

Standard units

Units	Extractor type	Loading system	Raw material processed	Extraction type	Filtration type	Solvent recovery from spent material	Residue discharge
330	Non-agitated Extractor	Tiered grids and fully opening hatch	Flowers / Chips / Stalks	Non-agitated or recirculation	Gravitational	Steam stripping	Moist material from above
340	Floating Filter Extractor (FFE)	In bulk from above with fully opening hatch	Powders / Gums / Resins	Agitated from below - turbine / deflector	Floating filter suction	Steam stripping	Suspension liquid with bottom-drain crust-breaking or wide aperture valve
325	Filtering Bottom Extractor (EF2)	In bulk from above with manhole or dedicated pipework	Powders / Ground materials	Agitated from above - vertically adjustable, clockwise and counter-clockwise rotation, heated blade system	Nitrogen pressurised, or pump suction, or vacuum beneath the filter medium	Vacuum drying	Dry powder with swivelling bottom or wide aperture lateral hatch

Characteristics: • Construction materials: High quality stainless steel (304L and 316L) • Capacity and dimensions: from 50L to 5 000L (standard versions 300L, 1 500L, 3 000L, 5 000L) • Certification and standards: EU regulations / PED Directive / French CODAP construction code for pressurised equipment

Ancillary equipment: Tournaire can offer optional extras • Steam generator (electric, gas or oil powered) • Grinder, roller, chipper • Support framework Residue processing • Discharge conveyor • Screw conveyor

300L extraction pilot



300L extractor - 3 bar pressure

Subcritical extraction pilot



30L subcritical extractor - 22 bar pressure

► YOUR TAILOR-MADE SOLUTION IS OUR STANDARD

Our customers say:

“Our recent 2 x 5,000L extraction unit project with Tournaire has become the group's benchmark project.”

Thierry Bodin, Robertet

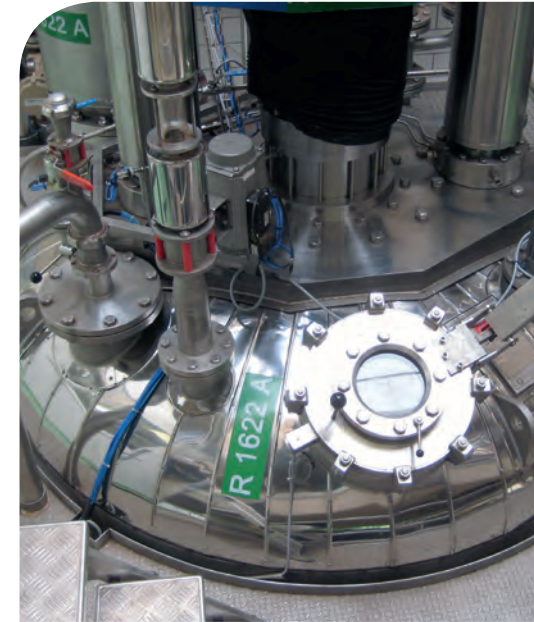
70 COUNTRIES

5 CONTINENTS

See also our rectification technical datasheet



March 2019 - Photos: Tournaire, JJ L'Héritier, Folclia, Sonic Blue



Complete, made-to-measure, turn-key solutions, suitable for all types of raw material.

EXTRACTION SOLID / LIQUID

APPLICATIONS

PERFUMES AND FLAVOURS
FOOD INGREDIENTS
PHARMACEUTICALS AND HEALTH
COSMETICS
CHEMISTRY

- 180 years of extraction process expertise.
- Constant innovation to meet every need.
- Support from a team of experts in all phases of the project.
- More than 1000 complete units for natural material processing, supplied since 1833.



SINCE 1833

70, route de la Paoute - Le Plan
CS 71004 - 06131 Grasse Cedex France
Tél. +33 (0)493 09 34 34 - Fax +33 (0)493 09 34 56
equipement@tournaire.fr



TOURNAIRE
Produces the best, protects the most

SINCE 1833



TOURNAIRE
Produces the best, protects the most

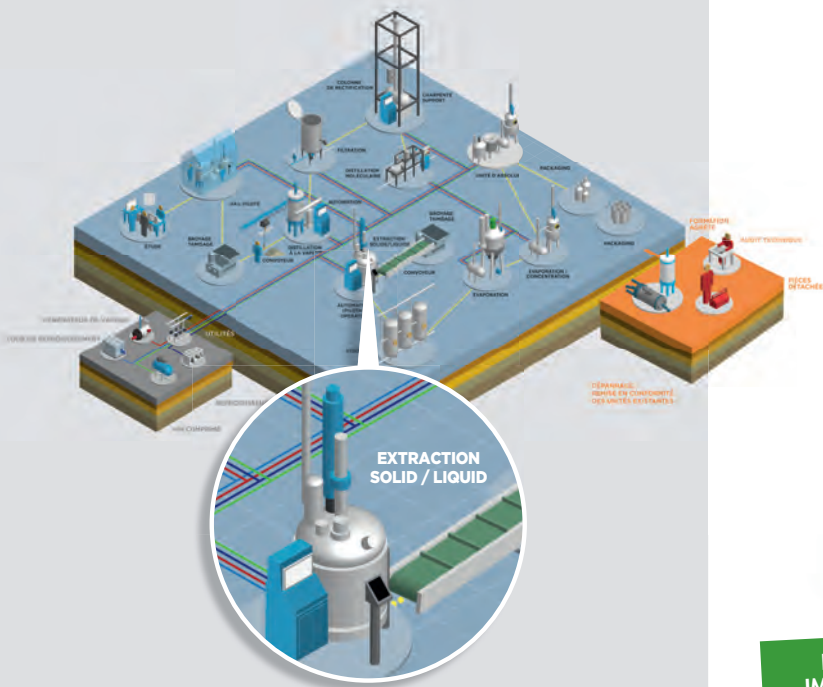




EXTRACTION SOLID / LIQUID

Founded in 1833, Tournaire came into being alongside the first perfume plant distilleries in Grasse.

Originally a coppersmith, then a manufacturer of stills, modern extractors and copper then aluminium containers, Tournaire has continually acquired new expertise with the evolution of the perfume industry, and to meet the specific needs of its customers. « Associate Member of the IFEAT » since 2018.



Tournaire added value

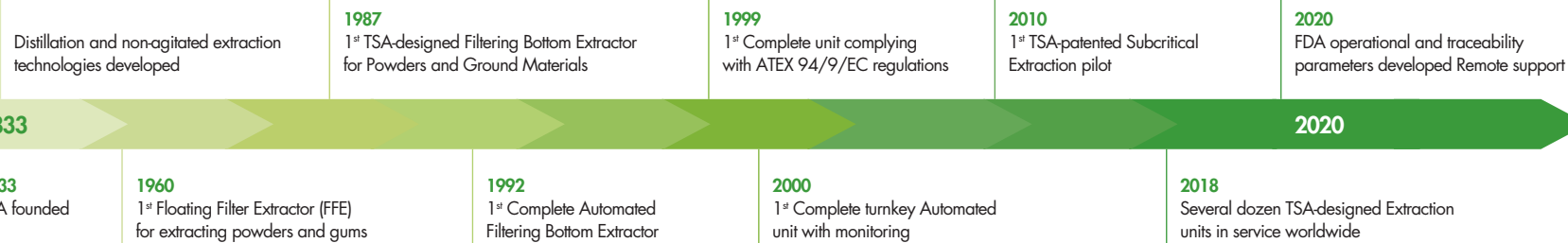
Tournaire has developed a complete range of **Solid / Liquid batch extractors** suitable for a wide range of raw materials, to produce **extracts with high added value**. To follow its non-agitated extractors and floating filter extractors (FFE), Tournaire designed and developed the filtering bottom extractor (EF2).

The **filtering bottom extractor** (EF2) has become, after more than 20 years, **the market reference for natural extracts**. Its great versatility, its industrial capacity and performance, and its reliability all come from constant improvements to the technology, linked to changing regulations and an increasingly demanding market seeking optimised production capacity and top-quality extracts.

Tournaire offers a pre-project **engineering assessment** for complete turnkey units. These complete units feature processes optimised using new automation functionalities that comply with the latest European regulations (PED/ATEX), while limiting environmental impact through energy consumption and waste control systems.

The Tournaire EF2 extractor is the product of long experience with a great variety of **natural extracts**. This continuous experience goes back decades and enables Tournaire to provide its customers with the best performance and service.

These units include evaporation and concentration systems, as well as mechanisms for transforming concretes to absolutes.



NON-AGITATED EXTRACTOR

- Designed for extraction and maceration of bulk large-particle-size products or sensitive materials like flowers.
- Loading and discharge using tiered grids.
- Residual solvent recovery from spent material using steam stripping.

This is the equipment used for traditional maceration and extraction of a wide range of products for perfumes, flavourings and pharmaceuticals.



Seeds



Herbs



Vanilla



Rhizomes



Jasmine



Gums / Resins



Roots



Wood / Bark



Cocoa



EFFICIENCY IMPROVEMENT by 20 to 90%



FLOATING FILTER EXTRACTOR

- Designed for extraction from bulk or powdered raw materials with a tendency to clump, such as gums and resins.
- A powerful turbo-agitator at the bottom of the tank is used for mixing and grinding.
- Miscella separation from the solid phase is achieved with a filter piston linked to a suction pump, its downward movement driven by a sealed float.
- The residual solvent is recovered using steam stripping.
- Residues are removed in liquid suspension through a bottom-drain valve.

FILTERING BOTTOM EXTRACTOR

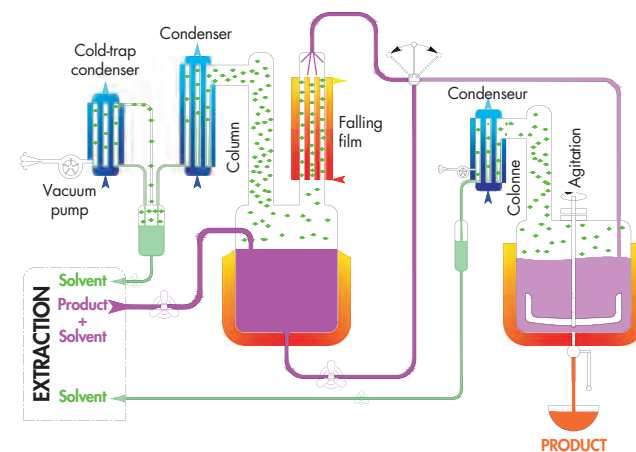
The latest generation solid/liquid extractor designed to:

- Reduce solvent quantities used.
- Reduce the number of washes > reduce evaporation volumes > reduce energy consumption.
- Reduce loading and discharge times.
- Optimise the extraction, filtration and drying kinetics to reduce production times.
- Limit residual solvent content of residues.

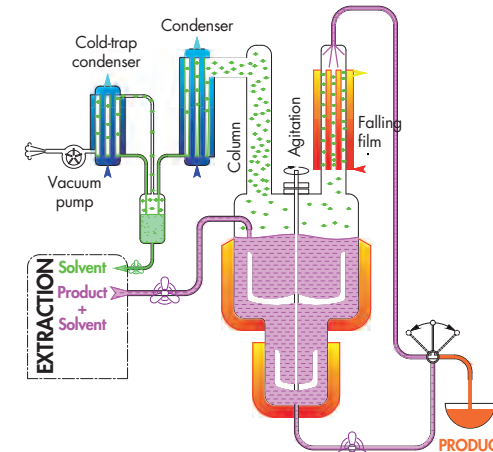


Evaporation unit

Separate evaporator and condenser



Integrated evaporator and condenser



EF2 Technology features

Quick-loading system

- Loading hopper on the unit.
- Hopper loading concurrent with extraction from previous load.
- Accurate weighing of the load in the hopper.
- Hopper loading and emptying is automated.
- Extractor loading time limited to a few minutes thanks to integrated anti-bridging.
- Other loading systems on request.



Powerful agitation with automated vertical movement

- Full-volume agitation of the extractor with manual or automated vertical movement of the agitator.
- Change agitator direction of rotation manually or automatically.
- Powerful motor and torque to break-up a compacted press-cake after pressurised filtration and to mix powders during drying.



Multi-function agitation blades

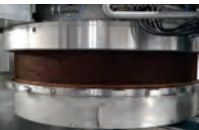
Several functions:

- Agitate the suspension during extraction - slurring direction.
- Smoothing the cake after filtration - smoothing direction.
- Re-slurring the damp cake at the start of the drying phase - slurring direction.
- Reduce cake drying times (option for heated blades).
- Discharge the cake if the lateral hatch discharge option is taken.



Quick-opening, full-surface filtering bottom

- The entire bottom surface of the extractor is a filter.
- Filtration takes place under nitrogen pressure for maximum cake drainage, to limit washes to two and reduce the duration of the filtering process.
- The bayonet and hydraulic swivel opening system for the filtering bottom enables very quick residue discharge.



Vacuum drying

- After extraction the residual solvent in the material is recovered with vacuum drying of the residue.
- The entire system is heated: The body, filtering bottom, dust filter and agitator mechanism.
- Very low residual solvent content.
- The dust filter is designed to capture the finest particles efficiently, with automated de-clogging.



Process automation

Various phases of the process are automated:

- Nitrogen inerting.
- Raw material and solvent loading.
- Cold, hot or reflux extraction.
- Vacuum or pressurised filtration.
- Vacuum drying.
- Residue discharge through lateral hatch or swivelling bottom.
- In place cleaning.

