

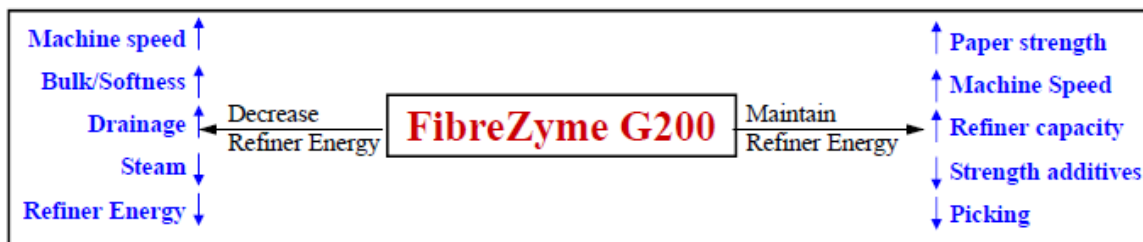


DYADIC INTERNATIONAL (USA), INC.  
140 INTRACOASTAL POINTE DRIVE, SUITE 404  
JUPITER, FLORIDA 33477  
(561) 743-8333 tel.  
(561) 743-8343 fax  
www.dyadic.com

## FibreZyme<sup>®</sup> G200

### Product #935

(Considerations in applications for Pulp and Paper Processing: Biorefining)



### I. INTRODUCTION:

**FibreZyme G200** is a next generation, high performance enzyme custom designed to significantly improve the economics of pulp and paper production. **FibreZyme G200** has wide pH and temperature capabilities allowing it to adapt to most existing pulping and paper making processes. It is a specially designed liquid cellulase (carbohydrase enzyme) preparation that is selectively active on wood cellulose to improve subsequent pulp refining and fiber to fiber bonding. For a dry version of the **FibreZyme G200**, please contact your Dyadic representative. For tissue operations, it allows mills to unlock more value from wood fibers by improving softness while reducing the costs of production. **FibreZyme G200** is a cellulase operating between a broad range of pH (4.5–9.0) and temperature 35°C–75°C (95°F–167°F).

### II. PHYSICAL PROPERTIES:

Specification: 6,500 to 8,000 Cellulase Units/gram  
Appearance: Medium to dark amber liquid (Note that color does not affect or reflect activity.)  
Odor: Slight fermentation odor  
pH (as is): 6.0 ± 0.5  
Density: 1.10 to 1.25

### III. PRODUCT CAPABILITIES:

When run as directed in this bulletin, **FibreZyme G200** can be utilized to accomplish the following:

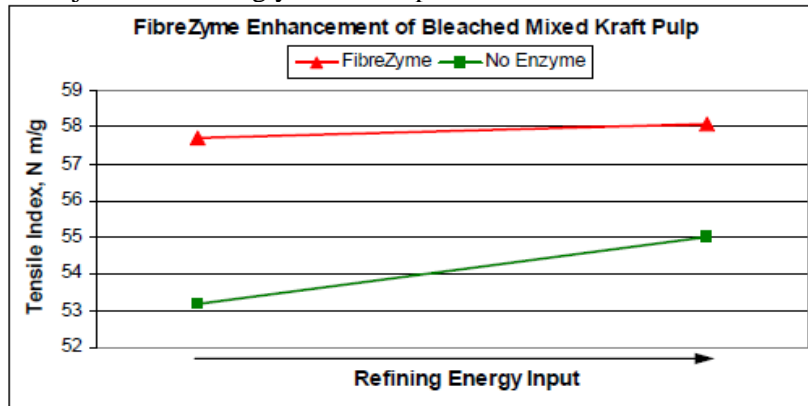
1. Enhances & restores fiber strength and increases inter-fiber bonding through fibrillation.
2. Increases paper machine production rates and efficiencies.
3. Allows for lower cost fiber substitution and rationalization.
4. Reduces pulp refining energy requirements by 10 to 50%.
5. Improves softness in tissue production.
6. Restores fiber strength in dried market pulps that are hornified from the pulp drying process.
7. Enhances pulp drainage rates and reduces paper drying demand.
8. Decreases paper drying steam demand.
9. Reduces petroleum derived chemical usages.

### IV. PROCESSING CONDITIONS: GENERAL

**pH - FibreZyme G200** will function from a pH of 4.5–9.0 making it a product very adaptable to most existing pulping processes. The typical use for this enzyme is at a neutral pH but it has the flexibility to adjust to process conditions by adjusting dosage.

**Temperature - FibreZyme G200** will function from 35°C–75°C (95°F–167°F). Higher operating temperature results in higher enzymatic activity providing lower enzyme dosage for a particular application.

**Retention Time - FibreZyme G200** will function with retention times of 30 to 600 minutes. A normal retention time is 60 minutes but dosage can be adjusted accordingly to fit the specific mill.



#### **V. RECOMMENDATIONS FOR USAGE:**

1. **FibreZyme G200** is added at a dosage between 100–400 grams/ton (metric ton) of dry pulp. Dosage will depend on the process temperature, pH and retention times. The enzyme is dosed at the pulper for market pulps or in tanks/pumps for other applications. Proper mixing is necessary to ensure a successful enzyme application.
2. **FibreZyme G200** is formulated to be dosed automatically by using a dosage pump.
3. When the plant is operating under normal set-up conditions the first effect after enzyme addition is a higher steam requirement in the drying section at the paper machine. This indicates that more fines are produced during refining. The refining energy needs to be lowered until the drying section returns to normal steam consumption. The process can then be adjusted to follow the quality parameters of the paper that is manufactured in the production run.
4. Enzymes are naturally occurring biodegradable protein molecules that are susceptible to harsh oxidizing chemicals and care must be taken when deciding where to apply the enzyme.

#### **VI. STORAGE CONDITIONS / ACTIVITY:**

**FibreZyme G200** retains more than 90% activity after four months when stored at 25°C (77°F) out of direct sunlight and in the original, closed container. **FibreZyme G200** also retains more than 90% activity after 1 month when stored at 38°C (100°F). Do not let freeze.

#### **VII. INACTIVATION:**

**FibreZyme G200** can be inactivated by raising the pH above 11.0 or temperature above 85°C (185°F) or a combination of the two. Oxidizing chemicals such as hypochlorite can be used to deactivate the enzyme activity. In the pulp and paper process, **FibreZyme G200** is inactivated in the dryers at the paper machine.

#### **VIII. PACKAGING:**

**FibreZyme G200** is available in 25 kg and 1200 kg package sizes.

#### **IX. TECHNICAL SERVICE:**

Process knowledge is important prior to attempting to use an enzyme because of the specific nature of its reaction. Information covering specific applications for this product is available from your Dyadic International, 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.