



Martin

SUGAR

CAPABILITIES

For Sugar Beet & Sugar Cane

Conveying

Washing/Classifying

Cutting/Milling

Dying

Power Generation

Clarification / Purification

Filtering / Thickening

Carbonization

Lime Furnace / Fans

Evaporation

Crystallization

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Martin

Inventory

We maintain large inventories to ensure superior service to all customers.

That Personal Touch

When you call Martin a person answers your call every time.

Complete Manufacturer

We manufacture what we sell, which means we control the quality, inventory levels, deliveries, and cost of our products.

Point-of-Sale Service

We have built our inventories, services, and capabilities to meet the demands of the market areas each of our locations serve.

After-Hour Emergencies

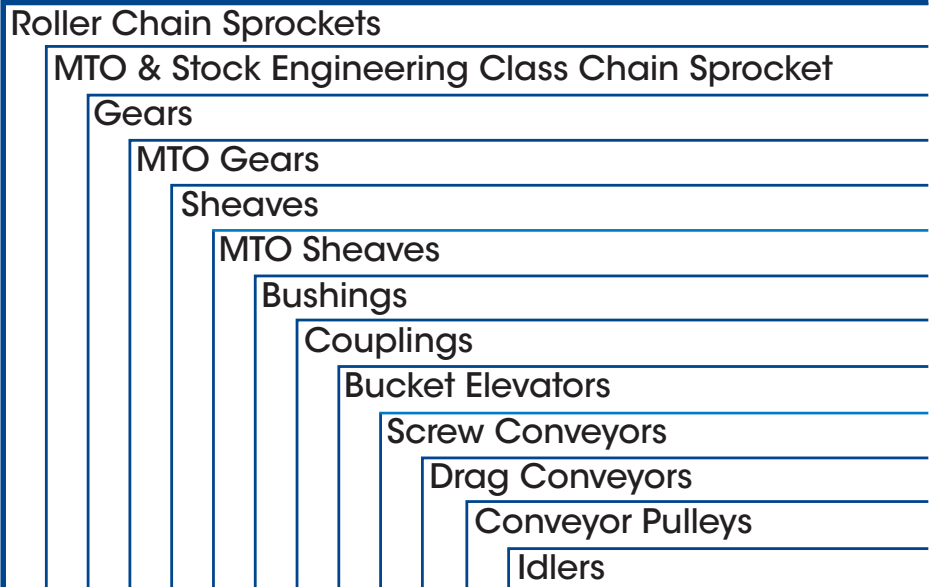
Each of our locations have people on-call for stock, altered, and made-to-order products, 24 hours a day, 7 days a week, 365 days a year.

Superior Field Support

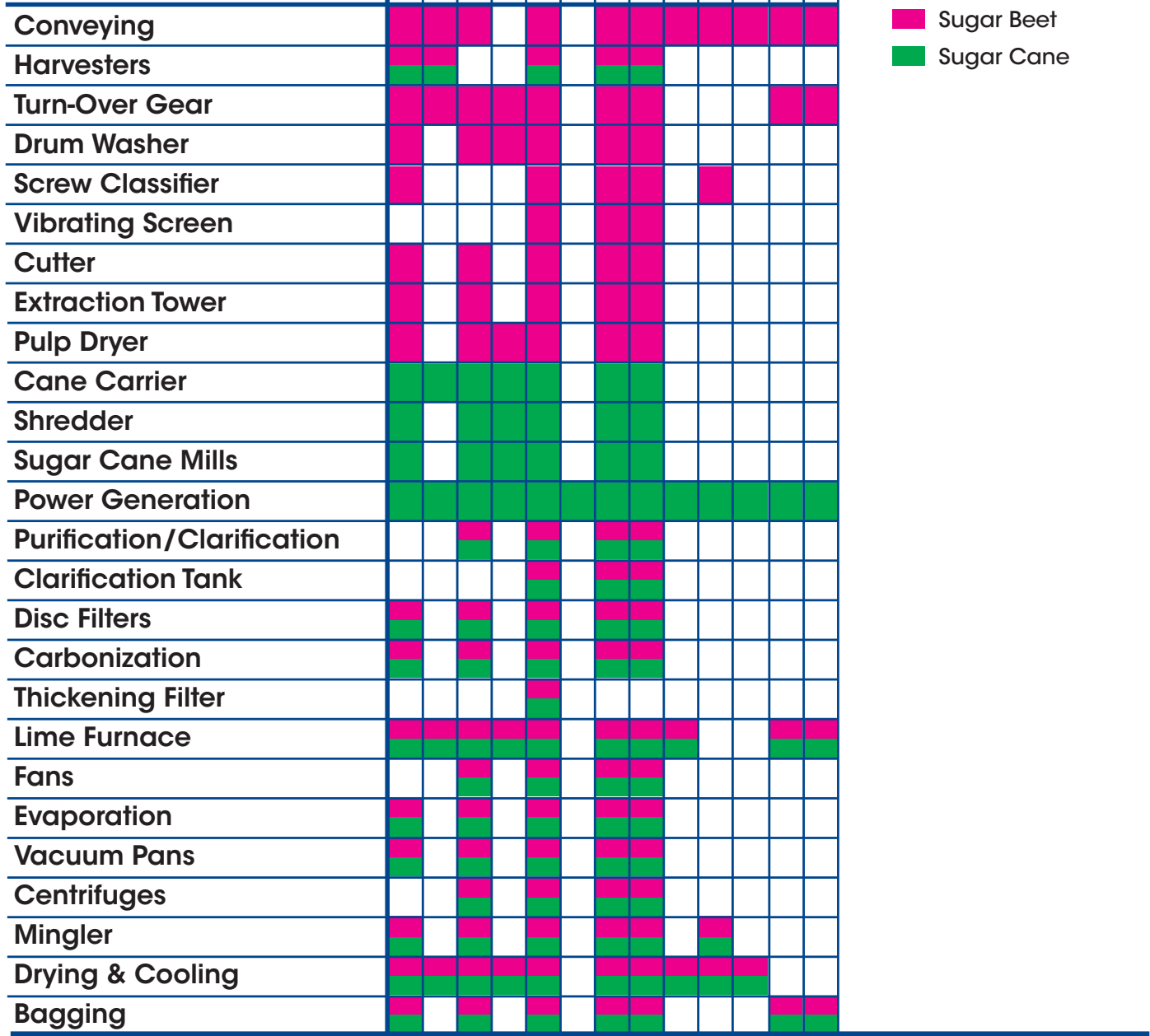
We have field professionals who understand our products, processes, and services. They are available to help better match our offerings with your specific needs.



PRODUCTS



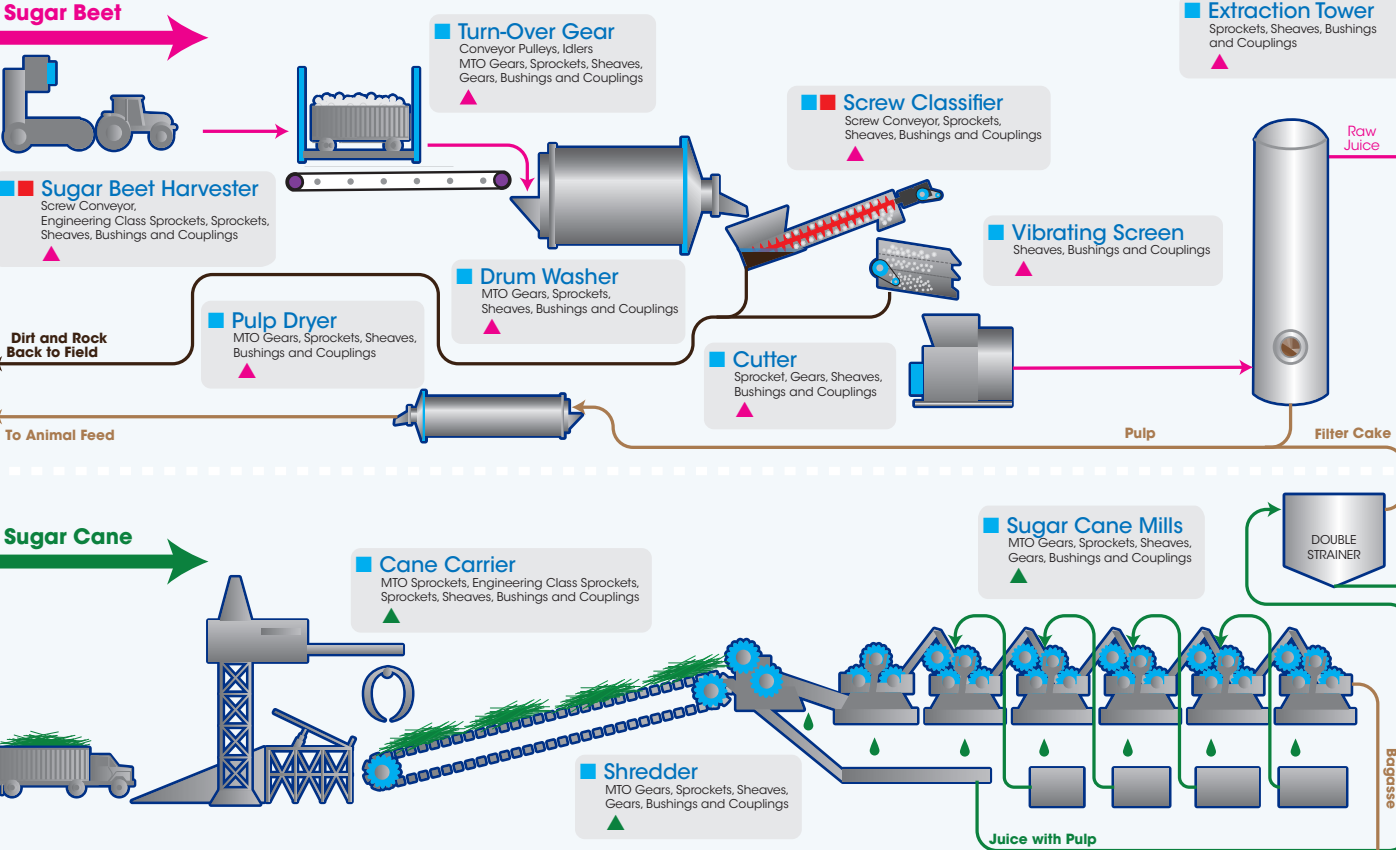
APPLICATIONS



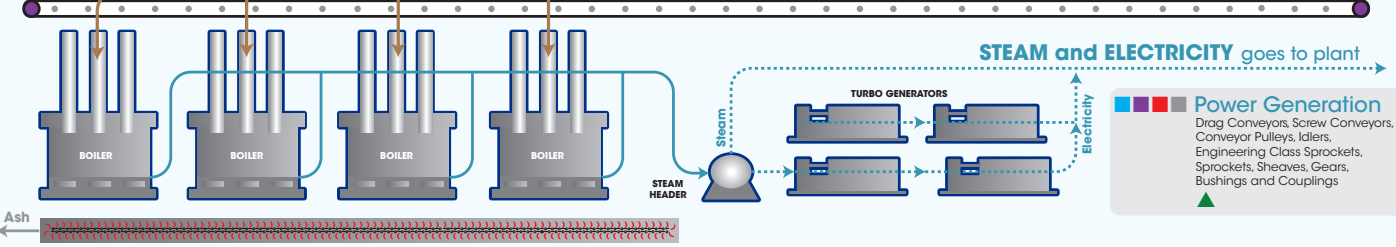
■ Sugar Beet
■ Sugar Cane

Martin SUGAR PLANT FLOW DIAGRAM

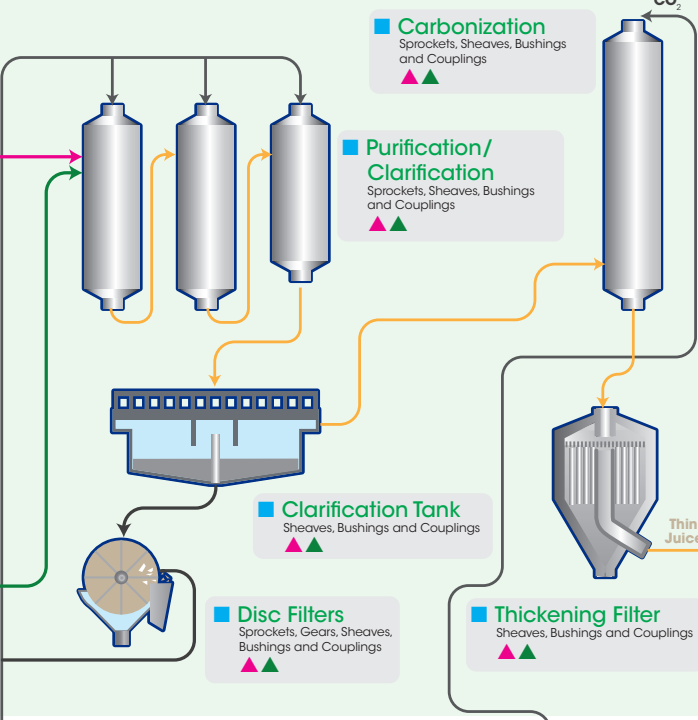
1a. RECEIVING, MILLING AND EXTRACTION OF JUICE



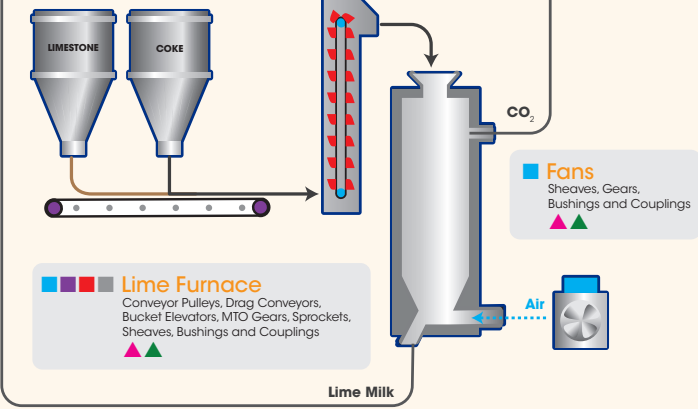
1b. POWER GENERATION (ELECTRICITY and STEAM)



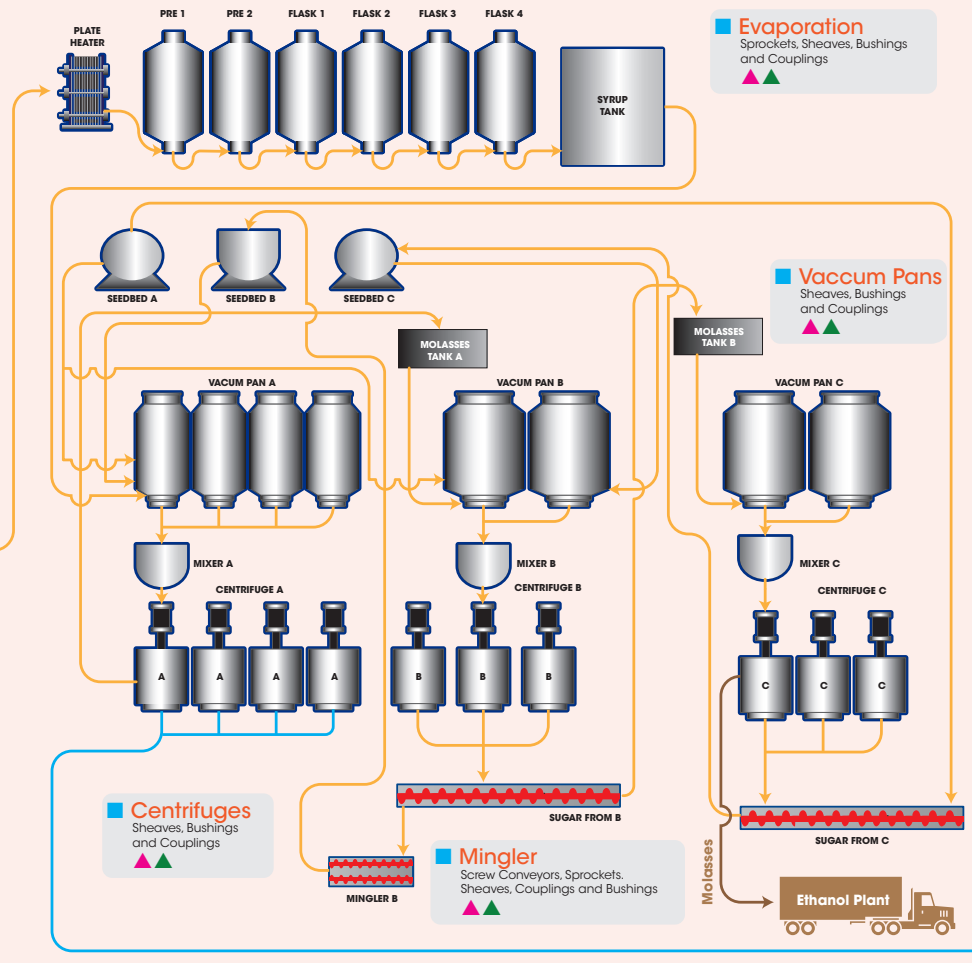
2a. JUICE PURIFICATION



2b. LIME MILK PRODUCTION



3. EVAPORATION AND CRYSTALLIZATION



*This diagram shows a simplified typical sugar process for illustration purposes.

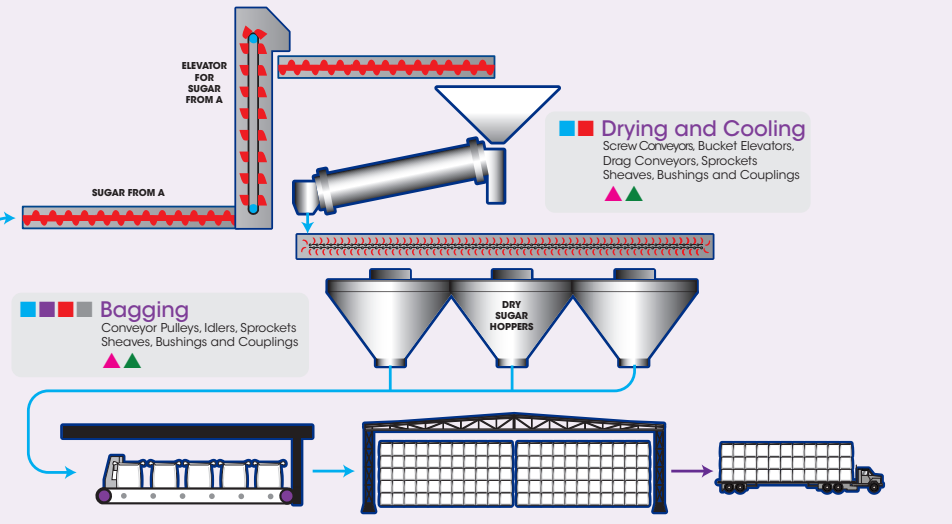
TYPE OF PRODUCTS USED IN PROCESS:

- Power Transmission Components
- Conveyor Pulleys and Components
- Material Handling Conveyors
- Idlers and Components

TYPES OF SUGAR:

- Sugar Beet
- Sugar Cane

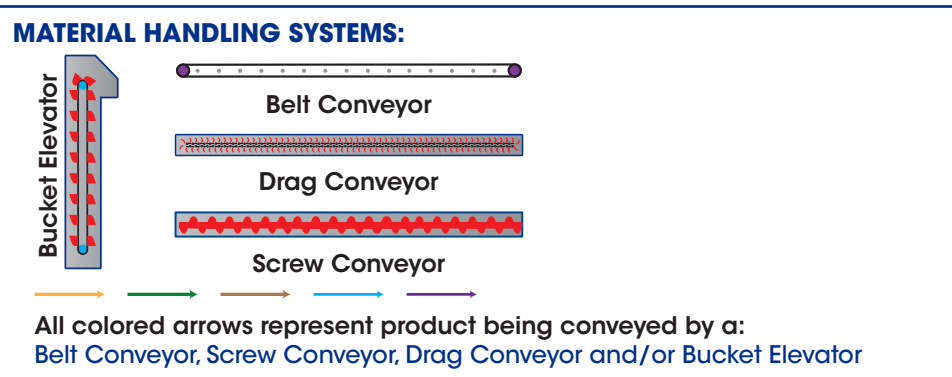
4. DRYING AND PACKAGING



CONVEYING

Sugar plants use a variety of conveyors for wet and dry product, typically you would see Belt Conveyors, Screw Conveyors, Drag Conveyors and Bucket Elevators depending on the plant's needs and layout.

Martin products used: Conveyor Pulleys, Conveyor Pulley Components, Idlers, Idler Components, Screw Conveyors, Drag Conveyors, Bucket Elevators, Engineering Class Sprockets, Sprockets, Sheaves, Bushings and Couplings



1a. RECEIVING, MILLING & EXTRACTION OF JUICE ▲ SUGAR BEET

- Sugar Beet Harvester:** The beet harvester lifts the root, and removes excess soil from the root in a single pass over the field.
Martin products used: Engineering Class Sprockets, Roller Chain Sprockets, Sheaves, Bushings, Couplings, Screw Conveyors
- Turn-Over Gear:** Some plants have a Turn-Over Gear that turns over the train wagons and dumps the sugar beet onto a belt conveyor.
Martin products used: Roller Chain Sprockets, Sheaves, MTO Gears, Gears, Bushings, Couplings, Conveyor Pulleys, Conveyor Pulley Components, Idlers, Idler Components
- Drum Washer:** Beets are conveyed into a rotating drum where the beets are being shot with strong streams of water.
Martin products used: Roller Chain Sprockets, Sheaves, MTO Gears, Gears, Bushings & Couplings
- Screw Classifier:** After the beets are washed, they are raised by a large screw leaving the rocks and dirt at the bottom.
Martin products used: Screw Conveyors, Roller Chain Sprockets, Sheaves, Bushings & Couplings
- Vibrating Screen:** The beets go past a vibrating screen, separating any additional smaller rocks and debris.
Martin products used: Sheaves, Bushings & Couplings
- Cutter:** The sugar beets are cut into slices called cassettes, similar to french fries but thinner.
Martin products used: Roller Chain Sprockets, Gears, Sheaves, Bushings & Couplings
- Extraction Tower:** The cassettes are moved into the extraction tower where they are pushed up against the downward flow of hot water that separates the raw juice from the pulp.
Martin products used: MTO Gears, Gears, Sheaves, Bushings & Couplings
- Pulp Dryer:** The pulp is dried, packed, and sent to be used in the Animal Feed industry.
Martin products used: Sprockets, MTO Gears, Sheaves, Bushings & Couplings

1a. RECEIVING, MILLING & EXTRACTION OF JUICE ▲ SUGAR CANE

- Cane Carrier:** The sugar cane is delivered to the plant by trucks and is unloaded by cranes or other hydraulic mechanisms to a Cane Carrier, which is a row of several MTO engineered class chains, that carry the cane to the plant.
Martin products used: MTO Sprockets, Engineering Class Sprockets, Roller Chain Sprockets, Gears, Sheaves, Bushings & Couplings
- Shredder:** This special machine cuts the cane into strips.
Martin products used: MTO Gears, Sprockets, Sheaves, Gears, Bushings & Couplings
- Sugar Cane Mills:** This is one of the largest processes in the sugar cane industry, requiring large size MTO power transmission products.
Martin products used: MTO Gears, Sprockets, Sheaves, Gears, Bushings & Couplings

1b. POWER GENERATION (ELECTRICITY & STEAM) ▲▲

- Power Generation (Electricity & Steam):** In the sugar cane industry the bagasse is conveyed to boilers to generate electricity and steam that is used in the plant. The ash from the boilers is then recollected by drag conveyors.
Martin products used: Conveyor Pulleys, Conveyor Pulley Components, Idlers, Idler Components, Screw Conveyors, Drag Conveyors, Bucket Elevators, Engineering Class Sprockets, Roller Chain Sprockets, Sheaves, Gears, Bushings & Couplings

2a. JUICE PURIFICATION ▲▲

- Purification/Clarification:** The lime milk helps to prevent sucrose from decaying into glucose and fructose. The milk is then heated and let to flash to saturation temperature: this process precipitates impurities which get held up in the calcium carbonate crystals.
Martin products used: Sprockets, Sheaves, Gears, Bushings & Couplings
- Clarification Tank:** The flashed juice (raw juice with Lime Milk) is then transferred to a clarification tank which allows the suspended solids to settle.
Martin products used: Sheaves, Bushings & Couplings
- Disc Filters:** Recovers Lime Milk to be reused.
Martin products used: Sprockets, Sheaves, Gears, Bushings & Couplings
- Carbonization:** Carbon dioxide is bubbled through the alkaline sugar solution, precipitating the lime as calcium carbonate (chalk) which absorbs other impurities.
Martin products used: Sprockets, Sheaves, Gears, Bushings & Couplings
- Thickening Filter:** The solution from the Carbonization is then filtered, leaving a cleaner, golden, light-brown sugar solution, referred to as "thin juice".
Martin products used: Sheaves, Gears, Bushings & Couplings

2b. LIME MILK PRODUCTION ▲▲

- Lime Furnace:** The limestone and coke is conveyed into the vertical furnace used to mix and burn the two to create Lime Milk.
Martin products used: Sprockets, Sheaves, MTO Gears, Gears, Bushings & Couplings
- Fans:** The Lime Milk is cooled with fans.
Martin products used: Sheaves, Gears, Bushings & Couplings

3. EVAPORATION & CRYSTALLIZATION ▲▲

- Evaporation:** The thin juice goes to the evaporators. In this step all the water is removed from the juice, resulting in syrup.
Martin products used: Sprockets, Sheaves, Bushings & Couplings
- Vacuum Pans (Crystallization):** The syrup is cooked in the vacuum pans in different stages, and the sugar that doesn't pass the size for fine sugar is returned and melted until it reaches expected size.
Martin products used: Sheaves, Bushings & Couplings
- Centrifuges:** The sugar crystal is separated from the honey in the centrifuges which are, cylinders of very fine mesh that spin at high velocity.
Martin products used: Sheaves, Bushings & Couplings
- Mingler:** Sugar crystals that are too large are returned and mixed into the honey/syrup to be melted again in the vacuum pans, repeating the entire process.
Martin products used: Screw Conveyors, Sprockets, Sheaves, Bushings & Couplings

4. DRYING & PACKAGING ▲▲

- Drying & Cooling:** The already refined sugar is washed with condensed vapor, dried with hot air, and is classified by the size of the crystal (refined sugar or regular sugar).
Martin products used: Drag Conveyors, Bucket Elevators, Screw Conveyors, MTO Gears, Gears, Sprockets, Sheaves, Bushings & Couplings
- Bagging / Packaging:** The sugar is bagged for transport.
Martin products used: Conveyor Pulleys, Conveyor Pulley Components, Idlers, Idler Components, Sprockets, Sheaves, Gears, Bushings & Couplings

Martin Products at Work in the Sugar Industry



Roller Chain Sprockets



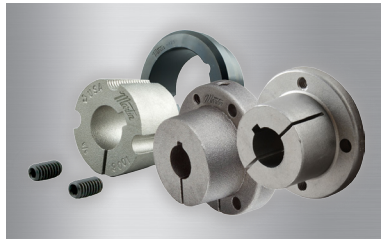
Engineering Class Sprockets



Gears



MTO Gears



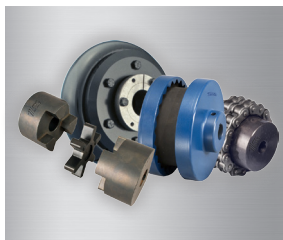
Bushings



Sheaves



MTO Sheaves



Couplings



Steel & Stainless Steel Bucket Elevators



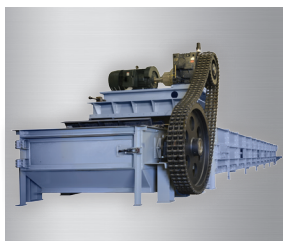
Clean Flight Wing Pulley



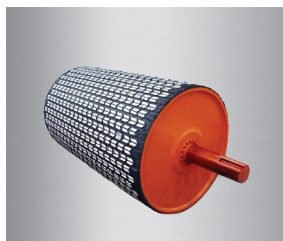
Screw Conveyors



Shaftless Screw Conveyors



Drag Conveyor



Conveyor Pulleys



Idlers

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