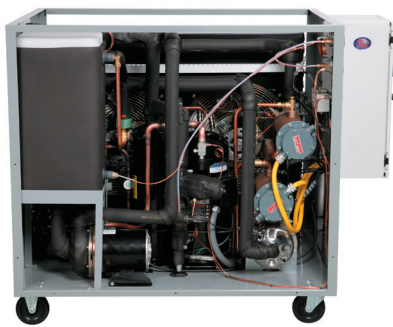




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How Extraction and Distillation are Used to Develop Industrial Hemp.

As the pharmaceutical, bio-medical, cosmetic, chemical, food and beverage and many other industries develop new uses for hemp, the consumer has a wide variety of new ointment supplements, edibles, beverages, and other products to choose from. This growing demand has pushed the agriculture industry to open new facilities and increase the output of hemp farming. New developments have also put additional pressure on the extraction and distillation processing plants to supply base products to manufacturers that create the end-product consumers are looking for.



Prior to the processing of hemp, the plant undergoes many weeks of cultivating and retting. Once the plant is ready for processing, it will go through the following primary processes: ethanol chilling and extraction,

particle filtration, solvent recovery, decarboxylation, and distillation. Mokon temperature control systems aid in these critical processes necessary for hemp processing.

Here's a closer look at the essential steps required for industrial hemp extraction and distillation.



Mokon's water-based Full Range temperature control system offers a combination of heating and chilling in one superior package. A Mokon water system combined with a chiller integrates the benefits and features of both products into one compact, self-supporting unit.



Ethanol Chilling In order to increase the efficiency of the extraction process and generate more product, extreme low temperature chillers are used to lower an ethanol solution down to arctic temperatures. Once the ethanol solution is reduced to the desired temperature, the extraction process can commence.

Ethanol Extraction The extraction process involves the separation of biomass from the oils within the plant. We use many forms of extraction every day. For example, the brewing of coffee or tea is a simple form of heat extraction. The hemp industry, however, commonly uses a chilled ethanol extraction method. Shredded plant material is placed in a kettle and the chilled ethanol solution is introduced. As the plant material soaks in the ethanol, it breaks down and the remaining organic material is removed, leaving behind an oil and ethanol solution.

Particle Filtration A filtration system is used to remove excess particulate from the ethanol solution which contains a high concentration of oil. This process allows for other materials to be reclaimed and used for other purposes and increases the efficiency of the evaporation process.

Evaporation After the saturated oil solution is filtered, it is metered through a heated column to create a thin laminar flow. Creating a thin falling film is critical to provide efficient heat transfer to the solution. As gravity works to physically separate the solutions where hemp oil is ~7.5 lbs./g vs. the ethanol solution weighing ~6.5 lbs./g, heat is used to evaporate the solution. Once this process is complete, it leaves behind only the hemp oil.

Decarboxylation The hemp oil is heated to remove the carboxyl group and release carbon dioxide. A jacketed vessel is typically used in conjunction with a circulating liquid heat transfer system to accurately control the temperature of the oil and the subsequent chemical reaction.

Distillation This process allows for the desired chemical compound to be extracted from the decarboxylated oil using heat, vaporization and condensation. The various chemical compounds targeted go on to be used in numerous applications ranging from food and beverage to pharmaceutical.

For additional information on process heating and cooling equipment for hemp processing, contact Mokon today.

mokon.com | sales@mokon.com

