ARES

Alcohol Recovery Evaporator System

OPERATOR'S MANUAL

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Introduction

This manual provides step by step instructions for the safe installation, operation, and maintenance of the ARES (Alcohol Recovery Evaporator System) Falling Film Evaporator. The ARES uses falling film technology to safely and effectively separate solvents from essential oil. To establish the proper application of the safety in handling the solvent and crude oil, the following operating procedures must be followed carefully

Read and understand this manual completely before attempting to operate or service the ARES FFE.

Key Terms

The following key terms are defined below and are referred to throughout this manual:

1. **Evaporation Column**: The heated column where solution is fed for evaporation.
2. **Essential oil**: Un-processed oil extract in combination with the solvent, terpenoids and pigments from the plant material.
3. **Solvent**: 100% organic grain ethanol which will be used as the primary solvent in all extraction procedures herein.
4. **Separation**: The removal process of desired constituents from a solution.
5. **Solution:** The ethanol / essential oil tincture produced by the extraction process.
6. **Condensers:** The chilled columns where ethanol is condensed from vapor to liquid form
7. **Collection Vessel:** The vessel or vessels connected to the condenser.
8. **Evacuation:** The removal of essential oils or solvent from the ARES.
9. **INHG:** Inches Mercury is a measurement of vacuum.

Safety:

WARNNING

The solvent which is required for the processes contained in this manual, is dangerous if not handled with care. Follow the processes in this operator's manual to safely handle the solvent and operate this unit.

1. Do not allow any persons under the age of 18 to operate this unit.
2. Install and operate this unit in a safe location, away from persons under 18 years of age or pets.
3. The solvents associated with these processes are flammable, be sure to handle the solvent with caution and store unused solvent in a proper fire-proof storage container.
4. Always install and keep an appropriate fire extinguisher near the device.
5. Check the fire extinguisher quarterly. Some extinguishers have a shelf life.
6. Do not use cigarette lighters, matches or any other open flame source near this device.
7. Connect proper ventilation ducting to the ARES built in fume hood. Solvent vapors can accumulate in closed areas and ignite without warning.
8. Check the strainers on the boiler plumbing regularly. Clean them when necessary to prevent blockage in the condensate return and water feed line.
9. Always wear gloves and protective eyewear when operating the ARES.
10. Only use the recommended solvent for extractions. DO NOT FEED PURE HYDROCARBONS INTO THE ARES.
11. Clean up any solvent spills. Flames may follow solvent that has been spilled.
12. Keep water away from the electrical components of the ARES FFE.
13. Do not move unit when its in operation.
14. Use earthquake straps to secure the ARES FFE after installation.
15. Never leave an operating unit unattended at any time.

In case of fire:

- Only use dry powder or foam based fire extinguishers.
- Never extinguish a solvent fire using water; this will cause the fire to spread.
- A fire blanket may also be used to smother the fire.
- Tap the RED Emergency Stop button on the panel to cut power to the system
- If possible, disconnect any electrical sources to the unit.
- Ensure all flames are put out and evacuate the fire area.
- Call your local fire department if emergency response is required.

Specs

- Dimensions: L 109” x H 91” x W 28”
- Power: 3PH 240V 43amp + 1PH 120 v 15amp
- Essential Oil Capacity:
- Recovery Capacity: 60L-90L / hr
- Solvent Recovery Efficiency: 95%

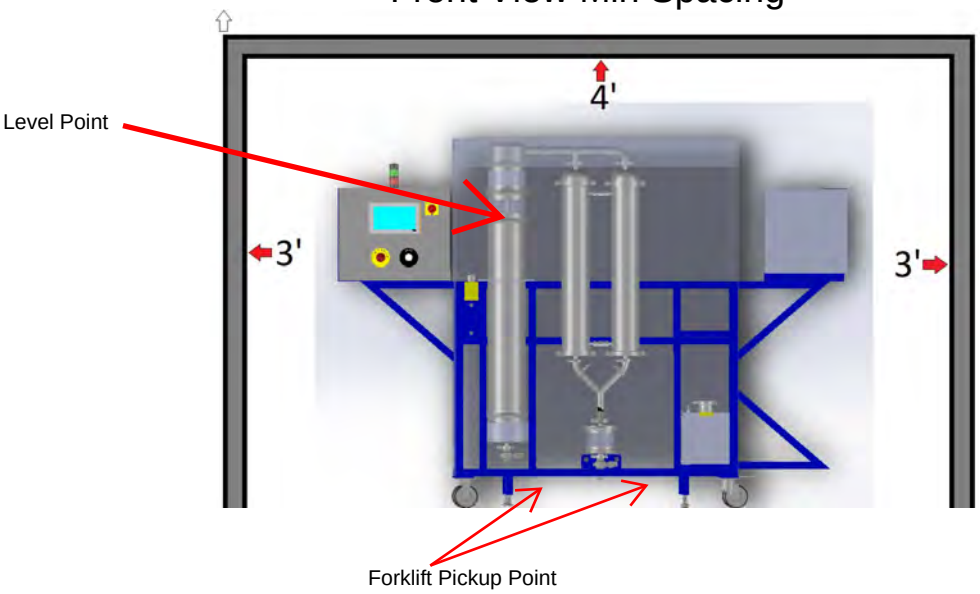
Water cooling is REQUIRED

System Components

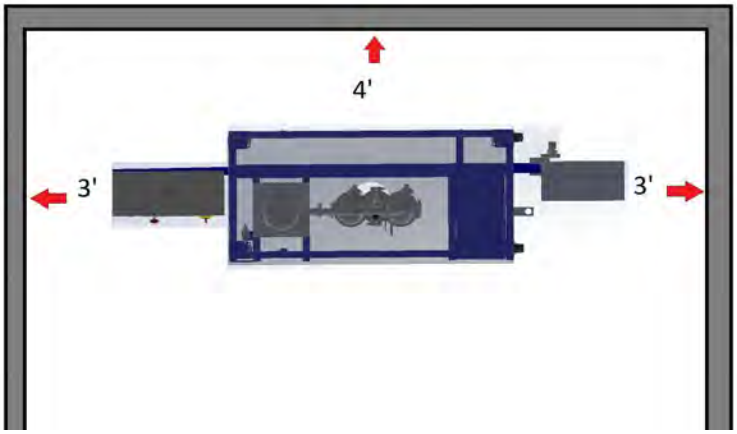
Steam Boiler	Sussman MBA 20kw
Vacuum Pump	Welch 2054B-01
Solvent	200 Proof Organic Grain Ethanol
Sanitary Gaskets	FDA PTFE, EPDM
Butterfly Valves	304L SS / EPDM
Heat Exchanger	316L SS
Plumbing	316L SS
Sight Glass	Borosilicate, 316L SS, Silicone
Flex Hose	Teflon inner, 316L SS outer
Steam Trap	Armstrong 2011
Condensate Return Pump	BURKS

Installation

Front View Min Spacing



Top View Min Spacing



1. Remove the unit from its packaging and Install it on flat level ground.
2. Use A Forklift to take unit off pallet-unit is Top Heavy
3. Level machine using the 4 leveling foot on machine. See Level Point
4. Connect ventilation ducting to the fume hood port at the top of the unit
5. Connect the condenser cooling water inputs to city water, or chiller.
6. Install the unit allowing 3-4 ft minimum free area all around for service and maintenance.
7. Assemble all sanitary clamp connections and check that all clamps are tightened properly.
8. Plug electrical cord from the ARES unit into 240V 3 phase electrical outlet.
9. Plug the ARES 120v control panel into proper power outlet.
10. Fill Water Day Tank with Soft Water ONLY. Make sure its filled to 80% Min
11. Prime Water Pump using prime lever on bottom right side
12. Always ensure fire safety equipment such as a dry powder extinguisher and suitable

Pre Operation

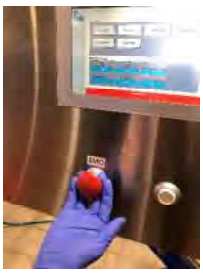
WARNING!

Hot surfaces can cause serious burns while operating the ARES. Prior to operation, wear personal protective gear such as gloves, goggles, and organic vapor respirator to promote laboratory safety. In addition to gloves and goggles, wear a sleeved laboratory coat to protect your arms from touching the hot surfaces of the ARES.

1. Power on the ARES Control Panel by plugging it into

2. Check that cooling water is connected and running through the condensers.

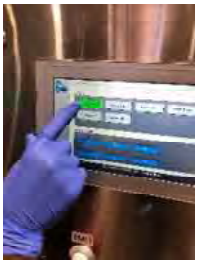
3. Connect the solvent collection vessel to the ARES FFE solvent evacuation port via the next to EMO



5. Pull OUT the RED EMO button.

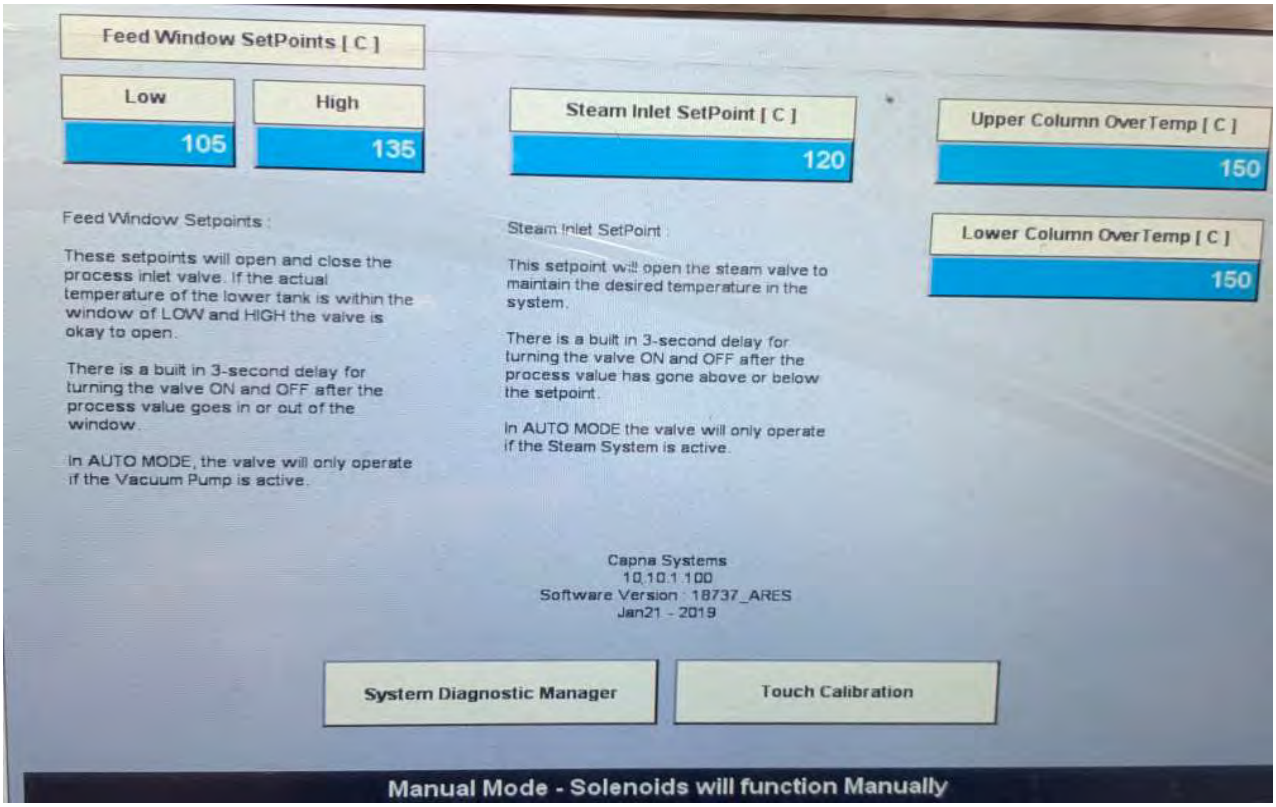
4. Connect the solvent collection vessel to the vacuum pump via the silicon tubing provided.

6. Press the WHITE RESET button next to Emergency Stop



7. Power on the Sussman Steam Generator using the power switch on the control unit.

Process Standard Set Points



Operations Overview

The ARES is designed to be simple and straight forward in operating procedures. The system operates on 3 factors, which will affect the evaporation process. Vacuum, Heat, and Feed Rate all work to determine recovery and reduction rates.

Solution is fed into the system with the assistance of the vacuum pump. Deeper vacuum will produce a faster flow of solution into the system. The flow can be metered by the flow metering valve positioned on the feed line. The flow can by shut off by the 'Feed Solenoid' button. NOTE: it is typical for vacuum to drop by a few points during operation.

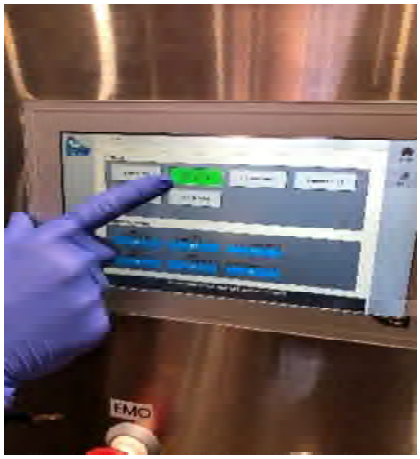
Once the system has reached the set temperature, and vacuum has stabilized, the system is ready to receive solution. Solution can be fed from an open container such as a bucket or an ARES/Ethos evacuation vessel.

The ARES is designed to process continuously and will produce better reduction results when ran over a period of time. A minimum of 60L is recommended to process, before evacuating the essential oils from the jacketed receiver.

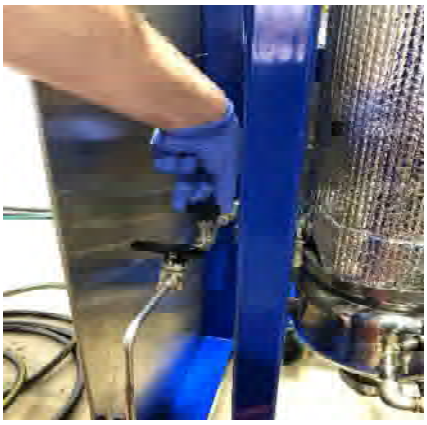
Below are the simple operating procedures that will allow for quick and easy start up, and operations.

1. PUMP DOWN PROCEDURE

A: Close Butterfly valve on 6" sight glass and external tank top assembly



B: Press the Vacuum Pump button on the control screen.



C: Allow vacuum to settle at desired INHG - 20-25inMG.

Note: The operating vacuum will be determined by the temperature of the solution being fed into the ARES FFE column. The vacuum can be manipulated by the mechanical needle valve.

HEATING PROCEDURE

NOTE: The steam boiler must be plugged in, and the power switch on the unit must be turned ON.

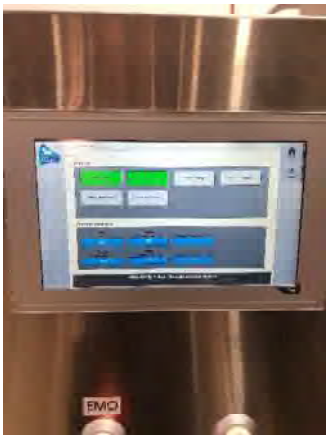
NOTE: Before starting the boiler, make sure that water level in condensate Day tank is '80-90%' (of Soft Water)

A. Press the Steam Enable button on the control panel.

B. Allow several minutes for the steam generator to reach its set point of 130C on TOP and BOTTOM Thermocouple

2. OPERATING PROCEDURE:

A: Drop the feed tube into a holding vessel full of solution ready to be fed into the ARES FFE column. Please call technical support, if plumbing directly into an enclosed holding vessel.



B: Once temperatures reach their set points and the vacuum has stabilized. The system is ready for operation.

C: Open the metering valve to a desired flow rate. (3 turns @ -15ingh will typically process 60L per hour).

D: Press "Feed Inlet" button on controller to start feeding solution into the ARES

3. EVACUATION OF SOLVENT:

Note: THE VALVE ON THE SOLVENT COLLECTION TANK MUST BE OPEN .

A. The solvent will automatically evacuate to the solvent tank.
B. Make sure the butterfly valve under the 6" sight glass is closed

4. EVACUATION OF ESSENTIAL OIL:

A. Place a container directly under the evacuation port below the Evaporation column.
B. Open valve to drain the essential oils.

Maintenance

- Blow down the boiler daily. (refer to boiler manual included with this document)
- Clear any debris from mesh strainers on condensate return and water feed on lines. refer to the boiler manual included with this document)
- Clean Day Tank once a week
- For All Sussman related Maintenance, please see supplied manual for Sussman

Storage

1. Unplug unit from incoming power.
2. Drain any solvent from the storage cartridges.
3. Store this product in a safe, dry, well-ventilated area,
4. Store solvents safely in an appropriate container with the lid tightly shut.
5. Always ensure fire safety equipment such as a dry powder extinguisher or suitable fire blanket, is easily accessible in case of fire.

Support

Email: Info@capnafabrication.com

Phone: 628-222-5099 x 103

Please keep this manual for future reference.
We recommend storing manual with your unit when not in use.

NOTES

UNIT SERIAL NUMBER: