

## Supercritical CO<sub>2</sub> to solve your purification problems

A supercritical fluid has physical properties (high density and solubility, low viscosity, and high diffusivity) that make its use interesting in chromatography. Among the different available fluids, CO<sub>2</sub> emerges as the fluid of choice for SFC for the following reasons:

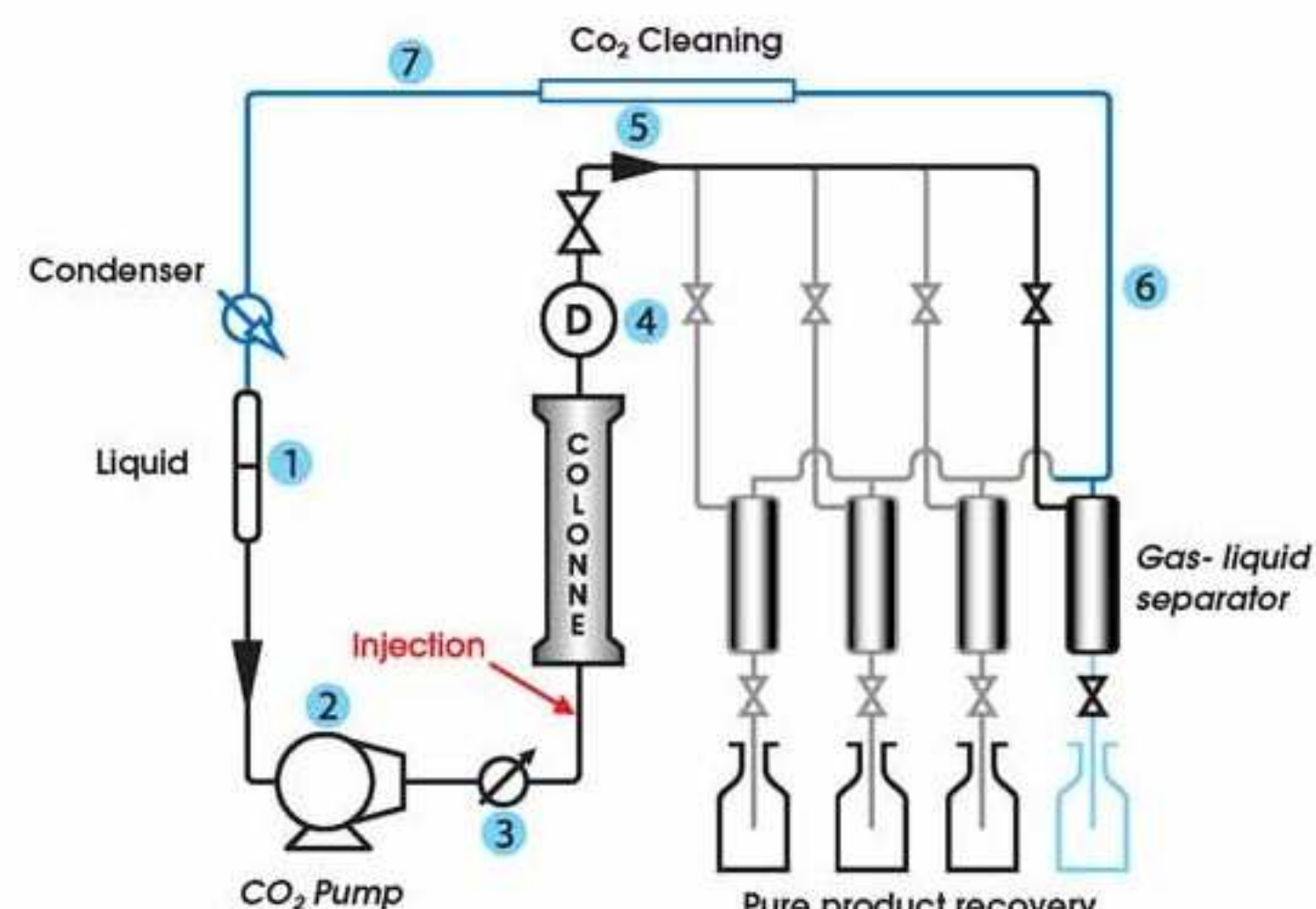
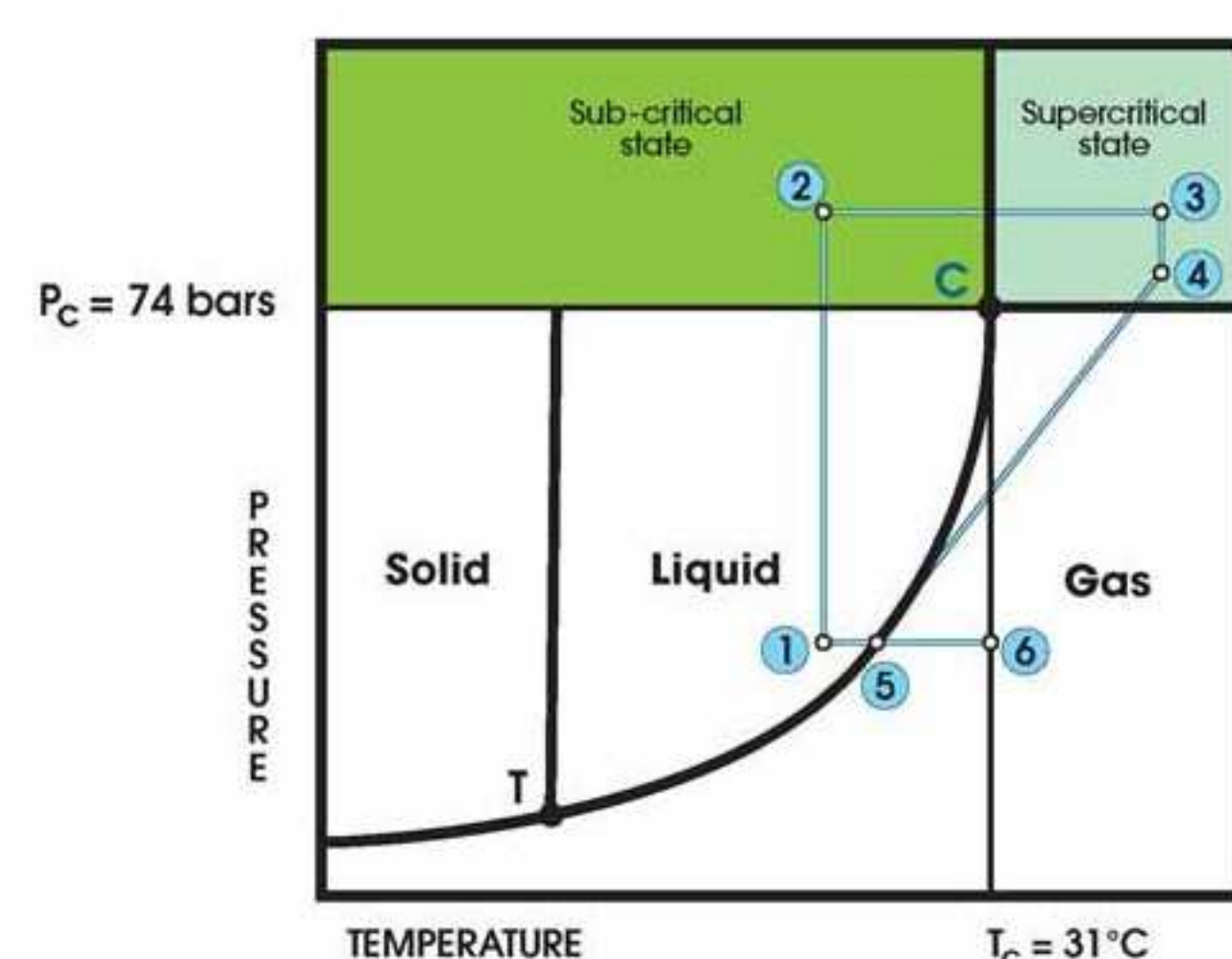
- Critical point C easily reachable (T=31°C ; P=74 bars)
- Fast separation time (typically less than 5 min): the low viscosity of supercritical CO<sub>2</sub> allowing high elution flow rates.
- High plates' number and more resolution power thanks to the transport properties of supercritical CO<sub>2</sub>.
- Easy recovery of purified sample highly concentrated.
- Supercritical CO<sub>2</sub> exhibits a good solvent power. It is cheap, non-flammable and non-toxic.
- CO<sub>2</sub> is transparent in UV and IR.

### Which applications in chromatography with supercritical CO<sub>2</sub> ?

In general, apolar compounds, and polar compounds soluble in alcohol can be purified by SFC. Among the different applications, we can mention:

- Enantio-separation on chiral stationary phases.
  - Purification on silica and bonded silica of molecules such as steroids, fatty acids, tocopherols, benzodiazepines, alkaloids, etc...
- Depending on compound polarity, addition of polar co-solvent (typically alcohol up to 25%) to CO<sub>2</sub> is needed.

### Process principle of Chromatography using supercritical CO<sub>2</sub>



1. Eluent is stored in liquid state (gas-liquid equilibrium).
2. Liquid CO<sub>2</sub> is pressurized to working pressure with a pump ( $P > P_C$ ).
3. Pressurized liquid is heated (or cooled) to working temperature. Eluent is supercritical and injection is made.
4. Separation occurs in a chromatographic column.
5. Mixed eluent and purified compounds are adiabatically depressurized ( $P < P_C$  and  $T < T_C$ ). After depressurization, eluent is under gas-liquid equilibrium. The purified compound is directed to the selected fraction.
6. Eluent is heated and becomes gaseous. Solvent capacity of the vaporized eluent is null and the pure compounds condense in small droplets together

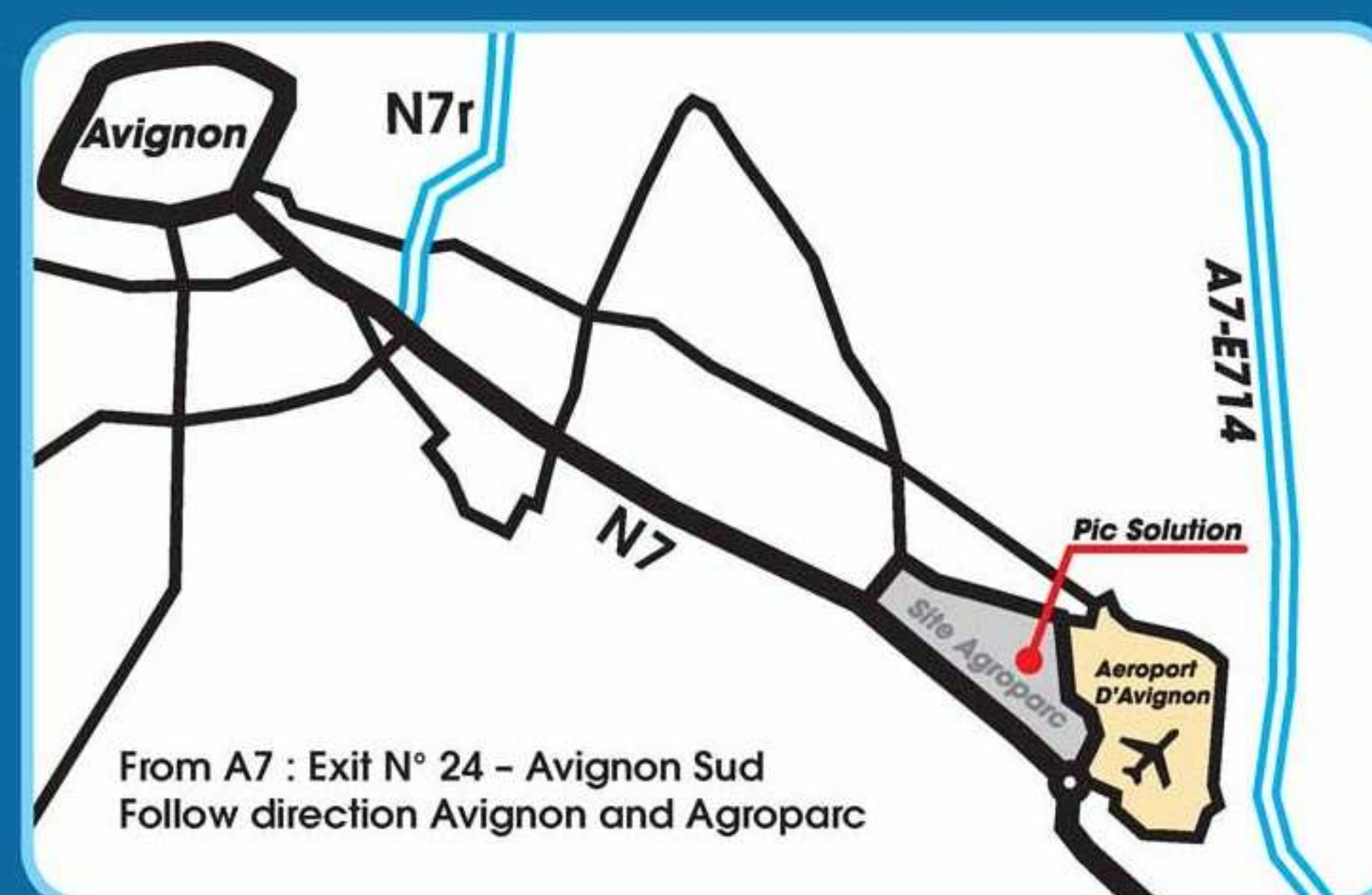
with the modifier. Physical separation of gas CO<sub>2</sub> and liquid phase (co-solvent + purified sample) is made in gas-liquid separator with high efficiency.

7. Gaseous CO<sub>2</sub> is cleaned and recycled. It is cooled down and condensed back to the reservoir.



### - CONTACTS -

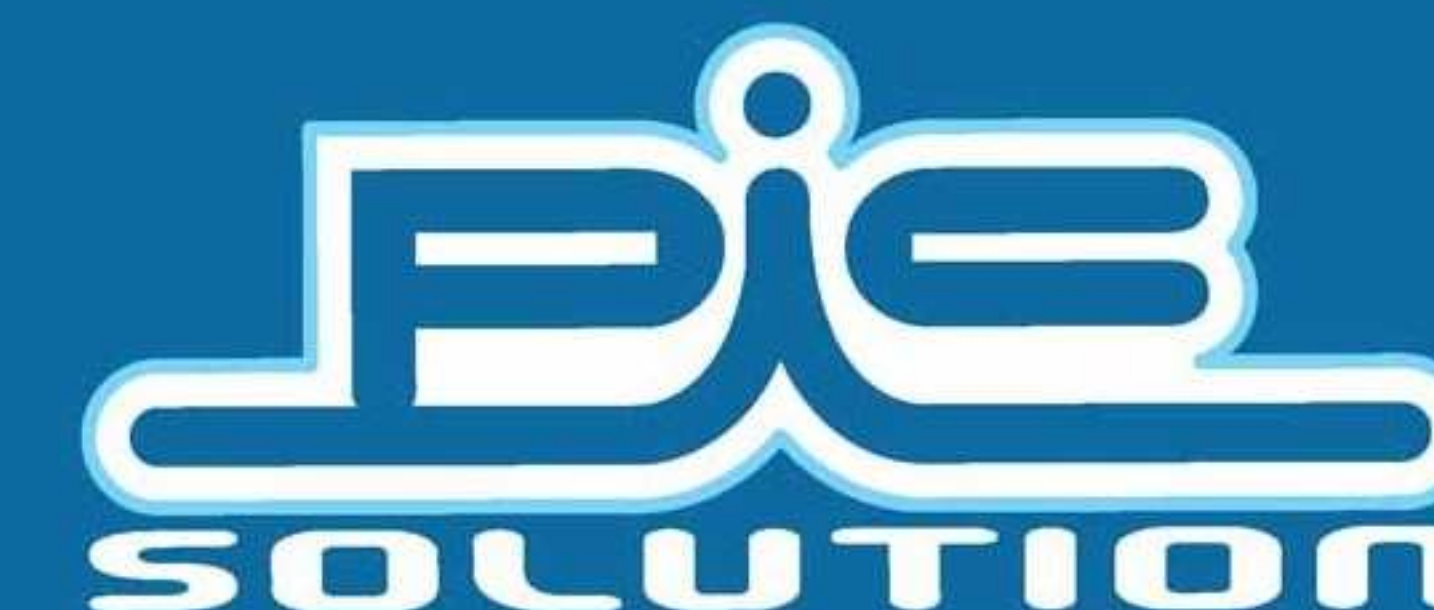
Do not hesitate to contact us for more details and/or demonstrations of systems.



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## Equipments and Solutions for Supercritical Fluid Chromatography