



naturally
extracting **LIFE'S
ESSENTIALS**

Pioneering industrial high
pressure CO₂ solutions

matex
PROZESSTECHNOLOGIE



INNOVATIVE TECHNOLOGY

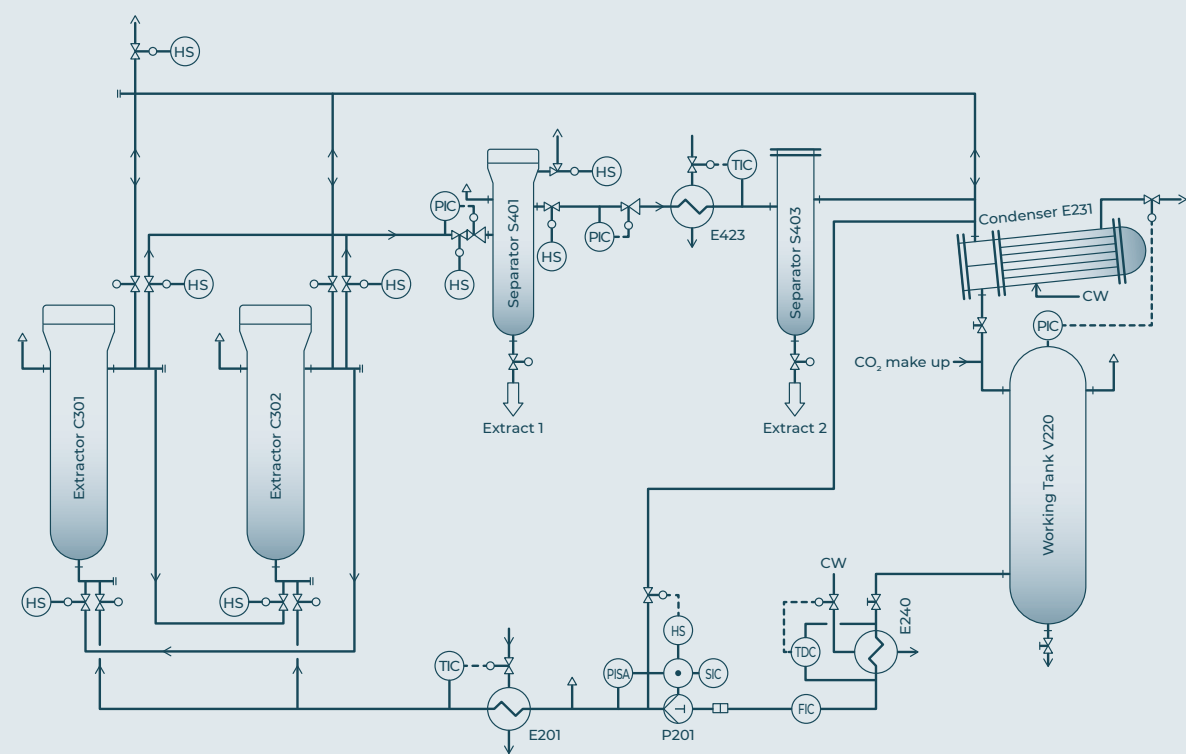
to succeed

CO₂ is used in a variety of processes

where its unique properties are advantageous for the process and the processed materials. NATEX is continuously expanding the list of applications and technologies.

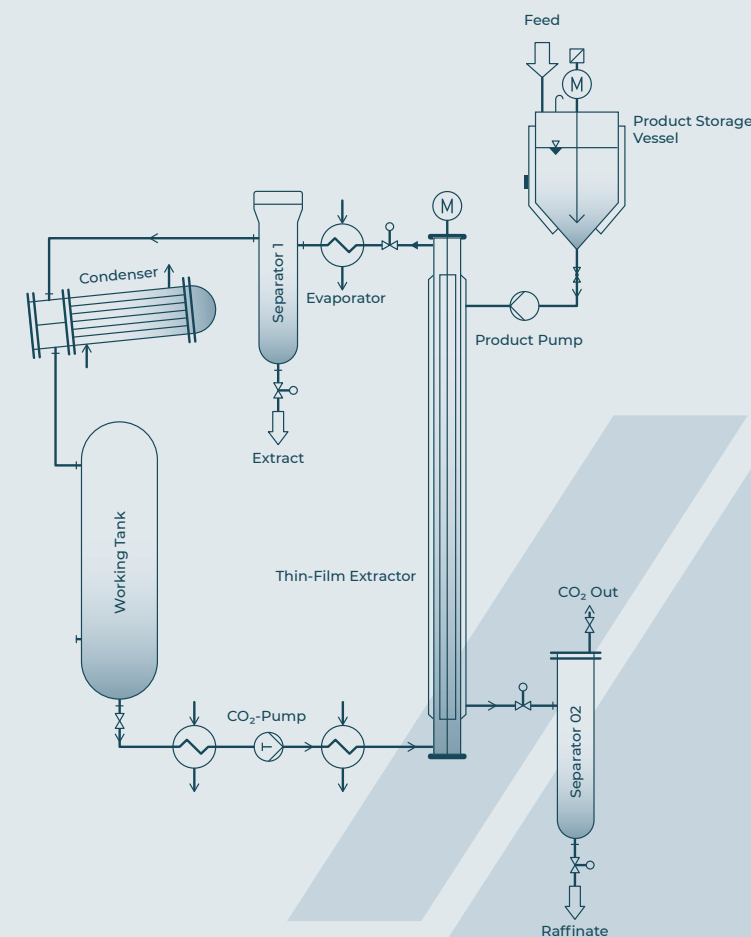
Extraction of solid raw materials

Processing solid raw materials by means of CO₂ is the most common application for this solvent. It is done by filling the material into baskets or directly loading the extractors. The solid or liquid extracts can then be fractionated by gradually changing the conditions of CO₂. At the end of the process the gaseous CO₂ is fully recycled by liquifying and reusing it.



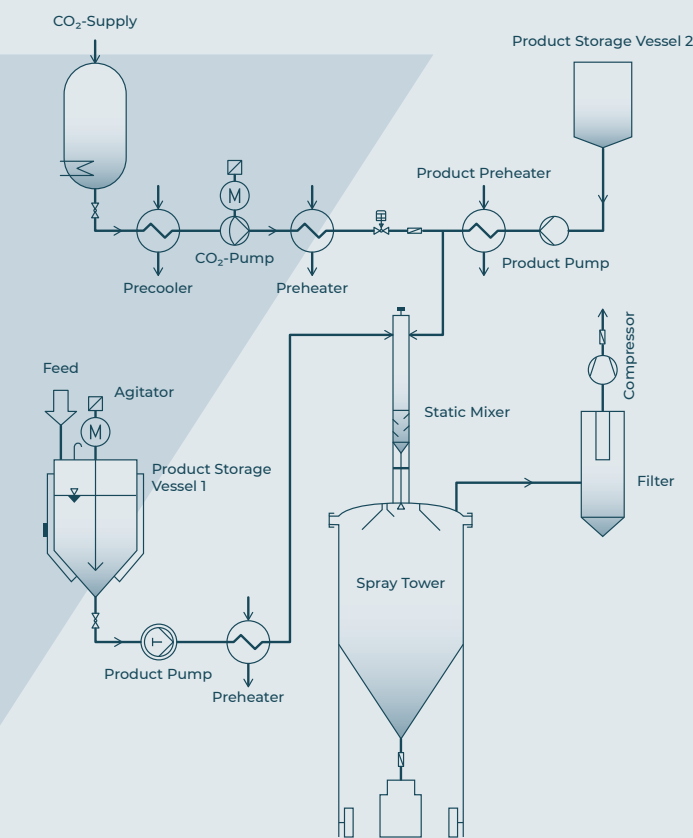
Extraction of liquid raw materials

Liquid raw materials can be continuously processed in packed columns or thin-film extractors (NATEX patented technology). The thin film can also be applied to highly viscous raw material or sludge.



Particle generation

Microparticles with different sizes and morphologies can be obtained through a variety of CO₂-based processes. These are mainly spraying or antisolvent processes. Additionally, liquid compounds can be applied onto solid carrier materials. Particle formation processes can create unique products, increase the range of applications or simplify the dosing of critical substances.



TOGETHER IN A JOURNEY

from the first idea to
industrial realization

As a world-leading specialist NATEX provides the complete range of services from initial idea to industrial plant in the field of high-pressure CO₂ extraction. The journey starts in Research and Development and ends in a long-term relationship with ongoing optimization of industrial installations.

Empowered by R&D

Research activities are essential for testing new ideas and generating basic understanding for new products. With flexible inhouse plants and dedicated staff we help to turn ideas into reality. Our engineers apply extensive theoretical and practical knowledge to each new task. This includes:

- **Testing of new materials and processes**
- **Development and optimization of existing concepts**
- **Production of samples for initial tests and proof of concept**

Our research units, fully equipped according to the highest industrial standards, are available for research institutions that want to explore the potential of the technology on their own. R&D units are also complementing industrial plants and allow testing of new products on a small scale before easily transferring them to industrial scale.

A reliable scale-up

For successful industrialization of CO₂-based processes, scale is an important factor to improve the economics. NATEX proved its competence in various applications and supports customers in their transition from a small-scale process to an industrial-scale plant. This is accomplished engineering and testing in close through collaboration with the customer to consider all individual needs, while staying within industrially available standards. The following services are performed:

- **Inhouse pilot testing or in collaboration with industrial partners**
- **Pre-engineering study for generation of all specifications**
- **Optimization of consumption figures and layout**
- **Forecast of Operational and Capital Expenditures (OPEX/CAPEX)**

Setting the standard in industrialization

Using CO₂ as a process medium at industrial scale is the core competence of NATEX and its affiliated partner company Innoweld Metallverarbeitung GmbH. Within this collaboration numerous large industrial plants have been successfully realized, most of them for the first time in history. This pioneering work results in continuously challenging the status quo and moving the boundaries of the industry. The engineering and process know-how from NATEX, complemented by the individual abilities of selected suppliers for the core equipment such as apparatus, pumps, compressors and instrumentation allows an efficient realization of innovative turnkey projects.

Full lifecycle support

NATEX plants are built for decades of productivity and so is our Service & Support. In addition to supervision, training of operators and safety checks on the equipment, by providing continuous optimization and introduction we offer support of new products.



A WORLD OF SOLUTIONS

Dominique Tourneix

CEO Diam Bouchage and Oeneo SA, France

NATEX has had a key role as our partner in the realization of successful DIAM projects to create supercritical CO₂ cork cleaning units. A professional relationship between the two companies NATEX and DIAM has gone beyond the usual quality of such client-supplier relationships. It must be said that a valuable partnership has been established in terms of technical input, innovative solutions and in the strategic vision the leaders of NATEX are fully associated with. DIAM and NATEX also have a joint patent, which defends the know-how acquired during this real teamwork. The NATEX team is also very involved in DIAM's various R&D activities. If you are searching for a more than efficient and highly reliable partner who supports you in economic development, capable of being a source of proposals for your own strategy, I strongly recommend you to choose the NATEX team to realize your projects

Ranjit Ramachandran

CEO Plant Lipids Private Limited, India

The zeal to adapt new technology, attention to detail and the impeccable service of NATEX, makes them the world's leading and preferred manufacturer of SCFE plants. Our relationship with NATEX is getting stronger by the day.

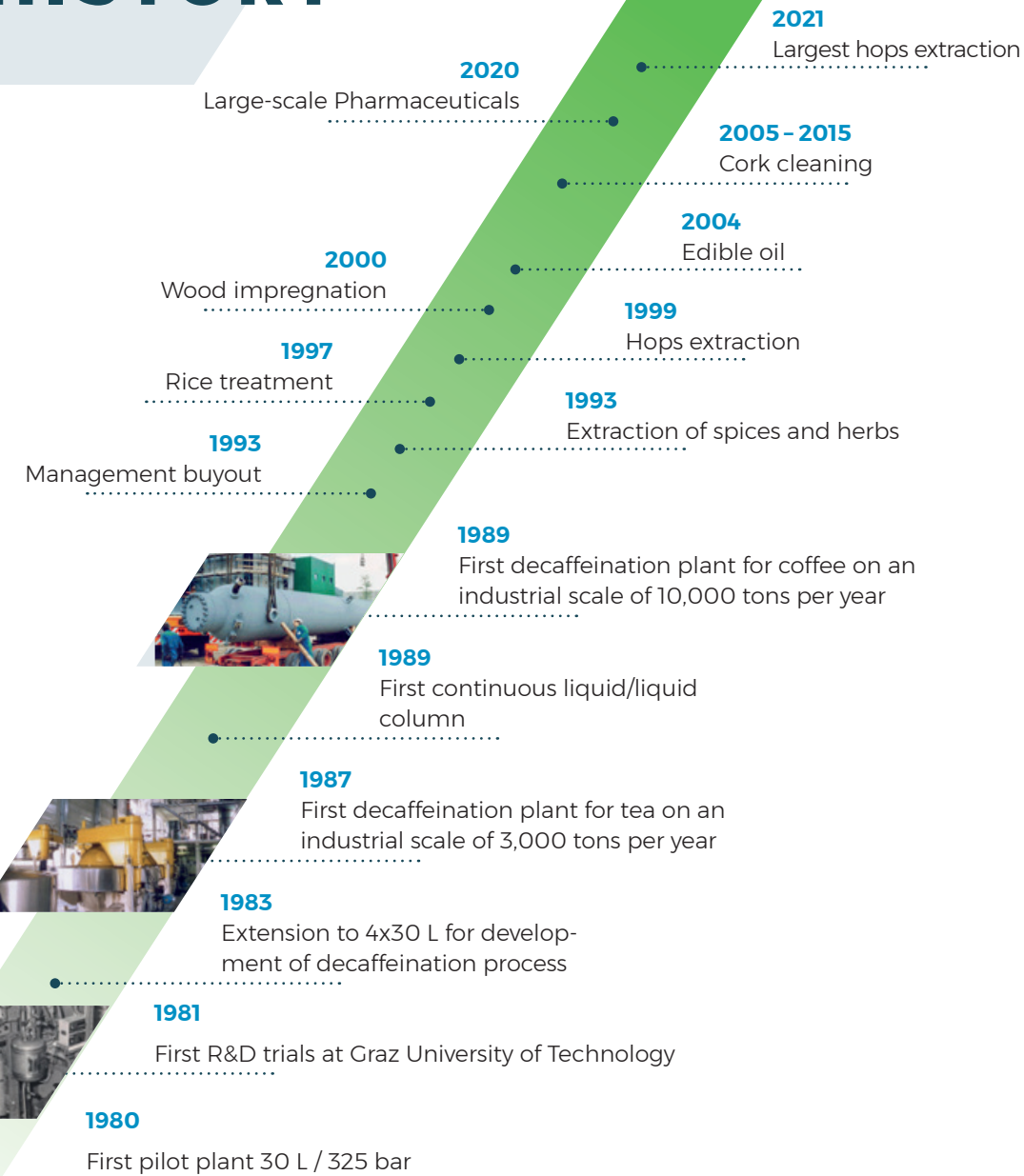
Vincent T.C. Kuo

Chief of Bio-process & Energy Engineering Section of MIRDC, Taiwan

NATEX are the professionals in dense CO₂ technology, especially in the extraction and powder generation processes, with substantial experience in scale-up ... I believe that NATEX will supply a valuable service to any customer, with consistent high quality and reliable system performance.



OUR HISTORY



NATEX was created in a management buyout from Schoeller-Bleckmann Process Technology Division, a part of a state-owned steel conglomerate, where more than 40 years ago the first applications of supercritical CO₂ were introduced.

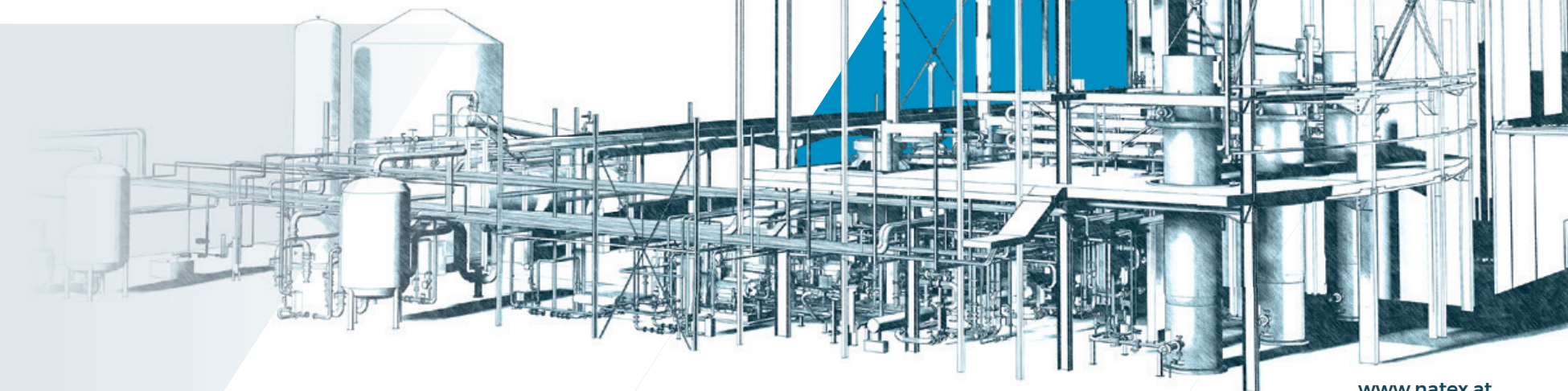
In 1980 the first pilot plant was installed and R&D activities in close cooperation with customers started. Soon this resulted in two major milestones for the CO₂ extraction industry: an installation for a tea decaffeination plant with a capacity of 3,000 tons per year and a coffee decaffeination plant processing 10,000 tons of coffee annually, with recovery of caffeine.

Backed by this unique industrial know-how, patents and pilot installations, the former key employees founded NATEX in 1993 to continue the journey as one of the main driving forces in the industrial CO₂ process industry. This process and plant building know-how is complemented by Innoweld Metallverarbeitung GmbH, a specialized manufacturer for high-pressure, high-temperature and corrosion-critical equipment. The close collaboration with industrial customers, research institutes and precisely selected suppliers have yielded in several novel and unique processes, with consideration of the individual task at hand.

Mission

We believe in the unique power of CO₂ as a process fluid and want to utilize it in as many industrial applications as possible.

Our goal is the technically and economically successful industrialization of established and the introduction of new and efficient CO₂-based processes for the advancement of future society.



BENEFITS OF CO₂-BASED PROCESSES:

CO₂

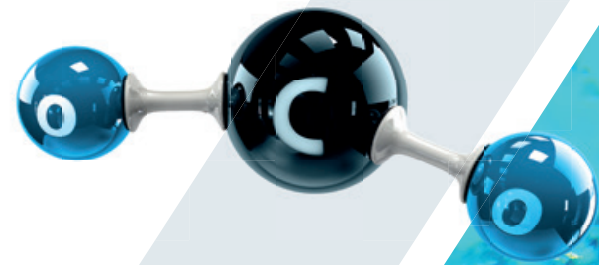
- physiologically harmless
- Non-flammable
- Germicidal & inert

Extracts & raw materials

- Solvent-free
- Pure with excellent flavor profile
- Possibility of fractionation

The process

- Gentle due to moderate temperatures
- NATEX advanced CO₂ recovery processes result in minimum CO₂ consumption



TYPICAL UTILIZATIONS:

Pharmaceutical Industry:

- Extraction of active pharmaceutical ingredients (APIs) from natural raw materials and medicinal plants
- Cleaning, purification or fractionation of intermediate products
- Removal of organic solvents, monomers, oligomers and other residues from medical products and tools
- Formation, encapsulation and impregnation of micro-particles



Cosmetic Industry:

- Flavors and fragrances
- Waxes
- Powders
- Vegetable oils from seeds, nuts, wheat germ and more
- Antioxidants

Special Applications:

- Removal of organic solvents or other substances
- Cleaning / Recycling application
- Impregnation
- Supercritical Drying
- Fractionation
- Extraction of chemical products

Food and Nutraceutical Industry:

- Defatting of food stuffs and removal of undesired substances
- Decaffeination of coffee and tea
- High-value special oils
- Hops and hemp extraction
- Antioxidants, essential oils, aromas and flavors
- Oleoresins, natural colors from spices and herbs





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