

PROSPIANT

Rolled Film Distillation (RFD-27)

Patent Pending

Facilities Guide



Prosplant

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1 Safety

Read and follow all safety and use instructions.

ONLY TRAINED PROFESSIONALS WITH A COMPLETE OPERATIONAL UNDERSTANDING OF THE EQUIPMENT—AND A FULL UNDERSTANDING OF THE RISKS ASSOCIATED WITH ALCOHOL USE—SHOULD BE AUTHORIZED TO USE THE EQUIPMENT. THE USE OF ALCOHOL HAS RISKS. ANY MISUSE OF THIS EQUIPMENT CAN RESULT IN SEVERE INJURY, INCLUDING BUT NOT LIMITED TO DEATH, DISABILITY AND PROPERTY DAMAGE.

1.1 Safety Notices



A **DANGER** notice indicates an immediate hazard which, if not avoided, will result in death or serious injury.



A **WARNING** notice indicates a hazardous situation which, if not avoided, could result in death or serious injury.



A **CAUTION** notice indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or damage to the equipment. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

IT IS THE OPERATOR'S SOLE RESPONSIBILITY TO USE EQUIPMENT IN A SAFE MANNER. OPERATOR ASSUMES ALL RISK ASSOCIATED WITH THE USE OF THIS EQUIPMENT AND AGREES THE EQUIPMENT IS ONLY TO BE UTILIZED FOR LAWFUL PURPOSES.

SAFETY

Table 1-1: Dangers, Warnings, and Cautions



EXCESSIVE HEAT – BURN HAZARD. Do not touch the sides of the column or feed tank during operation. Operator should take precaution to protect skin from hot source fluids during operation.



Operator must follow all precautions and safety guidelines to ensure their own safety, the safety of other personnel, and the protection of property.



Always visually monitor fill levels, tanks, valves, and hoses for leakage. While the system is protected with pressure relief valves, care should be taken to ensure overfilling does not occur.



Unguarded rotating mechanism hazard. Secure loose hair and clothing and do not touch rotating equipment parts while in motion



Component wear varies depending on the amount of usage. Inspect all nuts, bolts, and gaskets before each use. If there is any question about the integrity of a component, replace it immediately.



During system setup, follow all manufacturers' recommended safety guidelines for working with and exposure to heat transfer fluids. Contact Customer Support for MSDS for each fluid if needed.



Make certain all safety devices are functioning properly before operating the equipment.



This system is NOT equipped with an overflow prevention device. Ensure proper fill levels prior to operation.



All system containers must be checked for accidental pressurization. Depressurize prior to opening.



DO NOT allow children to tamper with or play near the equipment.



DO NOT stand on the unit for any purpose.

SAFETY



Slip-resistant footwear is highly recommended.

2 Facilities Guide

The Rolled Film Distillation system utilizes rollers in contrast to wipers to increase evaporative surface and promote consistent operation. The stainless-steel construction also allows for superior thermal properties in comparison to glass. A crude oil that has had all of its residual solvents removed may be fed into the system at rates of 4-5 liters per hour to distill its remaining volatiles and terpenes. A second pass may also be performed on the botanical concentrate resulting in a high potency and visually appealing distillate.

NOTE: All electrical wiring and connections must be installed by a fully-certified electrician.

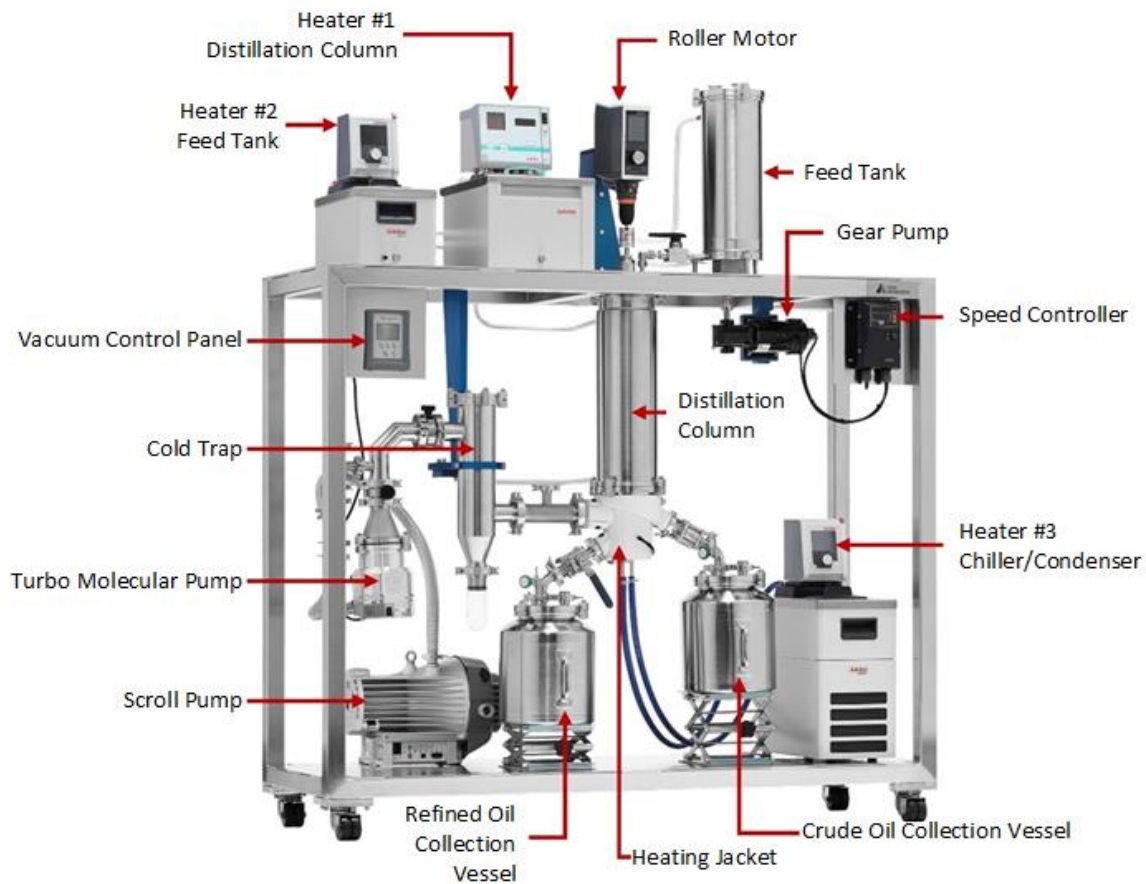
NOTE: All HVAC facilities must be installed by a fully-certified HVAC professional.

NOTE: A forklift is needed to uncrate the Rolled Film Distillation system.

2.1 Rolled Film Distillation System Overview

Figure 2-1 identifies the major system components.

Figure 2-1: System Components



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See Figure 2-2 and Table 2-1 for physical specifications.

Figure 2-2: Dimensions

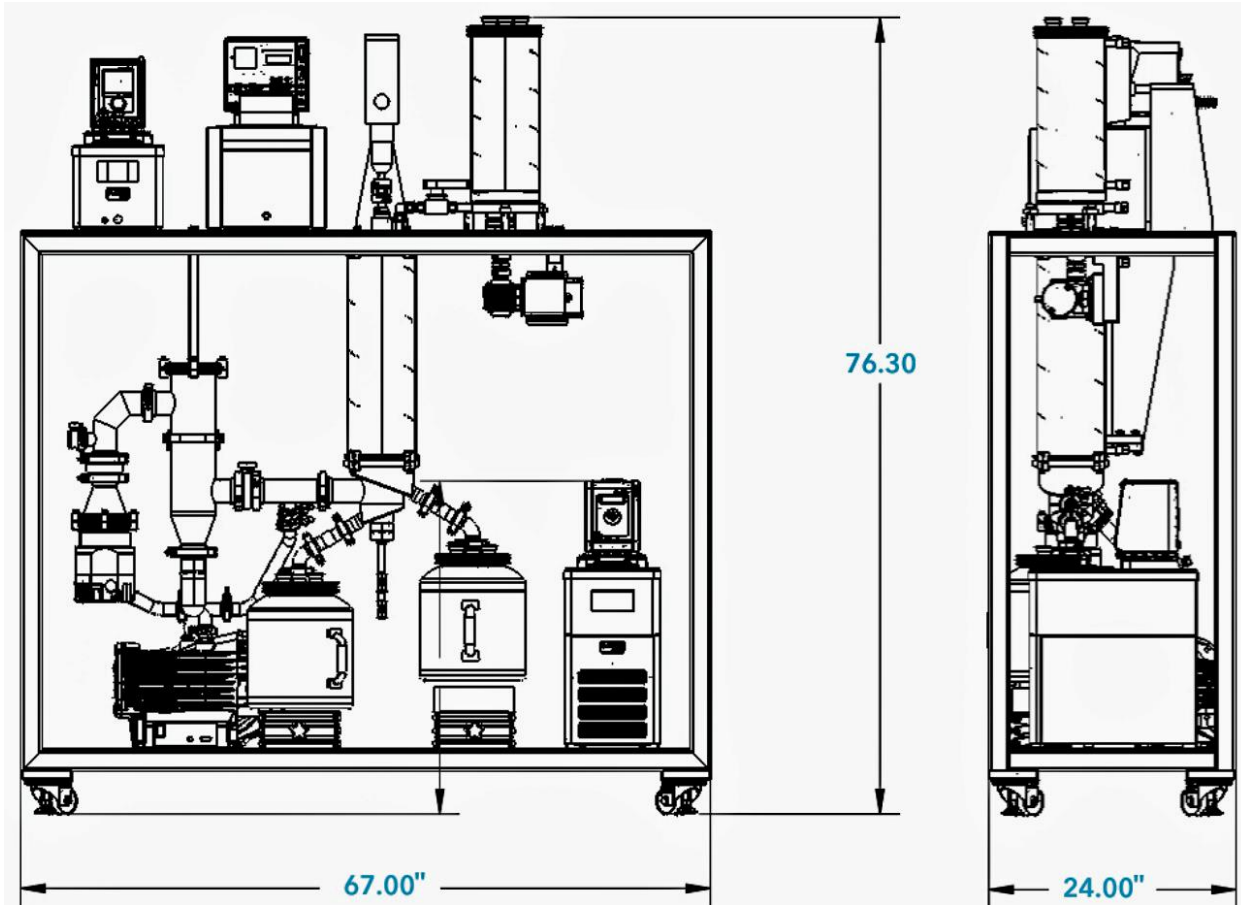


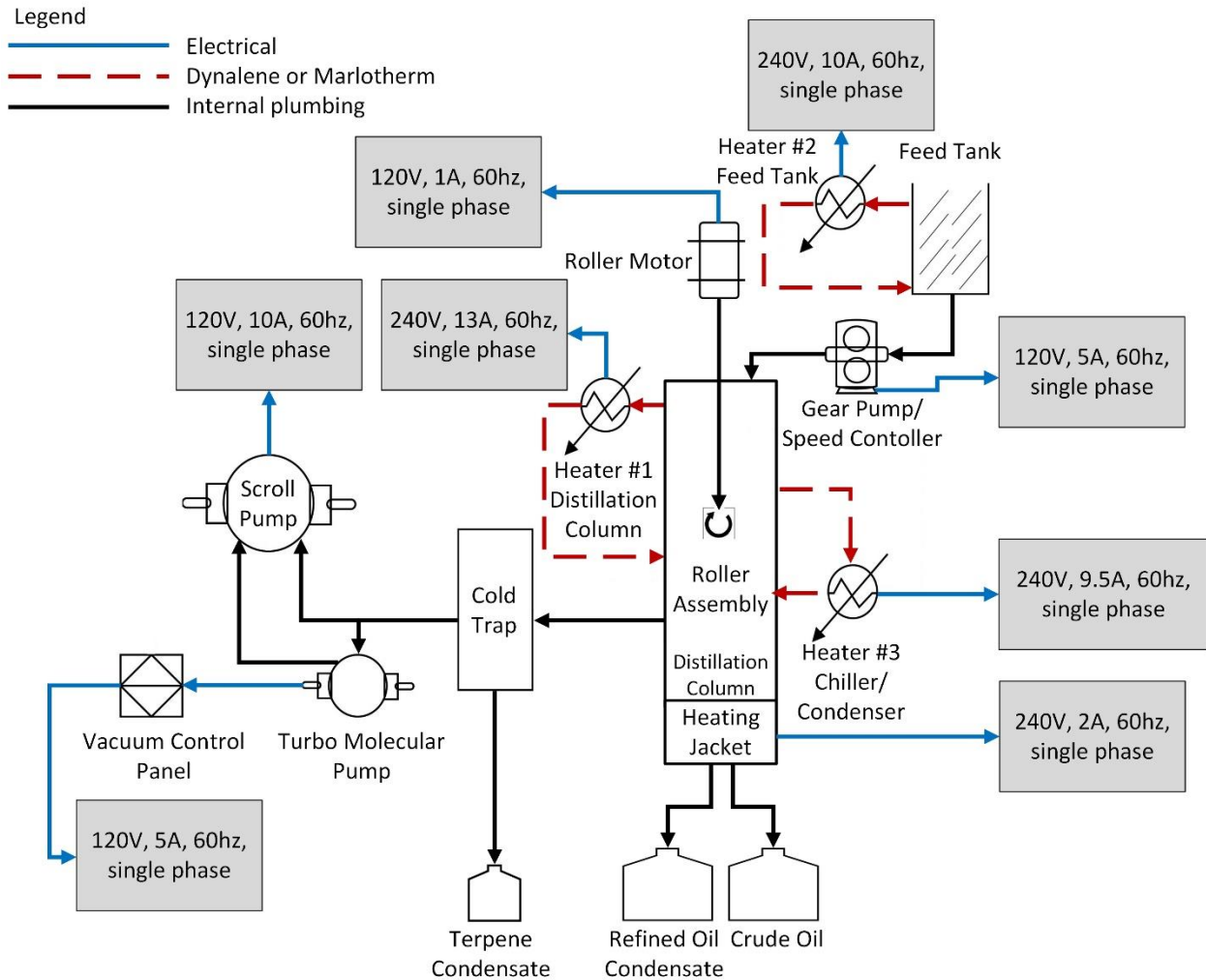
Table 2-1: Physical Specifications

Physical Specifications	
Dimensions	67" L x 24" W x 76.30" H (170 cm L x 61 cm W x 194 cm H)
Weight	600 lbs (272.15 kg)
Operational footprint	10' L x 5' W x 9' H (305 cm L x 152 cm W x 274 cm H)

FACILITIES GUIDE



Figure 2-3 provides a system diagram of the Rolled Film Distillation system.

Figure 2-3: Rolled Film Distillation System



FACILITIES GUIDE

Table 2-2: Facilities Requirements

Facility	Specifications	Component Connection Point	
Vacuum control panel	120V, 5A, 60hz, single phase	NEMA 5-15 plug	
Scroll pump	120V, 10A, 60hz, single-phase	NEMA 5-15 plug	
Roller motor	120V, 1A, 60hz, single phase	NEMA 5-15 plug	
Gear pump speed controller	120V, 5A, 60hz, single phase	NEMA 5-15 plug	
Heater #1 – Distillation column	240V, 13A, 60hz, single phase	NEMA 6-20 plug	
Heater #2 – Feed tank	240V, 10A, 60hz, single phase	NEMA 6-20 plug	
Heater #3 – Chiller/condenser	240V, 9.5A, 60hz, single phase	NEMA 6-20 plug	
Heating jacket	240V, 2A, 60hz, single phase	NEMA 6-20 plug	

Appendix A. Rolled Film Distillation Preliminary Facilities Review

Review this checklist with a Delta Separations Sales representative prior to installing any facilities for the Rolled Film Distillation. An online version of this checklist is available at <https://www.deltaseparations.com/rfd-27-preliminary-facilities-review/> or contact Customer Support at 800-837-1333 or dssupport@prospiant.com.

Company: _____
Address: _____ Name: _____
Address 2: _____ Email Address: _____
City/Town: _____ Phone Number: _____
State/Province: _____
ZIP/Postal Code: _____
Country: _____

Vacuum control panel

- NEMA 5-15 receptacle for 120V, 5A, 60hz, single phase

Scroll pump

- NEMA 5-15 receptacle for 120V, 10A, 60hz, single-phase

Roller motor

- NEMA 5-15 receptacle for 120V, 1A, 60hz, single phase

Gear pump speed controller

- NEMA 5-15 receptacle for 120V, 5A, 60hz, single phase

Heater #1 – Distillation column

- NEMA 6-20 receptacle for 240V, 13A, 60hz, single phase

Heater #2 – Feed tank

- NEMA 6-20 receptacle for 240V, 10A, 60hz, single phase

Heater #3 – Chiller/condenser

- NEMA 6-20 receptacle for 240V, 9.5A, 60hz, single phase

Heating jacket

- NEMA 6-20 receptacle for 240V, 2A, 60hz, single phase

Forklift

- A forklift is needed to unpack the Rolled Film Distillation system.

Signature: _____ Date: _____

Appendix B. Rolled Film Distillation Site Preparation Checklist

Return this checklist to Delta Separations Customer Support (dssupport@prospiant.com) upon completion of the facilities installation. Customer Support will contact you to schedule an onsite installation acceptance inspection. An online version of this checklist is available at: <https://www.deltaseparations.com/rfd-27-site-prep-checklist/> or contact Customer Support at 800-837-1333.

Company: _____

Address: _____ Name: _____

Address 2: _____ Email Address: _____

City/Town: _____ Phone Number: _____

State/Province: _____

ZIP/Postal Code: _____

Country: _____

Rolled Film Distillation Serial Number _____

Vacuum control panel

- NEMA 5-15 receptacle for 120V, 5A, 60hz, single phase
Actual line voltage to vacuum control panel _____

Scroll pump

- NEMA 5-15 receptacle for 120V, 10A, 60hz, single-phase
Actual line voltage to scroll pump _____

Roller motor

- NEMA 5-15 receptacle for 120V, 1A, 60hz, single phase
Actual line voltage to roller motor _____

Gear pump speed controller

- NEMA 5-15 receptacle for 120V, 5A, 60hz, single phase
Actual line voltage to gear pump speed controller _____

Heater #1 – Distillation column

- NEMA 6-20 receptacle for 240V, 13A, 60hz, single phase
Actual line voltage to heater #1 _____

Heater #2 – Feed tank

- NEMA 6-20 receptacle for 240V, 10A, 60hz, single phase
Actual line voltage to heater #2 _____

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Heater #3 – Chiller/condenser

- NEMA 6-20 receptacle for 240V, 9.5, 60HZ, single phase
Actual line voltage to heater #3 _____

Heating jacket

- NEMA 6-20 receptacle for 240v, 2A, 60HZ, single phase
Actual line voltage to heating jacket _____

Acknowledgement

- By submitting this checklist, I confirm the Rolled Film Distillation facilities and system are ready
- for Delta Separations to make the final connections, start the system, and perform acceptance tests.

Signature: _____ Date: _____

Appendix C. Bill of Materials Checklist

Please verify that all parts and materials in the Bill of Materials have been received. Contact Customer Support at 800-837-1333 or dssupport@prospiant.com with any questions.

Items Shipped with System			
Received?	Quantity	Item	Part Number
<input type="checkbox"/>	N/A	RFD CAGE removed from system and packed well in cardboard box with Fragile Stickers. Box wrapped to one leg on frame.	N/A
<input type="checkbox"/>	1	Julabo 12 Heating Circulator S/N: _____	400-00076
<input type="checkbox"/>	1	Huber/Poly Science/Julabo Heating/Refrigerated Circulator S/N: _____	400-00075
<input type="checkbox"/>	1	Julabo BC4 Heating Circulator S/N: _____	400-00077
<input type="checkbox"/>	1	Scroll Pump AND Cord (HEXT240D) S/N: _____	400-00080
<input type="checkbox"/>	1	Turbo Pump, Cord, and Screen (TIC Turbo) S/N: _____	400-00079
<input type="checkbox"/>	3	Adjustable Lift Stand	725-00043
<input type="checkbox"/>	2	Catch Cans	400-00108
<input type="checkbox"/>	1	PTFE Adapter, NW 50 (w/ O-Ring)	200-00149
<input type="checkbox"/>	2	PTFE Adapter, NW25 (w/ O-Ring)	200-00151
<input type="checkbox"/>	1	Hardline 1 of 4	210-00499
<input type="checkbox"/>	1	Hardline 2 of 4	210-00500
<input type="checkbox"/>	1	Hardline 3 of 4	210-00501
<input type="checkbox"/>	1	Hardline 4 of 4	210-00502
<input type="checkbox"/>	1	48" Flex line	745-00355
<input type="checkbox"/>	1	18" Flex Line	745-00354
<input type="checkbox"/>	4	Claw Clamp	745-00540
<input type="checkbox"/>	6	Center Rings	745-00402

APPENDIX

Items Shipped with System			
Received?	Quantity	Item	Part Number
<input type="checkbox"/>	6	Hinge Clamp	200-00162
<input type="checkbox"/>	2	Blue Hoses w/ clamps (53175K29) 6'	ASK
<input type="checkbox"/>	1	Cable for Pirani Gage	735-00019
<input type="checkbox"/>	1	Scroll Pump Cord	ASK
<input type="checkbox"/>	1	Turbopump Cord	ASK
<input type="checkbox"/>	1	Dynalene Heat Transfer Fluid, Ethylene Glycol	805-00011
<input type="checkbox"/>	1	Vent Valve, Manual Needle, NW 25	752-00025
<input type="checkbox"/>	1	Marlotherm Heat Transfer Fluid	805-00010
<input type="checkbox"/>	1	Funnel, 304 SS	ASK

Items Shipped Separately			
Received?	Quantity	Item	Part Number
<input type="checkbox"/>	1	SWITCH, FEED CORD, AC 250V 6A 3P	726-00003
<input type="checkbox"/>	2	PUMP, SIPHON, 2 GPM	770-00011
<input type="checkbox"/>	1	GREASE, SILICONE, HIGH VACUUM	805-00008
<input type="checkbox"/>	2	FLASK, BOILING, 2 NECK ROUND, 5 LITER	790-00005
<input type="checkbox"/>	3	FLASKS, BOILING, 2 NECK ROUND, 2 LITER	790-00006
<input type="checkbox"/>	1	CHEMGLASS, EXTRACTION NUT, HOLLER STOPPER, 24/40 or 29/42	790-00007
<input type="checkbox"/>	3	CLIP, METAL KECK, 24/40 or 29/42	745-00109
<input type="checkbox"/>	3	ADAPTER, KF25 TO 24/40	745-00127

Appendix D. Training Supplies and Materials

The customer is responsible for providing the supplies and materials needed for training. Training consists of four hours of preparation and two ten-hour days of hands-on training for a total of 24 hours. The customer must provide photos of each item to Delta Separations before at least seven days prior to scheduling the training.

Included with Rolled Film Distillation System		
Item	Quantity	Description of Use
5-liter round bottom distillation flasks	2	For main fraction collection
2-liter round bottom distillation flasks	3	For secondary fractions
24/40 Metel Keck (glass) clip	4	To hold glass onto machine without vacuum
29/42 Metel Keck (glass) clip	3	To hold glass onto machine without Vacuum
PTFE glass cap	3	For sealing secondary neck during distillation
Customer to Provide the Following Items		
Item	Quantity	Description of Use
Degassed/Decarbed and winterized crude cannabis oil without gums and sugars. Must not bubble at 100°C under no vacuum when on hot plate or in roto. If crude bubbles when arriving on site, Delta Separations reschedule training. Do not heat oil with agitation.	8000 to 12,000 grams	To distill through the Rolled Film Distillation system for operator training
Non-pressurized liquid nitrogen (LN2)	50 liters	For Rolled Film Distillation operation
64oz Hydroflask	1	For transferring liquid nitrogen
Step-ladder – approximately 4 ft and rated for a minimum of 250 pounds	1	For pouring hot crude into the Rolled Film Distillation system
Heat resistant gloves rated for at least 200°C	1 pair	For handling hot glass throughout the process
Solvent spray bottle for use with ethanol or isopropyl alcohol, acetone, and limonene	1	Used to check for vacuum leaks
Heat gun rated for 200° - 1000°F (approximately 100° - 600°C)	1	Used in case of clogs and for transferring crude easily
Convection/Vacuum oven rated for 15° - 300°C above ambient	1	For warming up botanical crude to transfer into the RFD

Appendix E. Rolled Film Distillation System Acceptance

An online version of this form is available at:

<https://www.deltaseparations.com/rfd-27-system-acceptance-sign-off/>

System Specification Acceptance.

1. The delivered system and accessories meet the requirements in the sales contract.
2. System runs per the specification agreed to in the contract.

System Limitation Acceptance.

The system limitations have been explained and running the system outside of these settings voids the warranty. Any alterations to the system; counter resets, software changes, hardware modification, voids the warranty. For more details, review the purchase agreement contract.

ONLY A TRAINED OPERATOR SHOULD RUN THE SYSTEM. OPERATING THE SYSTEM WITHOUT TRAINING FROM DELTA SEPARATIONS MAY VOID THE WARRANTY.

Signing below accepts the system as operational and with the understanding of the limitations.

Failure to sign and return this document to Delta Separations Customer Support may void the warranty. Send to: support@deltaseparations.com

Company Name:

Customer Representative:

Customer Signature:

Date:

Delta Separations Installer Name:

Date:

Appendix F. Glossary

The Glossary contains definitions of terms, acronyms, and initialisms commonly used in Delta Separations technical documentation. Although these are preferred terms, the list is not exhaustive.

A

- AHJ** Authority having jurisdiction
- ANSI** American National Standards Institute

C

- CFM** Cubic feet per minute
- CFR** Code of Federal Regulations
- CUP** Centrifuge Utility Platform

E

- EMO** Emergency off button

F

- FDA** Food and Drug Administration
- FFE** Falling Film Evaporator
- FLA** Full load amps
- FNPT** Female National Pipe Thread
- FSE** Field service engineer

H

- HAZLOC** Hazardous location
- HE** Heat exchanger
- HEPA** High efficiency particulate air (filter)
- HMI** Human/machine interface
- HVAC** Heating, ventilation, and air conditioning

J

- JIC** Joint Industry Council

L

- LFL** Lower flammability limit

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M

- MFL** Male flare fitting
- MSDS** Material Safety Data Sheet
- MSHA** Mine Safety and Health Administration

N

- NEC** National Electric Code
- NEMA** National Electrical Manufacturers Association
- NFPA** National Fire Protection Association
- NIOSH** National Institute for Occupational Safety and Health

O

- OSHA** Occupational Safety and Health Administration

P

- PPE** Personal protective equipment

R

- RMA** Return Material Authorization

T

- TEFC** Totally enclosed, fan-cooled
- TSE** Technical support engineer

U

- UL** Underwriters Laboratories

APPENDIX

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