



Application Project: Soybean Crushing Plant Case Study – Mechanical Oilseed Crushing

Project:

Greenfield Site
Mechanical Crushing
Soybeans

Location:

Continental Refining Company (CRC)
Somerset, KY, USA

Requirements:

300 Tons Per Day (TPD)
Residual Oil (RO) < 8%
Trypsin Inhibitor Units (TIU) < 8,000 TIU/g

Anderson Products:

DOX™ 1200 (Dry Oilseed Extruder™)
ECOMEAL™

CRC Products:

ULTRABLEND SOYSHIELD+

The Opportunity:

There are many methods for mechanically crushing soybeans to produce soybean meal and soybean oil. Each method has advantages and disadvantages depending on project scope and end market.

CRC wanted to build a new, state-of-the-art mechanical soybean crushing facility capable of crushing 300 TPD of soybeans with soybean meal RO levels below 8% and TIU/g levels below 8,000 to service their Customers' needs for soybean meal and soybean oil. In addition, CRC wanted the ability to add additional crushing capacity into the facility as their business grows.

Facing this opportunity, CRC turned to the Anderson Oilseed Division Team to help with their soybean crushing, meal production and oil clarification needs.

The Solution:

The Anderson Oilseed Division Team of Sales, Project Management and Engineering worked together with CRC and their General Contractor to design and build a state-of-the-art mechanical soybean crushing facility with the ability to add 33% more capacity using Anderson's engineering, application knowledge and proprietary technologies.

To achieve the 300 TPD and < 8% RO targets, Anderson utilized two (2) of its new, industry leading **DOX 1200** extruders capable of crushing 6 TPH of soybeans paired with two (2) 12" screw presses.

To meet the low TIU levels, Anderson worked with CRC to use best manufacturing practices to produce Anderson's proprietary **ECOMEAL** soybean meal.

The Result:

Over the course of about 12-months, CRC's greenfield site in Somerset, KY was taken from concept to functioning mechanical soybean crushing facility capable of processing 300 TPD of soybeans with an average soybean meal RO of 6% and TIU/g levels of 6,000.

This state-of-the-art plant incorporates new ideas in material handling, extrusion and pressing technologies to achieve these industry leading results for RO % and Trypsin levels in mechanically pressed soybean meal. This, in combination with the lowest total cost of ownership as measured by uptime tonnage produced and energy consumed has allowed CRC to launch and sell its proprietary line of soybean meal using Anderson **ECOMEAL** and technologies called [ULTRABLEND SOYSHIELD+](#).

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:

DOX 1200 EXTRUDER

Built to be the best-in-class 6 TPH dry, extruder for enhancing oil recovery and meal nutrition, the **DOX 1200** features advanced engineering and manufacturing platforms optimized to provide the highest oil return with the lowest energy use at less than 50 kWh/t for soybean applications.

ECOMEAL

Anderson's proprietary dry-extruded, mechanically-pressed and chemical-free soybean meal produced using Anderson equipment and technology.

www.expellerecomeal.com



The Anderson Application Process:

After meeting with CRC and their General Contractor to understand their needs, the Anderson Oilseed Team went to work designing a new, state-of-the-art mechanical soybean crushing facility. Over the course of several months, Anderson Engineering worked in conjunction with the CRC 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 **ECOMEAL** soybean meal and soybean oil using locally sourced, US soybeans. Once the Final Design was established, Anderson Project Management and CRC 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 commences 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 CRC Team.

CRC's mechanical soybean crushing process starts with purchasing, receiving, inspecting and storing locally sourced, US soybeans. Sourcing high quality soybeans directly correlates to the profitability and operational efficiency of the plant. From storage, the soybeans 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 soybeans. Once cleaned, the soybeans are conditioned to get consistent moisture and temperature heading into the rest of the manufacturing process. The soybeans are now ready for cracking and dehulling. The unwanted fibers are removed from the process allowing the conditioned soybeans to head to the Anderson **DOX 1200** extruder. The **DOX 1200** extruder uses mechanical energy, high-shear and short residence time to dry, cook and shear the soybeans separating the soybean oil from the soybean and preparing the soybean meal for acceptance into the screw press. Anderson's proprietary design and process of the **DOX 1200** destroys harmful enzymes associated with soybeans without degrading protein quality. Once through the screw press, the **ECOMEAL** soybean meal is sent to a cooler where it is allowed to cool before moving on to the hammermill where the **ECOMEAL** product is sized for sale based on the Customer's requirement. The **ECOMEAL** product is now typically 6-8% RO and 6,000-8,000 TIU/g. The soybean oil is sent through a screening and clarification process before it is stored for sale. The soybean oil may require further processing like degumming 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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