



SPEZYME® RSL

High Performance Liquefaction Blend

DESCRIPTION

SPEZYME® RSL is a system of enzymes designed to liquefy dry grind corn or milo. The enzymes contained in the SPEZYME® RSL system are produced by genetically modified strains of *Bacillus licheniformis* and *Trichoderma reesei*.

TYPICAL CHARACTERISTICS

Activity: 20,100 NLC/g (target)

Appearance: Brown liquid

pH: 5.0 to 6.5

Specific gravity: 1.17

The activity of the SPEZYME® RSL system is expressed in NLC units per gram. Enzyme activity is determined by the rate of starch hydrolysis as reflected in the rate of decrease in iodine-staining capacity. A detailed assay method is available upon request.

PERFORMANCE BENEFITS

The SPEZYME® RSL system offers the following benefits to ethanol plant operators:

- Robust liquefaction at pH's ranging from 5.0 to 5.8
- Lower total liquefaction cost (enzyme, ammonia and sulfuric acid)
- Lower sulfur in distiller's grains
- Single enzyme dose

APPLICATION RECOMMENDATIONS

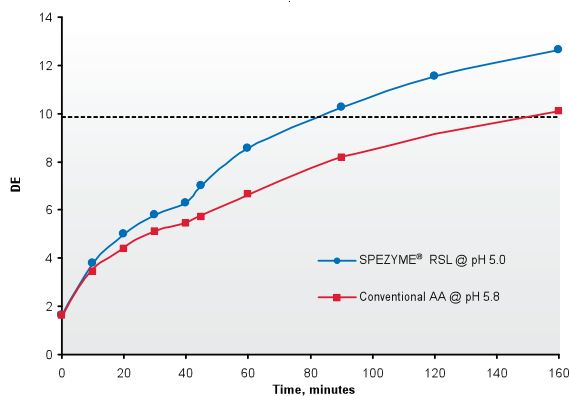
SPEZYME® RSL enzyme is suitable for use in a variety of liquefaction process designs.

RECOMMENDED OPERATIONAL CONDITIONS

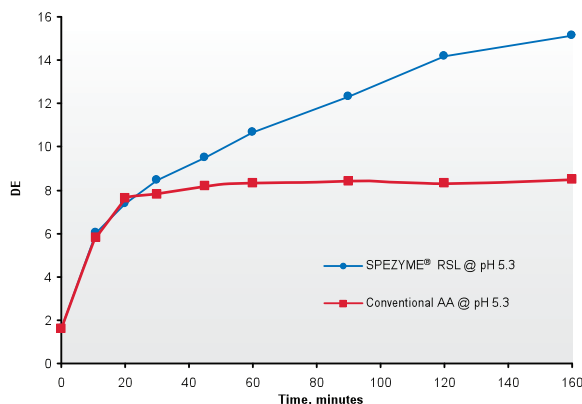
Solids	30 to 36% weight/ weight
Optimal pH	5.0 to 5.3
pH Range	5.0 to 6.0
Temperature	
Slurry	83 - 86°C (182 - 187°F)
Liquefaction	83 - 88°C (182 - 191°F)
Time	90 to 140 minutes
Slurry	Preferably at least 15 minutes
Liquefaction	90 to 240 minutes

DuPont's technical sales professionals will provide specific process recommendations based on your objectives and plant characteristics.

Comparison of DE developemnt at equal weight / weight dosages (without jet)



Comparison of DE developemnt at equal weight / weight dosages (without jet)



Daily Concentrated H₂SO₄ Usage @ 52,000 bushels per day

To reduce liquefact pH by	kg
0.1	437
0.2	874
0.3	1,311
0.4	1,748
0.5	2,184

DOSAGE RECOMMENDATIONS

The SPEZYME® RSL system should be dosed at 0.020 to 0.024% weight enzyme / weight as is grain. To maximize performance, 100% of the dose should be added to the mix box or slurry.

REGULATORY STATUS

The enzymes and ingredients in SPEZYME® RSL are in compliance with TSCA and meet the standards for fuel ethanol production in the United States. In addition, the enzymes in the product have been determined to be GRAS for distillers dried grains produced as a by-product in alcohol production. For other countries, please contact customer service.

PACKAGING

SPEZYME® RSL is available in various package sizes and bulk tankers. Please consult your DuPont representative for detailed information.

STORAGE

SPEZYME® RSL will meet the declared activity upon arrival at your plant. SPEZYME® RSL can be safely stored in sealed containers. Enzyme should be stored below 25°C (77°F) and sheltered from direct sunlight for maximum stability.

SAFETY & ENZYME HANDLING

Inhalation of enzyme dust and mists should be avoided. In case of contact with the skin or eyes, promptly rinse with water for at least 15 minutes.

For detailed handling information, please refer to the appropriate Material Safety Data Sheet, the Enzyme Technical Association (ETA) handbook Working Safely With Enzymes, and the Association of Manufacturers and Formulators of Enzyme Products (AMFEP) handbook *Guide to the Safe Handling of Microbial Enzyme Preparations*. All are available from DuPont.

TECHNICAL SERVICE

DuPont is committed to working with ethanol producers to achieve their goals. More detailed information about the application of this product is available upon request. If you have any questions, please call us and let us know how we can be of assistance.

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