

HACCP Verification and Validation
27 MAR 2023

HACCP Plan 2023

Verification:

The HACCP Plan was verified by the HACCP Team.

The flow charts were verified to be correct and current by the HACCP Team. This was done by walking the line and verifying that each step on the flow chart matched each step in production. This was done for the entire processes.

Product descriptions were verified to be current and correct by comparing the descriptions to the product and the product specifications.

The raw material risk analysis was reviewed to ensure it is current and correct. All raw materials used in the facility are listed on this document and all risks are correctly identified. There have been no developments in the past year that would lead us to change these risks. None of our suppliers have had any recalls associated with their products. All control measures for any risks listed were verified to be in place and working correctly.

The process flow risk analysis was verified to be current and correct. All risks listed on this document and the risk levels assigned were correct. No risks were added, removed, or changed. Customer complaints and non-conformances from internal and external audits were reviewed to see if any new risks should be added. None were found. Hardened product was the top issue in 2021, and low bag weights were there top issue in 2022.

Validation:

Magnets are in place, and the analysis of deviations since the implementation of the SQF system shows there is still risk due to metal contamination and will be our site critical control point (CCP). There has been 1 foreign matter complaints since the last validation in 05MAY2022, however, we did not receive a sample back from the customer for confirmation. It was believed to be rubber material from the Bulk Loader (BL) internal rubber pads which were removed last year under Management of Change (MOC) record MOC-2022-SYR-18.

The limit on the magnet control point is 2-7mm found. This limit was validated as being effective by being aligned with FDA choking hazard limit. When a new packing line is assessed/acquired for the site we will utilize metal detection as well as magnets.



Shane McCarty
Quality Manager

Food Safety and Quality Policy 2023

Chemtrade Solutions, LLC Syracuse, NY facility is committed to Food Safety and Quality, and providing consistent value to our customers, business partners and other stakeholders.

The Syracuse Sodium Nitrite Facility, its management staff and hourly employees are conscious of Food Safety and Quality.

To create the safest product possible, we are committed to:

- Not only meeting, but exceeding, all regulatory requirements and industry standards for Food Safety and Quality.
- Providing the resources needed for employee training and development.
- Utilizing our Food Safety Plan and HACCP Plan and all prerequisite programs that provide the foundation for the system's success.
- Maintaining a PCQI Certified SQF trained practitioner who designs and implements the Plant's standards. This practitioner leads our food safety teams to help us create and implement internal policies and programs that are the building blocks to ensuring our facility produces safe and high-quality products.

Our customers trust us to deliver product that exceeds their expectations. We are committed to providing safe, quality food ingredient.


_____, 1/Jan 4/23
Patrick Lamont, Plant Manager


_____, 1/1/4/2023
Duane Gordon, Operations Manager


_____, 1/1/4/2023
Shane McCarty, Quality Manager, PCQI and SQF Practitioner

Company Overview

SQF Food Sector Category: 19 Food Ingredient Manufacturer; Sodium Nitrite

SQF System Elements for Food Manufacturing Module 2

Good Manufacturing Practices for Processing of Food Products Module 11

ISO 9001:2015 Certified

Chemtrade Solutions, LLC. produces a variety of Sodium Nitrite products. These products are processed using 1 HACCP Plan.

Chemtrade Solutions LLC was founded in 2001 in Toronto, Canada. In early 2014 Chemtrade acquired General Chemical which includes the Syracuse location for production of Sodium Nitrite.

Facility size and acreage of site: 50,000 sq. ft. of building space on approximately 3.5 acres of land. Multiple buildings (Administrative, Warehouse, Production)

Facility Age: 103 years. The site was built in 1920 with the capacity to produce 4 tons per day. The site has expanded production with the capacity to produce up to 80 tons per day.

Number of Processes: 7

- Granular Super Free Flowing Food Grade
- Granular Super Free Flowing Technical
- High Purity Flake
- High Purity Granular
- High Purity Special Granular
- Pure Solution
- Technical Solution

Number of HACCP Plans: 1

Number of Staff: Approximately 50

Number of Shifts: 3

Hours of Operation: 24 hours

Sanitation Details: Daily cleaning at the start and end of each shift.

Other cleanings performed according to the SQF Cleaning and Sanitization Programs SOP.

Dress and Hygiene Requirements SOP.

**CHEMTRADE**<http://www.chemtradelogistics.com>

Sodium Nitrite, Granular Super Free-Flowing Food Grade PRODUCT DATA SHEET

CHARACTERISTICS

Sodium Nitrite, Granular Super Free-Flowing Food Grade is a pale straw-colored dry granular product.

Meets all Food Chemicals Codex specifications. Certified Pareve and Kosher.

TYPICAL PROPERTIES

| | | |
|--|----------------------------|-------------|
| Formula: | Sodium Nitrite Mixture | |
| C.A.S. | 7632-00-0 (Sodium nitrite) | |
| Bulk Density, lbs./cu. ft. | | 76.9 - 80.5 |
| Granulation: | Through 40 mesh screen, % | 75 |
| | Through 50 mesh screen, % | 34 |
| | Through 70 mesh screen, % | 15 |
| | Through 100 mesh screen, % | 5.5 |
| Assay as NaNO ₂ , % | | >97.5 |
| Sodium Nitrate (NaNO ₃), % | | <1.0 |
| Lead (Pb), ppm | | <4 |
| Loss on Drying, % | | <0.25 |
| Sodium Carbonate (Na ₂ CO ₃), % | | <0.15 |
| Anti-Caking Agent, % | | 0.10 - 2.0 |

PRODUCT USES

Curing salt formulations.

SHIPPING CONTAINER

2000 lb. Super Sack mini-bulk bag

400 lb. fiber drum

50 lb. poly bag

SHIPPING REGULATIONS (US DOT / TDG)

Classification: Sodium Nitrite Mixture

Hazard Classes: 5.1 (6.1)

ID Number: UN1500

Packing Group: III

The EPA reportable quantity (RQ) for sodium nitrite is 100 lbs.

PRODUCT SAFETY INFORMATION

Wash hands, forearms and exposed areas thoroughly after handling. Wear protective gloves, protective clothing, and eye protection. Anyone procuring, using or disposing of these products or their containers must be familiar with the appropriate safety and handling precautions. Such information may be found in the **Safety Data Sheets (SDS)** for these products or you may contact Chemtrade at 416-496-5856. In the event of an emergency with these products, call the 24-hour **Emergency Number: USA and Canada (CHEMTREC) 800-424-9300**. For additional information contact:

Syracuse Technical Center
315-478-2323 or 800-255-7589

Specialty Chemicals - Sales
(479) 256-0916
WEmfinger@chemtradelogistics.com

CHE-2028P

Revision Date: February 3, 2022

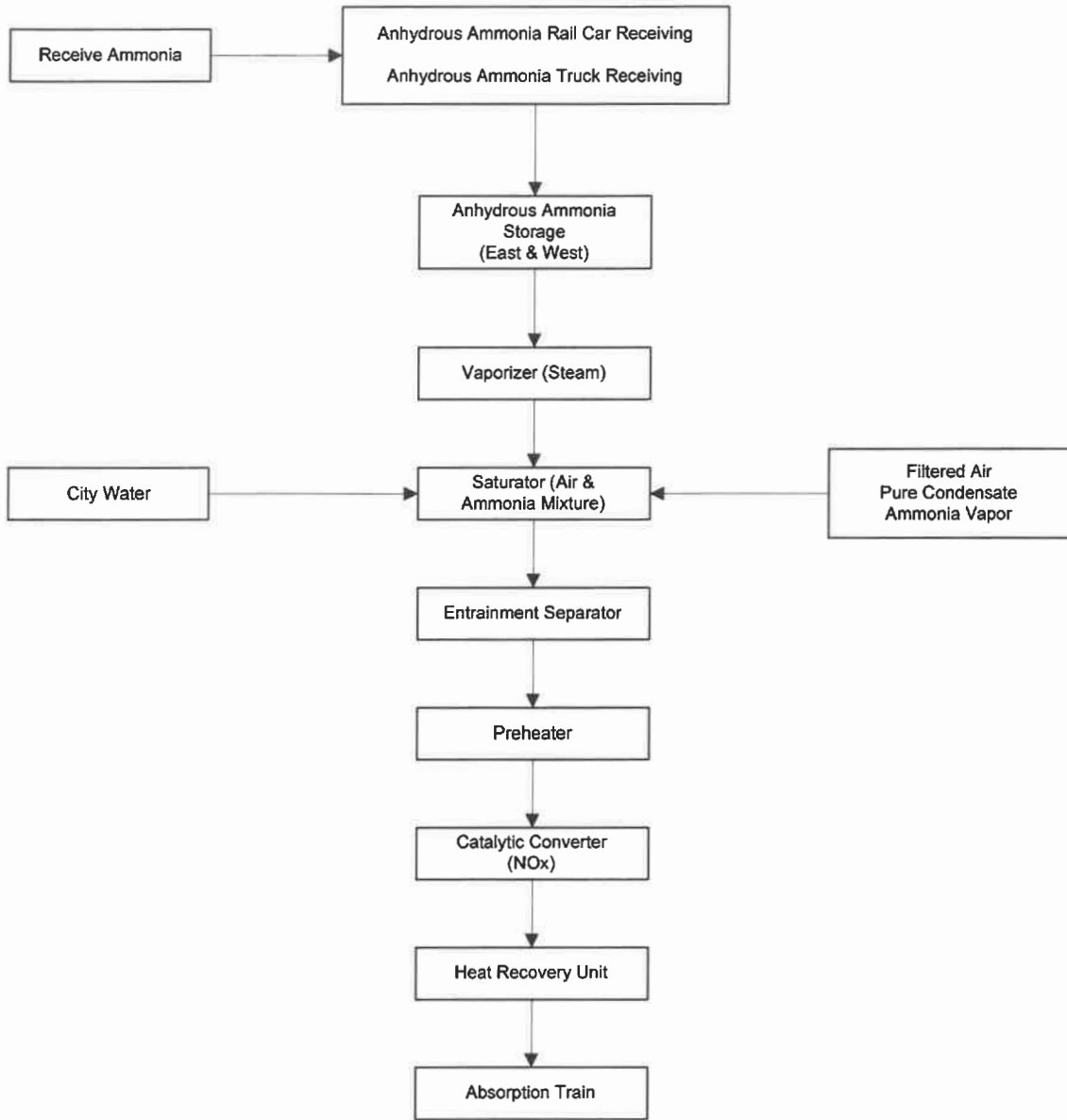
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Product Description and Use Sodium Nitrite Food Grade

| | |
|--|--|
| Product Description: | Sodium Nitrite Is a white to pale straw-colored, dry granular crystalline product that contains and FDA approved anti-caking agent. Sodium Nitrite is used as a high quality food preservative. All products are labeled as manufactured and sold by Chemtrade as food grade product. |
| Process: | Production of Sodium Nitrite is a chemical reaction by oxidizing anhydrous ammonia to produce NOx. Utilizing Soda Ash solution the chemical process is driven to produce Sodium Nitrite. This is a continuous process. The crystals are dried and the anti-caking agent is added weight to weight. The product is packaged, palletized and stretch wrapped for shipping. |
| Food Safety Characteristics: | The product is a food preservative and will not harbor microbial growth. Food Sector Category #19: Food Ingredient Manufacturing. |
| Customer/Consumer Use: | This product is to be used by the user as a food additive and must follow current FCC and FDA guidance. This product is Ready-to-Eat (RTE). |
| Packaging: | Packed in 50 pound paper or polyethylene bags, 2000 woven polyethylene mini bulk bags and 400 pound fiber drums. |
| Target Market: | Food manufacturers as a food additive or ingredient. |
| Label Instructions: | Meets Food Chemicals Codex for manufacturing use only. Not a drug additive. |
| Special Distribution and Cold Storage | Store in a dry, cool and well ventilated space. Keep closed when not in use. Store away from oxidizer, combustible material and ignition sources. Store in original container. |
| Shelf Life (at room temperature)* | Product shelf-life is 3 years at ambient indoor conditions. |

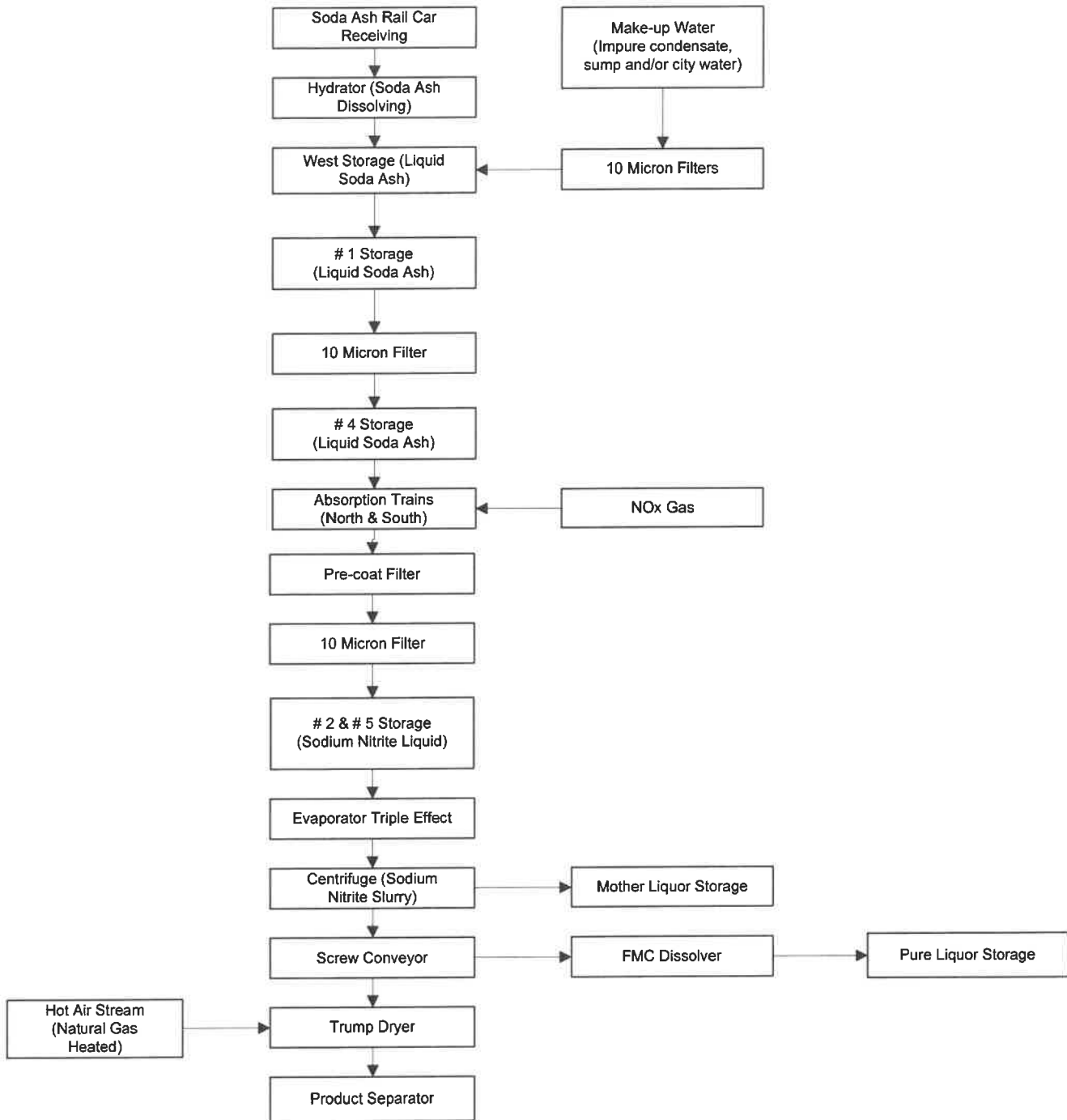
* Shelf life does not guarantee material will maintain free-flowing nature. Material may start caking and/or hardening within 6 months of manufacturing date.

Anhydrous Ammonia Process Flow Diagram
 Rail Car receiving through Catalyst Converter (NOx)



| REV. | DESCRIPTION | DATE |
|------|---------------------------------------|------|
| 8 | 8/21 Food Safety Plan Update | 1/21 |
| 9 | Most recent available revision | 8/21 |
| 10 | Reformatted and added product streams | 4/22 |
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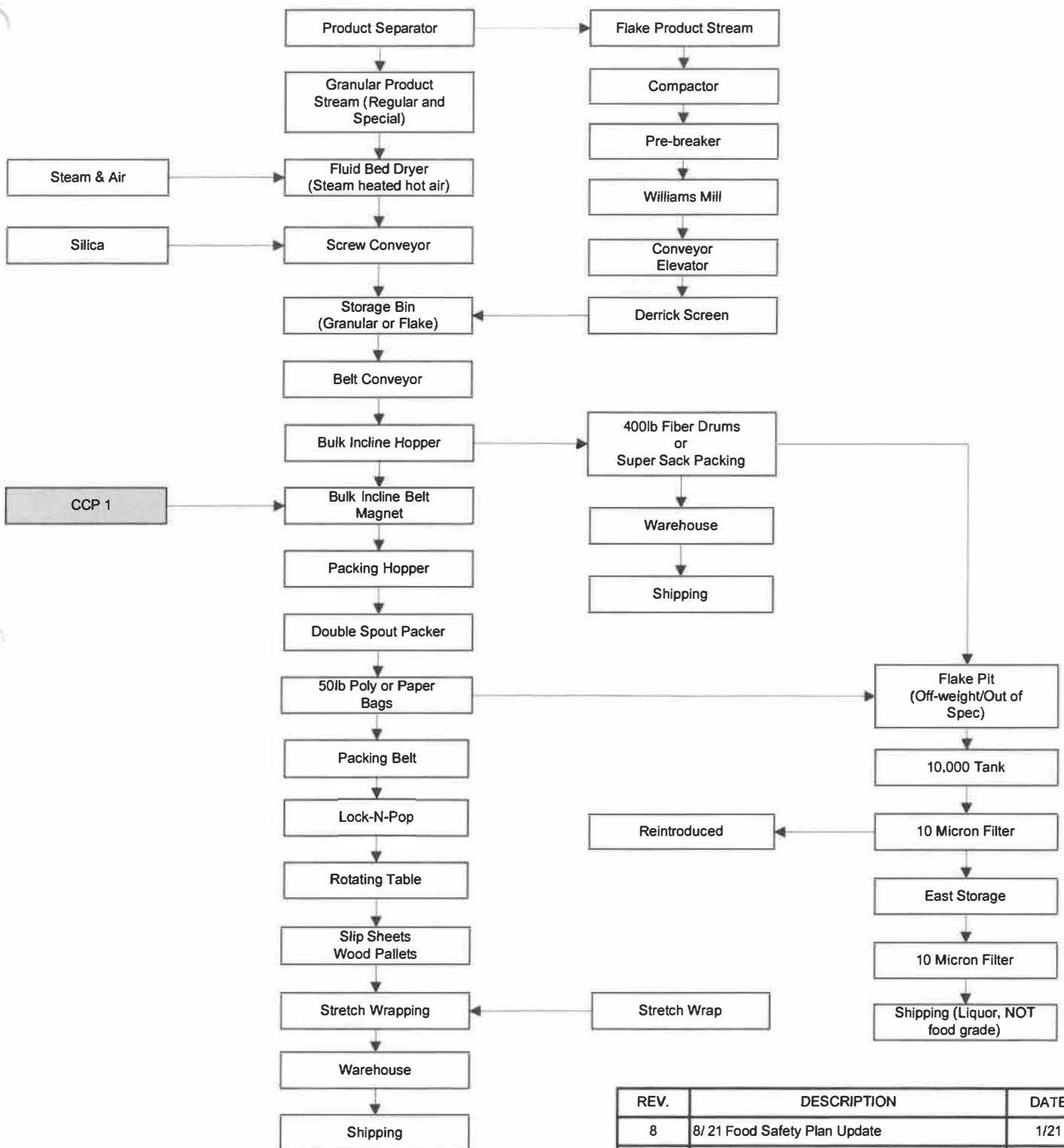
Sodim Nitrite Process Flow Diagram - Wet Side to Dry Side
Raw Material Receiving through Product Separator



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Sodium Nitrite Process Flow Diagram - Dry Side Packing and Shipping

Product Separator through Shipping



Product Returns
 Deposition according to SYR-QUAL-1018
 (Dissolve or Destroy)
 Not used to make food grade product

| REV. | DESCRIPTION | DATE |
|------|---------------------------------------|-------|
| 8 | 8/ 21 Food Safety Plan Update | 1/21 |
| 9 | Most recent available revision | 8/ 21 |
| 10 | Reformatted and added product streams | 4/ 22 |
| 11 | Updated wording for Magnet to CCP | 4/23 |
| | | |
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| | | |

Process Narrative

Receiving Raw Materials and Packaging

All raw materials and packaging are purchased from approved suppliers that meet the product specifications. The product's Certificate of Analysis (CoA) is verified upon arrival by trained personnel and the product is stored in a designated area until it is ready for use.

Raw Materials Receiving and Storage

- **Anhydrous Ammonia:** Arrives at plant via tanker trucks or railcar and is stored in East and West Tanks.
- **Synthetic Amorphous Silica:** Arrives at plant via trucks. Received in bulk 500 lb. bags and is stored in the Lower KOH Building.
- **Soda Ash:** Arrives at plant via railcar and is pumped into the West storage tank and dissolved. Soda ash is then pumped to Storage Tank #1 where it is filtered and then stored in Storage Tank #4.
- **Heat Treated Pallets:** Verified through Certificate of Conformance (CoC) and a visual inspection to identify the heat treatment stamp. Stored in Upper KOH Building
- **Super Sack bags:** 100 bags per pallet when received; Stored in Lower KOH Building
- **Polyethylene Bags:** Received in bulk (3000 bags per pallet); Stored in Lower KOH Building
- **Product Drums:** 4 per pallet when received; Stored in Lower KOH Building
- **Paper Food Grade Bags:** Received in bulk (2000 bags per pallet); Stored in Lower KOH Building

Nitrite Process

Anhydrous Ammonia is vaporized and sent through a pressure regulator and a flow control valve. Air is then introduced and the mixture is sent through the saturator. The Saturator feeds vaporized Ammonia and air mixture through the entrainment separator to eliminate any moisture. The Entrainment Separator feeds vaporized Ammonia to the Pre-Heater. The Pre-Heater raises the temperature of vaporized Ammonia and air mixture as it feeds the North or South Converter. Vaporized Ammonia and air mixture is introduced into the North or South Converter for reaction. This reaction is exothermic. The temperature is monitored by two thermocouples in the Converter. The temperature controller adjusts the flow of NH_3 to maintain a temperature between 730°C to 760°C.

The soda ash is dissolved in the West storage to a concentration of 400 g/L and is then pumped to Storage #1, and is filtered and stored in Storage #4. It is then pumped to tubs #1 and #4 in the South train and tubs #1 and #11 in the North train.

In the South train the reacted Converter gas mixture then passes through the tube side of the Converter Pre-Heater where it releases heat to the Ammonia and air mixture entering the Converter. The gas exits the tube side of the Converter Pre-Heater and passes through the Towers. The gas flows through the Towers in the following order: #5, to #1, to #2, to #3, to #4. After exiting Tower #4, the gas passes through the Stack Valve into the Mesh Pad where 3 micron and larger particulates are removed.

dust from the Product Separator is sent to the Ducon Scrubber for particulate removal. The crystals can now either enter the Fluid Bed Dryer (FBD) or go directly to the Flake Compactor.

If Flake product is made, the product will go directly to the Syntron Feeder, which in turn feeds the Flake Compactor. The Compactor compresses the product into sheets of material through use of two high pressure drum rollers (approximately 2200 psig). The product is sent through a Pre-Breaker to the William's Mill where it is broken into smaller pieces. An elevator then transfers it to the Derrick Screen. The smaller particles are separated by use of 24 mesh and 20 mesh screens and sent back to the Compactor. Smaller particles are further separated by a 3-4 mesh screen and sent to the Flake B/L. The oversized particles are sent back to the mill for reprocessing or to the Flake B/L. The suction, which removes dust from the compactor, is sent to the Flake Scrubber.

If Regular Granular product is being made, the Sodium Nitrite crystals are sent from the Product Separator through the Fluid Bed Dryer to the Regular Granular B/L. When making ACA treated product, the discharge from the FBD is sent across a weigh belt, which allows the proportional addition of ACA to product content of 0.05 – 2.0%. After the product is mixed, it is conveyed by Blender Screw to the #2 B/L or #3B B/L. If Special Granular is made, the Sodium Carbonate coated Sodium Nitrite crystals are sent from the Product Separator, through the FBD to the Special Granular #3A B/L.

In the Flake and Ducon Scrubbers, particulates are knocked out of the gas by liquor circulated from 10E Tub. The 10E Tub is fed by condensate from the Surface Condenser and Impure Condensate is added to achieve 28 maximum Baumé (Bé). Liquor from 10E is also slowly fed back into the absorption trains through Tubs #5 and #10. Liquor from 10E can also be sent to the 10,000 Tank if necessary. Condensate from the Second Effect and LTV is sent to the Impure Storage Tanks. Condensate from the First Effect is used to heat the finished liquor passing through the LTV Pre-Heater. All remaining condensate from Vaporizers, FBD, etc. is pumped to the Pure Condensate Storage Tank.

Release and Shipping of Final Product

After the final product is produced, samples are taken to the laboratory for analysis. Sample sizes vary depending on what the product is being packaged and how much was produced. Refer to SYR-OPSS-7036. If the product meets all specifications, then a CoA will be generated through SAP. The truck driver will be provided with the required shipping documents. Any non-conforming product will be resampled or put on hold until a decision can be made by management.

| Critical Control Point (CCP) | Hazards | Critical Limits | What | How | Frequency | Who | Corrective Actions | Verification | Records |
|------------------------------|---|-----------------------|--------------|---|---|---|--|--|--|
| Earth Magnet | The presence of hazardous metallic material in the final product. | Metal Particles > 7mm | Earth Magnet | <p>Visual Inspection for any deformities to the magnet.</p> <p>Magnet Pull Test</p> | <p>Magnet is inspected daily at beginning of shift and end of shift</p> <p>Magnet is tested monthly</p> | <p>Operators</p> <p>Quality Personnel/ Operations or Packing Supervisor</p> | <p>Stop Production, notify manager. Clean magnet and document findings. QA will investigate where foreign material came from</p> | <p>Packing Supervisor verifies the magnet check is done.</p> | <p>Daily Production Log</p> <p>Monthly Rare Magnet Pull Test</p> |



| Preventative Control (PC) | Hazards | Critical Limits | What | How | Frequency | Who | Corrective Actions | Verification | Records |
|---|---------------------|--------------------|------------------------------|----------|---------------------------|---|---|-----------------------------------|---|
| Environmental Monitoring Program | Pathogenic Bacteria | *See Table 1 below | **Packing Area BL Air | ATP Swab | Bi-annually Yearly | 3 rd Party Lab (Adirondack Environmental Services) | <p>If results do not meet specifications then a resample/re-swab will be done.</p> <p>The area will be cleaned/sanitized.</p> <p>If results pass, the product will be released, if results fail, the product will be put on hold.</p> | Test results reviewed by Manager. | 3 rd Party laboratory analysis |

**The Packing area consists of the rotating packing table, packing conveyor belt, packing staging table, outside east packer spout, outside west packer spout, outside super sack spout and a field blank.

*Table 1

| Location | Critical Limits |
|--------------|---|
| Packing Area | <p>Total Coliform: <10 cfu/100 ml</p> <p>E. Coli: <10 cfu/100ml</p> <p>Standard Plate Count: <500 cfu/ml</p> |
| BL Air | <0.01 mg/m ³ per class 1 purity. ISO8573-2:2007 |

| Preventative Control (PC) | Hazards | Critical Limits | What | How | Frequency | Who | Corrective Actions | Verification | Records |
|-----------------------------|--|--------------------|---|--|----------------------------|---|---|--|--|
| Supply Chain Program | <p>Wrong material</p> <p>Non-conforming material</p> | See Supplier's CoA | Receive materials only from approved suppliers. | <p>Suppliers must provide a CoA.</p> <p>Visual observation /inspection of lot</p> <p>Supplier Audits</p> | Every lot that is received | <p>Trained personnel will verify the material.</p> <p>3rd party laboratories to challenge CoA.</p> <p>Management/ Corporate</p> | If the material is not from an approved supplier or is missing a CoA the product will be put on hold. | Designated personnel will verify the CoA | <p>Received Materials Log</p> <p>Site Approved Supplier List</p> |