Mix-in application

Rip the road to 100mm. Break large clods to a maximum of 38mm.

Calculate the volume of water required to reach OMC for compaction.

Add two-thirds of the product to the right amount of water. Mix well and allow sufficient time for the powder to dissolve (see mixing instructions).

Apply the solution onto the prepared surface in 2 – 3 applications.

Shape to required camber. Compact with pneumatic or tyre steel roller to required density. Apply the remaining one-third of the product to the road

APPLICATION RATES

Mix-in application (150mm)			
Vehicles per day	Climate	Dustex (kg/m ²) Shrinkage product	
		<50	>50
<150	Dry	1.2	1.0
	Wet	1.2	1.2
> 150	Dry	1.5	1.2
	Wet	1.5	1.5
Haul road	–	3.0	3.0

Surface application (spray on)	
Rural / residential road	0.35 – 1.00kg/m ²
Haul road	0.1kg/m ² as part of routine watering programme until required result

ADVANTAGES

- » Improved road standards: dust-free road surfaces ensure safer and more comfortable driving.
- » Cost-effective: requires the minimum construction and road preparation to create a positive life cycle / cost ratio.
- » Easy to apply: spray with standard spray equipment.
- » Easy, affordable maintenance: normal maintenance to the road surface can be achieved with the minimum expertise and standard equipment. Rejuvenation can be done as and when it is required by softening the road surface with water before grading.
- » Quick drying: Dustex penetrates quickly, so the road can be opened to traffic immediately after application.
- » Improved quality of life: less dust!

THE IMPORTANCE OF REJUVENATION

To maintain the dust-free qualities of the treated area, it is essential that you run a planned road maintenance programme along with a Dustex rejuvenation schedule. The surface area will wear as a result of vehicle traffic, payload spillages, debris blown onto the road and other related causes. Dust on the treated area does not necessarily indicate that Dustex has been washed away – it may simply be the result of spillages.

How often should you rejuvenate?

Rejuvenate when the dust level reaches an unacceptably high level. Additional rejuvenation may be necessary in dry seasons or after heavy, sustained bouts of rain. Rejuvenation should be done using between 50-80g per square metre of rejuvenation area, but can vary considerably and should thus be assessed by a Dustex agent. Rejuvenation maintains your dust-free environment, prolongs the lifespan of the area, preserves the wearing course of road and enhances the working environment for people in the area. Regular Dustex rejuvenation 'builds up' the performance characteristics of the treated surface, thus distributing the cost of Dustex over a series of treatments.