



Coherex®



Dust Retardant

Tricor Refining, LLC

Producers of Golden Bear Preservation Products

P. O. Box 5877, Bakersfield, CA 93388

Phone 661 393 7110 extension 107 email: info@goldenbearoil.com



Coherex®

Dust is more prevalent than any other atmospheric contaminant. When carried into the air, it can damage crops, cause respiratory illness, affect visibility and spread disease. Unchecked it adds to pollution and adversely affects our entire ecology.

Coherex® was developed as a result of years of extensive research and thorough field and laboratory testing. Coherex® stabilizes soil against wind erosion, thereby eliminating airborne dust and movement of sand along the ground.



What is Coherex®?

Coherex® is an effective dust control and wind erosion agent. It is a stable, concentrated, nonvolatile emulsion consisting of approximately 60% semi-liquid natural petroleum resins and 40% wetting solution.

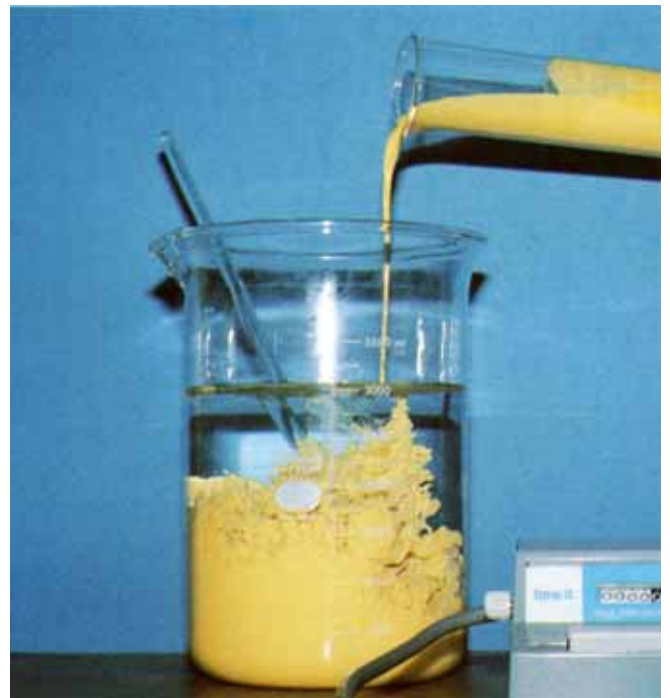


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The non-volatile resins are the film forming, dust-binding portion of the preparation.

The wetting solution is water containing a combination of wetting agents and sequestering agents, which serve four purposes:

- (1) Disperses the resins into fine particles, which can be kept suspended in the emulsion, making **Coherex®** a preparation readily miscible in water in all proportions.
- (2) Increases the spreading power of the diluted emulsion.
- (3) Facilitates penetration of the resinous particles into soils.
- (4) Stabilizes the preparation against hard water; permitting the dilution of the emulsion with almost any water available.



The water contained in the concentrate is an integral part of the preparation. It is the solvent for the wetting and sequestering agents and is proportioned in the concentrate in an amount assuring the greatest storage stability and ease of handling.

Additional water added to the concentrate before use, in amounts recommended at the end of this manual, serves as a diluent to assure greatest economy and increase penetration into the dust layer.

How does **Coherex®** work?

The prime conditions favoring susceptibility of soil to erosion by wind are:

- 1) Lack of cohesiveness (loose and dry soil).
- 2) Lack of protective cover (smooth and bare ground).
- 3) Lack of shelter from wind (large, unsheltered areas).



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In wind-resistant native soils, a correct balance of fine and course particles provides the required cohesiveness to resist the impact of saltation, the start of all erosion.

The development of **Coherex®** for treatment of soils started with the realization that the three types of movement of soil:

- 1) **Saltation** - The effects of direct pressure of the wind on soil particles and by their collision with other particles. Saltating grains can move, by the force of impact, particles over 200 times their own weight
- 2) **Surface Creep** – Slow movement of the soil surface that is caused primarily by the direct impact of saltating grains on particles, too heavy to be dislodged by wind, and bounced into the air.
- 3) **Suspension** – Is the transporting by wind of small particles. These particles, after having been dislodged from the surface by saltating grains or by mechanical disturbances, like traffic, can be transported long distances.

Can be arrested by imparting cohesiveness to the soil. In other words, **Coherex®** approach to stabilization of soils against wind erosion is the substitution of a resinous cohesive agent for the fines, which are required for the apparent cohesiveness in naturally wind-stable soils.

When **Coherex®** contacts the dusty ground, it coats the dust particles and forms cohesive membranes that attach themselves to adjacent particles. The chain-like bonds result in large “agglomerates” too heavy to be dislodged by wind. The resulting overall increase in particle size



actually immobilizes the dust and prevents it from becoming airborne. Treatment with **Coherex®** is a more effective approach to soil stabilization because the required cohesiveness is imparted to the soil without drastically altering its original make-up.



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Since treatment with **Coherex®** leaves a cumulative residue of the resins deposited on the soil particles, areas once conditioned with **Coherex®** require only occasional re-treatment to bind “new” dust, which has blown or drifted onto the area or which has been stirred up from beneath.

Coherex® is highly stable.

The high stability of Coherex® contributes greatly to the economic value of the product, assuring no loss of material by spoilage. It can be stored for long periods (12 months or more) without impairing its quality if kept in clean containers and protected from extreme temperatures (freezing and boiling). Diluted Coherex® should preferably be used within one day, since prolonged storage might result in stratification. If stratification occurs, simple agitation or stirring will prepare the mix for use.

How long does it last?

Under normal atmospheric conditions, and if the recommendations are followed in the **Coherex®** manual (available upon request), the first application will be effective 3-12 months and each succeeding application up to 12 months. If undisturbed by traffic, the initial treatment could last up to 3 years.

**Coherex® turned this
farm road from this...**



**... to this. Three months
later, it's still Dust FREE!**





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How do you apply Coherex® for best results?

Spreader trucks, hand sprayers, orchard sprayers, or other standard equipment can be used. Apply **Coherex®** by sprinkling the area with a sufficient amount of the diluted dust-binder to penetrate the layer of dust to the depth required. When determining the ratio of Coherex® to water, remember that depth of penetration is controlled by the total amount of fluid (product plus water) applied and the thickness of the deposit of resins on the dust particles is controlled by the amount of Coherex® concentrate in the fluid applied. Soil type influences the amount of fluid required and the time required to reach the depth of penetration desired.



Coherex® Case Studies

Everyone knows that New York's financial district is one of the nation's busiest areas. But few people realize that it's also one of the windiest. (Average winds at Battery Park: 14.5 mph.) This caused an unexpected, and quite serious situation.

The City's problem: The giant landfill for Battery Park City, the planned location for 16,000 apartments and 6 million feet of offices was begun in 1966. The problems began after the completion of the northern landfill section. Winds blowing across the Hudson River onto the landfill's surface gave rise to swirling dust. That's when officials, impressed by success with a similar problem at the JFK airport, turned to Coherex® for help. Applying Coherex to all 15 acres solved the problem, so plans for the city within a city continued.



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Treatment of sand dunes at Vandenberg AFB, Lompoc, CA. - Active and secondary sand dunes in the coastal area surrounding Vandenberg Air Force Base created a limitless source of shifting sands. A danger to personnel, facilities and equipment, the instability of the land demanded treatment to put a stop to progressive wind erosion. Treatments with Coherex, combined with a certain amount of seeding and planting, have proven highly successful in the long term planning of sand dune stabilization at Vandenberg Air Force Base.

Soil Sterilization. When delicate equipment must be kept free of pollen as well as dust, a suitable sterilant may be readily introduced into the Coherex dilution and sprayed onto the surfaces to be treated. Such applications have been necessary at many of the Minuteman missile sites installed in the north central states.

Bridger Coal does away with haul road dust at Wyo. coal mine. At Bridger Coal Company near Rock Springs, Wyoming, dust on haul and access roads became a serious problem after the mine began operations in mid-1974. As traffic from 120-ton coal haulers and ash trucks built up, dust became increasingly acute and made driving hazardous. The company's Coherex dust retardant program, which went into full operation early the next year, provided a safer, cleaner environment for the truck drivers and negated the need for additional watering trucks to keep the dust down. An additional benefit of Coherex is its ability to stabilize the soil without harming vegetation or deterring plant growth. This will be especially important when Bridger Coal returns its roadways to nature.



Coherex being sprayed on haul road at Bridger Coal, Wyoming.



Coherex®

Climax Molybdenum stabilizes dust on tailing ponds and dam faces.

Climax Molybdenum

Company evaluated a number of chemical agents in a search for an effective and economical way of controlling dust coming off the tailing ponds and dam faces at its mining sites in Climax, Colorado. Sloping terrain and high-altitude climatic conditions combined with cost and toxicity considerations eliminate most of the contenders. Treatments with Coherex dust retardant, mixed with wastewater from



Spraying Coherex on tailing pond at Climax Molybdenum, Colorado.

Climax retention ponds, proved successful in stabilizing problem areas and have led to long-range control programs using the agent.

General recommendations.

For best application, spraying pressure should be approximately 25 to 40 pounds. The following examples may serve as further illustrations:

Ballparks and playgrounds - Deep penetration on a thin coating of dust particles can be obtained by drenching the ground with a highly diluted mixture. (A 1:7 dilution of Coherex® to water will immobilize only the dust, while maintaining the soft free-flowing properties of the sand.) Less penetration and a heavier coating can be obtained by using a more concentrated mixture of dust-binder and water. (A 1:4 dilution applied at a lower rate will result in a surface, which will better withstand wear, and will bind dust blown onto the treated area.)

Dirt roads, driveways and utility yards with relatively thin layers of dust over hard sub-surfaces, application of a more concentrated mixture in moderate amounts will produce the desired complete penetration down to the hard subsurface with a sufficiently heavy coating of dirt particles. (A 1:4 dilution applied one-half gallon per square yard



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will suffice to treat a dust layer of approximately 1/2 inch thickness.) **Additional treatments** will be necessary, depending on the soil type, the kind of traffic and the traffic volume.

An area covered with large amounts of loose dirt - On construction sites, for example, several applications at a high dilution with water is recommended. (A 1:10 or even 1:15 dilution of Coherex® is advantageous in all cases where water is presently used as a temporary dust palliative or as a means of stabilizing a road undersurface.) This application will save time, labor and water. The highly diluted dust binder gives better penetration, better wetting, stabilization and improved adhesion, all of which result in considerable cost savings.

Road shoulders and farm service roads - Here, the application of a moderately concentrated mixture in high amounts is recommended. In many cases it will prove most practical to give the surface two applications. (On ranch roads, for instance, a 1:6 dilution applied one gallon per square yard, followed a few days later by a 1:4 dilution applied one-half gallon per square yard will give the most satisfactory results.) These two applications will convert dusty roads into compact road surfaces. On dirt roads, additional treatment will usually be necessary.

Mine haul roads where oversize and overweight vehicles are predominant, repeated applications are the general rule. In most cases the initial application must be repeated several times and thereafter the frequency depends on the soil type, amount of traffic, spillage and atmospheric conditions. (1:6 dilution is recommended for the initial application, and after resins are built up, the necessary re-treatments can be 1:8 dilution). Additional treatments should only be done when necessary to alleviate dust, not on a regularly scheduled, routine basis.

Note of caution: Detailed treating instructions are available, and should be consulted to assure proper application. Under no circumstances should Coherex® be applied in its concentrated form. Coherex® must always be in diluted form in accordance with recommended dilution ratios for specific applications.



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Product Safety Data

Read the Material Safety Data Sheet (MSDS) before using Coherex.

Coherex® has been **tested for oral toxicity**. Its LD50 was found to be greater than 16 grams per kilogram of body weight in rats, which is considered **“nontoxic”**.

Coherex® has been tested in accordance with Consumer Product Safety Commission (CPSC) regulations (see Code of Federal Regulations Title 16, Sections 1500.3, 1500.41 and 1500.42) and is NOT considered to be an eye irritant nor a primary skin irritant.

Coherex® has been **tested for inhalation toxicity**. Two groups of rats suffered no negative health effects as a result of exposure to 31,000 ppm of Coherex®.

Coherex® has a flash point about 400 °F and is not classified as flammable nor combustible by US DOT.

Coherex® cannot be ignited by either the direct flame or the hot surface methods. (Minimum ignition temperature determined using the Godbert-Greenwald Furnace developed at the U.S. Bureau of Mines, Bruceton Station, Colorado).

Coherex® is **not corrosive**, and will not track out onto other surfaces after drying.

Coherex® is a stable, concentrated, **nonvolatile water emulsion** consisting of approximately 60% petroleum resins and 40% wetting solution. Coherex is manufactured to strict specifications that must pass ASTM and AASHTO test procedures. **Coherex® resins are suspended** in water, and **are not water-soluble**. Therefore, **Coherex® will not leach out** of the soil as happens to many other dust palliatives. Coherex® should not be applied during a rainstorm, or if a storm is imminent. Normally, Coherex® will penetrate into the surface and be relatively dry in less than one hour. However, should a sudden heavy rainstorm occur during the application process and wash away any Coherex still on the surface, please note the product retains its safety qualities.

Coherex® has been tested for its BOD in accordance with “*Standard Methods for the Examination of Water & Waste Water*”, 13th Ed., 1971. The presence of Coherex in storm water runoff results in little increase of BOD.



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Coherex® is not injurious to most plants, trees and shrubs. In fact, it has frequently been used to aid germination. Many states now employ diluted Coherex® when hydro seeding highway slopes, etc. because of its ability to aid the germination process while holding the seed in place. Coherex® was recently used in a similar application at the Los Angeles International Airport.

The biodegradability of Coherex® has not been measured. We predict that **Coherex® will biodegrade** under normal environmental conditions, based on our knowledge of the chemical constituents of Coherex and a review of the literature on chemicals of similar composition.

Successive treatments of Coherex® will result in a desirable gradual buildup of the resins. If a regular maintenance program is in place the resins are not totally lost when a roadway is lightly graded and the treated material is not “lost” when pushed to the sides. Simply blade the treated soil back onto the roadway and make another light application of dilute Coherex® solution. When maintenance treatment is discontinued the built-up Coherex® resins will disappear through the biodegradation process.

The pH of Coherex® in its concentrated form ranges from 4.5 to 6.5 and as the product is diluted with water, the pH will move to match the pH of the local water being used.

Coherex® is an emulsion that does not have a single CAS number. The CAS number 64742-11-6 shown on the MSDS applies to the **base oil** used in the Coherex® manufacturing process. Coherex® was patented many years ago and is produced by combining base oil, water, and an emulsifier in a proprietary manner. The base oil is a heavy naphthenic extract. **There is no naphtha in Coherex®.**

The NFPA hazard ratings for Coherex® are 0 for fire, and 1 for toxicity. Coherex® does not contain any chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Coherex® does not leach out and a surface treated with Coherex® can usually be opened to foot traffic almost immediately - no sticky clods are formed to cling to shoes. If the soil has high clay content, however, the surface should be allowed to dry somewhat before exposing it to vehicular or foot traffic.



Coherex®

COHEREX®

(All Tests ASTM Unless Otherwise Stated)		Test	Min.	Max.
VISCOSITY, 25° C, SSF	D-244	21.0	15.0	40.0
SIEVE, W%	D-244	0.01		0.10
RESIDUE, W%	D-244	62.0	60.0	65.0
PARTICLE CHARGE TEST	D-244	POSITIVE		
pH OF EMULSION	D-244	5.4		7.2

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