Marketing of FGD Gypsum in the Midwest U.S.

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Cal-SO 100

100% PURE GYPSUM

100% AVAILABLE
Key Management Factors

Hybrids

Crop

Pest Control
- Diseases
- Insects
- Weeds

Planting & Tillage

Microbial Activity

Soil

Air & Water

Nutrients
Solutions

• From the past.
  – Improve surface runoff.
  – Install tile.
  – Subsoil.

• The latest from the World of Science.
  – Increase soil calcium and reduce magnesium.
  – Apply gypsum on the soil surface.
  – Increase aggregate forming soil microbes.
What is Cal-SO 100®?

Calcium Sulfate Dihydrate (CaSO$_4$2H$_2$O)

Sources of Gypsum:

- Natural Deposits
- Recycled Dry Wall
- Power Plants (Synthetic or FGD)
Advantages of FGD gypsum:

- Purity
- Uniform particle size
- Low heavy metal content
- Inexpensive

100% Available!
Cal-SO 100 is a Fertilizer

- Approximately 20% Calcium
- Essential for cell wall health and strength
- Approximately 15% Sulfur
- Essential for protein formation

Cal-SO 100 is not a liming agent

Different letters over each bar represent a significant difference at $p \leq 0.05$. 
Cal-SO 100 is an Amendment

Alkaline Soils: Helps toxic salts leach out of the root zone.

Acidic Soils: Provides usable Calcium to soil.

Cal-SO 100 is made from a neutral salt, however it will neutralize soil acidity caused by exchangeable Al⁺.
Sodium (Na\textsuperscript{+}) and Magnesium (Mg\textsuperscript{2+}) may accumulate in soils through:

- Natural weathering processes
- Use of poor quality irrigation water
- Long-term application of dolomitic limestone (Mg\textsuperscript{2+})
Facilitates water movement through soils

Clay suspension added to funnels. Time = 0 minutes.
Filtrates after Na\(^+\), Mg\(^{2+}\), and Ca\(^{2+}\) added.
Time = 15 min
Cal-SO 100

Clay particle

Ca$^{2+}$

Water

Na$^+$
Cal-SO 100

$\text{Na}^+$

$\text{Ca}^{2+}$
Good soil structure (aggregation) is enhanced by:

- Freeze-thaw
- Minimum tillage
- Crop residues
- Active soil biology
- Soluble calcium ions
Cal-SO 100 can be used to improve soil aggregation (structure) and inhibit or overcome soil dispersion. Soil dispersion contributes to:

• Surface sealing and crusting
Crusting and surface sealing due to dispersion of cultivated surface soil
Cal-SO 100 can be used to improve soil aggregation (structure) and inhibit or overcome soil dispersion. Soil dispersion contributes to:

- Surface sealing and crust formation
- Problems with seedling emergence
Seedling emergence in crusted soil.
Cal-SO 100 can be used to improve soil aggregation (structure) and inhibit or overcome soil dispersion. Soil dispersion contributes to:

- Surface sealing and crusting
- Problems with seedling emergence
- Run-off/Erosion
Infiltration

Crusting and poor infiltration results in runoff and soil erosion

Runoff
Cal-SO 100 can be used to improve soil aggregation (structure) and inhibit or overcome soil dispersion. Soil dispersion contributes to:

- Surface sealing and crusting
- Problems with seedling emergence
- Run-off/Erosion
- Subsoil swelling
Nu-till in Ohio on the bottom and conventional on the right. Both fields have pattern drainage tiles.
Within 2 years, water-soluble Ca from surface applied gypsum is present at 36 in depth.
Cal-SO 100 can be used to improve soil aggregation (structure) and inhibit or overcome soil dispersion. Soil dispersion contributes to:

• Surface sealing and crusting
• Problems with seedling emergence
• Run-off/Erosion
• Subsoil swelling
• Poor air exchange
Van Wert Co.; June, 2003; following 2.3” rain

**Cal-SO 100**

Good Air / Water Mgt.  Poor Air / Water Mgt.
Cal-SO 100

The result: Van Wert Co.; August, 2003

Good Air / Water Mgt.  Poor Air / Water Mgt.
• Water table is level in the soil below which water saturates all the pore volume.

• The root area is the area between the soil surface and the water table where plant usable (oxygenated) water is found.
Before treatment with gypsum
After treatment with gypsum
Cal-SO 100 can be applied directly to the soil using conventional dry material spreaders.
Cal-SO 100® Application

- 2006 Tandem Axle Pull Spreader
- Rental Available through JLM INC
• Managing Soil Air and Water:
  - Reduces Risks!
  - Increases Yields and Profits!

• New Science has provided more tools:
  - Increasing Calcium and Reducing Magnesium and Sodium.
  - “Salting” the Soil Surface with Gypsum Prevents Sealing.
  - Take Steps to Increase Stable Soil Aggregates.
Questions ?