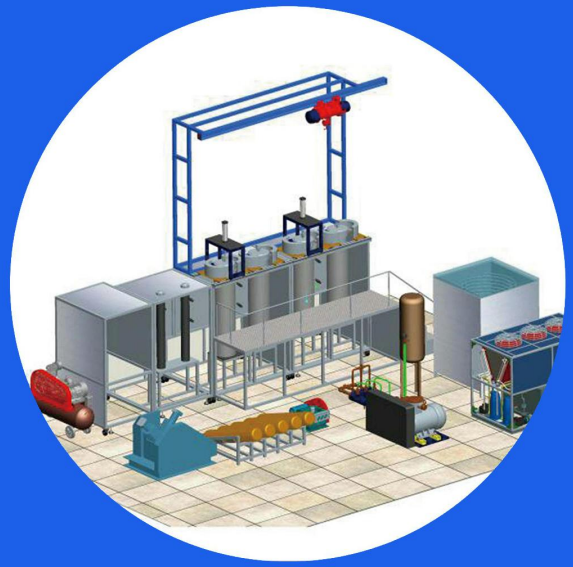

TOPTION, Your Top Option, Welcome!

TOPTION

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TOPTION

LAB SOLUTION PROVIDER

Supercritical CO2 Extraction Machine

XI'AN TOPTION INSTRUMENT CO.,LTD

Company

TOPTION INSTRUMENT has spent 18+ years becoming a world leading manufacturer engaged in the research, development, production, sale and service of Extraction , distillation ,filtration ,drying & Pretreatment series equipment.

The headquartered is in Xi'an City, the ancient capital with 5000+ history; includes several production bases, own professional research and development team 25+ persons; the distillation production base is located in Xi'an, covering an area of 4040㎡; the drying and other production bases are located in southern China cities.

Since 2004 TOPTION'S equipment has been used and praised in many counties including United States, Canada, Poland,Spain Italy,Sweden, Switzerland, Germany, France & Colombia. We are your dependable partner in distillation and drying industry, we are flexible, intelligent, and truly care about your benefits potential. We want your business to be remembered and welcomed by your customers.

TOPTION has passed ISO9001 & CE certification. We work closely with our clients to deliver a successful and extraordinary equipment, choose TOPTION to maximize your benefits.

TOPTION will be your TOP OPTION.

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Super Critical CO2 Extraction

The Super Critical fluid technology is a new-type separation technology in modern chemical separation.The Super Critical extraction takes CO2 as the solvent.As CO2 fluid under Super Critical state has larger density and dielectric constant,larger dissolvability against substances,which can change abruptly when pressure and temperature change therefore it has not only the selection of dissolvability against some substances, the separation of the solvent with the extracted substances is also easily.The Super Critical CO2 extraction is specially suitable for extraction of fat-soluble and heat sensitive substances with high boiling point,and is suitable for fine separation of different components,i.e.Super Critical fine distillation.

Characteristics of the Super Critical CO2 fluid:

1. Low Critical temperature suitable for extraction and purification of heat sensitive compound.
2. Being capable to provide inert environment to avoid oxidation of products and affection of effective content of extracts.
3. Fast extraction speed,no toxicity, non-flammable,safe application and no pollution upon environment.

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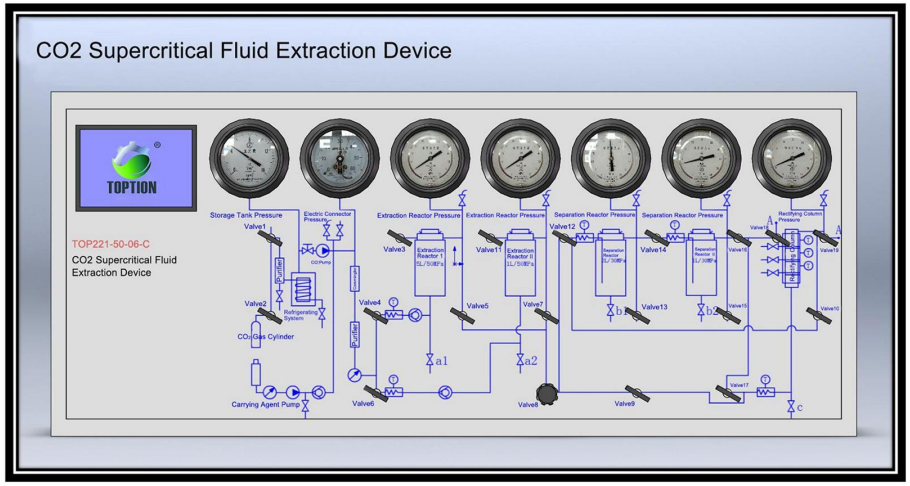
Super Critical CO2 Extraction Device:

The device mainly consists of extraction kettle,separation kettle,fine distillation column,CO2 high pressure pump, entrainer pump,refrigeration system,heat exchange system,purifying system,pressure stabilizing system of extraction kettle,CO2 tank,flow meter,temperature and pressure control(protection) system etc. Take CO2 as the solvent to make extraction and purification upon a lot of products such as biological products,foodstuff and medicines.



Main Technical Index:

1. Extraction Kettle:0.5L , 1L , 2L , 5L/50Mpa, 10L , 24L/40Mpa, 50-200L/32Mpa, dual purpose for solid and liquid, equipped with water jacket for circulated heating with adjustable temperature.

2. Separation Kettle:0.3-10L/30 Mpa, 50-100L/16-22 Mpa, equipped with water jacket for circulated heating with adjustable temperature.

3. Fine Distillation Column:inner diameter Φ25 x 2-3m/ Mpa, Φ35 x 2-3m/30Mpa, Φ48 x 4-6m/30Mpa, Φ78 x 4-6m/30Mpa, according to technological requirement, 4-section, 6-section or 8-section temperature control are available and relative stuffing can be selected and loaded by customer according to technological requirement.

4. High Pressure Pump: 20L/40Mpa.h double-plunger, 50L/50Mpa.h double-plunger frequency-modulating,400L/40Mpa.h three-plunger frequency-modulating, 800L/40Mpa.h three-plunger frequency-modulating, the pump head with cooling system.

5. Take Pump:in the course of extraction, the entraner is used to change polarities of CO2 so as to extend range of application.

6. Cooling System:equipped with semi-sealed or full-sealed compressor to meet technological requirement.

7. Heat Exchange and Temperature Control System: according to technological requirement, the heat exchange and temperature control system are equipped for extraction kettle,separation kettle and fine distillation column respectively to control the temperature of water circulation at -85℃ and the temperature of oil circulation at -150℃; the digital display double-screen is used to control the temperature of water bath and to measure the temperature of CO2 fluid with the accuracy of temperature control at ±1℃.

8. Pressure Control (Protection): equipped with the electro connecting pressure gauge at the outlet of the high pressure pump and set the working pressure to release pressure and make automatic protection in case overpressure occurs; equipped with safety valves for high pressure pump,extraction kettle,separation kettle,fine distillation column according to their maximum working pressures to release pressure and make automatic protection in case overpressure occurs; equipped with back-pressure valve system at the outlet of the extraction kettle which has stable pressure and is easy to make adjustment.The control accuracy of pressure(dynamic)is ±0.1Mpa.

9. Display of Flow: the metal rotor flow meter with remote transferable digital display for instant flow and accumulated flow respectively.

10. Pipelines: all containers, valves, pipe fittings and pipelines contacting with fluid are all made of stainless steel.

11. Others:three-phase-four-wire-power supply with 380V/50Hz and CO2 with foodstuff grade ≥ 99.5% are prepared by customer itself.

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Basic Flow and Combination Style of the Super Critical CO2 Extraction Device :Main Technical Index:

Basic Flow :

1. CO2 → Extraction kettle → Separation I → Separation → Return circuit

2. CO2 → Extraction kettle → Separation I → Separation II → Fine distillation column → Return circuit

3. CO2 → Extraction kettle → Fine distillation column → separation I → Separation II → Return circuit

4. CO2 → Extraction kettle → Separation I → Fine distillation column → separation II → Return circuit

Extra floes can be increased according to technological requirement:Main Technical Index:

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1.CO2 →bottom of fine distillation column →separation I→separation II →return circuit,meanwhile raw Material (liquid)→continuous extraction of liquid material in the middle part of the fine distillation column(counter flow).

2.separation I or separation II (separated substances)→sub-pump→middle and upper part of fine distillation column .

TOP220-40-48

TOP420-40-96

Combination Style:

1-extraction-1-separation,1-extraction-2-separation,
2-1-extraction-1-separation-1-column,2-extraction-2-separation,
3-2-extraction-2-separation-1-column,4-extraction-2-separation,
4-4-extraction-2-separation-1-column
and special combination can be customized as requested.

Characteristics of the Super Critical CO2 Extraction Device:

1.The press ring of the extraction kettle can be opened quickly ;O-ring is imported with service period over 4 months.
2.CO2 can be used in circulation.
3.It can be designed and manufactured as per "GMP" standard.
4.The pressure stabilizing system of the extraction kettle is imported back- pressure valve.
5.It can be matched with computerized automatic control system (temperature,pressure,flow).
6.All valves of the device are under special heat treatment so they are robust and durable.

High Quality Raw Material

Processing

Application of the Super Critical CO2 Fluid:

Range of Application	Type of Application
Pharmaceutical Industry	Extraction of effective contents of Chinese herbs,concentration,refinement and precipitation of raw material drug,separation and refinement of fatty mixtures.
Foodstuff Industry	Extraction of hopes,caffeine removal from coffee berry ,extraction of plant pigment.
Cosmetics and Perfumery Industries	Separation and refinement of natural and synthetic perfumeries,dealkalization of tobacco,extraction of raw material cosmetics.
Chemical Industry	Separation of hydrocarbon,refinement of organic synthetic raw material,separation of azeotrope,retrieval of raw materials of reaction,dehydration of water soluble power of organic solution,water oxidation.
Others	Superconducting,semiconductor,ceramics,oil washing of petroleum core,enzyme catalytic reaction,preparation of materials,superfine granules,extraction of complex compound,supereritical dyeing technique,supereritical reaction,supereritical coating technique (pharmacy-making)

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SPECIFICATIONS

Model	Extract Capacity	Pressure	Temperature range	Combining Form
TOP120-50-0.5	0.5L	500bar	RT-75℃	One extracting pot-two separating pot circulation mode
TOP121-50-0.5	0.5L	500bar	RT-75℃	One extracting pot-two separating pot one rectifying column circulation mode
TOP120-50-01	1L	500bar	RT-75℃	One extracting pot-two separating pot circulation mode
TOP121-50-01	1L	500bar	RT-75℃	One extracting pot-two separating pot one rectifying column circulation mode
TOP120-50-02	2L	500bar	RT-75℃	One extracting pot-two separating pot circulation mode
TOP121-50-02	2L	500bar	RT-75℃	One extracting pot-two separating pot one rectifying column circulation mode
TOP120-50-05	5L	500bar	RT-75℃	One extracting pot-two separating pot circulation mode
TOP121-50-05	5L	500bar	RT-75℃	One extracting pot-two separating pot one rectifying column circulation mode
TOP220-50-06	(5+1)L	500bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP221-50-06	(5+1)L	500bar	RT-75℃	Two extracting pot-two separating pot one rectifying column circulation mode
TOP220-40-11	(10+1)L	400bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP221-40-11	(10+1)L	400bar	RT-75℃	Two extracting pot-two separating pot one rectifying column circulation mode
TOP220-40-20	（10+10L	400bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP221-40-20	（10+10L	400bar	RT-75℃	Two extracting pot-two separating pot one rectifying column circulation mode

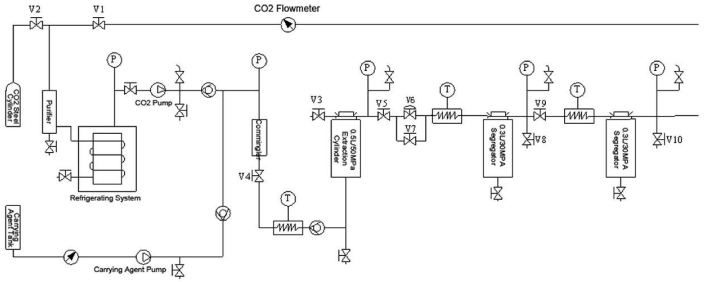
TOP120-40-24	24L	400bar	RT-75℃	One extracting pot-two separating pot circulation mode
TOP121-40-24	24L	400bar	RT-75℃	One extracting pot-two separating pot one rectifying column circulation mode
TOP220-40-48	24L×2	400bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP321-40-72	24L×3	400bar	RT-75℃	Three extracting pot-two separating pot one rectifying column circulation mode
TOP420-40-96	24L×4	400bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP421-40-96	24L×4	400bar	RT-75℃	Two extracting pot-two separating pot one rectifying column circulation mode
TOP220-40-100	50L×2	400bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP221-40-100	50L×2	400bar	RT-75℃	Two extracting pot-two separating pot one rectifying column circulation mode
TOP320-40-150	50L×3	400bar	RT-75℃	Three extracting pot-two separating pot circulation mode
TOP420-40-200	50L×4	400bar	RT-75℃	Four extracting pot-two separating pot circulation mode
TOP220-40-200	100L×2	400bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP630-40-300	50L×6	400bar	RT-75℃	Six extracting pot-three separating pot circulation mode
TOP320-35-300	100L×3	350bar	RT-75℃	Three extracting pot-two separating pot circulation mode
TOP320-35-600	200L×3	350bar	RT-75℃	Three extracting pot-two separating pot circulation mode
TOP220-35-600	300L×2	350bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP220-35-1000	500L×2	350bar	RT-75℃	Two extracting pot-two separating pot circulation mode
TOP220-35-2000	1000L×2	350bar	RT-75℃	Two extracting pot-two separating pot circulation mode

Note:

1) Standard configuration: PID digital display and the PID control module, pressure regulation: manual back pressure valve adjustment.
2) Can be combined and customized according to user's special process requirement.

Main Features

1) Intermittent or continuous work，co-solvent can be added if request
2) CO2 can be recovered and reused;
3) Pressure and temperature can be designed according to demand.
4) Can custom made into PLC or computer control



Super Critical CO2 Dyeing Device

Supercritical CO2 Dyeing Device is a novel waterless dyeing device.By means of CO2 fluid to substitute water which is used in the course of traditional dyeing and printing,it realizes real waterless dyeing,The supercritical CO2 fluid dyeing device is mainly used in dyeing of synthetic fiber and natural fiber, desizing and functional finishing of fabric.

Technical Index:

1.The maximum pressure is 30MPa.

2.The maximum temperature of media is 200℃.

3.The volume of the dyeing kettle is 24L.and the standard yard bobbins are 165*152*6 pieces.

Main characteristics：

1.The absorbing rate of dyestuff is 98% so it has high dye uptake rate and good dye leveling.

2.In the course of dyeing,the Super Critical CO2 fluid is dynamically circulated.

3.The Super Critical CO2 fluid has function of both diffusion from the inside core to the outside core and diffusion from the outside core to the inside core.

4.The residue dyestuff is retrieved therefore the utilization rate of dyestuff can reach 98%.

5.The whole course of dyeing is automatically controlled by computer.

Part of Product Performance

4000L High pressure autoclave

Super-high pressure testing autoclave for CSIC 715 Ø130×5000mm; 200MPa; 250℃

Ø126×1500 Testing device for Xi'an Petroleum University 180MPa; 425℃

DIA125mm Super-high pressure testing autoclave China Academy of Engineering Physics Ø150×800mm; 180MPa; 425℃ Petroleum University 180MPa; 425℃

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China Academy of Engineering Physics Ø396×300mm; 120MPa; 120℃

China Academy of Engineering Physics Ø295×247mm; 150MPa; 120℃

High temperature & pressure testing device for Chinese Academy of Sciences Structure of Matter

1000L Supercritical Drying Equipment for Middle and Southern University

5L Supercritical Dyeing Device for Chengdu Textile College

300L×2 Supercritical Extraction equipment

Supercritical Extracting Device

1.1 500 ML Device

1.2 1L Device

1.3 5L Device

1.4 5L+1L Device

1.5 10L Device

1.6 24Lx2 Device

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1.7 50L Device

1.8 300L Device

1.9 500L Device

1.10 1000L Device