



Leading designer of innovative
SUPERCritical
CO₂ solutions



We think outside the box...

We are a French and passionate innovative solutions designer.

Our experienced team has a **strong expertise** in design, process and equipment. We handle the creation of machines from **laboratory systems to industrial-sized machines.**

Innovation is part of the DNA of SFE Process.

We provide complete **genius supercritical CO₂ solutions** to our customers in order to improve their productivity, let them save time and money.

SFE Process challenges the status quo about supercritical CO₂ with an innovative point of view and a high expertise

>>> Our values

Reliable and
long-term **partnership**

Commitment

**Constant
innovation**

Passion

Teamwork

**Respect for nature
and environment**

Customer oriented

»» Diverse applications

Our technique opens a wider range of supercritical process possibilities.

SFE Process provides complete scCO₂ extraction and fractionation solutions from lab to production scale.



AGRO-FOOD



PHARMACEUTICAL



PERFUME AND AROMA



COSMETIC



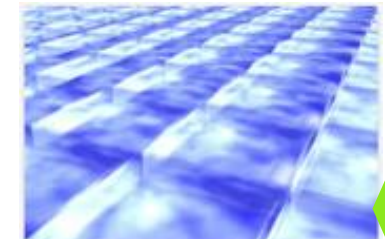
CLEAN APPLICATION



HEMP AND CANNABIS



HIGH PRECISION INDUSTRIES



AEROGEL



»» Benefits of using **supercritical CO₂**

A “Green” technology

- ➔ **Environmentally friendly**
- ➔ **No effluent generation and non-polluting**
- ➔ **No waste production**
- ➔ **Non-toxic / non-flammable / safe**
- ➔ **Less resources are required when using a green solvent such as scCO₂**
- ➔ **Easily available, safest and fully recoverable***



**The CO₂ used to perform a run is fully recycled and re-injected into the loop.
At the end of a run, the loss of CO₂ represents only 10% of the volume of the extractors.*

»» Benefits of using **supercritical CO₂**

Full extraction

- Higher extraction efficiency
- Gentle process which does not damage the plant and the raw material
- Respects the plant and the raw material
- No residue of CO₂ in final product



100 %

of the valuable
compounds contained
in the plant is extracted



Thanks to our advanced engineering expertise and the perfect control of extraction parameters such as pressure, temperature, volume and CO₂ flow rate, SFE Process is proud to carry out a full extraction of your material: 100 % of the valuable compounds is extracted

»» Benefits of using **supercritical CO₂**

Advantages of SFE Process solutions

- **Continuous and automatic production with very low idle and turnaround time**
- **High performance and secured technology**
- **Lower operating costs, higher profits**
- **Fast and efficient ROI**
- **Investment in scCO₂ is at low risk**
- **Eco-resource, CO₂ gas is cheaper than other solvents such as ethanol**
- **Minimum footprint, compact solutions**



»» How is your **Project** handle by SFE Process Team

1

SPECIFICATIONS

- ▶ Customer's needs assessment
- ▶ Definition of the technical specifications
- ▶ Price offer
- ▶ Specifications validation



2

DESIGN

- ▶ PID (Piping Instrumentation Diagram)
- ▶ Flow Switch Program
- ▶ 3D model design & validation
- ▶ Sizing
- ▶ BOM (Bill Of Materials)



3

FABRICATION

- ▶ Made in France
- ▶ Quality management system
- ▶ Qualified & validated sub-contractors
- ▶ FAT validation (validation and tests in our factory)



4

INSTALLATION

- ▶ Delivery
- ▶ SAT validation (validation and tests in your factory)

We support our customers from A to Z with their new project

**Benefits of working
with us**



»» You are in **goods hands**

when you rely on SFE Process Team

Your Project is taken care of by our **passionate and dedicated team**

15 years of expertise in **SUPERCRITICAL CO₂** process at your service

A **team leader / project manager** who will be your main contact for any topic, planning management, quality and cost control

Passionate engineers for process improvement, smart and green technology

A **reliable team of technicians** for the mechanical and electrical design

A network of **qualified and validated sub-contractors** for parts machining, electrical design and assembly, skid manufacturing and equipment assembly



» Fully automated process control

100 %
automated process



Systems perfectly piloted by performant programs.
**Automated extract collection, automated valves,
automated data recording...**

Thanks to this efficient automation, switching from one vessel to an other during extraction is automatically made too.
Operator is free while extraction is under process.

Because our systems are **flexible** you can choose and personalize automation levels : **from fully automated to fully manual.**

PLC Control

Eurotherm®
by Schneider Electric

Our control and piloting programs are **automated**, they have been developed in partnership with **Eurotherm** (by Schneider Electric).

They are designed to be **used for life, autonomous and independent of side technologies.**

No computer obsolescence.

You can be connected from everywhere.

» Simple, modular & user friendly solutions

Simple and user friendly solutions

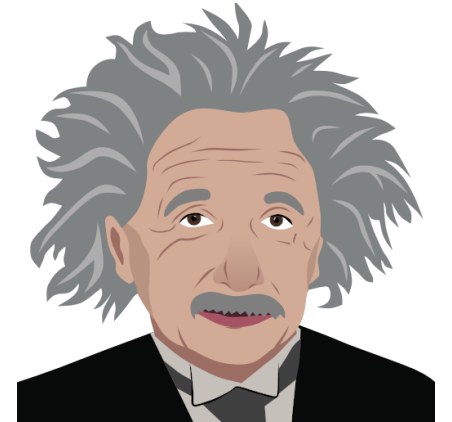
- Plug and play
- Turnkey solutions
- Fast installation in maximum one day
- Easy to start up and to use: training and support provided

SUPER SIMPLE SYSTEM → Choose a **preset recipe**, and just press the start button... then, you can relax and focus on your business, our genius solutions will do the rest for you!

Modular and expendable

You can increase the capacity of your equipment just by adding a complementary skid and take the benefits of our **Xtramile optimization**.

- Expendable capacities and flexible skids.



« Everything should be made as simple as possible, but not simpler »

A. Einstein

»» Innovation is part of our DNA

We are developing innovative products and tailor made equipment.

To fit your needs SFE Process builds **ultra-high performance advanced equipment.**

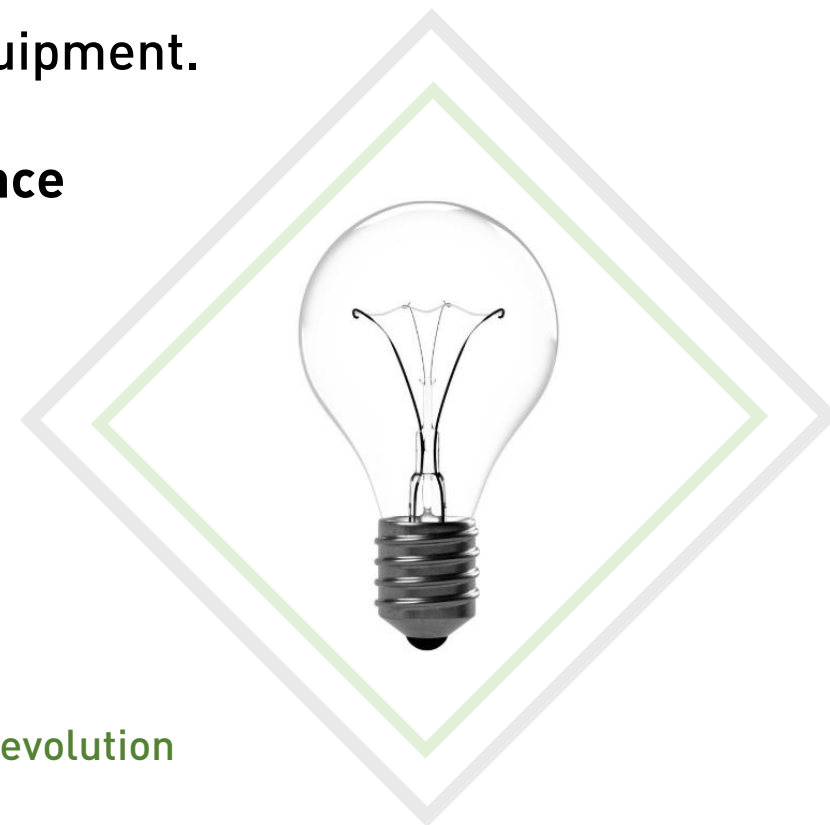
We also develop R&D project to go further...

- New and complete processes
- Fractionation
- Impregnation
- Chromatography
- Analysis
- Dewaxing
- Purification

We anticipate future needs and market evolution

We already **master all the processes** related to supercritical CO₂

We always think outside the box...



» Certifications / Compliance standards

SFE Process designs and installs its solutions all over the world.

Our equipment always meets the standards set by your country and your industry (such as pharma, agrofood, medicine, fine chemistry...)

All our systems are CE marked for Europe according to PED/2014/68/UE norm.

Available on demand :
Standard, GMP ready, full GMP, 21 CFR PART 11, ASME, CRN



»» **Reliable service & support**

SFE Process provides **periodic check-ups**, either mandatory or recommended, according to the new PED 2014/68/UE norm.

In addition, we recommend **preventive and corrective maintenance**.

You can rely on us !

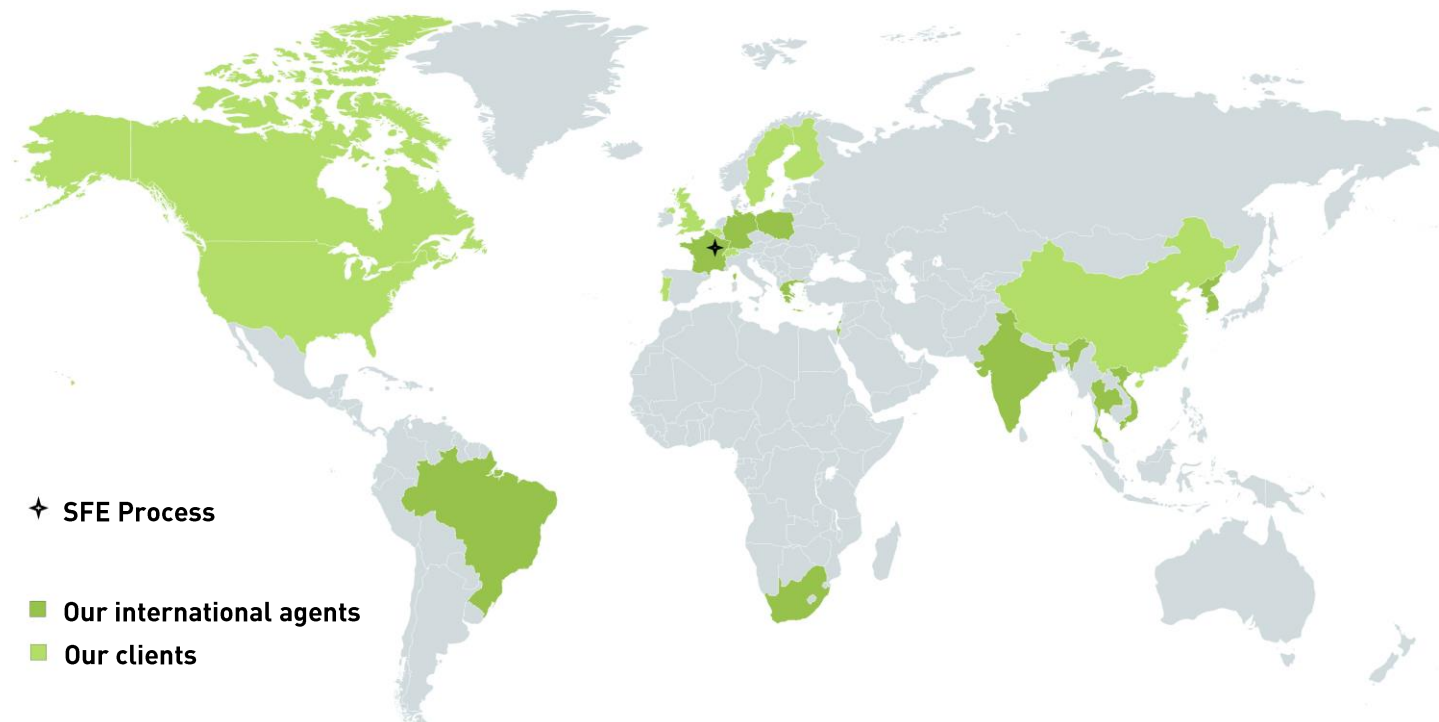
Services, training, maintenance, scale up,
perfect after sales services...

We offer **expert support** throughout the project and beyond.

Wherever you are, we have an agent network all over the world to assist you.



»» Our worldwide presence



✦ SFE Process

■ Our international agents

■ Our clients

PT | PARALAB - Rui SOARES
rui.soares@paralab.pt

TH | ACI - Supat MUANGYOT
supat@acisciencs.com

UK | SCIMED - Dr James TUNSTALL
james.tunstall@scimed.co.uk

IL | RELEX - Lex MENC0
lex@relex-process.com

IN | MEDI ANALYTIKA - Ramesh R.
info@medianalytika.com

DE/KR | SOLNATEX - Andreas WEBER
andreas@solnatex.com

PL | AGA ANALYTICAL - Piotr KĘSICKI
p.kesicki@aga-analytical.com.pl

VN | SATICUS - Anh LAM
anhlam@saticus.com

SG | LABCAL SOLUTIONS ASIA - Stéphane CHESNEAU
s.chesneau@labcalsolutions.com.sg

GR | NOMADLABS - Dr Nikos XYNOS
nikolasx79@gmail.com

BR | Pedro Ivo NUNES
pedroivonc@gmail.com

ZA | STERITECH- Stéphane CHESNEAU
stephane@steritech.co



» SFE Prod: Standard range from 2x5L up to 2x100L



SFE Prod 2x5L



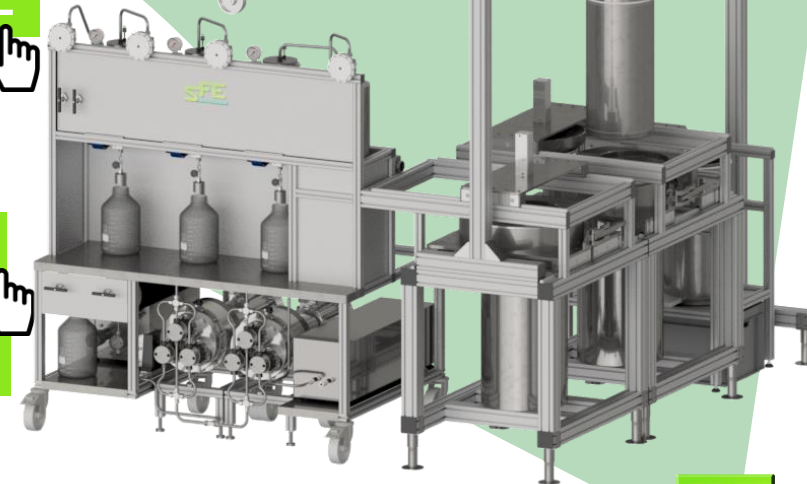
SFE Prod 2x10L



SFE Prod 2x20L



SFE Prod 2x25L



SFE Prod 2x50L



SFE Prod 2x100L

Wide range of scCO₂ extraction solutions for industrial scale

STANDARD | from 2x5L up to 2x100L with modular options

TAILOR MADE | from 150L and above to fit your special needs

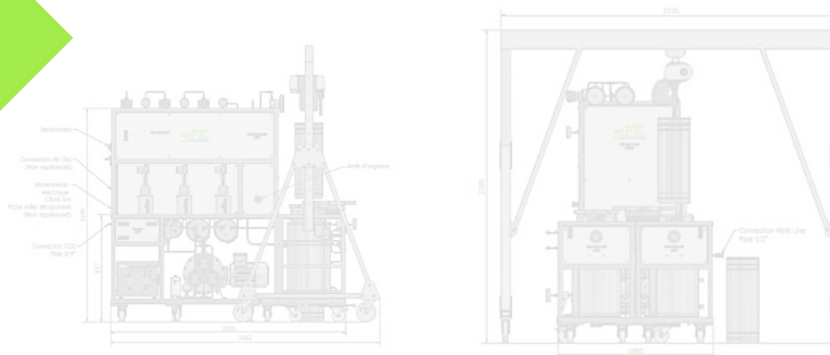
SFE Prod | INDUSTRIAL SCALE



» SFE Prod: **Tailor made solutions** for even greater capacities

Because your project is ours, we also design tailor made systems, with a range up to multiple 500L extractors

- » Our standard solutions are at 400 bar.
We can upgrade to 700 bar according to your specifications.



Depending on **your specific needs...**

We can define the most suitable and productive solution : design, create and implement it.

We create **dedicated extraction recipes**
that can always be modified.

»» Effective loading capacity

It is important to **point out that**

All our extractors offer a total material loading capacity **equal to the announced capacity**. We manufacture larger autoclaves so that the insides baskets in which the material is loaded have the expected loading capacity.

so that we can **compare like with like**



We always talk about effective loading capacity (content),
and not about the **extractor volume** (container)

Example with a « 10L SFE Process extractor »

Loading capacity = 10L net
Volume extractor = 12,6L

→ A small detail that
makes a **big** difference !

»» Process optimisation on SFE Prod

Our extractor technology

Our standard version is composed of 2 extractors. With our **basket technology**, loading and unloading of raw materials inside the vessels is easier.

No time loss to clean the vessel, the cleaning of autoclaves and baskets is much **simpler, faster and more accessible**.



»» Process optimisation on SFE Prod

Xtramile optimisation

The process is optimised by an extraction path like no other, with a **smart** pressure and fluid route. **No downtime, less energy required.**

With a perfectly mastered solubility and diffusivity, **you can extract more in less time. Higher performance.** Lower CAPEX, improved OPEX, best ROI.

For the same total capacity, operating on 3 smaller extractors with Xtramile increases your productivity.

A 2+1 extractors solution brings a much greater performance. It is possible to choose Xtramile on all our standard range, either at the order or for a later upgrade.

Example with hemp extraction:

Without Xtramile

10

extractions/24h

With Xtramile

15

extractions/24h



Let us know your specifications and we'll provide you with a customized process optimization plan !



» SFE Lab: Standard range from 100mL up to 2L



SFE Lab 100mL
1000 bar



SFE Lab 500mL
1000 bar



SFE Lab 1L
700 or 1000 bar



SFE Lab 2L + Fractionation column
700 or 1000 bar



Wide range of lab-scale scCO_2
extraction solutions

STANDARD | from 100mL up to 2L with modular options
TAILOR MADE | solutions adapted to the precise and specific
needs of laboratories, R&D projects and industries

SFE Lab | LABORATORY SCALE



» SFE Lab: Custom solutions to fit your specs

Because we perfectly master all the process parameters and steps, we can offer a **perfectly appropriated solution**.

Our range of standard equipment extends from 100mL to 2L.

We also design **customised solutions** adapted to the precise and specific needs of laboratories, R&D projects and industries.



For particle formation (SAS, RESS, PGSS) processes, we have developed **dedicated performant scCO₂ systems**.

Our laboratory equipment are designed for sterilization, medical device cleaning, API, natural extraction, perfume making & flavors, cosmetics...

