

EXTRAKTLAB 140 SPECIFICATIONS:

General Operating Characteristics

Attribute	Specification
Flow Control	Manual, Automatic
Extraction Vessels	2 x 20L
Collection Vessels	3 x 2.5L or 3 x 4L + terpene trap
Recycler Vessels	1 x 20L
Flow Meter	PID Controlled Algorithm, rules based on process parameters, optional Coriolis meter
CO ₂ Pump Flow Rates Range (LPM)	0 to 3.5 LPM
Max Operating Pressure (psi)	6850 psi, 472.29 bar
Maximum Process Temperature	100°C
Skid Operating Temperature (C°)	15 to 30°
Eluent Inlet Lines	Up to 2
CO ₂ Solvent Inlet Lines	1
Sound Pressure	40 - 50 dB
User Interface	Touch Screen HMI panel
Biomass Loading and Unloading	10 micron flexible no channel bags

Process Utilities Requirements

Process Utilities Requirements				
Type	Quality	Capacity	Pressure	Temperature
Compressed air	Class IV 40um filtered, oil free	0.33 Nm ³ /h	80 psi	Room
Solvent	Food grade or better 2um filtered degassed	300 mL/min max	NA	5 - 60°C
Carbon Dioxide, Liquid	2um filtered, 850 psi, food grade or better	300-600 mL/min	700 - 850 psi inlet	20 - 30°C
Thermo Static Fluid	50/50 propylene glycol and water	1 m ³ /h	6 bar max 0,7 bar @ 1 m ³ /h	-30°C - 90°C

Environmental Specifications

Attribute	Specification
Operating Temperature	5 to 40°C (15 to 30°C optimal)
Operating Humidity	20 to 80%
Transportation & Storage Temp	-20 to 60°C
Transportation & Storage Humidity	< 60%
Environment	Approved for indoor use
Altitude	Approved for use up to 2000m
Sound Pressure	45 to 50 dB
Pollution Degree	2



Electrical Specifications

Attribute	Specification
Models	140
Full Load Amps	67 FLA (extraktLAB 140)
Voltage	208 - 240 VAC
Phases	Three Phase
Frequency	50 - 60 Hz
SCCR	10 kVA
Enclosure Ingress Protection	NEMA 1, Tools required
Electrical Input Connection	Customer shall provide electrical connections according to installation instruction
Line Voltages, nominal	Grounded AC
Protection class	Class I
Overvoltage category	II
Pollution degree	2

Venting Specifications

Attribute	Specification
Venting connection	4 1/2" compression fittings for venting of extractor gasses
Anti-Static Piping	Conductive, antistatic, carbon steel
Grounding	Earth ground required
Wetted Materials	Carbon Steel

Extractor Vessels

Extractor vessels are held at a high temperature and pressure to dissolve oils from biomass. Oils that are locked in the biomass are dissolved in liquid CO₂ as they become solvated as a function of temperature and pressure.

Extractor Vessel Specifications

Attribute	Specification
Extractor Volumes	20 L
Extractors per System	2
Maximum Allowable Working Pressure	6800 psi, 468.84 bar
Wetted Materials	FDA approved, ASME 304 Structural Grade Steel, FDA grade Buna-n, peroxide cured
Chemical Compatibility	CO ₂ , Organic Solvents, Acids and Bases, plant extracts
Temperature Control Range	25 to 100°C, 1200W each
Compliance	Independently P.E. Stamped according to ASME DIV II VII-2 PED compliant, CE marked, notified body, Lloyd's Register, CRN number available

Collector Vessels

Extracted oils that are dissolved in the solvent are fluidically conveyed to collector vessels that are held at user defined temperatures and pressures to accomplish selective precipitation of

the dissolved product.

Collector Vessel Specifications

Attribute	Specification
Collector Volumes	2.5 L (optional 4 L)
Collectors per system	3
Max Allowable Working Pressure (psi)	8500 psi
Wetted Materials	FDA ASME 304 Structural Grade Steel, Buna-n, peroxide cured
Chemical Compatibility	CO ₂ , Organic Solvents, Acids and Bases, plant extracts
Temperature Control Range	25-100°C, 600W each
Cooling	Optional Internal Cooling Coil (1500 watts)
Compliance	Independently P.E. Stamped according to ASME VIII DIV PED compliant, CE marked, notified body Lloyd's Register CRN number available
Separation Principle	Cyclonic

Valve Specifications

Attribute	Specification
Valves	Ball valves, check valves, back pressure regulators
Manufacturers	Swagelok, Tescom, United Science.
Construction	316 stainless steel, Ferrule compression fittings throughout
Compliance	PED compliance
Actuation and Automation	Pneumatic or Manual
Wetted Materials	PEEK, PTFE, 304 Stainless Steel ASME materials
Chemical Compatibility	CO ₂ , Organic Solvents, Acids and Bases, plant extracts
Allowable Temperature Range	20 to 150°C
Maximum Pressure	7500-10,000 psi

Heat Exchanger Specifications

Attribute	Specification
Tube in Tube	Tube in tube
Wetted Materials	316 Stainless Steel, medium pressure fittings throughout
Max Pressure	4000 psi at 100°C PED compliant
Fluid Exchange Media	Water at 5°C or 30% glycol at -5°C
Chemical Compatibility	CO ₂ , Organic Solvents, Acids and Bases, plant extracts
Allowable Temperature Range	-20°C to 150°C

Pump Specifications

Attribute	Specification
CO ₂ Pump	Chilled heads, 1.5-2L/min at max operating pressure, 5,000 psi Max Pressure, dual PTFE diaphragm, safety valve, electronic and manual flow control
Cleaning Pump	Optional, up to 300 mL/min, 5000 psi max pressure, positive displacement, ATEX II 3GD version available
Process Aid Pump	Optional, up to 300 mL/min, 5000 psi max pressure, positive displacement ATEX II 3GD version available
Co-solvent Pump	Optional, up to 300 mL/min, 5000 psi max pressure ATEX II GD version available
Wetted Materials	Sapphire, PTFE, 316 SS, SA-304SS
Pre-chiller	3500 W @ -5°C or as built up to 10 hp
Inlet pre-filter	20 micron fiber
Chemical Compatibility	CO ₂ , organic solvents, acids and bases, plant extracts

GMP Compliance

Attribute	Specification
Datasystem	Export data, diagnostics and event logging, data traceability, unlimited working level access, user traceability method, CO ₂ lot, input lot trace
Regulatory Compliance	21 CFR Part 117,211, 177 and Health Canada equivalents
Cleaning methods	Supercritical CO ₂ , alcohol, non-polar solvents
Wetted Materials	Non-leaching, 304, PTFE, food grade Buna-n, peek
Surface Roughness	Compliant with cGMP
Calibration/Maintenance	Software tracking built-in
Training Records	Software tracking built-in
Cross containment	6" dia. port holes for cleanability

CO₂ Specifications

Attribute	Specification
CO ₂ Minimum Inlet Pressure	750 psi
CO ₂ Purity	Conforming to CFR, EIGA, CGA regulations for food grade 99% Pure CO ₂
CO ₂ Bottle Source	Dip tube required, 60L CGA 320
Cylinder Bundles	Available in a bulk package of 16 – 100lb cylinders with CGA 320 male inlet pre-plumbed for convenience.
6 Ton Bulk Storage	Available with recirculation pump

Temperature Control Module Specifications

Attribute	Specification
Pre-Heater	Max Temp, 130°C, K type thermocouple, PID Control Algorithm, Wetted Materials: 316 SS, 10000 PSI MWAP, NEMA 1 Enclosure, Direct wire, precision 1°C
Vessel Heaters	Max Temp, 100°C, K type thermocouple, PID Control Algorithm, insulated blanket heaters, precision 1°C
Collector Heaters	Max Temp, 100°C, K type thermocouple, PID Control Algorithm, insulated blanket heaters, precision 1°C
Post Heater	Max Temp, 130°C, K type thermocouple, PID Control Algorithm, Wetted Materials: 316 SS, 10000 PSI MWAP, NEMA 1 Enclosure, Direct wire, precision 1°C Max pressure: 10,000 PSI
Zones	Up to 16 zones, independent control

Insulation Specifications

Attribute	Specification
Fire Rating	Certificate, 200°C max
Materials	3170 Grey Silicone Cloth
R Value	5 Gage Insulation, 10

Table of Sensor Input Devices

Item	Description
Temperature	Thermocouple, k-type, 1°C precision
Pressure	ATEX II 3GD, 1% precision
Flow meter	PID Algorithm or optional Coriolis meter
Load cell	1000 lbs., 1% precision
CO ₂ detector	Safety controls, calibrated, list traceability available

Safety Specifications

Attribute	Specification
Rupture Discs	Zook burst discs, calibrated, ASME VIII Div II compliant, Max Pressure is 6850 psi, Certificate Attached to Disc
Temperature Switch	Preheater, Post heater MAX TEMP 140°C, Certificate Available Collector, Extractors MAX TEMP 100°C, Certificate Available
E-stop Switch	Switch disengages main contactor, not dependent on PLC
CO ₂ Gas Detector	Built in alarm, turns off pump and closes valves at 9000 ppm, Certificate Available, test traceable
Interlocks	Marked with safety warnings
Pressure Transducers	Post pump, Extractor, Collector 1,3; Turns off pump when overpressure (>5800 psi) condition is detected.
Isolation Valves	Manual, bypass valves

Containment System Specifications

Attribute	Specification
Max Pressure	MAWP 300 psi
Poppet Valve	200 psi max
Wetted Materials	Buna-N, 316 SS
Surface Finish	16 micro in or better
Temperature Range	-50°C to 100°C
Rigid connection hose	3000 psi max pressure
Seal Material	Buna-n

Recycler Specifications

Attribute	Specification
Recycler Volume	20L
Recyclers per System	1
Maximum Allowable Working Pressure (psi)	6800 psi
Wetted Materials	ASME 304 Structural Grade Steel, Buna-n, peroxide cured
Chemical Compatibility	CO ₂ , Organic Solvents, Acids and Bases, plant extracts
Temperature Control Range	25 to 100°C, 1200W
Compliance	Independently P.E. Stamped according to ASME DIV II VII-2 PED compliant, CE marked, notified body Lloyd's Register CRN number available

Customer Interface

Item	Visual	Description
CO ₂ Feed		1/2" compression fitting type Swagelok® Follow WI-006 and manufacturer's documentation for making and breaking connections.
Compressed Gas		ColorConnex Push-To-Connect Female Green Coupler, ARO Type B 1/4 in. FNPT
Ventilation Interface		Customer shall provide a vent fan that will provide a minimum of 600 - 1000 CFM and vent fan conduit that is antistatic and can interface with 4x 1/2" compression type fittings to be connected to HVAC ductwork.
Electrical Interface		Customer shall provide electrical connections according to installation specifications
Chiller		Quick disconnect, Holmbury IBB series Brass Couplers

Other Characteristics

Attribute	Specification
Tubing internal roughness	< 0.8 μ m Ra (32 μ -inches Ra)
Valves internal roughness	< 2.4 μ m Ra (94 μ -inches Ra)
Material wetted parts	Stainless Steel 316, Stainless Steel 304, Quartz, PTFE, PFA, PEEK, Urethane
Frame	Aluminum anodized Bonded joints, GMP compliant
Electrical cabinet	Painted Steel, NEMA 1
Electrical design	Designed for general purpose area
Air Quality	Class 1V or better

Track and Trace Specifications

Attribute	Specification
Industrial PC	Intel PC processor with <i>igwLAB</i> track & trace software Cannabis & Hemp specific.
LOT Barcoding	2 to 5 lot track & trace
Receipt printer	Run receipt
Barcode scanner	For track and trace monitoring
Input & Output	Track waste, oil production, raw material, input
Metadata	Lot #, weight in, weight out, labor in, calibration, pm schedule, and lot tracking.

Automation Interface

Action	Type
Pump Power off & Process Stop	Digital input dry contact (DI)
Full Functional Remote Access	Ethernet, WIFI, Customer Computer, Customer Specified
Status of the (RUN or STOP)	Digital output dry contact (DO)

Architecture of the Control

Attribute	Specification
Operator Interface	A touch screen graphical user interface is used for the operator interface and historical data logging through the automation software. This automation software provides automated and safe operation of the solvent pumping module.
PLC Controller	A Programmable Logic Controller ensures real-time operation, high availability (reliability) and a high degree of safety. The communication between the PLC and the operator interface is based on Ethernet protocol.
Electrical Cabinet	Contains all controls and electrical components necessary for proper operation of the system (power supplies, fuses, PLC I/O cards, PLC controller).
Telemetry Option	Optional via customer supplied network bridge. Remote monitoring and datalogging software allows remote troubleshooting, service, software and firmware updates on Apple, android or pc devices.
Programming	Non-windows based control software machine language

Description of the Software

Architecture	Specification
User Access	The User Access Module is used to define access rights of the users for the protection of the system. The password and Username strategy are managed by the operating system.
Datalogging Module	The Datalogging Module is used for logging and viewing the data acquired during the system operation i.e. Flow, Temp, Pressure, and Pump counted
Graphics	It allows to trend relevant process parameters such as CO ₂ signals, flowrate, pressure drop, temperature, etc. It also allows the user to compare data from various cycles within a run.
Method Editor	The Recipe Editor module is used to create easily and quickly the base parameters of the method, unlimited methods. (Recipe Identification, Recipe Duration, Valve Configuration).
Manual Mode	The Manual Module is typically used for the priming and testing.
Sequence Mode	The Sequence Mode runs extraction in an attended mode as defined in the Method. Methods may be linked. For example, the user can run five cycles of a given separation method and then run one cycle of a regeneration method and then run again five cycles of the separation method.
Alarms	The alarm data and event data are stored as an event in the batch record. This data can be recalled from <i>igwLAB</i> management module.
Reserved Parameters	This module has restricted user access. It contains all critical parameters, which could affect safety, validation or operation of the unit.
Safety	Safety circuits independent of PLC