TECHNICAL BULLETIN

ROAD BUILDING WITH CORCHEM® 5510 Soil Polymer / Enzyme

Road construction under optimum conditions should consider the following;

Use materials that are structurally sound. Road Base materials using CORCHEM® 5510 should have a gradation mix (size distribution) that will result in good load bearing values and contain approx. 18% to 30% non-granular fines (-200 mesh size and be cohesive in nature). Many roads have used material outside design standards. However prior to construction field testing was necessary for determining suitability. Upon completion excellent results were obtained. Some clays and "fines" are silty in nature and are not useful for road construction. Also, excessive fines can cause problems as a result of high plasticity and/or low bearing value.

Proper moisture must be maintained during compaction. CORCHEM® 5510 works best between 2% - 3% below optimum moisture. Do not compact above optimum moisture. After applying CORCHEM® 5510 to the road material additional water can be applied to bring the moisture content closer to the amount needed for proper compaction.

Generally, roads should not be compacted in lifts greater than 3". Lift thickness is determined by the size and type or compaction equipment plus the type of material being compacted. Sufficient compactive effort must be maintained during road construction to obtain maximum density. Less comparing effort will be required using CORCHEM® 5510

The road should be allowed to cure prior to use if possible (and final testing). However, the road can be used sooner if necessary. Drying of the base material will create less plasticity, decreased permeability and greater strength.

STEP 1 – Blade or rip the existing road to a minimum depth of six inches and then windrow the loose material. If the road requires greater depth, work the material in lifts. If additional aggregate is needed, use less expensive material (with more fines). Check the overall gradation of the material to ensure it is within the design limits. Overall depth to be treated depends upon designated axle load requirements.

STEP 2 – For each 165 cubic yards of road base material add one gallon of CORCHEM® 5510 to the amount of water to obtain optimum moisture. Refer to the worksheet contained in this document for additional information. Spray both the bladed surface and the windrow to obtain optimum moisture. Blend the CORCHEM® 5510 treated material using a grader blade, working the soil & aggregate back and forth to blend in the CORCHEM® 5510 and water. If the material is too wet, blade dry. If too dry, add water without CORCHEM® 5510 to bring the material up to optimum moisture. After thoroughly mixing, spread the material to grade. The road material can be left in a windrow over night to allow complete moisture absorption. This will result in better compaction with less effort.

STEP 3 – Extend and crown the road surface with a blade. If your material dries out on a hot day, spray again with a dilute CORCHEM® 5510 mixture. Compact with a compactor such as a sheepsfoot or pneumatic roller. Vibratory rollers may be used for the first and second passes however further compaction should be done without vibrator action to avoid cracking. Compact in 3" or 8 cm lifts (layers) to insure maximum compaction.

After allowing the road surface to dry (cure), it is ready for use. CORCHEM® strongly recommends the application of a surface sealer such as CORCHEM® 5405, to the cured surface, in order to protect from water. If asphalt or other road top surface is desired, better bonding will be achieved by moistening the surface with a diluted application of CORCHEM® 5510 and water at one to ten thousand (1:10,000) dilution rate. This surface application may be applied .anytime after a three (3) day curing period.

CORCHEM® 5510

CHARACTERISTICS & APPLICATION PARAMETERS

CHARACTERISTICS

CORCHEM® 5510 is a highly concentrated product formulated to contain an enzyme base with a dispersant in a water base solution.

NON-TOXIC, NON-HAZARDOUS & NON-FLAMMABLE

Shelf Life: 2 years from date of shipment, store below 120° F. (49° C.) Freezing is not harmful.

APPLICATION PARAMETERS

CORCHEM® 5510 should be diluted at least than 1 part to 500 parts of water or more. This will insure sufficient water for CORCHEM® 5510 to penetrate evenly throughout the soil.

TOTAL MOISTURE SHOULD NEVER EXCEED OPTIMUM MOISTURE.

Road construction projects should not be initiated when rain is expected. Soils with high moisture content prevent the penetration of CORCHEM® 5510 into the soil.
For best results: NEVER EXCEED OPTIMUM MOISTURE. It is hard to dry out wet soil!

Mix and apply when daytime temperature is above 50° F, (10° C) and night time temperature is above freezing, 32° F, and (0° C).

CORCHEM® 5510 - WATER APPLICATION GUIDELINES (METRIC)

WATER TO BE ADDED TO REACH OPTIMUM MOISTURE FOR COMPACTION

IMPORTANT: · DETERMINE APPROX MOISTURE IN SOIL BEFORE STARTING
Estimate Optimal Moisture then subtract existing moisture to obtain water needed.

Volume:	8cm x 8m x 1000m =	640 Cubic Meters
Material Weight:	640cu.m x 1,600kg/cu.m =	1,024,000 kg or Liters
Additional water to achieve optimum moisture:	8% moisture x 1,024,000 liters =	81,920 Liters water
Safety Factor (avoids excess water):	70% x 81,920 liters =	57,344 Liters water
CORCHEM® 5510 – (1 Liter treats 33 cu.m of soil):	liters required =	19 Liters

640 cubic meters road base material divided by 33 cubic meters

CORCHEM® 5510 dilution rate for example purposes only (DRY Conditions) 3,000:1 CORCHEM® 5510

CORCHEM® 5510 DILUTION TABLE - water to be added

WATER REQUIRED TO REACH OPTIMAL MOSITURE FOR COMPACTION

Water %	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
Water per Liter of 5510	528	1056	1584	2112	2640	3168	3696	2442	4752	5280	liters
Using 70% safety factor	370	739	1109	1471	1848	2218	2587	2957	3326	3696	liters

PROCEDURE

1. Determine (estimate) water to be added to soil then determine capacity of water truck and add CORCHEM® 5510 according to dilution rate calculation. (estimate water slightly below amount needed)
2. Apply water & CORCHEM® 5510 to base material wetting surfaces evenly.
3. Blend & mix CORCHEM® 5510 & water into soil with grader blade or recycler, (several passes may be necessary using a blade).
4. Observe if road base material has enough moisture for compaction. (a hand sample should make a firm ball.)
5. If more moisture is needed, add water and re-blend.

DO NOT USE MORE WATER THAN IS NEEDED.

6. Compact material to maximum density, usually 5 to 8 passes.
7. Repeat the above procedure for the top lift (layer).
8. If the first lift surface is too dry, dampen with a small amount of water before 2nd lift is extended across the road and compacted.

CORCHEM® 5510 - WATER APPLICATION GUIDELINES (ENGLISH)

WATER TO BE ADDED TO REACH OPTIMUM MOISTURE FOR COMPACTION

IMPORTANT: · DETERMINE APPROX MOISTURE IN SOIL BEFORE STARTING
Estimate Optimal Moisture then subtract existing moisture to obtain water needed.

Volume:	3 in x 24 ft. x 5,280 ft. =	1,173 cubic yards
Material Weight:	1,173 cu.yd x 2,700 lbs / cu. yd =	3,167,100 lbs.
Additional water to achieve optimum moisture:	(8% x 3,167,100 lbs) ÷ 8.33=	30,416 gallons water
Safety Factor (avoids excess water):	70% x 30,416 gallons =	21,291 gallons water
CORCHEM® 5510 – (1 gallon treats 165 cu.yd of soil):	gallons required =	7.11 gallons

1,173 cubic yards road base material divided by 165 cubic yards

CORCHEM® 5510 dilution rate for example purposes only (DRY Conditions) 3,000:1 CORCHEM® 5510

CORCHEM® 5510 DILUTION TABLE - water to be added

WATER REQUIRED TO REACH OPTIMAL MOSITURE FOR COMPACTION

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ROAD BUILDING SPECIFICATION GUIDELINES

GRADATION SPECIFICATION

	GRADATION	GRADATION LIMITS	
SIEVE SIZE	(% Passing)	UPPER	LOWER
1"	100%		
1/2"	85%	89%	81%
No.4	62%	66%	58%
No. 16	48%	52%	44 %
No. 200	24%	30%	18%

CORCHEM® 5510 can be used effectively over a wide range of soil gradation mixes, (aggregate sizes), as can be seen from the table above.

To achieve effective stabilization, materials containing approximately 20% cohesive fines, (non-granular) have been found a satisfactory target. However, excellent results have been achieved outside this range.

Additionally the soil should contain a wide range of material sizes to provide shear strength and internal friction which increases load bearing values.

CORCHEM® 5510 has proven useful over a wide range of soil types.

MATERIAL GRADATION – refers to the distribution, (% by weight) of the different sizes or particles within a given soil sample. A sample is described as well-graded if it contains a good, even distribution of particle sizes. If a soil sample is composed of predominantly one size particle, is said to be poorly graded. In terms of compaction, a well-graded soil will compact more easily than one that is poorly-graded. Well graded material allows smaller particles to fill the empty spaces between the larger particles, leaving fewer voids after compaction.

STRENGTH – The load which the wheel of a vehicle exerts on a gravel surface spreads out as it passes down through the road base. The angle of force, increasing in width as it penetrates deeper into the road material is referred to an internal angle of friction. It varies depending upon the type of material present. The objective in road design is to have sufficient road base thickness to support anticipated wheel loads.