



**Simplify to prosper.**

**Automated In-line Refinement**



# System Configurations



(Spill tray not pictured.)

**DEWAX**

**DECOLOR**

**DESOLVATE**

## Airo™ D<sup>3</sup>

Automate and simplify the refinement of crude oil from your CO<sub>2</sub>, ethanol, or multi-solvent extraction system. For hands-free winterization, the Airo D-3 can be integrated with the output of a Vitalis CIS or Polaramax™ extraction system.

## Airo™ D<sup>3</sup>+CIS

Add a module for an integrated Vitalis Cosolvent Injection System (CIS) to improve your extractions and enjoy direct output to the Airo D-3. Compatible with Vitalis PrimeEx™ Q- and R-Series CO<sub>2</sub> extraction systems.

**DEWAX**

**DECOLOR**

**DESOLVATE**

**DECARB**

## Airo™ D<sup>4</sup>

Get all the same features of the Airo D-3 plus an additional module for decarbing your extract after the desolvation stage. The Airo D-4 includes an integrated decarboxylation reactor from Beaker & Wrench.

## Airo™ D<sup>4</sup>+CIS

Add a module for an integrated Vitalis Cosolvent Injection System (CIS) to improve your extractions and enjoy direct output to the Airo D-4. Compatible with Vitalis PrimeEx™ Q- and R-Series CO<sub>2</sub> extraction systems.

**CRYO-ETHANOL**

**FILTRATION**

**DESOLVATION**

## Airo™ CFD

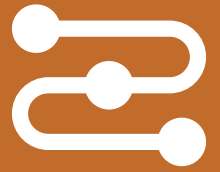
Cold ethanol enthusiast? Use the Airo CFD to automate the chilling of your solvent and the refinement of your extract solution from an external, in-line centrifuge (such as a Vitalis E-30 or similar system from a different manufacturer).

**DESOLVATION**

## Airo™ D<sup>1</sup>

Minimize your extract's exposure to heat by adding the Airo D-1 to your workflow. Take advantage of the system's gentle desolvation membranes.





# Simplified Production

**Winterization sucks, but it doesn't have to.**

With automation and touchscreen controls, Airo systems are revolutionizing a traditionally messy, labor-intensive, undesirable process.



- Set-it-and-walk-away processing
- Easy recirculation through filters
- Automatic process safeguards
- Simple filter resets
- Wash-in-place (WIP) system
- Washdown-friendly surfaces

# ROI That Makes Sense

**Do you know your total costs of winterization?**

Labor, facility floor space, room classifications, maintenance, transfer loss, process bottlenecks. All cut into profitability. We designed Vitalis Airo systems from a holistic view of capital and operational costs—to bring you an investment that makes sense now and well into the future.



- One-person operation
- Small footprint (~55 sq. ft.)
- No classification restrictions
- Automated in-line transfers
- High-efficiency cooling
- No high-maintenance vacuum pumps
- Spill management



# Unmatched Output Quality

**In a world of increasing competition, there's no room for second best.**

Airo systems help catapult you ahead of the competition with optimal product consistency, greater than 99% of fat and wax removal in a single pass, and filtration to remove unwanted color (such as from chlorophyll)—**every run.**

- Processing optimized for consistency
- Batch-data automation for ultimate repeatability
- Enhanced clarification
- More lipid removal to ensure higher-quality end products (like full-spectrum vapes) and better-performing downstream distillation or chromatography

# Unprecedented Speed

**Winterization in hours, not days.**

Airo systems are cascading—capable of running multiple processes in parallel—resulting in the production of **up to 20 kg of refined cannabis oil in 2:1 solution every 120 minutes.** (Or process an individual batch of 125 L of crude extract in 4 hours, start to finish.\*)

\* Starting with homogenized crude extract at room temperature with minimum ratio of 5:1 solvent to extract.

- Rapid cooling (8-16 hours faster than traditional refrigeration)
- High-speed filtration (over 3 times faster than standard methods)
- Always cold dewaxing (removes greater than 99% of fats and waxes in a single pass)
- Cascading system for running multiple processes in parallel







# A New Standard in Safety

## Peace of mind is critical.

Vitalis' commitment to workplace safety extends beyond our own walls to include the products we design and manufacture for our clients' facilities.

- Does not require a classified area
- Fully enclosed with a spill tray and air evacuation fan

## The Particulars

(For an Airo D-3 system. Some specifications differ for other Airo system configurations.)



### THROUGHPUT & PERFORMANCE

- **Individual batch:** Process 125 liters of crude extract in 4 hours, start to finish\*
- **Cascading throughput:** Achieve up to 20 kg of refined cannabis oil in 2:1 (solvent to extract) solution every 120 minutes
- Winterization temperature: -50°F
- Four-stage filtration
- Dewaxing and color remediation



### SITE REQUIREMENTS

- Power requirements (North America):
  - 460V 3Φ 60Hz
- Can operate in a non-classified room



### AUTOMATION & CONTROL

- Multiple user levels
- Automated filtration sequences



### OPTIONAL FEATURES

- Extended service plan



### SPECIFICATIONS

- Weight: 1,800 lbs
- Power consumption: 19 kWh
- Transport dimensions (LxWxH):
  - 3 modules—50" x 33" x 78"
- Assembled dimensions (LxWxH):
  - 144.5" x 52" x 78"

**Each module fits through a standard 34" door.**



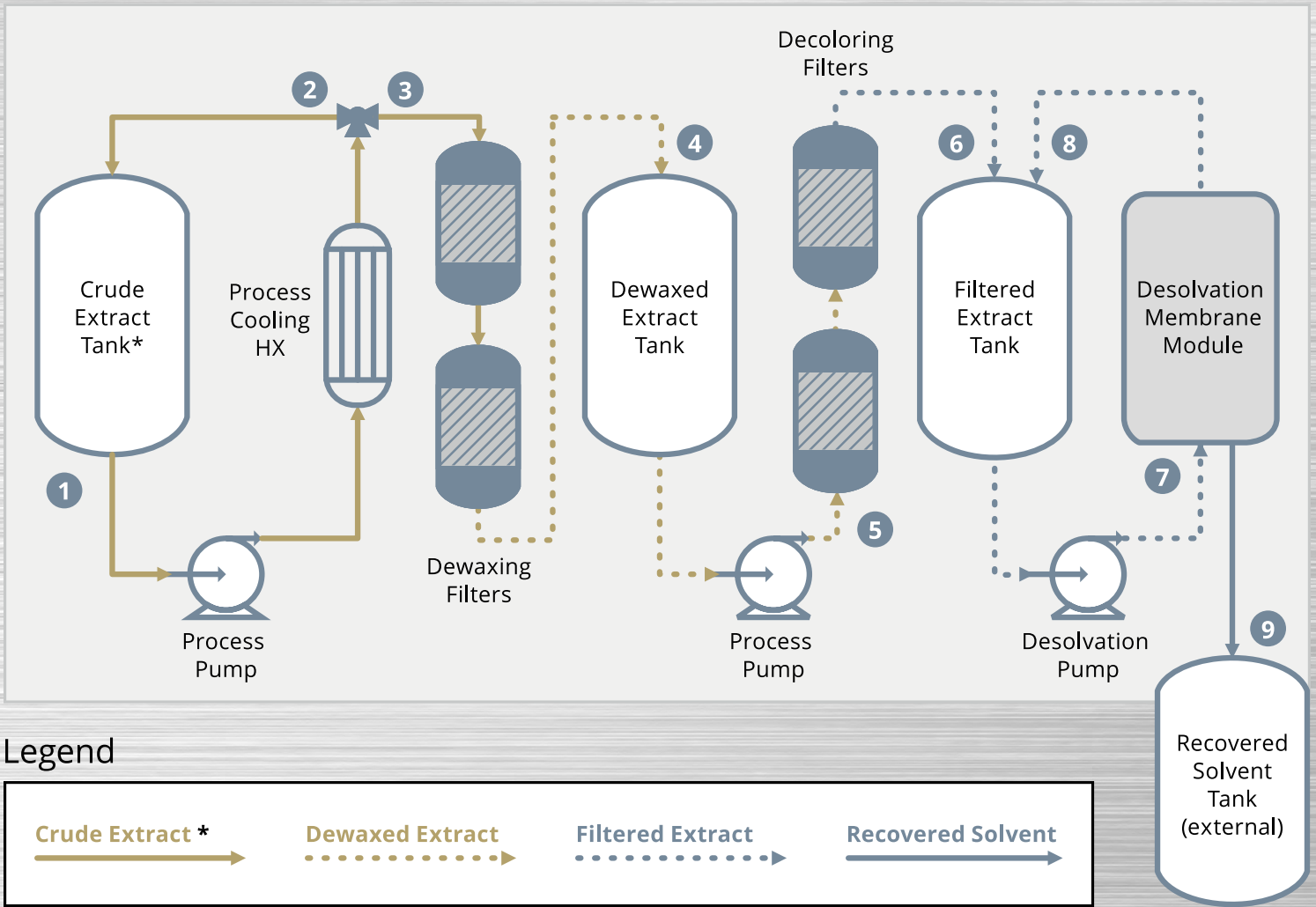
### ADDITIONAL STANDARD FEATURES

- Stainless-steel contact surfaces
- Sanitary vessel closures
- Wash-in-place (WIP) system
- Integrated flooded CO<sub>2</sub> heat exchanger
- Over-the-air software updates
- Professional commissioning
- On-site operator training
- One-year warranty on components

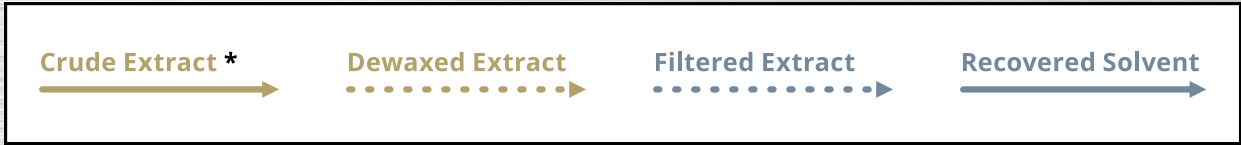
\* Starting with homogenized crude extract at room temperature with minimum ratio of 5:1 solvent to extract.



# DEWAX DECOLOR DESOLVATE



## Legend



- 1 The Crude Extract Tank can be filled with up to 125L of crude extract solution.\*
- 2 The crude extract solution is circulated and chilled to -50°F (~90 mins to cool 125L from room temp).
- 3 The -50°F solution is passed through the set of Dewaxing Filters.
- 4 The dewaxed extract solution collects in the Dewaxed Extract Tank.
- 5 The dewaxed extract solution is pumped through the set of Decoloring Filters.
- 6 The filtered extract solution collects in the Filtered Extract Tank.
- 7 The filtered extract solution is cycled through the Desolvation Membrane Module to recover solvent.
- 8 The filtered extract solution is concentrated down to a 2:1 or 1:1 solvent-to-extract ratio.
- 9 The recovered solvent collects in the external Recovered Solvent Tank.

\* Crude extract must be homogenized with solvent to form a solution with a minimum ratio of 5:1 solvent to extract.



# DEWAX DECOLOR DESOLVATE DECARB

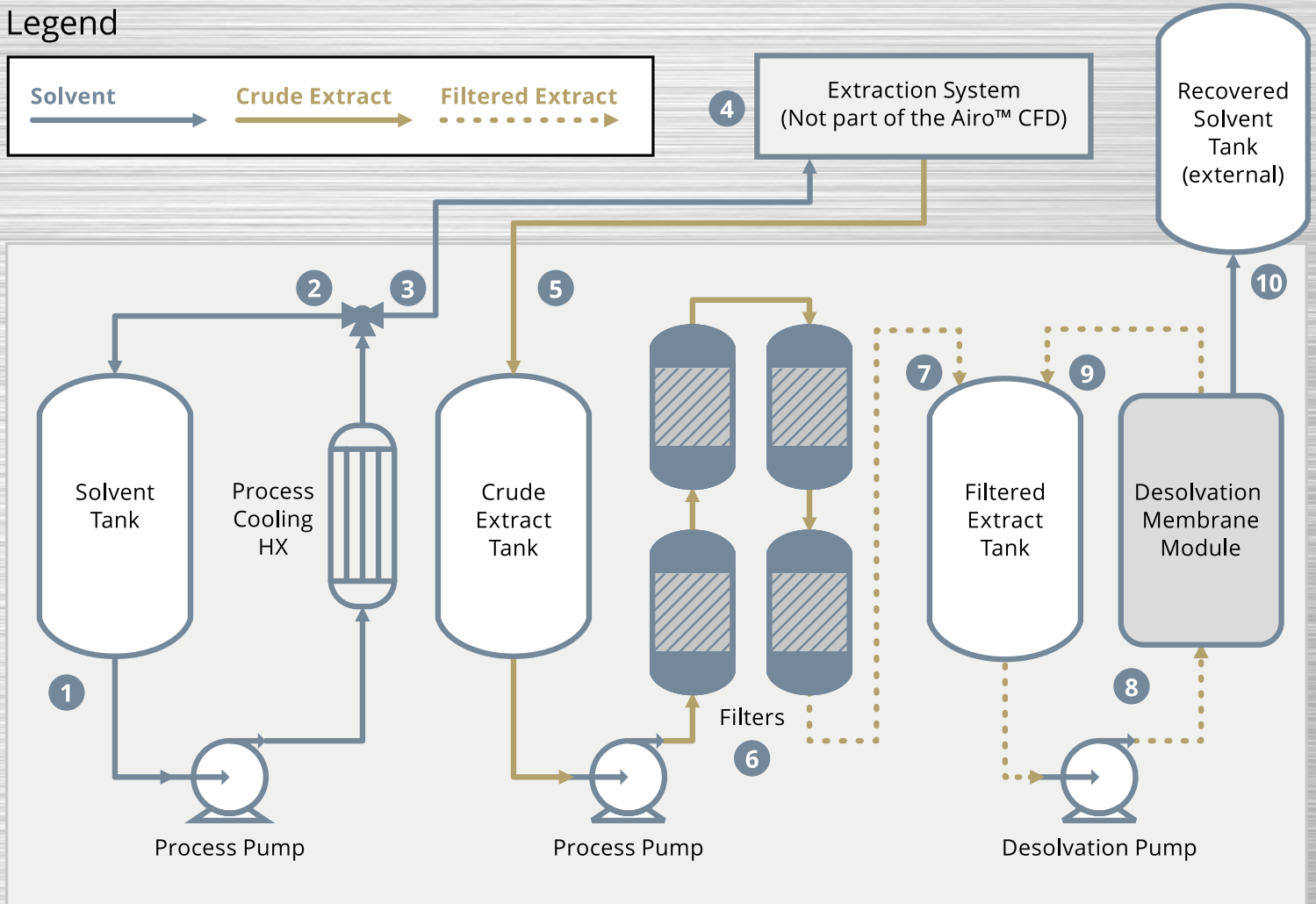
The Airo D-4 system features an additional step. After desolvation, the filtered extract solution is decarbed in the Decarboxylation Reactor.





## CRYO-ETHANOL FILTRATION DESOLVATION

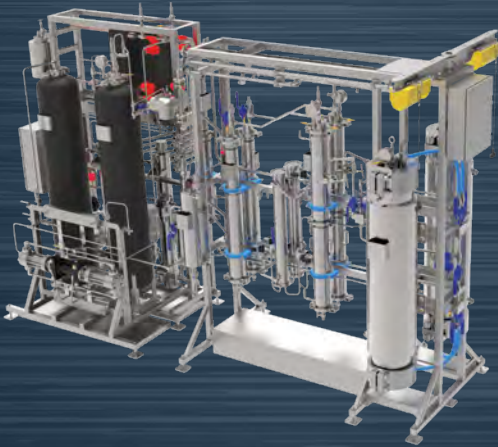
### Legend



- 1 The Solvent Tank can be filled with up to 125L of solvent.
- 2 The solvent is circulated and chilled to -50°F (~90 mins to cool 125L from room temp).
- 3 The -50°F solvent fills the extraction system.
- 4 An extraction is performed.
- 5 The crude extract solution (extract + solvent) fills the Crude Extract Tank.
- 6 The crude extract solution is filtered for particulate and color remediation.
- 7 The filtered extract solution collects in the Filtered Extract Tank.
- 8 The filtered extract solution is cycled through the Desolvation Membrane Module to recover solvent.
- 9 The filtered extract solution is concentrated down to a 2:1 or 1:1 solvent-to-extract ratio.
- 10 The recovered solvent collects in the external Recovered Solvent Tank.

# About Vitalis

## Additional Product Lines



**PrimeEX™**

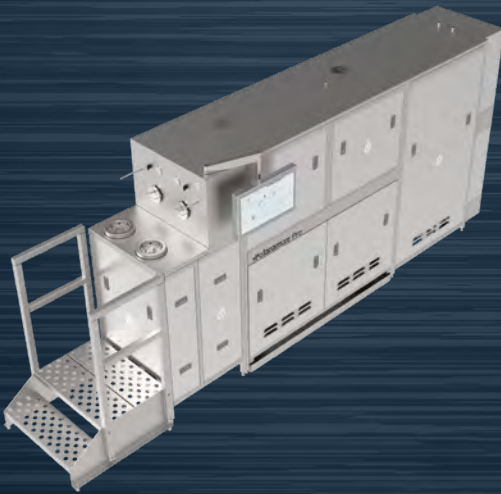
CO<sub>2</sub> Extraction Systems

Vitalis is a vertically integrated original equipment manufacturer (OEM) of CO<sub>2</sub>-based technologies.

Renowned for industry-leading support and innovation, Vitalis solutions provide great economics, high performance, and environmental sustainability.

Product lines include extraction and refinement, R744 natural refrigerant heating and cooling solutions, and carbon capture and storage.

With customers on five continents and in-country support centers spread across the globe, Vitalis is proud to support global decarbonization efforts through the deployment of clean technology.



**Polaramax™**

CO<sub>2</sub> & Multi-Solvent  
Extraction Systems



**Coolshift™**

R744 Heat Pump Solutions



**FreeCO<sub>2</sub> Recovery™**

CO<sub>2</sub> Recovery System



**VITALIS**

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