



Application Project: High Oleic Sunflower Seed Crushing Plant Case Study – Mechanical Oilseed Crushing

Project:

Greenfield Site
Mechanical Crushing
High Oleic Sunflower Seeds

Location:

307 Processing
Gillette, WY, USA

Requirements:

50 Tons Per Day (TPD)
Residual Oil (RO) < 8%

Anderson Products:

CONDITIONER
DOX™ 800 (Dry Oilseed Extruder™)

The Opportunity:

There are many methods for mechanically crushing high oleic sunflower seeds to produce sunflower meal and sunflower oil. Each method has its advantages and disadvantages depending on the project scope and end market.

307 Processing wanted to build a new, mechanical sunflower seed crushing facility capable of crushing 50 TPD of high oleic sunflower seeds with sunflower meal RO levels below 8% to service their Customers' needs for sunflower meal and sunflower oil. In addition, 307 Processing wanted the ability to add additional crushing capacity into the facility as their business grows.

Facing this opportunity, 307 Processing turned to the Anderson Oilseed Division Team to help with their sunflower seed crushing, meal production and oil clarification needs.

The Solution:

The Anderson Oilseed Division Team of Sales, Project Management and Engineering worked together with 307 Processing and their General Contractor to design and build a new, mechanical sunflower seed crushing facility with the ability to add 50% more capacity using Anderson's engineering, application knowledge and proprietary technologies.

To achieve the 50 TPD and < 8% RO targets, Anderson utilized one (1) Anderson **CONDITIONER** and one (1) of its industry leading **DOX 800** extruders capable of crushing 2 TPH of sunflower seeds paired with one (1) 6" **EXPPELLER** press.

The Result:

Over the course of about 12-months, 307 Processing's greenfield site in Gillette, WY was taken from concept to functioning mechanical sunflower seed crushing facility capable of processing 50 TPD of sunflower seeds with an average sunflower meal RO of 8%.

This plant incorporates new ideas in material handling, extrusion and pressing technologies to achieve these results for RO% in mechanically pressed sunflower meal. This, in combination with the lowest total cost of ownership as measured by uptime tonnage produced and energy consumed has allowed 307 Processing to launch and sell its proprietary line of sunflower meal using Anderson processes and technologies.

Anderson Application Technologies:

Anderson's proprietary process utilizes technologies from various Anderson Vendor Partners in addition to Anderson's own technologies including and not limited to:

CONDITIONER

Anderson's Conditioner quickly and efficiently conditions products for crushing applications utilizing plant supplied steam.

DOX 800 EXTRUDER

Built to be the best-in-class 2 TPH dry extruder for enhancing oil recovery and meal nutrition, the **DOX 800** features advanced engineering and manufacturing platforms optimized to provide the highest oil return with the lowest energy use at less than 75 kWh/t.



The Anderson Application Process:

After meeting with 307 Processing and their General Contractor to understand their needs, the Anderson Oilseed Team went to work designing a new, mechanical high oleic sunflower seed crushing facility. Over the course of several months, Anderson Engineering worked in conjunction with the 307 Processing Team to develop a Conceptual Design, Preliminary Design and Final Design before ground was ever broken. Careful attention was paid to safety, building and regulatory codes, equipment layout and material flow to have a safe and efficiently run facility producing consistent, high quality sunflower meal and sunflower oil using locally sourced, US sunflower seeds. Once the Final Design was established, Anderson Project Management and 307 Processing executed the Design Plan. Throughout the execution of the plan, communications, meetings, checks, and signoffs were conducted to ensure the success of the project. With the Design Plan complete, the plant was ready for commissioning.

During dry commissioning, all plant operations were checked without introducing product to the system to ensure proper equipment operation. Once completed, wet commissioning commenced with product flowing through the process in steps. During these steps, checks were taken to ensure proper inputs and outputs from the various points in the system before bringing the entire system online. Throughout commissioning, training was conducted by Anderson and Anderson Vendor Partners to ensure a smooth hand-off to the 307 Processing Team.

307 Processing's mechanical sunflower seed crushing process starts with purchasing, receiving, inspecting and storing locally sourced, US high oleic sunflower seeds. Sourcing high quality sunflower seeds directly correlates to the profitability and operational efficiency of the plant. From storage, the sunflower seeds are conveyed to a cleaner where debris is removed prior to further processing. It is important to balance between too clean and clean enough when selecting what cleaning process to use. This is highly dependent on the quality of the incoming sunflower seeds. Once cleaned, the sunflower seeds are conditioned to get consistent moisture and temperature heading into the rest of the manufacturing process. The conditioned sunflower seeds head to the Anderson **DOX 800** extruder. The **DOX 800** extruder uses mechanical energy, high-shear and short residence time to dry, cook and shear the sunflower seeds separating the sunflower oil from the sunflower seed and preparing the sunflower meal for acceptance into the **EXPELLER** press. Sunflower oil is extracted from both the **DOX 800** and the **EXPELLER** due to the high oil content, > 40%, of the sunflower seeds compared to soybeans, ~18%. Once through the **EXPELLER** press, the sunflower meal is sent to a cooler where it is allowed to cool before moving on to the hammermill where the sunflower meal is sized for sale based on the Customer's requirement. The sunflower meal is now typically 6-8% RO. The sunflower oil is sent through a screening and clarification process before it is stored for sale. The sunflower oil may require further processing depending upon the Customer's requirements.

Anderson International Corp

With 135+ years of process experience, Anderson is an industry leader and a trusted partner in the various markets we service throughout the world: Mechanical Oilseed Processing, Solvent Oilseed Processing, Biofuel, Aqua Feed, Pet Feed, Feed Mill and Polymer.

Anderson supplies a broad range of process solutions, equipment, OEM parts and services to assure safety, productivity, quality and sustainability.

For more information, visit www.andersonintl.com.

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