



120 DAY LONG-TERM SOIL SURFACTANT

## TECHNICAL INFORMATION BULLETIN

LT 120 is a specialized long-term soil surfactant formulation designed to improve and maintain uniform water movement, distribution, retention, drainage and air:water ratios in water repellent soils for approximately 120 days! LT 120 incorporates a blend of two uniquely different, but highly complimentary surfactants that is capable of significantly extending the performance window of LT 120's surfactant activity. This unique surfactant combination is ideally suited for superintendents looking for a long-lasting solution for water repellent soils.

### WHAT LIMITS THE LENGTH OF SURFACTANT PERFORMANCE?

*Regardless of the efficacy of surfactant, how long it will maintain its promised performance is usually determined by the how rapid its polymer structure is degraded and disassociated by microbes and chemical interaction in the soil profile.*

Traditional "long-term" surfactants (with claims of 2 – 3 months of activity) are usually formulations containing higher concentrations of surfactants in order to compensate for microbial degradation. Soil microbes that proliferate in the rootzone of turfgrass consider surfactants as a viable food (carbon) source they need to provide the energy necessary to sustain life. Since microbial populations are normally quite high and active in turf soil rootzones, few of these formulations can be expected to deliver consistent performance for a full 60 to 90 days.

Traditional Surfactant

It is common for soil microbes to begin their degradation of surfactants through enzymatic cleavage of bonds at oxygen sites of the surfactant. This can result in the rapid separation (Fig. 1) of the hydrophobic part of the surfactant molecule that attaches to the water repellent surface of the soil particle from its hydrophilic molecular counterpart that attracts water molecules. **As a result of this separation, the surfactant is rendered ineffective and its surfactant performance is lost.** The biodegradation sequence is usually completed with the stepwise degradation of the remaining molecular chains.

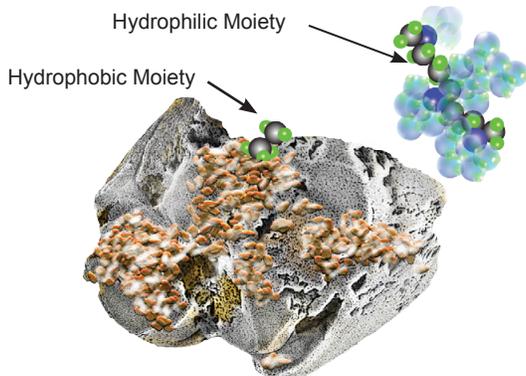


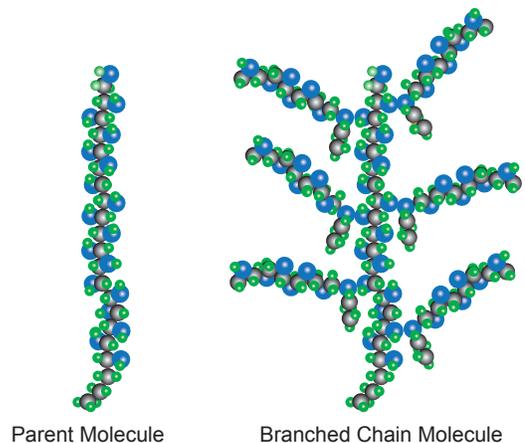
Fig. 1 Illustration showing cleavage and disassociation of hydrophilic part (site of hydration) from hydrophobic part (site of attachment) of surfactant molecule.

### LT 120 TECHNOLOGY

*LT 120 represents a truly innovative product at the forefront of long-term surfactant technologies. It combines novel surfactant structures ideally suited to extend performance over a longer period of time when compared to other "long-term" soil surfactants on the market.*

#### Radically Different Chemistry

At the heart of the LT 120 long term soil surfactant technology are new copolymerization processes that allow selected surfactant candidates to be grafted onto a large fully functional surfactant parent molecule in a manner similar to branches on a tree. In LT 120, this branched sequence of independent copolymer surfactants are used to increase hydration characteristics as well as provide a means to compensate for microbial degradation of the surfactant's structure -- the primary cause of performance decay.



Unlike traditional "long-term" surfactants whose surfactant characteristics are terminated when disassociated by the cleavage of their molecular structure, the LT 120's branched chain molecule is constructed in a manner that allows surfactant branches to be removed from the parent surfactant molecule, attach to water repellent sites on soil particles and retain their surfactant activity (Fig. 2).



120 DAY LONG-TERM SOIL SURFACTANT

Once attached to hydrophobic areas on the soil particle surface, the copolymers establish new sites of hydration. This greatly extends the time that LT 120 will continue to provide improve hydration on water repellent soils. It should be noted that the parent molecule also retains its surfactant structure and activity – even when all its “branches are removed.

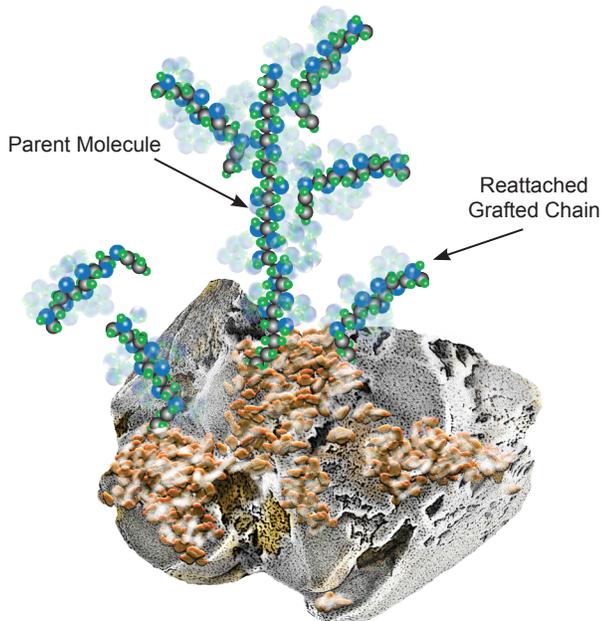


Fig. 2 Illustration showing cleavage, disassociation and reattachment of branched copolymer surfactants on water repellent soil particle surface.

### Improved Hydration Strategy

LT 120 makes use of an advanced combination of two surfactant technologies –a block polymer surfactant in addition to its long-lasting branch copolymer surfactant. These surfactants have been selected specifically for their unique hydration properties, their impact on water movement into and within the soil and their overall contribution to improved water management. Truly, LT 120 puts technology to work for you for unsurpassed performance.

The use of a combination of surfactants in the LT 120 formulation is a key element in the product’s hydration strategy. Used in combination, these surfactants create a hydration matrix that promotes a more effective and efficient use of applied water (Fig. 3).

Superintendents will experience a product that gives them an exceptional, long-lasting treatment for water repellency in greens, tees, fairways and other areas suffering from hydrophobic soil conditions. Golf course superintendents will find that using LT 120 will result in:

- **120 days of** uniform vertical and lateral movement of water and solutes into and through the soil profile.
- **Exceptional hydration and rehydration of existing areas showing symptoms of hydrophobicity**
- **Improved stress tolerance, color and overall turf quality**
- **Significant improvement in soil air:water ratios**
- **Better drainage**
- **Reductions in localized dry spot (LDS)**
- **Safe to use on all grasses**

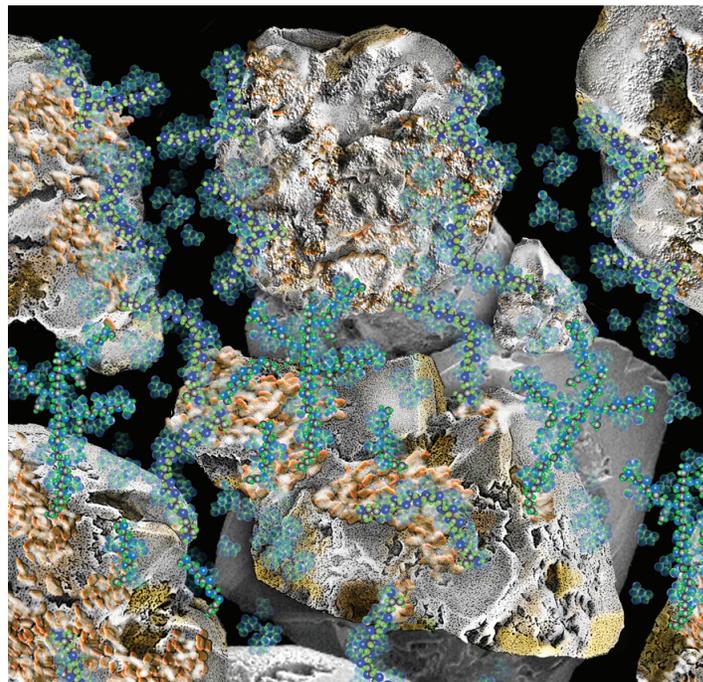


Fig. 3 Illustration showing hydration matrix formed from three surfactants found in LT 120. Not only is hydration enhanced, but movement of water from irrigation or rainfall events moves uniformly throughout soil profile.

## USE DIRECTIONS

**ACTIVE INGREDIENT:** 100% Alkoxylated Polyols  
**NOT A PLANT FOOD INGREDIENT**

### DIRECTIONS FOR GENERAL TURF USE

#### GREENS, TEES, FAIRWAYS, LAWNS AND SPORTS TURF

##### Localized Dry Spot and Water Repellency Conditions:

**LT 120 L Formulation:** Apply LT 120 L as a preventive program. LT 120 L should be applied in two applications. Apply at 8 ounces per 1,000 ft<sup>2</sup> (240 ml. per 100 sq. meters). Wait 7 to 10 days to reapply second application. Under the two split applications LT 120 L should be sprayed at 8 ounces per 1,000 ft<sup>2</sup> (240 ml. per 100 sq. meters) and should be applied in 2 gallons of water per 1,000 ft<sup>2</sup> (8 liters of water per 100 sq. meters) spray solution.

LT 120 L can also be applied at 16 ounces per 1,000 sq. ft. in 5 gallons of water per 1,000 ft<sup>2</sup> (480 ml. 100 sq. meters in 20 liters of water per 100 sq. meters).

**LT 120 G Formulation:** Apply LT 120 G as a preventive program. Granular rates can be two split applications at 3.5 lbs per 1,000 ft<sup>2</sup> (1.6 kilograms per 100 sq. meters) each. LT 120 G can be applied in one application at 7.0 lbs. per 1,000 ft<sup>2</sup> (3.2 kilograms per 100 sq. meters). Irrigation should be applied after application to remove LT 120 G from the leaf surfaces. LT 120 G is safe on turf.

# NUMERATOR

TECHNOLOGIES, INC.

P.O. Box 868  
SARASOTA, FLORIDA 34230  
941.807.5333