

Amylase (detergent) Technical Sheet

High activity enzyme for digesting starch



HIGH ACTIVITY ECONOMICAL



CLEANING



WASHING



BULK OPTION

 Scientific & Technical™

Lipase (detergent) Technical Datasheet

1. Product Overview

Amylase (detergent) enzyme is used in detergents for laundry as well as automatic dishwashing. This enzyme facilitates the removal of starch containing stains, e.g. from pasta, potato, gravy, chocolate, and baby food. Dried-up starch is difficult to remove at medium to low temperatures, especially with detergents of modest alkalinity. It adheres to the surface of laundry and dishes, acting as a glue for other stain components. The enzyme hydrolyses starch into dextrins and sugars which are readily dissolved in the washing liquor. The enzyme is an alpha-amylase produced by submerged fermentation of a genetically modified *Bacillus* microorganism.

2. Product Characteristics

Parameter	Specification
Enzyme Class	Hydrolases (EC 3.2.1.1)
Source	<i>Bacillus</i>
Appearance	Light brown liquid
Activity	240,000 U / g
Units	Where 1 U is the amount of enzyme required to release 1 µmol of glucose from starch under standard conditions
Total Protein	5-10 % w/v
Density	1.1-1.3 g per mL
Temperature Range	15–70 °C (operational)
Optimal Temperature	35–45 °C
pH Range	7.0–12.0
Optimal pH	10.0–11.0
Shelf Life	24 months (sealed and kept under recommended storage conditions)

3. Enzymatic Properties

3.1 Mechanism of Action:

Detergent-grade amylase enzymes work by hydrolysing the α-1,4-glycosidic bonds in starch-based stains, breaking large, sticky polysaccharides into smaller, water-soluble sugars that can be easily lifted and dispersed by surfactants. When applied to fabrics or dishes, the amylase quickly targets residues from foods like sauces, gravies, baby food, chocolate, and processed carbohydrates, reducing their viscosity and adhesion. These enzymes are engineered to remain active under typical wash conditions—including varying pH, the presence of surfactants, and low to moderate temperatures—allowing them to rapidly degrade stubborn starchy deposits. By

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converting complex starches into soluble fragments, detergent-grade amylases prevent redeposition, enhance overall cleaning performance, and support effective stain removal even in short-cycle and cold-water washing environments.

3.2 Kinetics:

Detergent-grade amylase enzymes follow classic Michaelis–Menten reaction kinetics, where the rate of starch hydrolysis increases with rising substrate concentration until reaching a maximum catalytic rate (V_{max}) determined by the enzyme's turnover capacity. Because starch stains exist as insoluble or semi-soluble deposits, amylase activity is influenced by substrate accessibility, making factors such as temperature, pH, and surfactant composition critical to its kinetic performance. In detergent systems, optimized formulations ensure the enzyme remains active across a broad pH range and in the presence of builders and surfactants, enabling rapid breakdown of α -1,4-glycosidic bonds. This results in the efficient conversion of complex starches into soluble oligosaccharides early in the wash cycle, accelerating stain removal and boosting overall cleaning performance even at low temperatures and short wash times.

3.3 Inhibitors:

- Heavy metals (Hg^{2+} , Cu^{2+})
- Urea, Guanidine hydrochloride, SDS
- Extreme low or high pH
- High temperatures above 90 deg. C
- High chelator concentrations (EDTA)

4. Applications

4.1 Laundry Detergents (Liquid, Powder, Pods):

- Removal of fatty, oily, and sebum-based stains
- Enhanced cleaning performance in cold-water and short-cycle washes
- Improved stain removal in eco-friendly, low-surfactant formulations

4.2 Pre-Soak and Pre-Treat Stain Removers:

- Targeted breakdown of tough grease spots
- Effective on collar/cuff grime, food oils, cosmetics, and body-fat residues

4.3 High-Efficiency (HE) Washing Machine Detergents:

- Optimized for low-water washing environments
- Faster emulsification and removal of lipid soils

4.4 Automatic Dishwashing Detergents:

- Breakdown of food oils, baked-on fats, and greasy residues
- Supports low-temperature and rapid-wash programs

4.5 Industrial & Institutional Cleaning:

- Laundry services (hotels, hospitals, restaurants) needing efficient fat removal
- Enhanced cleaning of heavily soiled textiles and uniforms

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4.6 Multi-Enzyme Detergent Formulations:

- Synergistic action with proteases, lipases, cellulases, and mannanases
- Creation of premium, high-performance enzyme blends

4.7 Eco-Friendly & Low-Chemical Detergent Lines:

- Enables reduction of surfactant loading
- Supports sustainability claims such as biodegradability and energy savings

4.8 Fabric Care & Longevity Products:

- Gentle cleaning with less harsh chemicals
- Helps maintain fabric softness, brightness, and integrity over time

4.9 Household Degreasers and Hard-Surface Cleaners:

- Removal of kitchen grease from counters, stovetops, filters, and tiles
- Effective in enzymatic spray cleaners and foam formulations

5. Handling & Storage

5.1 Storage Conditions:

- Store at 4–25 °C in sealed containers
- Avoid direct sunlight and freezing
- Keep away from acids, oxidizing agents, and heavy metals

5.2 Stability on Storage:

- Activity loss ~1–5% per month at room temperature
- Refrigeration improves stability

5.3 Safety Information:

- Non-toxic and biodegradable
- May cause allergic reactions via inhalation or skin contact
- Use protective clothing, gloves, goggles
- Avoid aerosol formation

Refer to product SDS for complete safety details.

6. Packaging Options

- 0.1 L, 1 L, 10 L, 25 L (1000 kg totes available upon request)

7. Quality Control Specifications

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Test	Specification
Activity assay	≥ labelled activity
Density (liquid)	1.1–1.3 g / mL
Microbial load	Total plate count ≤ 50,000 CFU / g
Pathogens	<i>Salmonella</i> negative, <i>E. coli</i> negative

9. Shelf Life

Liquid: 24 months. When stored in original container, sealed, in cool conditions.

10. Disclaimer

This technical data sheet provides general information. Application testing is recommended to determine optimal use conditions.

NOTE: THIS DOCUMENT CANCELS AND SUPERSEEDS ALL OTHER EDITIONS