



# Attenuzyme® Flex

Revision date: 01/25/2015

Version No: 3

**1. PRODUCT AND COMPANY IDENTIFICATION**

<b>Product Name</b>	Attenuzyme® Flex
<b>Chemical Name</b>	Enzyme preparation
<b>Declared activity</b>	Pullulanase Glucoamylase (glucan 1,4-alpha-glucosidase)
<b>Use of the substance/preparation</b>	Novozymes' enzyme preparations are biocatalysts used in a variety of industrial processes within food manufacturing
<b>Contact Manufacturer</b>	Novozymes North America, Inc. 77 Perry Chapel Church Rd., Box 576 Franklinton, NC 27525 E-mail: SafetyDataSheet@novozymes.com www.novozymes.com
<b>Information Telephone Number</b>	1-919-494-3000, 8 am - 4:30 pm EST M-F
<b>Emergency Telephone Number</b>	1-800-424-9300 (Chemtrec) 24 hours every day

## 2. HAZARD(S) IDENTIFICATION

**Classification** Classification of the chemical in accordance with 29CFR §1910.1200

Respiratory sensitization	Category 1
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**Label elements**

**Danger**

**Hazard Statements**  
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled

**Precautionary Statements - Prevention**  
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray  
P285 - In case of inadequate ventilation wear respiratory protection

**Precautionary Statements - Response**  
P304 + P341 - IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing  
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTRE or doctor/physician



**Hazards not otherwise classified (HNOC)**

1	Health
1	Flammability
0	Reactivity
X	Protective Equipment



## 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Hazardous Components**

Chemical Name	CAS-No	IUB No.	Weight %*
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Glucoamylase (glucan 1,4-alpha-glucosidase) (aep)	9032-08-0	3.2.1.3	20 - 30
Pullulanase (aep)	9075-68-7	3.2.1.41	0.1- 1

aep (active enzyme protein) contributes to the GHS classification.

\* The exact percentage (concentration) of composition has been withheld as a trade secret

#### 4. FIRST AID MEASURES

In case of unintended overexposure, the following measures apply

##### Inhalation

###### Effects

May cause allergic respiratory reaction

###### Symptoms

Shortness of breath, wheezing and coughing

The effect of inhalation may be delayed

###### First Aid

Remove person to fresh air. If signs/symptoms continue, get medical attention

Show this safety data sheet to the doctor in attendance

##### Skin Contact

###### Effects

May cause slight irritation.

###### Symptoms

Slight irritation.

###### First Aid

Remove and wash contaminated clothing before re-use. Wash off immediately with plenty of water. If symptoms persist, call a doctor. Show this safety data sheet to the doctor in attendance.

##### Eye Contact

###### Effects

May cause slight irritation.

###### Symptoms

Slight irritation

###### First Aid

Hold eye open and rinse slowly and gently with water for 15-20 min. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. If symptoms persist, call a doctor. Show this safety data sheet to the doctor in attendance

##### Ingestion

###### Effects

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

###### Symptoms

Irritation

###### First Aid

Rinse mouth with water and drink plenty of water. If symptoms persist, call a doctor. Show this safety data sheet to the doctor in attendance.

#### 5. FIRE-FIGHTING MEASURES

##### Flammable Properties

Slightly flammable according to HMIS criteria

##### Suitable Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

##### Unsuitable Extinguishing Media

None

##### Hazardous Combustion Products

None

**Specific Hazards Arising from the Chemical**

May cause allergic respiratory reaction

**Protective Equipment and Precautions for Firefighters**

Self-contained breathing apparatus and standard turn-out apparel

**6. ACCIDENTAL RELEASE MEASURES****Personal Precautions**

For personal protection see section 8

**Environmental Precautions**

Collect spillage.

**Methods for cleaning up**

Avoid formation of dust and aerosols  
 Spilled preparation should be removed immediately to avoid formation of dust from dried preparation. Take up by mechanical means preferably by a vacuum cleaner equipped with a HEPA (High Efficiency Particulate Air) filter. Flush remainder carefully with plenty of water. Avoid splashing, high pressure washing or compressed air cleaning to avoid formation of aerosols. Ensure sufficient ventilation. Wash contaminated clothing.

For personal protection see section 8

**7. HANDLING AND STORAGE****Handling**

Avoid formation of dust and aerosols  
 Ensure adequate ventilation  
 Liquid enzyme preparations are dustfree preparations. However, inappropriate handling may cause formation of dust or aerosols.

**Storage**

Keep tightly closed in a dry and cool place. Temperature 0-10 °C (32-50 °F)

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

Chemical Name	DNEL Dermal Acute Local (Workers)	DMEL Inhalation Long term Local (Workers)
Pullulanase (aep)		DMEL = 60 ng/m <sup>3</sup>

Derived No Effect Level (DNEL)  
 Derived Minimal Effect Level (DMEL)

**Occupational exposure controls****Engineering Controls**

Ensure adequate ventilation, especially in confined areas  
 Maintain good conditions of industrial hygiene. Some processes may require enclosures, local exhaust ventilation, or other engineering controls to control airborne levels. Additional handling and healthy/safety information is available upon request

**Personal Protective Equipment**

**Respiratory Protection** In case of insufficient ventilation wear suitable respiratory equipment that meets HEPA/P100 specifications

**Eye Protection** Safety glasses with side-shields

**Skin and body protection** No special technical protective measures are necessary

**General Hygiene Considerations** Handle in accordance with good industrial hygiene and safety practices

**Environmental exposure controls** Local authorities should be advised if significant spillages cannot be contained

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Information on basic physical and chemical properties**

Physical State Liquid  
 Color Brown  
 Odor Slight fermentation odor  
 Density (g/ml) 1.15  
 pH Not relevant  
 Solubility Active component is readily soluble in application-relevant solutions at all levels of concentration, temperature and pH which may occur in normal usage

**Other information** No information available

**10. STABILITY AND REACTIVITY**

**Reactivity** Not relevant

**Chemical stability** Stable under recommended storage conditions

**Possibility of Hazardous Reactions** None under normal processing

**Conditions to Avoid** None

**Incompatible materials** None

**Hazardous Decomposition Products** None

**11. TOXICOLOGICAL INFORMATION**

**Information on toxicological effects**

**Inhalation** Repeated inhalation of enzyme dust or aerosols resulting from improper handling may induce sensitization and may cause allergic type 1 reactions in sensitized individuals

**Skin contact** Mild skin irritation

**Eye contact** Mild eye irritation

**Ingestion**

Chemical Name	Acute oral toxicity	Acute inhalation toxicity	Skin corrosion/irritation	Serious eye damage/eye irritation

Glucoamylase (glucan 1,4-alpha-glucosidase) (aep)	LD50: > 2000 mg/kg bw (OECD TG 401, 420)		Not irritating (OECD TG 404)	Not irritating (OECD TG 405)
Pullulanase (aep)	LD50: > 2000 mg/kg bw (OECD TG 401, 420)		Not irritating (OECD TG 404)	Not irritating (OECD TG 405)

Chemical Name	Specific target organ toxicity – single exposure	Genetic toxicity	Skin sensitization	Respiratory sensitization
Glucoamylase (glucan 1,4-alpha-glucosidase) (aep)		No indication of mutagenic effects (OECD TG 471, 476, 487)		Sensitizer (Human experience)
Pullulanase (aep)		No indication of mutagenic effects (OECD TG 471, 476, 487)		Sensitizer (Human experience)

## 12. ECOLOGICAL INFORMATION

### Toxicity

Chemical Name	Daphnia, acute	Algae, acute	Fish, acute
Glucoamylase (glucan 1,4-alpha-glucosidase) (aep)	EC50 (48 hours): 31.7 - 457 mg aep/l (OECD TG 202)	ErC50 (72 hours): $\geq$ 5.2 mg aep/l (OECD TG 201)	LC50 (96 hours): 58.3 - 326.7 mg aep/l (OECD TG 203)
Pullulanase (aep)	EC50 (48 hours): 31.7 - 457 mg aep/l (OECD TG 202)	ErC50 (72 hours): $\geq$ 5.2 mg aep/l (OECD TG 201)	LC50 (96 hours): 58.3 - 326.7 mg aep/l (OECD TG 203)

### Persistence/Degradability

Chemical Name	Persistence and degradability	Partition coefficient (n-octanol/water)	Bioaccumulative Potential
Glucoamylase (glucan 1,4-alpha-glucosidase) (aep)	Readily biodegradable (OECD 301)	LogPow: <0	Does not bioaccumulate
Pullulanase (aep)	Readily biodegradable (OECD 301)	LogPow: <0	Does not bioaccumulate

**Mobility in soil** Not relevant

**Other adverse effects** No information available

## 13. DISPOSAL CONSIDERATIONS

**Waste Disposal Method** Dispose of in accordance with local regulations

**Contaminated Packaging** Dispose of wastes in an approved waste disposal facility

## 14. TRANSPORT INFORMATION

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### Transport Regulations

No dangerous goods according to transport regulations  
 No special precautions required

**Transport hazard class(es)** not applicable

**Packing group** not applicable

**Environmental hazards** not applicable

## 15. REGULATORY INFORMATION

The product complies with the recommended purity specifications for food-grade enzymes given by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Food Chemical Codex (FCC).

### USA, Federal Regulations

**TSCA Inventory** The active ingredient and all components of the enzyme preparation are listed on the TSCA inventory

#### SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and 40 CFR Part 372.

#### SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

### USA, State Regulations

**California Proposition 65** This product does not contain any Proposition 65 chemicals

### Canada

**WHMIS Hazard Class** Controlled product hazard class D2 A (respiratory sensitizer)

**WHMIS Statement** This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

## 16. OTHER INFORMATION

**Training advice** Details on the safe handling of this product are located in the Novozymes Customer Center Document Library on [www.mynovozymes.com](http://www.mynovozymes.com)

**GHS-Classification** The GHS calculation method has been used for classification of this mixture.

**Disclaimer**

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text. Furthermore, as the conditions of use are beyond the control of Novozymes, it is the responsibility of the customer to determine the conditions of safe use of these products.

***End of Safety Data Sheet***

**Version No:**

3 / ANSI / English / 01/25/2015