

DUST SUPPRESSION ALTERNATIVES



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Purpose: This graphic training aid (GTA) will assist Soldiers in managing dust for airfields, helipads, base camps, marshaling areas, main supply routes (MSRs), and lines of communications (LOCs) and determining the appropriate method of dust suppression. Dust suppression factors include climate, area and soil type, equipment and material availability and methods of shipping. No one solution meets every requirement. For more information, refer to Field Manual (FM) 3-100.4 and Technical Manual (TM) 5-830-3.

The proponent agency for this publication is the United States Army Training and Doctrine Command (TRADOC). Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commandant, United States Army Engineer School, ATTN: ATSE-DT, Individual Training Division, 320 MANSCEN Loop, Suite 370, Fort Leonard Wood, MO 65473-8929.

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Dust Effects: Dust can limit or delay the mission, affect Soldiers' health, reduce visibility (increasing the risk of accidents), and damage equipment. Dust suppression helps to reduce these effects.

Dust Avoidance: Dust avoidance is a preventive measure in dust control. Dust avoidance techniques include—

- Leaving the hardpan (soil crust) intact when constructing parking or storage areas.
- Locating facilities in areas sheltered from the wind by vegetation or topography.
- Wearing personal protective equipment, such as goggles and large kerchiefs to cover the nose and mouth.

Dust Suppression: Dust suppression involves either physical or chemical barriers. For expedient helipads, matting materials or chemical palliatives may be used.

Physical barriers include putting down matting or gravel layers on the surface of the area of concern. Matting materials are heavier and last longer, but are labor intensive. Proven available matting materials include MOBI-MAT, AM-2 Landing Mat (aluminum), and DURA-BASE® Composite Mat System.

Chemical barriers or palliatives require equipment for application. Chemical palliatives vary in ease of application, effectiveness, and cost. They are usually applied topically or admixed (integrated into the top layer of the soil, approximately 3 to 5 inches, and then top-coated). Chemical palliatives (sprays) are available through the General Services Administration (GSA) Advantage!® online-ordering system.

Topical Applications: Topical application is the most common method of dust suppression. However, topical applications require applicators to maintain the greatest level of uniformity when dispersing the liquid. An

alternative method should be used if the area does not allow for uniform spraying.

Topical spraying requires equipment with a tank to hold the chemicals, a mechanical system to mix the chemicals with water (if dilution is necessary), and a spray apparatus, such as a spray bar or hose and a pump. The U.S. Marine Corps uses hydroseeders (see Figure 1) for topical application, while some U.S. Army units use water distribution vehicles.



Figure 1. Spraying a Topical Application

Admix Applications: Admix applications incorporate the chemical dust palliatives deeper into the soil than topical applications. They are used on areas that have heavy repetitive loading such as MSRs, LOCs, runways, taxiways, or parking aprons.

Admix applications require a grader, a rotary mixer, a steel-wheeled vibratory roller, and a spray applicator. Admix depths for roads should be at least 3 inches; admix depths for airfields should be at least 4 inches.

Admix Procedures:

Step 1. Grade the soil, if necessary, using a motor grader (Figure 2).



Figure 2. Grading the Soil

Step 2. Spray at a rate of one-half of the palliative application rate (for example, if the rate is 0.8 gallons per square yard [gsy], spray 0.4 gsy) on the soil surface and blend into the top 3 inches of soil for roads and top 4 inches of soil for airfields by using the rotary mixer (Figure 3).



Figure 3. Spraying an Admix Application

Step 3. Compact the soil using a steel-wheeled vibratory roller (Figure 4).



Figure 4. Compacting the Soil

Step 4. Spray the remaining palliative on the compacted surface (Figure 5).



Figure 5. Spraying the Remaining Palliative

Step 5. Allow the chemical to cure as directed on the product label.

Palliative Reapplications: As the effectiveness of the products diminishes over time, you may need to reapply dust palliatives (physical and chemical). Areas treated with chloride salts or synthetic fluids may be rejuvenated by applying more palliative at approximately half the original application rate. Any troublesome area or exposed untreated soil may be fixed by coating that particular region with small quantities of product. Reapplication on polymer-treated soil may require some site preparatory work prior to spraying. The existing polymer film, if undisturbed, will tend to repel the emulsion and prevent penetration of the new product. Using techniques to pulverize or scarify the soil may improve reapplication.

Palliative Selection Procedures: Check with the environmental office or the environmental-law specialist at your location for any information on what dust suppression methods or palliatives have worked best for your area and soil conditions or for any environmental-permit limitations (including overseas guidelines and host country or treaty obligations, if overseas).

Step 1. Determine type of area (airfield, helipad, base camp, marshaling area, MSR, or LOC).

Step 2. Use Table 1 to determine primary and secondary recommended chemical palliative solutions.

Step 3. Determine the amount of chemical needed based on size of area (in square yards) and the rate of application.

$$\text{Chemical (gal)} = \text{Area (yd}^2\text{)} \times \text{Rate (gsy)}$$

NOTE: Soil type has some effect on performance of dust palliatives. Finer-grained soils may require additional quantities of palliatives or may require multiple light applications. If soil is fine grained, estimate a higher quantity of chemical palliative.

Step 4. Determine the amount of water needed if the chemical requires dilution.

$$\text{Water (gal)} = \text{Chemical (gal)} \times \frac{\text{First number of dilution ratio}}{\text{of dilution ratio}}$$

For example, with a dilution ratio of 3:1, you would need 3 gallons of water for every gallon of chemical.

Step 5. Check with GSA Advantage! to determine the availability and the pricing to include shipping.

Step 6. Order palliative and/or application equipment through your supply office.

Safety: Ensure that a copy of the manufacturer's material safety data sheet (MSDS) is provided to all users of the product(s). Safety briefings will include identification of hazards associated with the use of the product(s), personal protective equipment requirements, and emergency measures that must be taken in the event of personnel exposure or accidental release of the product(s).

Summary: Dust suppression is used to ensure mission success and to protect Soldiers' health. However, no one dust suppression method or palliative fits all situations. Table 1 includes products specifically tested and proven to work.

Table 1. Recommended Chemical Dust Palliatives¹

Type of Area	Primary Solution				Secondary Solution			
	Product Category	Rate (gsy)	Dilution Ratio	Application Type	Product Category	Rate (gsy)	Dilution Ratio	Application Type
Airfields	Synthetic fluid (Durasoil™, EnviroKleen®, EK-35®) ²	0.4	N/A	Topical	Polymer emulsion (Envirotac II®, SoilTac™, Soil-Sement®, DustSet™DC-100, Enviroseal LDC™) ²	1.2	3:1	Admix ³
Helipads	Synthetic fluid (Durasoil, EnviroKleen, EK-35)	0.4	N/A	Topical	Polymer emulsion (Envirotac II, SoilTac, Soil-Sement, DustSet DC-100, Enviroseal LDC)	1.2	3:1	Topical
					Powdered polymer (Surtac™ [powdered]) ²	1.2	1.3 lbs/gallon	Topical
Base camps/marshaling areas	Synthetic fluid (Durasoil, EnviroKleen, EK-35)	0.4	N/A	Topical	Polymer emulsion (Envirotac II, SoilTac, Soil-Sement, DustSet DC-100, Enviroseal LDC)	0.6	3:1	Topical
					Powdered polymer (Surtac [powdered])	0.6	1.3 lbs/gallon	Topical
					Polysaccharide (Surtac) ²	0.6	3:1	Topical
LOCs/MSRs	Polymer emulsion (Envirotac II, SoilTac, Soil-Sement, DustSet DC-100, Enviroseal LDC)	0.8	3:1	Admix	Synthetic fluid (Durasoil, EnviroKleen, EK-35)	0.6	N/A	Topical
					Chloride salt ⁴	0.8	N/A	Topical

¹Tested by the United States Army Corps of Engineers®, Engineer Research and Development Center, Vicksburg, MS.

²All products listed have been tested and proven to work.

³Depth of mixing should be a minimum of 4 inches.

⁴Should not be used in excessively dry or excessively wet conditions. Chloride salts may have corrosive effects on metal vehicle components; therefore, frequent vehicle washing and maintenance checks may be required.