



CONSERVATION ENHANCEMENT ACTIVITY

E333118Z

CONSERVATION STEWARDSHIP PROGRAM

Applications of gypsum products to improve surface water quality by reducing dissolved phosphorus concentrations in surface runoff

Conservation Practice 333: Amending Soil Properties with Gypsum Products

APPLICABLE LAND USE: Crop (Annual & Mixed); Crop (Perennial)

RESOURCE CONCERN ADDRESSED: Water Quality Degradation

PRACTICE LIFE SPAN: 1 Year

Enhancement Description

Apply approved gypsum products to improve surface water quality by reducing dissolved phosphorus concentrations in surface runoff.

Criteria

- Do not apply gypsum products in watersheds where sulfate additions are restricted.
- It is the responsibility of the amendment provider to furnish chemical analysis documentation for the product to the producer. The chemical analysis documentation will include the calcium and sulfur content and content of heavy metals and all other potential contaminants listed in table 1.
- Concentrations of potential contaminants cannot exceed maximum allowable concentrations listed in table 1. In addition, the radium-226 concentration in the gypsum-derived product cannot exceed 10 picocuries per gram (pCi/g).
- Flue gas desulfurization (FGD) gypsum that is produced by forced-oxidation wet systems after the removal of fly ash is acceptable for these uses.

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- The prescribed minimum application rates are based on a calcium sulfate dihydrate equivalency of 100 percent. Application rates for products that are less than 100 percent calcium sulfate dihydrate equivalence should be adjusted accordingly.
- Gypsum-derived products must have a particle size less than 1/8 inch. Fluid application is acceptable.
- Do not exceed annual application rates of 5 tons/acre for the purposes defined in this standard. Use a soil analysis no older than 1 year that provides cation exchange capacity (CEC), calcium, magnesium, pH, and phosphorus, as a minimum, to plan the appropriate application rate of the gypsum products.
- General Use on High Phosphorus Soils. Apply no less than 1 ton/acre broadcast on the soil surface when soil test phosphorus (STP) is greater than two times the “maximum optimum level” for crop production, or when the P Index rating for the field is **HIGH** or **VERY HIGH**.
- Manure Application. Broadcast no less than 1 ton/acre of gypsum within 5 days after manure application or prior to the next runoff event, whichever occurs first. Mixing gypsum with manure prior to application is acceptable. **CAUTION:** Under anaerobic conditions, gypsum added to liquid manure storage facilities can result in dangerous levels of hydrogen sulfide emissions. Mixing or agitation of liquid manure with gypsum should not be conducted indoors. Gypsum has also been known to produce excessively high hydrogen sulfide emissions when mixed into outdoor, open-top liquid manure storages.

Table 1. Screening values for elements in gypsum-derived products for use as a soil amendment.

Symbol (Element)	Units gram (g) kilogram (kg) milligram (mg)	Screening Value for Gypsum-Derived Products	Comment
Ag (Silver)	mg kg ⁻¹	...	No limit required
Al (Aluminum)	g kg ⁻¹	...	No limit required
As (Arsenic)	mg kg ⁻¹	13.1	...
B [†] (Boron)	mg kg ⁻¹	200. [†]	...
Ba (Barium)	mg kg ⁻¹	1000.	...



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Symbol (Element)	Units gram (g) kilogram (kg) milligram (mg)	Screening Value for Gypsum-Derived Products	Comment
Be (Beryllium)	mg kg ⁻¹	2.5	...
Ca (Calcium)	g kg ⁻¹	...	Ca fertilizer; no limit required
Cd [†] (Cadmium)	mg kg ⁻¹	1.0	...
Co (Cobalt)	mg kg ⁻¹	20.	...
Cr(III) (Chromium)	mg kg ⁻¹	100.	...
Cu (Copper)	mg kg ⁻¹	95.	...
Fe (Iron)	g kg ⁻¹	...	No limit required
Hg (Mercury)	mg kg ⁻¹	2.5	...
Mg (Magnesium)	g kg ⁻¹	...	Mg fertilizer; no limit required
Mn (Manganese)	mg kg ⁻¹	1500.	...
Mo (Molybdenum)	mg kg ⁻¹	10.	...
Ni (Nickel)	mg kg ⁻¹	100.	...
Pb (Lead)	mg kg ⁻¹	30.	...
S* (Sulfur)	g kg ⁻¹	220.	S fertilizer; *limit access to ruminants
Sb (Antimony)	mg kg ⁻¹	1.5	...
Se (Selenium)	mg kg ⁻¹	50.	...
Sn (Tin)	mg kg ⁻¹	...	No limit required
Tl (Thallium)	mg kg ⁻¹	1.0	...
V (Vanadium)	mg kg ⁻¹	136.	...
Zn (Zinc)	mg kg ⁻¹	125.	...

[†] Should not apply greater than 0.9 lb. hot water soluble B/acre with gypsum amendment application rate.

[‡] Cd is 1% of Zn limit to restrict food-chain risks of soil Cd.

* Prevent ruminant livestock from ingesting gypsum from storage piles; prevent grazing on amended pastures until one rainfall (or irrigation) event to wash forage.

Documentation Requirements

- Amending Soil Properties with Gypsum Products, 333, Implementation Requirements document must be completed per the Plans and Specifications for the planned purpose.