



DYADIC INTERNATIONAL (USA), INC.
140 INTRACOASTAL POINT DRIVE, SUITE 404
JUPITER, FLORIDA 33477
(561) 743-8333 tel.
(561) 743-8343 fax
<http://www.dyadic-group.com>

FIBREZYME™ LBR 600

Product #927
Patent #5,811,381

(Considerations in applications for Pulp and Paper Processing)

I. INTRODUCTION:

FIBREZYME™ LBR 600 is an enzyme complex that selectively modifies cellulosic papermaking fibers under the proper processing conditions. **FIBREZYME™ LBR 600** is a stable, liquid formulation operating between a broad range of pH (6.0 – 8.0) and temperature 25°C – 60°C (77°F – 140°F).

II. PHYSICAL PROPERTIES:

Appearance: Medium to dark amber liquid (Note that color does not affect or reflect activity.)
Odor: Slight fermentation odor
pH (as is): 4.5 ± 1.0
Density: 1.15 – 1.25 g/ml

III. PRODUCT CAPABILITIES:

When applied as directed in this bulletin, **FIBREZYME™ LBR 600** can be utilized to accomplish the following:

1. Enhance fiber strength.
2. Reduce refining energy requirements.
3. Increase refining capacity and throughput.
4. Increase inter-fiber bonding and paper strength properties.
5. Reduce paper machine steam usage and increase paper machine production rates.
6. Improve paper formation
7. Enhance process water quality, thereby reducing the need for felt/wire washing chemicals, contaminant control agents, strength resins, and other wet end chemicals.
8. Reduce wastewater treatment demand and improve wastewater COD/BOD ratios.

IV. PROCESSING CONDITIONS: GENERAL

FIBREZYME™ LBR will function from a pH of 6.0 – 8.0, making it a product very adaptable to most existing pulp and papermaking processes.

FIBREZYME™ LBR will function from 25°C – 60°C (77°F – 140°F). Higher operating temperature results in higher enzymatic activity allowing lower enzyme dosage for a particular application.

V. RECOMMENDATIONS FOR USAGE:

1. **FIBREZYME™ LBR 600** is added at a dosage of 100 – 200 grams/ton (metric ton) of dry pulp. Dosage will depend on furnish, process temperature, pH and retention times. The enzyme is applied before the paper machine refiner(s) at a point resulting in a pulp contact time of 30 minutes or longer. In mills using recycled fiber as furnish, the feed point is often the hydra-pulper.
2. **FIBREZYME™ LBR 600** is formulated to be automatically dosed neat or diluted using a diaphragm pump.
3. Under normal operating conditions, the use of **FIBREZYME™ LBR 600** will result in lower refiner loads, higher refiner throughput, and reduce paper machine steam consumption. It may also be necessary to recalibrate refiner loads against final sheet properties, not pulp freeness, as refiner curves may become modified, reflecting the effect of the product's beneficial activity.

VI. STORAGE CONDITIONS/ACTIVITY:

Product shelf life of **FIBREZYME™ LBR 600** is a minimum of one year if stored in a controlled environment at 25°C (77°F) or lower. Do not let freeze.

VII. INACTIVATION:

FIBREZYME™ LBR 600 can be inactivated by raising the pH above 11.0 or temperature above 71°C (160°F) or a combination of the two. Oxidizers such as peroxide, hypochlorite, and chlorine dioxide can be used to inactivate the enzyme. In the pulp and paper process, **FIBREZYME™ LBR 600** is inactivated in the dryers at the paper machine.

VIII. PACKAGING:

FIBREZYME™ LBR 600 is packaged in 60 kg and 240 kg polyethylene drums and 1000 kg tote bins.

IX. TECHNICAL SERVICE:

Information covering specific applications for this product is available from your Dyadic International (USA), Inc. sales/technical representative. We will work with you to enhance processes and solve problems, in addition to assisting you in achieving the end result desired. Call your sales/technical representative for any questions, comments, or help that you need!

Nothing disclosed is to be construed as a recommendation to use our products in violation of any patents. The information presented is believed to be accurate. However, said information and products are offered without warranty or guarantee, except as to the composition and purity stated herein since the ultimate conditions of use and variability of the materials treated is beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale. The goods described herein are sold as is and with all faults. The seller specifically disclaims all warranties in connection with the sale of the goods, both express and implied, including, without limitation, the warranties of merchantability and fitness for any particular purpose, as those terms are defined in the uniform commercial code of Florida. The seller shall not be liable for any incidental or consequential damages whatsoever.