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#### ThornBac Bioaugmentation Line Technical Data Sheets

FOR WASTEWATER TREATMENT APPLICATIONS



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### Thorne Bac BIOAUGMENTATION

#### ThornBac 300

#### Industrial Wastewater Treatment Microbial Aid

ThornBac 300 is a broad spectrum of bacterial cultures designed to degrade hydrocarbon industrial wastes, thereby enhancing COD, TOC, BOD, and TSS removal in industrial or joint municipal/industrial wastewater treatment plants. The cultures in ThornBac 300 are capable of degrading wastes containing strong organic matter and semi-toxic compounds that interfere with normal biomass activity. Biomass optimization with ThornBac 300 will allow for effective treatment of complex organics such as, but not limited to; phenols, alcohols, surfactants, detergents, glycols, napthalenes, amines, nitriles, aliphatic and aromatic hydrocarbons, ketones, cutting oils, styrene, and low levels of cyanide. ThornBac 300 can also be used effectively for soil and groundwater remediation projects.

**Directions**: ThornBac 300 may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it's best to prehydrate product by adding 2 lbs. per gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.

**Benefits**: rapid biological upset recovery, wastewater treatment plant optimization and compliance.





#### **Operating Conditions**

- pH: 6.0 9.0
- Temp: 15°C 40°C (59°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum
- Viability: min 4 billion CFU/g

#### Applications

- Chemical processing
- Steel/coal mills
- Textile mills
- Pharmaceutical plants
- Petrochemical operations
- Pulp mills and landfill leachate





#### Availability

ThornBac 300 is available in 25-lb. plastic pails or 100-lb. fiber drums and may be packaged in 1-lb. water-soluble packs. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 300C

#### Industrial Wastewater Treatment Microbial Aid Patented Low Water Temperature Adapted Microbes

ThornBac 300C is a broad spectrum of selected and adapted, patented psychrophilic microbial cultures designed to degrade hydrocarbon industrial wastes, thereby enhancing TOC, COD, BOD and TSS removal in industrial or joint municipal/industrial wastewater treatment plants operating under cold water temperature conditions (2-15°C).

The cultures in ThornBac 300C are capable of degrading wastes containing strong organic matter and semitoxic compounds that interfere with normal biomass activity. Biomass optimization with ThornBac 300C will allow for effective treatment of complex organics such as, but not limited to; phenols, alcohols, surfactants, detergents, glycols, napthalenes, amines, nitriles, aliphatic and aromatic hydrocarbons, ketones, cutting oils, styrene, and low levels of cyanide. AulBac 300C can also be used effectively for soil and groundwater remediation projects.

**Directions**: ThornBac 300C may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it's best to prehydrate product by adding 2 lbs. per gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.

Benefits: rapid biological upset recovery, seasonal wastewater treatment plant optimization and compliance.

#### INDUSTRIAL WASTEWATER TREATMENT MICROBIAL AID (LOW TEMP)



#### **Operating Conditions**

- pH: 6.0 9.0
- Temp: 2°C 15°C (35.6°F 59°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum
- Viability: min 4 billion CFU/g

#### Applications

- Chemical processing & petroleum refining
- Steel/coal mills
- Textile mills
- Pharmaceutical plants
- Petrochemical operations
- Pulp mills and landfill leachate





#### Availability

ThornBac 300C is available in 25-lb. plastic pails or 100-lb. fiber drums and may be packaged in 1-lb. water-soluble packs. Contact a CITCO Water consultant for dosage rates.



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### Thorne Bac BIOAUGMENTATION

#### ThornBac 400

#### Wastewater Treatment Biomass Aid

ThornBac 400 is a blend of naturally occurring, non-altered microorganisms and growth stimulants formulated to efficiently degrade carbohydrates, proteins and fats (FOG). The bacteria in ThornBac 400 produce multiple types of enzymes such as protease, amylase, esterase, urease, cellulase, xylanase, and lipase to break down waste products associated with meat processing, dairies, vegetable packing, fruit processing and carbohydrate processing facilities. ThornBac 400 contains aerobic as well as facultative bacteria to work in anoxic conditions. Use of ThornBac 400 will increase biological activity, improve biomass flocculation and enhance nitrogen and phosphorous removal.

**Directions**: ThornBac 400 may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it is best to prehydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter.



**Benefits**: rapid upset recovery and start-up and wastewater treatment plant optimization.

#### WASTEWATER TREATMENT BIOMASS AID



#### **Operating Conditions**

- pH: 6.0 9.0
- Temp: 15°C 40°C (59°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum

- Applications
- Food processing industry
- Rendering plants
- Breweries & beverage industry
- Fruit/vegetable processing
- Municipla/industrial WWTPs

#### Availability

ThornBac 400 is available in 25-lb. plastic pails and 100-lb. fiber drums. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 400C

#### Cold Temperature Adapted Cultures

ThornBac 400C is a powdered blend of naturally occurring, non-altered, patented psychrophilic microorganisms (cold water adapted) and growth stimulants formulated to efficiently degrade carbohydrates, proteins and fats, oils and grease (F.O.G.). The bacteria in ThornBac 400C produce multiple types of enzymes such as Protease, Amylase, Esterase, Urease, Cellulase, Xylanase, and Lipase to break down waste products associated with meat processing, dairies, brewing and distilling operations, vegetable & fruit processing and carbohydrate processing facilities. ThornBac 400C contains aerobic as well as facultative bacteria to work in anoxic conditions. Use of ThornBac 400C will increase biological activity, improve biomass flocculation and enhance nitrogen and phosphorous removal at wastewater temperatures below 59°F (15°C). Do not use where high levels of toxic metals are present.



**Directions**: ThornBac 400C may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it's best to pre-hydrate product by adding 2 lbs. per 1.0 gallon of 20° - 30°C non-chlorinated water. Allow solution to stand for 30 – 60 minutes before adding to trickling filter..

#### COLD TEMP ADAPTED CULTURES



#### **Operating Conditions**

- pH: 6.0 10.0
- Temp: 2°C 15°C
- PO<sub>4</sub>: 2.0 mg/L minimum
- NH<sub>3</sub>N: 2.0 mg/L minimum
- Specific gravity: 0.5 0.7
- Color: beige to light brown



#### Applications

- Food processing
- Beverage industry, breweries
- Rendering plants
- WWTPs
- Fruit & vegetable proc.

#### Availability

ThornBac 400C is available in 25 lb. plastic pails and may be packaged in 1 lb. water-soluble packs as well as 100 lb. fiber drums (bulk).

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 500

#### Municipal Wastewater Treatment Microbial Aid

ThornBac 500 is a blend of adapted microorganisms and biostimulants formulated for use in municipal and domestic wastewater applications. The bacteria in ThornBac 500 produce multiple types of enzymes such as protease, amylase, esterase, xylanase, cellulase, and lipase. ThornBac 500 is designed to degrade BOD and FOG, in addition to the syntehtic detergents and surfactants that are commonly found in municipal wastewater. ThornBac 500 contains aerobic as well as facultative bacteria to work in anoxic conditions.

**Directions**: ThornBac 500 may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it's best to prehydrate product by adding 2 lbs. per gallon of 20-30°C nonchlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.

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**Benefits**: rapid biological upset recovery, wastewater treatment plant optimization and effluent performance.

#### MUNICIPAL WASTEWATER TREATMENT MICROBIAL AID



#### Applications

- Municipal wastewater treatment plants
- Package WWTPS



#### Availability

ThornBac 500 is available in 25-lb. plastic pails or 100-lb. fiber drums and may be packaged in 1-lb. water-soluble packs. Contact a CITCO Water consultant for dosage rates.

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• pH: 6.0 - 9.0

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**Operating Conditions** 

• Temp: 15°C - 40°C (59°F - 104°F)

• PO<sub>4</sub>: 2 mg/L minimum

• NH<sub>3</sub>N: 2 mg/L minimum

• Viability: min 4 billion CFU/g

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 500C

#### Low Temp Aerobic Bacteria

During low temperature periods many systems can lose COD, BOD, ammonia and TSS removal efficiency. Microbes in biological wastewater treatment systems are single-minded at growing and surviving using the contaminant found in wastewater as "food".

The growth rate of microbes affects the rate at which the chemicals are removed from the wastewater. As wastewater temperature increases or decreases beyond the optimal growth temperature range, microbes become less sensitive to the presence of the "food" and the net result is microbial growth rate decreases and the rate of biodegradation (COD/BOD removal) decreases. Bacteria that operate at lower temperatures than the mesophilic are termed Psychrophilic and can work in the 32°-70°F (0° - 20°C) range.



**ThornBac 500C Benefits**: increase biomass activity during low wastewater temperature periods (< 15°C/59°F), enhance COD, TOC, BOD and TSS removal, rapid upset recovery, enhance biosolids settling/secondary clarifier settling.

#### LOW TEMP AEROBIC BACTERIA



#### **Operating Conditions**

- Temp. stressed conditions
- High salinity
- Low and high pH
- Recalcitrant materials

- Applications
- WWTPs
- Activated sludge tanks
- Aeration basins
- Lagoons and anoxic digesters

#### Availability

ThornBac 500C is available in 25-lb. pails. Contact your CITCO Water consultant for dosage rates.



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### Thorne Bac BIOAUGMENTATION

#### ThornBac 900

#### Microbial Fat, Oil & Grease Control

ThornBac 900 contains a novel blend of microbes and micronutrients specifically formulated to breakdown and digest fats, greases, olefins, and vegetable oils suspended in wastewater over time. ThornBac 900 works effectively in scum pits, lift stations, wet wells, flow equalization tanks, facultative lagoons/basins and aeration basins. The microbes produce a prolific amount of diverse enzymes that penetrate and process insoluble oils and fats under stressful environmental conditions. ThornBac 900 works under both aerobic and anoxic conditions over a wide wastewater temperature and pH range. It does not contain caustics or acids and will not harm pipes or wastewater treatment equipment.

**Directions**: ThornBac 900 may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it is best to prehydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter. **Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.



#### Benefits: Fats, oil and grease removal.

#### MICROBIAL FAT, OIL & GREASE CONTROL



#### **Operating Conditions**

- pH: 4.50 10.0
- Temp: 5°C 55°C (40°F 130°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum

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#### Applications

- WWTPs
- Wet wells
- Pump and lift stations
- Collection systems
- EQ basins and traps

#### Availability

ThornBac 900 is available on 25-lb. plastic pails or 100-lb. fiber drums and can be packaged on 1-lb. and half-lb. water-soluble packs.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 900BC

ThornBac 900BC contains a novel blend of microbes and micronutrients specifically formulated to breakdown and digest fats, greases, olefins, and vegetable oils suspended in wastewater. ThornBac 900BC will work effectively in scum pits, lift stations, wet wells, flow equalization tanks, facultative lagoons/basins, and aeration basins. The microbes produce a prolific amount of diverse enzymes that penetrate and process insoluble oils and fats under stressful environmental conditions. ThornBac 900BC works under both aerobic and anoxic conditions over a wide wastewater temperature and pH range. It does not contain caustics or acids and will not harm pipes or wastewater equipment.

**Directions**: ThornBac 900BC may be applied to the wet well or lift station and various points within a collection system. Hang the ThornBac 900BC unit where it partially meets the water line but is not completely submerged. **Caution**: Do not use where high levels of toxic metals such as zinc, chrome, or mercury are known to exist. \*Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush area with water. Store product in a dry place between 21° - 27°C. Use immediately if wet. Do not freeze.



#### FATS, OILS, & GREASE



#### **Operating Conditions**

- pH: 4.40 10.0
- Temp: 5°C 55°C (40°F 130°F)
- PO<sub>4</sub>: 2 mg/L min.
- NH<sub>3</sub>N: 2 mg/L min.
- Viability: 4 billion CFU/g

#### Applications

- WWTPs
- Wet wells, lift station
- Collection systems
- Holding tanks & EQ basins

#### Availability

ThornBac 900BC is available in 2, 5, and 10 lb. blocks. A suspension net is included with each unit. Contact a CITCO Water Consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 900C

#### Microbial Fat, Oil, & Grease Control Patented Low Temperature Tolerant Strains

ThornBac 900C is a dry, free-flowing powder that contains a novel blend of microbes, including patented psychrophilic, low-temperature tolerant strains, and micro nutrients specifically formulated to breakdown and digest fats, greases, olefins, and vegetable oils suspended in wastewater. The microbes in ThornBac 900C produce a prolific amount of diverse enzymes that penetrate and process insoluble oils and fats under stressful environmental conditions. 900C works under both aerobic and anoxic conditions over a broad wastewater temperature and pH range. It does not contain caustics or acids and will not harm pipes or wastewater equipment.

**Directions**: add directly to an aeration tank, lagoon, or oxidation ditch. For trickling filters, pre-hydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter. **Storage**: store product in a dry place between 21 - 27°C (70° - 80.6°F). If product becomes wet, it must be used immediately. Do not freeze.



#### LOW TEMP FAT, OIL, & GREASE CONTROL



#### **Operating Conditions**

- pH: 4.25 10.0
- Temp: 2°C 15°C (35.6°F 59°F)
- PO<sup>4</sup>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum
- Viability: min 4 billion CFU/g

#### Applications

- WWTPs
- Wet wells & pump stations
- Collection system lift stations
- EQ basins, holding tanks

#### Availability

ThornBac 900C is available in 25 lb. plastic pails or 100 lb. fiber drums and may be packaged in one lb. and half lb. water-soluble packs.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 925BC

#### Microbial Fat, Oil & Grease Control

ThornBac 925BC contains a novel blend of microbes and micronutrients specifically formulated to breakdown and digest fats, greases, olefins, and vegetable oils suspended in wastewater over time. ThornBac 925BC blocks work effectively in scum pits, lift stations, wet wells, flow equalization tanks, facultative lagoons/basins and aeration basins. The microbes produce a prolific amount of diverse enzymes that penetrate and process insoluble oils and fats under stressful environmental conditions. ThornBac 925BC works under both aerobic and anoxic conditions over a wide wastewater temperature and pH range. It does not contain caustics or acids and will not harm pipes or wastewater treatment equipment.

**Directions**: ThornBac 925BC may be applied to the wet well, lift station, and various points within a municipal collection system. Hang unit to where part of it meets the water line but is not completely submerged. **Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.



Benefits: Fats, oil and grease removal.

#### MICROBIAL FAT, OIL & GREASE CONTROL



#### **Operating Conditions**

- pH: 4.50 10.0
- Temp: 5°C 55°C (40°F 130°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum

#### Applications

- WWTPs
- Wet wells
- Pump and lift stations
- Collection systems
- EQ basins and traps

#### Availability

ThornBac 925BC is available in 0.5, 1.0, 2.0, 5.0, 10.0 and 30.0-lb blocks. A suspension net is included with each unit.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 975L

#### Microbial Fat, Oil, & Grease Cleaner/Deodorizer

ThornBac 975L removes and digests fat, oil, and grease in various wastewater environments under a broad wastewater temperature and pH range. It is best used in grease traps, scum pits, wet wells, equalization tanks, drain lines, and collection systems. ThornBac 975L contains naturally occurring aerobic and facultative microbes specifically designed to digest grease, fat, fatty acids, vegetable oils, and sugars and starch (in addition to mitigating foul odors).

**Directions**: Mix container thoroughly prior to applying. ThornBac 975L may be added upstream from the treatment area or directly to the grease trap, EQ basin, or aeration basin. Consult your CITCO Water technical representative for more specific application or dosing instructions. Do not use in environments where high levels of toxic metals such as zinc, chrome, or mercury are known to exist. **Caution**: in the event of direct contact with the eyes or skin, flush the affected area with water. Always refer to the Safety Data Sheet for additional safety information. **Storage**: dry place between 15° - 30°C. Do not freeze (shelf life = 1 year at 21°C (70°F)).



#### LIQUID FATS, OILS, & GREASE



#### **Operating Conditions**

- pH: 4.25 10.0
- Temp: 5°C 55°C (40°F 130°F)
- Specific gravity: ~ 1.0
- Product: dormant bacterial cultures

- Applications
- Grease traps
- Wet wells
- Collection system lift stations
- Drain lines & EQ tanks

#### Availability

ThornBac 975L is available in 5 gallon pails, 55 gallon drums, and 330 gallon totes.

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# Thom BIOAUGMENTATION

#### ThornBac 1200

#### Microbial Aid for Sludge Reduction

ThornBac 1200 is a blend of naturally occurring, non-altered Mesophilic microorganisms, growth stimulants, and enzymes formulated to efficiently reduce organic matter in aqueous waste. The microbes in ThornBac 1200 produce multiple types of enzymes to break down lignin, cellulose, and other organic solid constituents. ThornBac 1200 will increase the biological conversion and removal rate of organic materials in aqueous environments.

**Directions**: ThornBac 1200 is typically mixed with water and applied directly to the basin, pond, or lagoon. It is best to pre-hydrate product by adding 1 lb. per 2 gallons of 20° - 30°C non-chlorinated water. Allow solution to stand for 30-minutes before applying. Consult your CITCO Water technical representative for detailed application and dosing application recommendations. Store product in a dry place between 21°-27° C (70°-80.6°F). If product becomes wet, it must be used immediately. Do not freeze.

**Operating conditions** - Temp: 15° - 40°C, pH: 5.0 - 8.0, D.O.: 0.5 - 5.0 mg/l. AulBac 1200 is nonpathogenic, salmonella free, contaminant-free, and non-toxic. Product: dormant bacterial cultures.

#### MICROBIAL AID FOR SLUDGE REDUCTION



#### Specifications

- Viability: min 4 billion CFU/g (Avail. in 3X conc.)
- Form: dry, free-flowing powder
- Color: beige to light brown
- Shelf-life: min 2-years



#### **Applications**

- Aerobic WWTPs
- Anoxic WWTPs



#### Availability

ThornBac 1200 is available in 25 lb. plastic pails or 100 lb. fiber drums. Contact your CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 1500

#### Filamentous & Sludge Settling

ThornBac 1500 is a combination of natural components that disfavor the proliferation of various filamentous bacteria in biological wastewater treatment systems. ThornBac 1500 has the ability to destabilize and manage excessive filamentous bacterial populations, thereby enhancing secondary biosolids settling while optimizing wastewater treatment plant operation. Nuisance foam generated by specific filament types may be reduced through the use of ThornBac 1500. When properly applied, ThornBac 1500 has been able to reduce the sludge yield in systems by 20-30%.

Directions: ThornBac 1500 may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it is best to pre-hydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter.

Do not use in environments where high levels of toxic metals such as zinc, chrome, or mercury are known to exist. Storage: store product in a dry place between 21°-27° C (70°-80.6°F). If product becomes wet, it must be used immediately. Do not freeze.



#### FILAMENTOUS & SLUDGE SETTLING



#### Specifications

- pH: 6.0 0.0
- Temp: 15°C 40°C
- PO<sub>4</sub>: 2 mg/L Min.
- NH<sub>3</sub>N: 2 mg/L Min.
- Viability: min 4 billion CFU/g

#### Applications

- Excessive foam generation management
- Improve biosolids settling
- Wastewater treatment plants



#### Availability

ThornBac 1500 is available in 25 lb. plastic pails or 100 lb. fiber drums and may be packaged in 1-lb. water-soluble packs.



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# Thorne Bac

#### ThornBac 1600

#### Aerobic Digestion Start Up

ThornBac 1600 is a blend of adapted facultative microorganisms formulated for industrial and municipal wastewater applications in which the dissolved oxygen is less than 1 mg/l, such as facultative/anoxic digesters and lagoons. The bacteria in ThornBac 1600 produce multiple types of enzymes such as amylase, protease, esterase, urease, cellulase, xylanase, and lipase to break down proteins, animal and vegetable fats and oils, and carbohydrates. Use of ThornBac 1600 will increase biological activity, increase supernatant clarity, reduce biosolids sludge yield, and produce a good settling biological floc.

**Application**: Primary applications include municipal and industrial wastewater treatment aerobic or facultative digesters.

Store ThornBac 1600 in a dry place between 10°C - 40°C. If product becomes wet, it must be used immediately. Do not allow to freeze. Product may be added directly to mixing tank, digester, or lagoon. Do not use in environments where high levels of toxic metals such as zinc, chrome, or mercury are known to exist.



#### AEROBIC DIGESTION START UP



#### **Operating Conditions**

- pH: 5.5 8.5
- Temp: 15°C 40°C (59°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum
- Viability: 4 billion CFU/g

#### Applications

- Municipal wastewater
- Industrial wastewater
- Facultative digesters
- Aerobic digesters

#### Availability

ThornBac 1600 is available in 25-lb. plastic pails or 100-lb. fiber drums and may be packaged in 1-lb. watersoluble packs. Contact your CITCO Water consultant for dosage rates.

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#### ThornBac 1600

#### Aerobic Digestion Start Up

# Thom BIOAUGMENTATION



#### **Benefits:**

- rapid upset recovery and startup
- improved settling
- enhanced supernatant clarity
- increase digestion rate

#### **Technical Specs:**

- product: dormant bacterial cultures and micronutrients
- form: dry, freeflowing powder
- color: beige to light brown





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# Thom BIOAUGMENTATION

#### ThornBac 1650

#### MBR Specific Microbial Blend

ThornBac 1650 is a broad spectrum bacterial specifically designed for use in the startup of Membrane BioReactor Wastewater Treatment Systems. ThornBac 1650 has a high water-solubility makeup containing a broad spectrum microbial profile, a multifaceted carbon carrier, and micronutrients essential in promoting rapid biomass growth.

The cultures in ThornBac 1650 are capable of degrading a wide variety of components associated with industrial wastewater, including but not limited to: proteins, carbohydrates, hydrocarbons, surfactants, and detergents. ThornBac 1650 will enhance COD, TOC, BOD, and TSS removal.

**Directions**: ThornBac 1650 may be added directly to aeration tank, lagoon, or oxidation ditch. For trickling filters, it's best to prehydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter. Consult a CITCO Water representative for detailed dosing recommendations.



Operating conditions - Temp: 15°C - 40°C (59°F - 104°F), PO4: 2 mg/L minimum,

#### MBR SPECIFIC MICROBIAL BLEND



#### **Operating Conditions**

- Dormant bacterial cultures
- Form: dry, free-flowing powder
- pH: 6.0 9.0
- Color: off white to gray

#### Applications

- Membrane bio reactor seeding
- Industrial wastewater
- System optimization
- Rapid start-up and upset recovery



#### Availability

ThornBac 1650 is available in 25-lb. plastic pails or 100-lb. fiber drums and may be packaged in 1-lb. watersoluble packs. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 1700

#### H<sub>2</sub>S & Odor Control

ThornBac 1700 includes the broad blend of bacteria contained in ThornBac A-300, in addition to sulfide/organic acid degrading cultures capable of reducing strong organic content and high COD/BOD wastewater. The microbial blend is capable of using sulfides, including hydrogen sulfide, as the energy source for their metabolism. In wastewater environments, ThornBac 1700 converts sulfide compounds to elemental sulfur and degrades various organic acids. ThornBac 1700 is applied to reduce toxicity and foaming caused by sulfides or for use in organic acid and mercaptan odor/corrosion reducing programs. ThornBac 1700 will work in low pH and anoxic environments.

ThornBac 1700 is also applied in tandem with Nitra-Nox for successful odor/corrosion control in collection system, primary clarifier, EQ basin, holding pond, digester, and thickener applications. In wastewater treatment plants that experience bio-solids settling concerns due to excessive filamentous growth associated with sulfides and organic acids, ThornBac 1700 is applied as a non-chemical, proactive filamentous bacteria management program which neutralizes the conditions that promote the growth of specific filamentous species.



#### H<sub>2</sub>S & ODOR CONTROL



#### **Operating Conditions**

- pH: 5.5 10.0
- Temp: 15°C 40°C (59°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum

- Applications
- Pulp and paper mills
- Petroleum refining
- Chemical processing
- Municipal and industrial wastewater



#### Availability

ThornBac 1700 is available in 25 lb. plastic pails or 100 lb. fiber drums and may also be packaged in 1 lb. water soluble packs.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 1800 Algae Control

ThornBac 1800 is a blend of proprietary microorganisms formulated for use where inordinate algae growth is a problem. The microbes in ThornBac 1800 will breakdown excess wastes in ponds and lagoons and reduce excessive quantities of inorganic nutrients, such as biologically usable forms of phosphorus and nitrogen (which are causative reasons for excessive algal blooms). This leads to cleaner water, higher dissolved oxygen levels and where necessary, lower effluent Total Suspended Solids (TSS).

**Directions**: ThornBac 1800 may be added directly to a pond, basin, or lagoon. Consult your CITCO Water representative for detailed Wastewater Treatment Plant dosing recommendations.

Do not use in environments where high levels of toxic metals such as zinc, chrome, or mercury are known to exist. Storage: store product in a dry place between 21°-27° C (70°-80.6°F). If product becomes wet, it must be used immediately. Do not freeze.



#### ALGAE CONTROL



#### **Operating Conditions**

- pH: 5.0- 10.0
- Temp: 5°C 40°C (40°F 104°F)
- Specific gravity: 0.5 0.7

#### Applications

- Pond clarification
- Lagoon clarification
- Algae management
- Municipal wastewater treatment

#### Availability

ThornBac 1800 is available in 25 lb. plastic pails or 100 lb. fiber drums and may also be packaged in 1 lb. water soluble packs.

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# Thom BIOAUGMENTATION

#### ThornBac 1950

#### Microbial Septic Tank & Cesspool Aid

ThornBac 1950 is an all-natural, microbial and micronutrient blend **specifically designed for** cleaning and maintaining septic tanks, cesspools, and drain fields. The cultures in ThornBac 1950 re-establish the liquefying and digesting capabilities of the system due to non-use, excessive loading (overloading), and the use of strong chemicals that contain anti-bacterial properties.

Biomass optimization with ThornBac 1950 will allow for effective treatment, thereby opening clogged sidewalls, collectors and distribution boxes, eliminating potential back-up issues and foul odors. ThornBac 1950 is non-toxic and non-hazardous to plants, animals, and humans. It contains no harsh chemicals and is not corrosive. Regular use of ThornBac 1950 allows the system to maintain peak efficiency helping to reduce system pumping and maintenance costs.

**Directions: Initial treatment** - use half pound of ThornBac 1950 for each 500 gallons of septic tank capacity. This is recommended for typical domestic applications. For schools and restaurants, consult an CITCO Water representative. Repeat dosage in one week.

**Maintenance treatment** - apply two ounces of ThornBac 1950 per 500 gallons of tank capacity monthly. For high use applications, apply two ounces of ThornBac 1950 per 500 gallons of tank capacity weekly. Mix AulBac 1950 with a gallon of warm water and flush down the toilet.



#### MICROBIAL SEPTIC TANK & CESSPOOL AID



#### Specifications

- Dormant bacterial cultures
- Form: dry, free-flowing powder
- Specific gravity: 0.5 0.7
- Color: beige to brown

#### Applications

- Septic tanks/porto potties
- Sand mounds
- Cesspools & drain fields
- Campgrounds, MHPs
- Schools & Restaurants



#### Availability

ThornBac 1950 is available in 25-lb. plastic pails or 100-lb. fiber drums and may be packaged in 1-lb. watersoluble packs. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### **ThornBac 2000** Alternative Carbon (BOD) Source

ThornBac 2000 is a non-hazardous, non-toxic blended organic carbon source. This solution provides a layered source of simple carbohydrate molecules to support rapid bacterial growth and enzyme production. ThornBac 2000 is ideal for denitrification applications and maintaining biomass during periods of low flow, low organic loading or plant shutdowns. It may also be used to establish a biomass in biological wastewater treatment plant start-up applications.

**Directions**: ThornBac 2000 may be added directly to an aeration tank, lagoon, oxidation ditch or trickling filter. Consult with your CITCO Water representative for detailed dosing recommendations.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.

Benefits: maintain biomass, denitrification, and aid in scheduled plant start-up.



#### ALTERNATIVE CARBON (BOD) SOURCE



#### **Operating Conditions**

- pH: 6.0 9.0
- Temp: 15°C 40°C (59°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum

#### Applications

• Municipal and industrial wastewater treatment plants



#### Availability

ThornBac 2000 is available in 25-lb. plastic pails or 100-lb. fiber drums and may be packaged in 1-lb. water-soluble packs. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 2050

#### Alternative Carbon (BOD) Source

ThornBac 2050 is a non-hazardous blended organic **carbon source**. ThornBac 2050 provides a layered source of soluble BOD to support rapid bacterial growth and enzyme production. ThornBac 2050 is ideal for denitrification applications and maintaining biomass during periods of low flow, low organic loading or plant shutdowns. ThornBac 2050 may also be used to establish a biomass in biological wastewater treatment plant start-up applications.

**Directions**: ThornBac 2050 may be added directly to aeration tank, lagoon, oxidation ditch or trickling filters or anoxic tanks/zones.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.



Benefits: denitrification, maintain biomass, aid in scheduled plant start-up.

#### ALTERNATIVE CARBON (BOD) SOURCE





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### Thorne Bac BIOAUGMENTATION

#### ThornBac 2100

#### Alkalinity & Micronutrient Blend

ThornBac 2100 provides trace levels as all the necessary chelated minerals such as calcium, iron, zinc, cobalt, selenium, and manganese. In addition to the minerals, ThornBac 2100 contains significant levels of available inorganic carbon which aids biosolids settling, nitrification (where applicable), and promotes vigorous cellular enzyme production, efficient COD and BOD removal, and rapid biomass growth.

**Directions**: ThornBac 2100 may be added to the influent or directly to the aeration tank, lagoon, or oxidation ditch. For trickling filters, add to influent feed. ThornBac 2100 does not require any special pre-hydration procedures.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.

**Benefits**: wastewater treatment plant optimization and performance, improve nitrification and TSS removal.

#### ALKALINITY & MICRONUTRIENT BLEND



#### **Operating Conditions**

- pH: 4.25 10.0
- Temp: 5°C 55°C (40°F 130°F)
- Specific gravity: ~ 1.0
- Product: dormant bacterial cultures

#### Applications

• Aerobic, anoxic, and anaerobic wastewater treatment units.



#### Availability

ThornBac 2100 is available in 30-lb. plastic pails and 100-lb. fiber drums. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### Micronutrient Blend

**ThornBac 2200** 

ThornBac 2200 is a proprietary blend of micronutrients that provides all the trace levels of minerals, vitamins, and amino acids necessary to support rapid biomass growth. ThornBac 2200 also includes inorganic carbon that aids biosolids settling, pH stability, nitrification (where applicable), promotes vigorous cellular enzyme production, and efficient TOC, COD, and BOD removal. ThornBac 2200 provides WWTP optimization and improves effluent removal and biosolids settling performance.

**Directions**: ThornBac 2200 may be added to the influent or directly to the treatment unit. For trickling filters and anaerobic reactors, add to the influent feed or prereactor mix box/tank. ThornBac 2200 does not require any special pre-hydration procedures. Consult your CITCO Water technical representative for detailed application and dosing application recommendations. Store product in a dry place. Keep product dry.





CHEMICAL SOLUTIONS

**Operating conditions** - Temp: 2° - 60°C (35.6°F - 140°F), pH: 6.0 - 8.5. Product: organic and inorganic materials.

#### MICRONUTRIENT BLEND



#### Specifications

- Bulk density: 890 Kg/m<sup>3</sup> <u>+</u> 25
- Form: dry, free-flowing powder
- Color: gray to dark green

#### Applications

• Aerobic, anoxic, and anaerobic wastewater treatment plants.



#### Availability

ThornBac 2200 is available in 25-lb. plastic pails and 100-lb. fiber drums and can be packaged in 1-lb. water-soluble packs. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac 2400

#### Anaerobic Unit Micronutrient Blend Wastewater Treatment Aid

ThornBac 2400 is a proprietary blend of essential micronutrients that provide specifc trace levels of minerals necessary to support anaerobic microbial processes and growth.

**Directions**: ThornBac 2400 may be added to either the influent or directly to the treatment unit. Anaerobic reactors: add to the influent feed or pre-reactor mix box/tank. Consult with you CITCO Water technical consultant for specific dosing recommendations.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.



Benefits: improve anaerobic removal efficiency and decrease effluent turbidity.

#### ANAEROBIC UNIT MICRONUTRIENT BLEND



#### **Operating Conditions**

- pH: 6.5 7.5
- Temp: 2°C 60°C (35.6°F 140°F)
- Specific gravity: ~ 1.0
- Form: liquid

- Applications
- Anaerobic wastewater treatment
   units
- Digesters
- Lagoons and basins
- UASB's



#### Availability

ThornBac 2400 is available in 55gallon plastic drums and 330-gallon totes. Contact a CITCO Water consultant for dosage rates.



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### Thorne Bac BIOAUGMENTATION

#### ThornBac 2450

#### Nitrification Micronutrient Blend Wastewater Treatment Aid

ThornBac 2450 is a proprietary blend of essential micronutrients that provide specifc trace levels of minerals necessary to support nitrifying microbial processes and growth.

**Directions**: ThornBac 2450 may be added to either the influent or directly to the tertiary treatment unit. Compete mixed aerobic reactors: add to influent feed. Consult with you CITCO Water technical consultant for specific dosing recommendations.

**Caution**: Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water.



Benefits: improve/maintain ammonia removal efficiency.

#### NITRIFICATION MICRONUTRIENT BLEND



#### **Operating Conditions**

- pH: 6.0 9.0
- Temp: 2°C 60°C (35.6°F 140°F)
- Specific gravity: ~ 1.0
- Color: clear slight yellow

- Applications
- Optimize the microbial processes associated with nitrification (ammonia oxidation
- Lagoons and basins
- Wastewater treatment plants

#### Availability

ThornBac 2450 is available in 55gallon plastic drums and 330-gallon totes. Contact a CITCO Water consultant for dosage rates.



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### Thorne Bac BIOAUGMENTATION

#### ThornBac A-100

#### Aerobic Bacteria

ThornBac A-100 is a blend of adapted microorganisms and biostimulants formulated for use in municipal wastewater applications. The bacteria in ThornBac A-100 produce multiple types of enzymes such as protease, amylase, esterase, xylanase, cellulase, and lipase. ThornBac A-100 is designed to degrade BOD and F.O.G., in addition to the synthetic detergents and surfactants that are commonly found in municipal wastewater. ThornBac A-100 contains aerobic as well as facultative bacteria to work in anoxic conditions.

**Directions**: ThornBac A-100 may be added directly to the aeration tank, lagoon, or oxidation ditch. For trickling filters, it is best to prehydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter. Store in dry place between 21-27°C. Do not freeze. If product becomes wet, it must be used immediately. Caution: persons allergic to dust should employ nose and mouth protection when handling this product. Always refer to the Safety Data Sheet for additional safety information. Do not use in environments where high levels of toxic metals such as zinc, chrome, or mercury are known to exist.



#### **AEROBIC BACTERIA**



#### **Operating Conditions**

- pH: 6.0 9.0
- Temp: 15°C 40°C (59°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- Product: dormant bacterial cultures

#### **Benefits**

- Rapid upset recovery
- Enhanced wastewater treatment plant operation
- Enhanced effluent performance



#### Availability

ThornBac A-100 is available in 25-lb. plastic pails and 100-lb. fiber drums and can be packaged in 1-lb. water-soluble packs. Contact a CITCO Water consultant for dosage rates.



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### Thorne Bac BIOAUGMENTATION

#### ThornBac A-300

#### **Chemical Processing**

ThornBac A-300 contains a novel blend of bacteria and micronutrients specifically formulated to breakdown and digest fats, greases, olefins, and vegetable oils suspended in wastewater. ThornBac A-300 works effectively in scum pits, lift stations, wet wells and flow equalization tanks, facultative lagoons/basins and aeration basins. The bacteria produce a prolific amount of diverse enzymes that penetrate and process insoluble oils and fats under stressful environmental conditions. ThornBac A-300 works under both aerobic and anoxic conditions and does not contain caustics or acids and will not harm pipes or wastewater equipment.

**Directions**: ThornBac A-300 may be added directly to an aeration tank, lagoon, or oxidation ditch. For trickling filters, it's best to pre-hydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter. Persons allergic to dust should employ nose and mouth protection when handling this product. In the event of direct contact with the eyes or skin, flush the affected area with water. Store product in a dry place between 21-27°C (70-80.6°F). If product becomes wet, it must be used immediately.



Do not freeze or use in environments where high levels of toxic metals such as zinc, chrome, or mercury exist.

#### CHEMICAL PROCESSING



#### **Operating Conditions**

- pH: 4.5 10.0
- Temp: 5°C 55°C (40°F 130°F)
- PO<sub>4</sub>: 2 mg/L minimum
- Specific gravity: 0.5 0.7

#### Applications

- F.O.G., BOD and TSS removal
- Wet wells
- Collection system, lift stations
- WWTPs

#### Availability

ThornBac A-300 is available in 25-lb. plastic pails and 100-lb. fiber drums and can be packaged in 1-lb and 0.5-lb. water-soluble packs. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac A-400

#### High BOD/COD & Sludge Settling

ThornBac A-400 is a blend of naturally occurring, non-altered microorganisms and growth stimulants formulated to efficiently degrade carbohydrates, proteins, and fats. The bacteria in ThornBac A-400 produce multiple types of enzymes such as protease, amylase, esterase, urease, cellulase, xylanase, and lipase to break down waste products associated with meat processing, dairies, vegetable packing, fruit processing, and carbohydrate processing facilities. ThornBac A-400 contains aerobic as well as facultative bacteria to work in anoxic conditions. Use of ThornBac A-400 will increase biological activity, improve biomass flocculation, and enhance nitrogen and phosphorous removal.

**Directions**: ThornBac A-400 may be added directly to an aeration tank, lagoon, or oxidation ditch. For trickling filters, it is best to prehydrate product by adding 2 lbs. per 1 gallon of 20-30°C non-chlorinated water. Allow solution to stand for 30 minutes to 1 hour before adding to trickling filter. Store product in a dry place between 21-27°C (70°F-80.6°F). If product becomes wet, it must be used immediately. Do not freeze or use in environments where high levels of toxic metals such as zinc, chrome, or mercury exist.



#### HIGH BOD/COD & SLUDGE SETTLING



#### **Operating Conditions**

- pH: 6.0 9.0
- Temp: 15°C 40°C (59°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum

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#### Applications

- Food processing industry
- Rendering plants
- Breweries & beverage industry
- Fruit/vegetable processing
- Municipla/industrial WWTPs

#### Availability

ThornBac A-400 is available in 25-lb. plastic pails and 100-lb. fiber drums. Contact a CITCO Water consultant for dosage rates.

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# Thom BIOAUGMENTATION

#### ThornBac ANA 200

#### Anaerobic Digestion

ThornBac ANA 200 is a specially formulated blend used to reduce foaming and improve sludge density and settling. It's effective in wastewater treatment systems that receive high levels of fats, oils, and greases. The bacteria in ThornBac ANA 200 has a higher kinetic rate than most indigenous bacterial populations. The bacterium converts a higher percentage of the available BOD into energy.

**Directions**: Using ThornBac ANA 200 regularly will increase the overall plant efficiency and reduce sludge production. For your protection, wear all proper safety devices as recommended in the Safety Data Sheet. Do not use where there are high levels of toxic metals such as zinc, chrome, and mercury. ThornBac ANA 200 may be added directly into lagoons, anaerobic tanks, or wastewater headworks. For filter, pre-hydrate product by adding 2 lbs. per gallon of 20-30°C non-chlorinated water. Let solution stand for one half hour up to two hours before adding to trickling filter.



#### ANAEROBIC DIGESTION



#### **Operating Conditions**

- pH: 6.0 8.5
- Specific gravity: 0.5 8.5
- Appearance: dry, light brown powder

#### Applications

- Food processing industry
- Rendering plants
- Breweries & beverage industry
- Fruit/vegetable processing
- Municipla/industrial WWTPs

#### Availability

ThornBac ANA 200 is available in 25-lb. plastic pails. Each pail contains (25) 1-lb. bags for easy application. Contact a CITCO Water consultant for dosage rates.

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### Thorne Bac BIOAUGMENTATION

#### ThornBac BTI Midge Flies

ThornBac BTI is a microbial composting product with midge fly and mosquito inhibiting cultures. ThornBac BTI contains bacillus thuringiensis, which destroy mosquito and fly larvae environments in which these pests can breed.

**Directions**: For Wastewater: ThornBacac BTI should be pre-hydrated at a rate of 1 lbs. per gallon of 20-30°C water. The product should be applied at a rate of 1/2 lb per 50,000 gallons of flow per day. Initial treatment may require 1.5 lbs per 50,000 gallons of flow per day for 5 days. For Composting: ThornBac BTI should be pre-hydrated at a rate of 1 lbs. per gallon and sprayed over a composting pile at a rate of 1 gallon per 100 cubic yards. For fly and mosquito control, spray product directly to standing water, pits, and puddles. Use of 2 to 3 oz. for 100 square feet is sufficient.

**Availability**: Product is available in 25 lb. plastic pails or 100 lb. fiber drums. Product may be packaged in 1 lb. or 1/2-lb water-soluble packs for an additional charge. Store product in a dry place between 10°-40°C. If product becomes wet, it must be used immediately. Do not freeze. Do not use in environments where high levels of toxic metals such as zinc, chrome, or mercury are known to exist.



#### MIDGE FLIES



#### **Operating Conditions**

- pH: 6.0 8.5
- Temp: 15°C 55°C
- Specific gravity: 0.5 0.6
- PO<sub>4</sub>: 2 mg/L Min.

#### Specifications

- Product: dormant bacterial cultures and enzymes
- Form: dry, free-flowing water and soluble powder
- Color: white to light brown

#### Applications

- Wastewater treatment plants
- Composting

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# Thom BIOAUGMENTATION

#### ThornBac LS

#### Lift Stations & Grease Control

ThornBac LS is a specially designed enzymatic biological complex. It quickly digests grease in lift stations and grease traps, producing a by-product of carbon dioxide in the water. ThornBac LS used regularly will remove and prevent grease build-up in lift stations and grease traps.

Directions: most dosage rates depend on grease concentration and the size

of lift station or grease trap. See below for general recommendations. For your protection, wear safety attire when using ThornBac LS. Refer to Safety Data Sheet for specific safety information.

Do not use where there are high levels of toxic metals such as zinc, chrome, and mercury. **Grease Trap**: using a dosage pump, apply ThornBac LS at an average of one quart per day. **Lift Station**: using a dosage pump, apply ThornBac LS at an average of one gallon per day.



#### LIFT STATIONS & GREASE CONTROL



#### **Operating Conditions**

- pH: 6.0 8.0
- Specific gravity: 8.2 PPG
- Appearance: tallow liquid
- Freezing/melting point: 32°F

- Applications
- Municipal wastewater treatment
- Grease traps
- Lift stations
- Collection systems

#### Availability

ThornBac LS is available in 5-gallon pails and 55-gallon drums. Contact a CITCO Water consultant for dosage rates.

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## Thomas Bioaugmentation

#### **ThornBac Nitrifiers**

#### Ammonia Removal

ThornBac Nitrifiers is a blend of nitrifying bacteria formulated to work in aerobic wastewater treatment plants that need to reduce or eliminate ammonia. ThornBac Nitrifiers can be applied to all industrial wastewater plants such as chemical plants, petroleum refineries, steel mills, food processing plants, landfill leachate, and municipal wastewater treatment plants. Benefits include rapid upset recovery and plant start-up, maintaining compliance.

**Directions**: primary applications include food processing and municipal and industrial wastewater treatment. Dilute ThornBac Nitrifiers concentrate with 1 part concentrate to 5 parts of non-chlorinated water. The dilution water temperature should be between 20°C - 35°C.

Let stand between 45 minutes and 1 hour then apply directly to the aeration basin. Consult your CITCO Water representative for precise dosing and application information.

**Warning**: do not use in environments where high levels of toxic metals such as mercury, chromium, copper, zinc, etc. are known to exist.



#### AMMONIA REMOVAL



#### **Operating Conditions**

- pH: 6.5 8.5
- Temp: 8°C 40°C (46.4°F 104°F)
- PO<sub>4</sub>: 2 mg/L minimum
- NH<sub>3</sub>N: 2 mg/L minimum
- Applications

  Landfills
- Steel mills
- Food processing
- Petroleum refineries
- Municipal, industrial wastewater

#### Availability

ThornBac Nitrifiers are available in 5 unit packs. Contact a CITCO Water consultant for dosage rates.



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### Thorne Bac BIOAUGMENTATION

#### ThornBac Nitrobe-Rx

#### Microbial Ammonia Degrader

ThornBac Nitrobe-Rx contains naturally occurring, acclimated, novel nitrifying microorganisms which biochemically oxidize (remove) ammonia and nitrite in aerobic wastewater treatment plants. Nitrifying bacteria are notoriously subject to growth stresses and toxicity. Various inhibitory compounds, pH variability and water temperature stress can limit the activity of nitrifying bacteria. They require extended periods of time to grow making system ammonia removal recovery slow, therefore efficient ammonia removal suffers during the regeneration period. ThornBac Nitrobe-Rx provides an immediate source of nitrifying microbes where unaided natural nitrification cannot or will not occur in the necessary time. ThornBac Nitrobe-Rx is also effective when applied in tandem with ThornBac 200/200C/200H, ThornBac 300/300C/300H or ThornBac 1900 for hydrocarbon and recalcitrant constituent biodegradation in refineries, landfills and chemical plants or with ThornBac 400/400C or ThornBac 1500/1500C in municipal and food processing wastewater treatment plants, specifically if toxicity is confirmed or suspected.

Directions: Consult with you CITCO Water technical consultant for specific dosing recommendations.

**Caution**: When handling wear appropriate hand protection. In the event of direct contact with the eyes or skin, flush the affected area with water. Refer to the SDS.



Benefits: start-up, enhance or restore ammonia and nitrite removal (nitrification)

#### MICROBIAL AMMONIA DEGRADER



#### **Operating Conditions**

- pH: 7.0 8.4
- Temp: 10°C 40°C (50°F 104°F)
- D.O. ppm: > 0.5
- o-PO<sub>4</sub>: 0.5 mg/L minimum (filtered)
- Applications
- Petroleum refining
- Chemical processing
- Petrochemical processing
- Food processing
- Landfill leachate
- Aquaculture



#### Availability

ThornBac Nitrobe-Rx is available in 1.0unit (0.25 lb.) and 5.0-unit (1.25 lb.) packs and 2.0-gallon (15.0 lb.) pails. Contact a CITCO Water consultant for dosage rates.

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#### Coverage Solutions driven. Commitment given.

From chemical, smart meter, engineering and technology, to inventory, hardware, and repair, we have every aspect covered.

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Committed to help take water from the source, deliver it to the consumer, and return it back to the source.

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