CENTRE TERRE ET PIERRE ASBL

Chaussée d'Antoing 55 – 7500 Tournai, Belgium

ANNUAL REPORT

ACCREDITED RESEARCH CENTRE

2024

CTP

www.ctp.be

EDITORIAL

The CTP's expertise is more than ever at the heart of a European strategy for resilience and smart reindustrialisation

The Centre is stepping up its international collaborations in 2024 (42% of total sales) on promising topics such as the circularity of mineral materials and the extraction and recovery of strategic metals from natural deposits (mining projects).

The CTP is currently organised into 3 areas of expertise: Mineral Processing, Extractive Metallurgy and Circular Materials.

These 3 divisions will see significant growth in 2024, with **total sales of €5.43 million.**

Admittedly, this sales figure is lower than in 2023, but this is due to a drop in 'pilot' activity (TRL5) with our Australian customer concerning the production of high-purity graphite for applications in electric car batteries. The fact is that this manufacturer is gradually validating its process and is therefore gradually moving out of this 'pilot' phase, which is a positive development in itself!

The new organisation of the CTP is already proving its worth, as the **cash flow** generated in 2024 reached a record level of **€593,000**. A reflection of an agile and efficient organisation - well done to our teams!

Public funding (subsidies) **increased by 25**% in 2024. This is mainly due to the launch of 2 new collaborative projects:

- The RE-ASSIGN project: recycling of complex composite plastic waste, selected under the INTERREG VI France-Walloon-Vlaanderen call for projects.
- The BOTTOM-UP project, use of bottom ash from household waste incineration in high-value applications, selected in the Walloon Region's WIN4COLLECTIVE programme.

It should be noted, however, that these subsidies still primarily stem from projects in partnership with industry, through the Remind Wallonia and Reverse Metallurgy innovation platforms.

If we consolidate these figures, we can see that 86% of our activities are in direct or indirect collaboration with industrial partners.
This is remarkable for a small R&D Centre like the CTP, which is more than ever involved in and driving innovation in the industrial sector and, in turn, accelerating reindustrialisation in Wallonia and, more broadly, across Europe.

"The CTP is demonstrating an agile and efficient organisation, essential to the success of a highly ambitious 2025–2030 strategic plan. This will only be possible thanks to the 47 staff members at the Centre, whom I warmly thank for their dedication and professionalism!"

Stéphane Neirynck
General Manager

The year 2024 also saw the launch of the **new 2025-2030 strategic plan**. The plan is highly ambitious, with over €7 million in investment (in buildings, infrastructure and major equipment) planned between now and 2030.

The CTP wants to position itself as a **key R&D partner in its core areas of expertise**, both in Wallonia and across Europe.

Challenges in 2025: maintaining efficient internal organisation and developing our international R&D capabilities!

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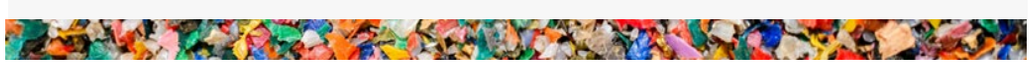


ABOUT US

As an R&D and Innovation Centre serving companies in the **environmental and materials fields**, the CTP, **in a circular economy** approach, is pushing back the limits of the treatment and recovery of solid materials, in particular ores, industrial by-products and post-consumer waste by providing innovative and profitable solutions for the industrial world.

With **over 25 years' expertise** in the field, the CTP offers a wide range of expertise and analyses to companies exploring and developing natural mineral deposits, as well as to companies processing and recycling industrial and post-consumer urban waste ("Urban Mining").

The CTP's **mission** is to actively support companies (particularly SMEs) in their economic development by providing them with high-quality technological support, enabling them to grasp the innovations needed to guarantee them a secure future. This support takes the form of a scientific contribution through research projects and a professional and relevant service in terms of expertise and testing.

Companies that extract, manage and use primary and secondary raw materials throughout the world choose CTP as their R&D partner to construct innovative, efficient, sustainable solutions in order to supply and develop circular economy loops, helping to solve the societal challenges of resource availability and global warming.

LABELS

Chèques entreprises

The CTP is eligible for technology cheques, which are part of an integrated portfolio of aid designed to support business creation and innovation, or to promote growth and entrepreneurship. They are targeted at SMEs in Wallonia and funded jointly by Wallonia and the European Regional Development Fund through the ERDF Wallonia-2020. EU operational programme (transition zone and more developed zone). In practice, our clients can benefit from several services through this measure.

In the exploratory phase, our researchers carry out tests, calculations and initial analyses. This first phase can be followed by technical feasibility studies (conducting tests, optimising test protocols, laboratory tests etc.) or assistance with preparing for industrial scale-up (defining technical specifications, designing production frameworks etc.).

Until July 2023, the cheques provided 75% funding for projects up to a maximum of €60,000 excluding VAT over 3 years (i.e. €45,000 in subsidies).

As part of Wallonia's Recovery Plan, the Walloon Government wanted to strengthen the digital model that contributes to the popularity of the scheme. For this reason, it commissioned SPW-Digital to take over the tool and include it in its portfolio of solutions and services. As of 1st July 2023, funding has been increased to 50% and is now managed solely by the Walloon Region.

Chèques-entreprises

Research Tax Credits

CTP has approval for the French Research Tax Credit (CIR) issued by the Ministry of Education, Teaching and Research. This means French companies qualify for grants in the form of tax deductions when undertaking Research and Development activities. The application for renewal covers a 3-year period up to the end of 2026. Many of our French clients make use of this measure, which supports part of their research by reducing the financial investment required in the work submitted to us

CREDIT IMPOT RECHERCHE
AGRÉMENT
CIR

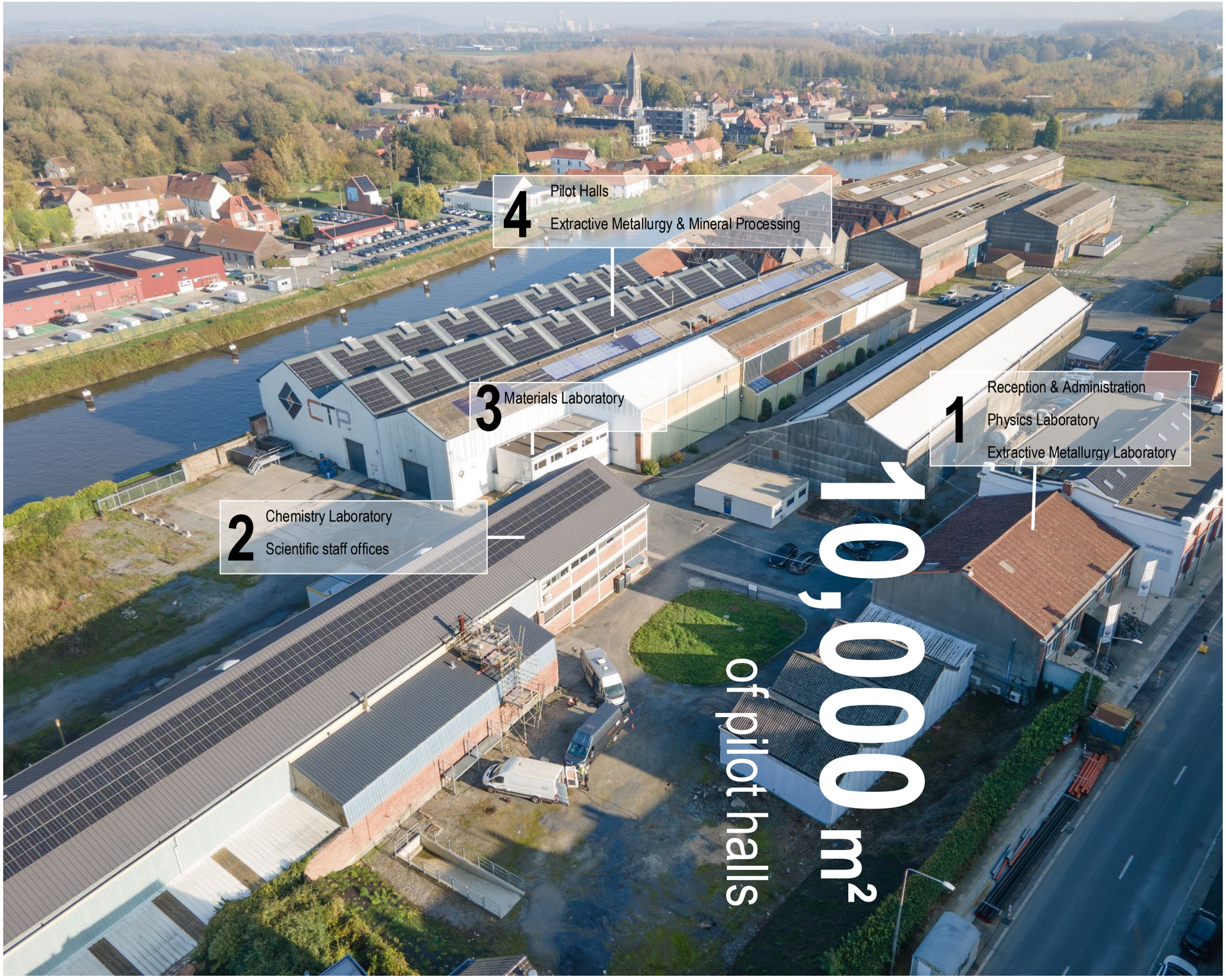
ISO 9001 : 2015

In 2024, the CTP obtained the renewal of its ISO 9001 certificate!

This is an essential label for our Centre, as it is a condition for obtaining approval as a Research Centre recognised by the Walloon Region.

This certification *(Certification n°BQA_QMS_C_2010372)* attests to the Centre's approach to continuous improvement of its Quality Management System in order to meet the growing demands of its stakeholders.

BQA
Belgian Quality Association


4 Pilot Halls
Extractive Metallurgy & Mineral Processing
3 Materials Laboratory
1 Reception & Administration
Physics Laboratory
Extractive Metallurgy Laboratory
2 Chemistry Laboratory
Scientific staff offices
10,000 m²
of pilot halls

KEY EVENTS

2024

The MC² ecosystem: a new Walloon reference hub for decarbonising the earth and stone sector

In the presence of Minister-President Elio Di Rupo


SUDINFO • NORDECLAIR

La une Actualités Régions Sports Vidéos Max Prog

ABONNÉS

30 millions d'euros injectés dans la future CleanTech Vallée de Tournai

Créer de nouvelles filières pour accélérer la diminution de la production de CO2 en Wallonie picarde et maintenir, malgré tout l'emploi, plus particulièrement dans le secteur de la terre et de la pierre : c'est le double défi que devra relever le nouveau pôle de recherche et de développement installé à la chaussée d'Antoing à Tournai.

Tournai : Cimenteries et briqueteries ont leur Cleantech Valley le long de l'Escaut

Pôle de référence de la décarbonation du secteur de la terre et de la pierre, MC2 est un enjeu considérable pour les cimenteries et briqueteries locales.

Christophe Desablens

Enregistrer

MC²: how can the mineral industry be decarbonised?

Watch the report

https://www.notele.be/it73-media149994-labeleco-mc2-ou-comment-decarboner-l-industrie-minerale.html

ZOOM

"When two forces join, their efficiency is doubled » Isaac Newton

Since 2020, the CTP has been working with the French company IB2, contributing its expertise in extractive metallurgy and making its instruments available at both laboratory and pilot scale. As a result, a revolutionary and innovative technology has been developed to transform low-grade bauxite into a high-quality material. Bauxite unsuitable for refining via the Bayer process is pre-treated. Thanks to this pre-treatment, the bauxite can be mined and the ore refined more efficiently, using less energy and resources.

ALUMINA REFINING

The pre-treatment of low-grade bauxites generates a by-product, hydrated calcium silicate, which can be used in a number of sectors:

- water treatment to extract heavy metals;
- the construction sector as a soundproofing product or as thermal insulation;
- in cement manufacture as an alternative to clinker, helping to address the growing challenge of reducing the carbon footprint of cement. It can also be used as an agent to enhance cement performance or as an admixture in concrete.

All products and by-products are thus recovered, reinforcing the proposed industrial plan.

EXPERTISE

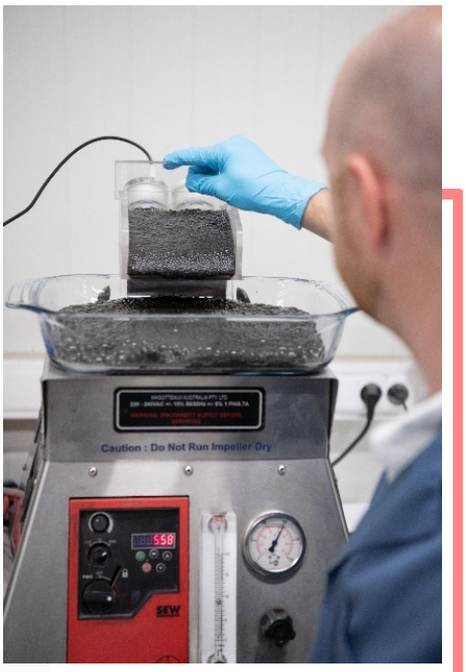
+65
New customers

MINERAL PROCESSING

The Mineral Processing division focuses on the development of processes, or parts of processes, applied to primary or secondary materials. The aim is to identify the most efficient and cost-effective treatment sequences, while minimising their environmental impact.

The work carried out focuses in particular on the fragmentation of materials, the release of their constituents, and the shaping of products (pelletisation, granulation, etc.). These stages are completed by separation and concentration processes.

As in previous years, a large proportion of our projects was devoted to supporting industry in replacing primary materials with secondary ones, both for minerals and plastics.



New developments in the field of battery recycling have also been launched, and research into the development of flotation processes has continued.

Our pilot facilities are regularly used to prepare the required quantities of enriched materials, enabling our industrial partners to continue their research or perform specific operations (crushing, grinding, classification, etc.).

THERMAL PROCESSES

The Centre's dry calcination facilities enable it to carry out research on a wide range of subjects, including the incorporation of new primary or secondary mineral materials into cements, soil decontamination, direct metal reduction and the activation of materials prior to hydrometallurgical treatment, for example.

This longstanding expertise, combined with the Centre's other activities, has enabled us to expand the range of treatment options explored in our facilities.

EXTRACTIVE METALLURGY

Extractive metallurgy covers all the tests and studies carried out in order to extract and recover one or more metals from an ore or a secondary raw material.

The supply of metals has become a highly strategic issue for Europe. This is particularly true in the context of energy transition, which requires large quantities of copper, cobalt, nickel, graphite, zinc, lithium and other rare earths. The CTP has always maintained active R&D in non-ferrous metallurgy as a core area of expertise. As a result, we are regularly approached by industrial stakeholders seeking to establish new production capacity in Europe. Our expertise and pilot facilities are highly valued and lead to robust partnerships.

Our laboratory offers a range of tests, including:

- Calcination at different temperatures
- Leaching and precipitation in acid or basic media for the selective extraction of a metal:
- Cementation
- Extraction using organic solvents
- High-pressure leaching tests carried out in autoclaves

CIRCULAR MATERIALS

As CTP specialises in the treatment of waste and mineral by-products, it has naturally focused on their recovery, particularly in the construction sector.

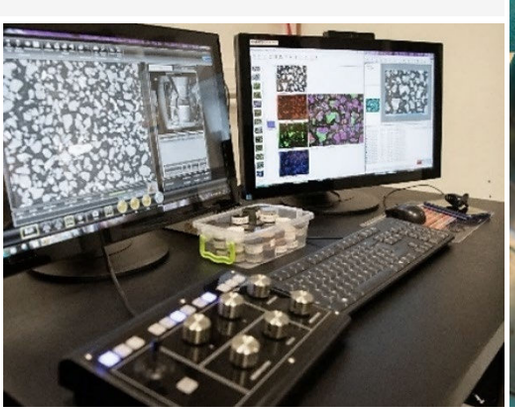
Accordingly, the “Circular Materials” division focuses on:

- The use of secondary materials or by-products as constituents of hydraulic binders, with a view to reducing CO_2 emissions.
- The development of alternative binders based on industrial by-products.
- Capture and storage of CO_2 by carbonation of mineral waste.
- Solidification/stabilisation of soil contaminated with heavy metals or containing waste.

Incorporating secondary mineral materials into construction materials, as a replacement for primary materials requires various tests to be carried out in order to assess, among other things, the rheological properties of the new formulations, mechanical strength, and leaching behaviour.

To this end, the CTP has a laboratory dedicated to materials, enabling it to:

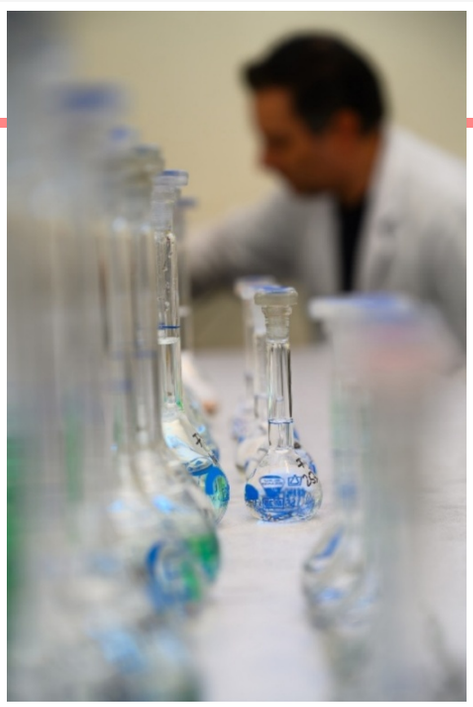
- Process new materials made from secondary inputs (mixers, hydraulic press, jolting table, etc.).
- Measure setting times (Vicat apparatus).
- Conduct consistency measurements on fresh mortar.
- Determine mechanical properties (flexural and compressive strengths, Young’s and shear moduli, etc.).
- Carry out soil tests (Proctor compaction, CBR and IPI indices).
- Perform leaching tests.

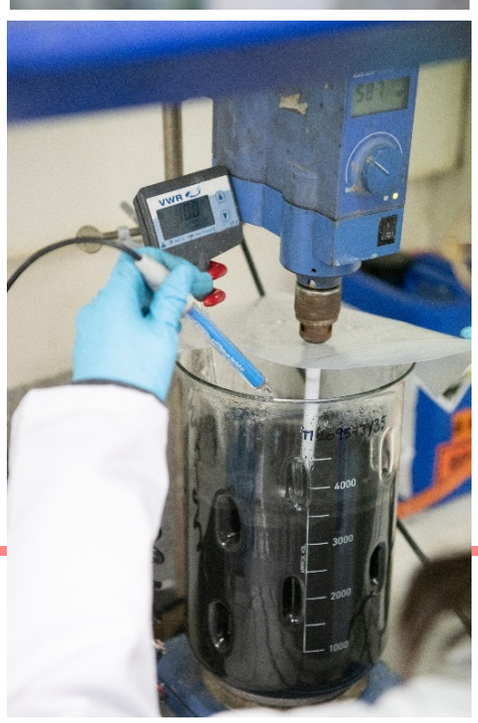


LABORATORIES ANALYSIS

The Centre has a chemical analysis laboratory equipped with a wide range of instruments for conducting analyses:

- Elemental analysis (ICP-OES and XRF);
- Mineralogical analysis (XRD);
- Morphological analysis (SEM and laser particle sizing);
- Thermogravimetric analysis (TGA);
- ...and more.

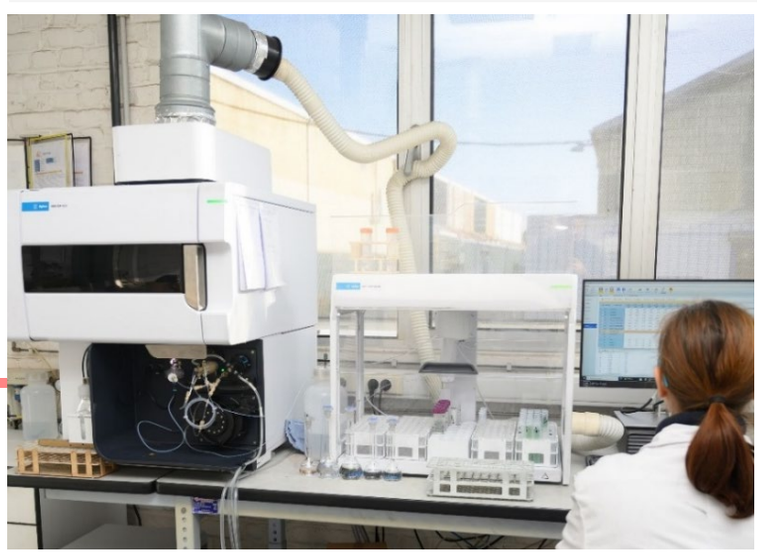




Although the laboratory plays a key role in the development of all the Centre's activities, it is also expanding due to an increase in demand from small and large companies. The expertise we have built up over the last 25 years enables us to analyse a wide range of solid matrices, including minerals, plastics, and metals. We continuously strive to evolve in order to respond effectively to the analytical challenges posed by our clients.

As the recycling of Li-ion batteries is becoming increasingly widespread, the Centre was keen to develop rapid and effective techniques for characterising black mass. Our laboratory is now capable of accurately analysing the elements present in this type of matrix, including of metals, carbon, and organic compounds.

With a new year comes a new challenge, to broaden our analytical expertise inf X-ray fluorescence in 2025.



COLLABORATIVE RESEARCH

FEDER 2021-2027

UP_PLASTICS

INTERREG FWV VI

RE-ASSIGN NEW

WIN2WAL

ECuME CLOSED

BioFACon3

WIN4COLLECTIVE

RED4SOLS

BOTTOM-UP NEW

« By working together and combining our resources, we can accomplish great things » Ronald Reagan

UP_PLASTICS

Partners : UMONS (leader) CELABOR SCRL, CERTECH, Centexbel, CSTC, CTP, Materia Nova, UCLouvain, ULiège

The "UP_PLASTICS" project portfolio, coordinated by U-Mons, aims to develop and demonstrate the eco-design of plastics for construction and building by exploiting eco-products (natural polymers, animal biomass, etc.) and industrial waste from buildings (PU foams, cables, PVC, end-of-life paints) using semi-industrial transformation methods. Within this portfolio, the CTP is notably involved in the preparation (grinding, purification of exogenous materials) of secondary flows for reuse in circular materials. Work has been carried out on materials such as optical cable sheathing and wind turbine blade core materials.

RE-ASSIGN NEW

REcycling plAStics deSIGN

Partners : Certech (leader), VKC-Centexbe, CREPIM, CTP, IMT Nord Europe

As part of the European research project INTERREG RE-ASSIGN, the CTP is actively contributing to the transition towards a circular economy in the cross-border region of France-Wallonie-Vlaanderen. The aim of the project is to develop plastic products incorporating the maximum possible amount of recycled materials, from post-consumer or pre-consumer flows, with the emphasis on eco-design based on recycling.

More specifically, the CTP is responsible for purifying plastic waste flows, including shredding, pelletising and removing contaminants. It also works on adapting recycled materials for its partners' processes (particularly extrusion), to ensure that they are optimally reused.

In addition, the CTP will adapt sampling methodologies to enable a detailed analysis of the flows of plastics to be recycled, with the aim of maximising their reintegration into the production chains of the circular economy.

The four-year RE-ASSIGN project was officially launched in November 2024 at an inaugural event in Ostend, in the presence of many representatives from industry and the research sector.

https://pubs.rsc.org/en/content/articlelanding/2024/su/d4su00092g

ECuME

Circular Economy and Electric Mobility: functional recycling by electro-hydraulic fragmentation, electro-leaching, and anti-solvent precipitation of lithium ion batteries

Partners : Comet Traitements, ULiège (GeMMe et GreenMat), CTP

The first Li-ion battery was unveiled by Sony in 1991, and is now used in a number of areas including electronic devices and the electric mobility sector. Global awareness of climate change has prompted governments and industries to turn massively to electric vehicles to replace the current fleet of cars. As these batteries offer a promising route to lower CO_2 emissions, their production is constantly evolving. However, their large-scale use presents a major challenge: recycling them. The aim of the ECuME project is therefore to develop an innovative process for recycling used Li-ion batteries in order to recover the metals they contain.

As part of ECuME, the CTP is in charge of developing a hydrometallurgical process combining leaching, purification and precipitation, with the aim of recovering metals from black mass. This project's innovation lies in its goal of producing a mixed salt composed of nickel, cobalt and manganese rather than separating them. Analyses were carried out at the University of Liège to study the capacity of the mixed salts produced to be reused in the production of cathode precursors for the manufacture of new Li-ion batteries.

BioFACon3

Treatment of biomass fly ash for use in the construction industry

Currently, fly ash from biomass combustion can be used in agricultural applications to improve soil alkalinity or in road construction as a filler, but it is still too often disposed of in landfill sites. Recent studies have demonstrated the potential of using this ash as a partial replacement for cement in structural concrete for buildings. However, this type of MMS (secondary mineral material) can be highly variable, both physically (particle morphology, porosity) and in terms of its chemical or mineralogical composition. This influences its reactivity and therefore its potential for use as a Supplementary Cementitious Material.

The BioFACon3 project aims to upcycle biomass fly ash to make it compatible with cement-based materials. In 2024, full characterisation (chemical, physical, mineralogical) of several ash types helped identify distinct batches with specific characteristics and challenges. Pre-treatments tailored to these challenges were selected and will be developed further by CTP as the project progresses. Among these treatments, an innovative and cost-effective physico-mechano-chemical process will be optimised to enhance the reactivity of biomass fly ash.

RED4SOLS

Electrodialytic remediation method for heavily contaminated soils

Partners : CTP, ULiège (GxABT-EESP)

Due of its industrial heritage, Wallonia has many disused industrial sites, some of which contain high concentrations of pollutants such as heavy metals. Although certain current techniques (mineralurgy, for example) make it possible to comply with the pollutant thresholds defined by the Walloon decree of 01/03/2018 for coarse fractions, this is not the case for fine fractions, whose sole purpose is to be disposed of in landfill sites, so that no comprehensive solution currently exists. In the absence of suitable technical solutions, the most polluted fractions are currently contained on these sites, which is only a temporary solution that is very costly because it requires long-term environmental monitoring. In addition, it prevents these sites from being put to any other use and therefore runs counter to the political will to establish new activities on these sites with a view to revitalising the Walloon economy.

RED4SOLS is studying an innovative remediation technique that complements existing approaches specifically targeting fine fractions, where most contamination is concentrated. This is electrodialytic remediation, the applicability of which the project aims to verify, as well as its transferability on an industrial scale, in the treatment of fines from a mineralurgical process of the 'soil washing' type.

To achieve this objective, an electrodialytic remediation cell was designed differently from those described in the literature, to improve performance, i.e. to distribute the amount of energy needed to extract the heavy metals in a sufficiently short time to be incorporated into an industrial unit. Initial tests have shown that soluble elements can be extracted more easily than by simple leaching. The next stage of the project will focus on increasing the mobilisation of pollutants, which will then be extracted by electrodialysis in the same way as soluble elements.

The project involves CTP, which is tasked with improving the electrodialytic remediation process, and GxABT-EESP (ULiège), which will study its effects on soil properties.

BOTTOM-UP NEW

BOTTOM-UP Safe recovery of bottom ash as road foundations

Belgium has one of the densest transport networks in Europe, both in terms of territorial coverage and population. In light of current climate and economic challenges, there is a real demand from the road sector for secondary materials that can effectively replace natural primary materials, both regionally and locally. Bottom ash, the residue from the incineration of household waste, has been used for many years in road structures, but its use in foundations is not currently favoured by contractors.

The aim of the BottomUp project, led by CTP and in partnership with CRR, is to encourage the use of bottom ash in high-value applications (upgrading) and to establish and secure technical criteria for its use in road construction. These criteria will ensure that no deleterious phases are formed in the long term, which could cause damage, in particular cracking of the wearing course. At the end of the project, the conditions for using bottom ash in cement-treated or non-cement-treated base courses will be defined, thus guaranteeing the durability of the road structure as a whole.

SAMPLING OF CRYSTALLINE SILICA AND ALVEOLAR DUSTS

For over 15 years, CTP has been monitoring workers' exposure to respirable crystalline silica (RCS) dust.

Stakeholders involved in the mining sector, particularly aggregate producers, are required to regularly monitor staff exposure to this substance, which is naturally present in the materials they produce.

CTP conducts on-site sampling by equipping workers with individual sampling devices (CIP 10) to collect airborne dust, which is then analysed in the laboratory.

These essential data can be used to help assess health risks and optimise protective measures.

INDUSTRIAL RESEARCH

PNRR

Plan National pour la Relance et la Résilience

- CARBOC
- CGROUT
- CIBER
- IRMA CLOSED
- WASTES2CEM
- WASTES2MAT
- CISTEMEEC

WIN4COMPANY

- ATHENA

PLAN DE RELANCE WALLON

« Déchets Ressources »

- VALOCELL

GREENWIN

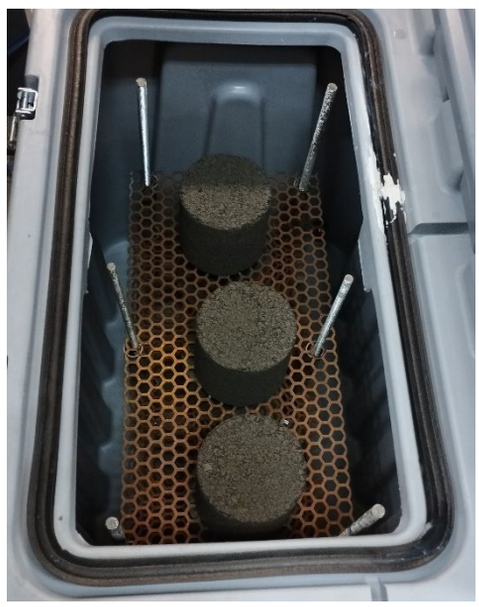
- COSMOCEM
- MINERAL LOOP
- RECOB2

« Nothing is lost, nothing is created, everything is transformed » Antoine Lavoisier

CARBOC

Capture and storage of CO_2 by carbonation of bottom ash and low-cement concrete

Partners : ULiège (PEP's, GeMMe)**, CTP, REMIND, Roosens Bétons, TRBA, Ipalle**



The various technical options envisaged as part of this project were deployed during 2024. Although several CO_2 capture and sequestration scenarios were tested, CTP also focused on processes for treating so-called secondary materials. The challenge was to identify and test techniques for eliminating deleterious elements for a "materials" application while retaining sufficient sequestration potential with regard to CO_2. While the tests carried out on a laboratory scale proved encouraging, the difficulty lies in the industrial transferability of the entire process. Larger-scale treatment trials and technical and economic validation will be the challenges of the final year of research for this project.

CGROUT

Pre-treatment of mineral-based waste and by-products for incorporation into material designed mainly for offshore wind applications

Partners : CTP, ULiège (PEP's)**, UCLouvain, REMIND, Euroquartz, Lessine**

Offshore wind energy has expanded rapidly over the past decade, making it one of the most promising sectors for tackling climate change. The CGROUT project aims to reduce the carbon footprint of offshore wind turbine production. The goal is to identify secondary mineral materials (SMMs) that can replace the primary materials used in both high-performance (structural) and low-performance (filler) concretes. All components are considered for substitution: cement, sand, fillers, etc.

The secondary mineral materials (SMMs) identified in the project were characterised and pre-treated by CTP before being incorporated into mixtures. Workability, setting time and mechanical strength tests have shown that the substituted grouts perform similarly to the original mixes. In July 2024, the project moved to its second phase, reflecting partners' commitment to pursuing this path.

In addition, the statuette representing the REMIND logo, unveiled at the inauguration of REMIND WALLONIA, was made from a C-GROUT-based mixture developed at CTP.

CIBER

Circularity of precast concrete

Partners : CTP, ULiège (PEP's, GeMMe)**, UCLouvain, REMIND, Wanty, Cogetrina Logistics, Roosens Bétons**

To address the high consumption of natural aggregates in the construction sector, the increasing use of recycled aggregates has become essential. Wanty and Dufour are working to improve the quality of aggregates produced so they can be used in higher-value applications such as precast concrete for large structural components (bridge decks, retaining lintels, hollow-core slabs, modular demountable blocks), in collaboration with Roosens.

Wanty and Dufour already have experience in this field, having recently developed a recycling process for deconstruction waste streams as part of joint research with CTP (the SOVALMIN and OPTIDEMO projects).

After receiving deconstruction materials, CTP implemented the full process chain (screening, air separation, washing, simulated optical sorting, etc.) to produce concrete aggregates of comparable quality to those from Wanty and Dufour's future treatment line. These aggregates were supplied to project partners to develop concrete formulations using secondary aggregates. CTP also contributes to upgrading these materials to enhance their properties (notably, porosity) and increase their recovery potential. Selective grinding, applied for this purpose, produces improved aggregates (with lower water absorption) and fine powder that can partially replace cement in concrete formulations.

IRMA CLOSED

Production of non-combustible insulating materials and refractory materials by recovering inert industrial waste, deconstruction waste and other recycled resources

Partners : REMIND, Ipsiis, Vinci, CTP, Buildwise, ULiège (PEP's)**, UCLouvain**

The IRMA project began in 2022 and concluded in 2024. Its goal was to develop new insulating, non-combustible, and refractory products from inert waste from industry and deconstruction.

The project was based on a patented process from IPSIIS to produce mineral-based, non-combustible insulating foams. The ambition was to develop new, cost-competitive products for building insulation and fire protection using secondary mineral materials (industrial by-products).

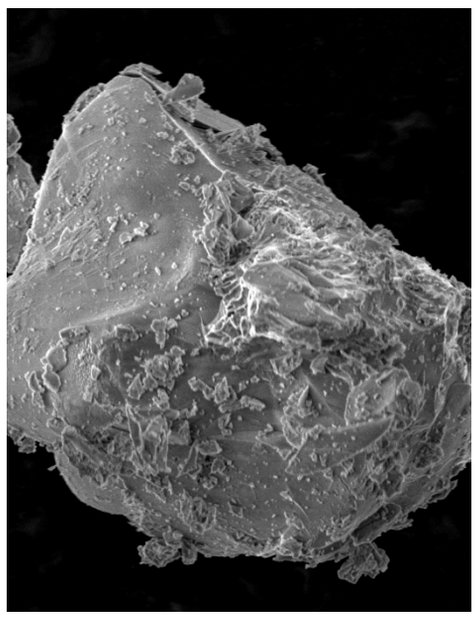
CTP handled the pre-treatment of these materials. IPSIIS validated the compatibility of several secondary materials with its process, based on both batch and continuous mode tests.

The porous materials produced at laboratory scale already meet key criteria for several building insulation applications.

WASTES2CEM

Alternative circular binder based on slag and fly ash

Partners : Remind, CCB, Duferco Wallonie, DC Environment, CTP, ULiège (PEPs), **UCLouvain**



Walloon cement producers currently face two main challenges: staying competitive against imported clinker and meeting CO_2 reduction commitments.

In this context, the WASTES2CEM project proposes two approaches:

- The first is to minimise the environmental impact of clinker by incorporating secondary mineral materials into the primary mix.
- The second is to reduce the clinker content in cement by adding reactive additions derived from industrial by-products.

The secondary materials studied in the project come from historical stockpiles. CTP first characterised these materials, then developed appropriate treatment procedures tailored to the cement producers' specifications, depending on the recovery route.

The CTP also carried out clinkerisation tests in a laboratory kiln to check that the partial substitution of primary materials by secondary materials did not affect the quality of the clinker produced.

The second phase of the project involves pilot-scale clinkerisation trials.

WASTES2MAT

Alternative ettringite-based circular binder

Partners : REMIND, CTP, ULiège, Sedisol, SWDE, IPALLE

Several Walloon companies - notably Sedisol, SWDE, and IPALLE - face difficulties when it comes to managing their waste. Pooling certain waste streams results in the formation of a specific hydraulic phase that can serve as a binder in the synthesis of materials with limited bearing capacity, such as re-excavable self-compacting materials (RSCM) or sub-base materials. In particular, RSCMs show strong development potential. Although they address a genuine need, they remain underused in the Walloon region. In addition, the phase synthesised stabilises the inorganic pollutants present in the waste and captures a large number of water molecules, thereby helping to stiffen the materials.

The aim of this project is therefore to develop eco-materials whose load-bearing capacity is provided by this particular phase. The project's originality is reinforced by the fact that all reagents used to synthesise this phase are secondary in origin, thus avoiding landfill disposal.

CTP contributed to this project by characterising the secondary mineral materials, developing the eco-material, and conducting recovery tests. This material, incorporating the hydraulic phase, forms the basis of backfill and sub-base formulations by another partner. A test bed set up by the industrial partner will validate the produced materials.

CISTEMEEC

Industrial Value Chains, Energy Transition, Electric Mobility and Circular Economy

Partners : Comet Traitements, Hydrometal, CRM, CTP, Citius engeenering, John Cockerill, Reverse Metallurgy, Sagacify, ULiège (GREENMat, PEPs, GeMMe)

The CISTEMEEC project aims to provide solutions for the reuse and recycling of end-of-life electric mobility equipment.

CTP is involved in recycling lithium-ion batteries (LIBs), focusing particularly on the concentration and recovery of black mass and the ferrous and non-ferrous metals they contain. Two major processing routes are being explored: the “pyrolysis” route, which involves thermally treating batteries at over 400°C, converting organic matter into gases and oils; and the “mechanical” route. The mechanical route is being studied by the GeMMe–CTP partnership within the CISTEMEEC project. In addition, as conventional mechanical shredding leads to incomplete release of certain cell components, the CTP is therefore exploring alternative shredding methods.

A prototype is scheduled for installation at CTP in 2025, enabling more effective recovery of black mass (the active material) from mechanically treated end-of-life Li-ion batteries.

https://youtu.be/FbXBX57hbX4?si=Gq_q21_8azb

ATHENA

Recycling secondary zinc-bearing materials to produce low-carbon zinc oxide

The aim of this project is to develop an innovative route, unique in the world, for recycling secondary zinc materials using secondary reagents (TRL 4 to 5). Alternative routes, variants of the main process, have been studied at laboratory scale. Their development will improve the flexibility of future production lines and open up new markets. A pilot hydrometallurgy line is currently under construction. It will allow, during 2025, the validation and testing of the robustness of each step of the process developed in the lab, including the alternative routes.

VALOCELL

Recycling and recovery of aerated concrete blocks

Partners : CTP, industrial partners

The aim of the project is to develop a comprehensive system for collecting, sorting and recovering cellular concrete masonry blocks from non-incinerable bulky waste from the construction sector. By isolating them from deconstruction flows such as rubble and plasterboard in particular, these blocks will be 'upcycled' into value-added concrete formulations after treatment and functionalisation.

The CTP has tested various dry sorting and separation techniques to isolate cellular concretes from non-incinerable waste. The crushing techniques required to incorporate cellular concretes into concrete formulations were successfully studied by the CTP. Despite a slight reduction in the properties of the formulated concrete, the different formulations can be used in a variety of applications.

https://recyclepro.eu/fr/nouvelles/la-filiere-de-valorisation-se-met-en-place/

COSMOCEM

Partners : CBR, Tradecowall, Duferco Wallonie, SBMI, Lessines Industries, Technord, CTP, CRIC, ULiège-PEPs

The CosmoCem project aims to transform Walloon industrial waste and by-products into new mineral additions for cement, using appropriate activation treatment. These additions offer an alternative secondary material that could eventually replace fly ash from coal-fired power stations and blast furnace slag, the production of which is steadily declining.

The CTP studied various activation methods (mechanical and thermal) and selected the most appropriate depending on the nature of the secondary materials.

The first phase of the project has been completed and has demonstrated the technical feasibility of these two treatment methods on a laboratory scale. Thermal treatment is mainly intended for clay-rich materials, while mechanical activation can be applied to a wider range of secondary materials.

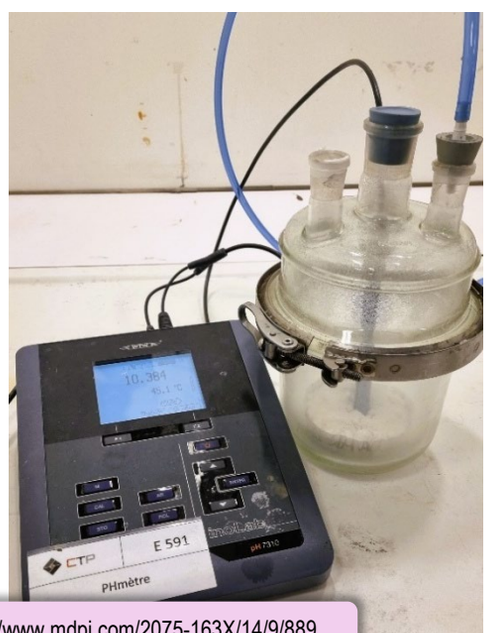
The second phase of the project has now begun, and involves validating the laboratory results by setting up pilot units. The effectiveness of the activation treatments applied will be verified through mechanical and rheological testing.

MINERAL LOOP

Capture and sequestration of Industrial CO_2 by carbonation of mineral waste

Partners : CTP, ULiège (PEP's, GeMMe)**, Carmeuse Europe, Lessine, Revatech, Tradecowall**

The aim of this project is to design, develop, install and operate an industrial pilot plant for transforming mineral waste into secondary products that can be reused in various application sectors. Secondary mineral materials were classified according to their CO_2 capture potential. The operating conditions were clearly identified, whether using a static or dynamic process. The results of the industrial research phase, on a laboratory scale, were validated in 2024. The project has therefore entered the industrial development phase for the pilot unit. CTP's work mainly involved anticipating and identifying the problems associated with the change of scale, particularly those related materials moisture.



https://www.mdpi.com/2075-163X/14/9/889

RECOB2

Development of an innovative circular dry screed panel made from recycled materials, combining cellulose fibres, mineral fibres, crushed sand and basic agents.

Partners : Remind, Knauf, Cogetrina Logisitics, CTP, Buildwise, UCLouvain, ULiège (PEPs)

The aim of the RECOB² project is to develop construction panels for use in dry screeds. These panels are designed to meet the needs of the energy renovation and new wood-frame construction sectors. They are made from waste paper, crushed sand, a binder phase and possibly other reinforcement phases to modulate the mechanical characteristics. At present, 80% of the market is made up of fibreboard panels, which do not always align with the objectives of limiting environmental impact and circularity. The specific aim of the project is to develop the entire local circularity chain for the product, from the supply of materials from the waste needed for its manufacture to its dismantling at the end of its life.

Over the past year, the CTP has collected and prepared the secondary materials to be delivered to project partners for the production of dry screed panels. The aim is to assess the technical performance of the material developed in this project. To achieve this, a test panel was installed under real conditions at the Ateliers de l'Avenir (a project partner and demonstrator site). At the same time, acoustic and fire-resistance tests were initiated at Buildwise.

The paper was shredded in our labs using an industrial shredder. Recycled concrete crusher sand [0-4 mm] from the Dufour and Wanty processing line was collected and sampled. The materials used in the composition of the binder, the formulation of which was developed by the CTP, were also collected and prepared by crushing and sieving, in particular, then sent to the UCLouvain, which was responsible for manufacturing the panels.

This year, the CTP also produced laboratory-scale test specimens of the dry screed material in order to assess the influence of the type of paper used on the mechanical properties of the material. Five types of paper from the recycled stream, sourced from a plasterboard recycling network, were tested separately to assess their impact on the mechanical properties of the material.

Various pressing techniques were also tested to assess performance ahead of potential industrialisation by Knauf.

ZOOM

FIRE SAFETY TRAINING

How should you respond to a fire?
How does a fire extinguisher work?
And how can you quickly and effectively put out the beginnings of a fire?
A well-designed and well-rehearsed evacuation procedure can save lives.
Prevention is essential in creating a fire-safe working environment, which is why the CTP has decided to train its staff in fire prevention, protection, suppression, and evacuation techniques.

A very positive experience in a warm and engaging atmosphere.

Thanks to **A-first**

NOTABLE EQUIPEMENT

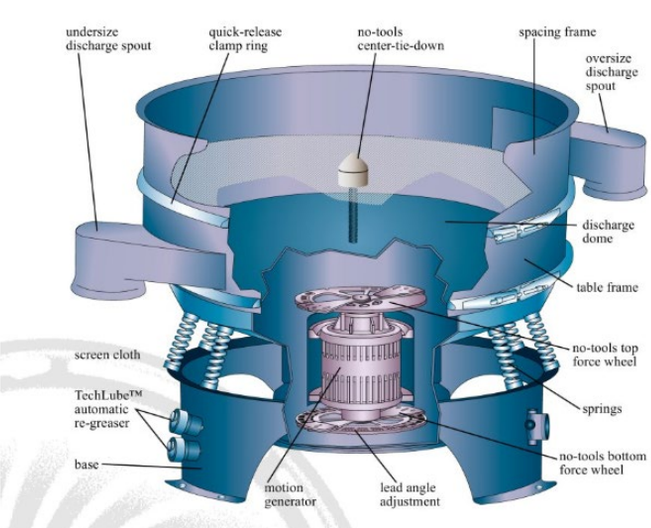
The **SWECO separator is a sieving device** designed to separate solids from liquids, or classify particles by size, or remove foreign matter.

The separator consists of a sieve with a diameter of approximately 1.219 mm, placed in a steel frame. Up to four sieve frames can be placed in a Sweco separator, for separation into five fractions. The individual frames are fixed to the base. A motor designed to transmit vibrations to the sieve operates the unit.

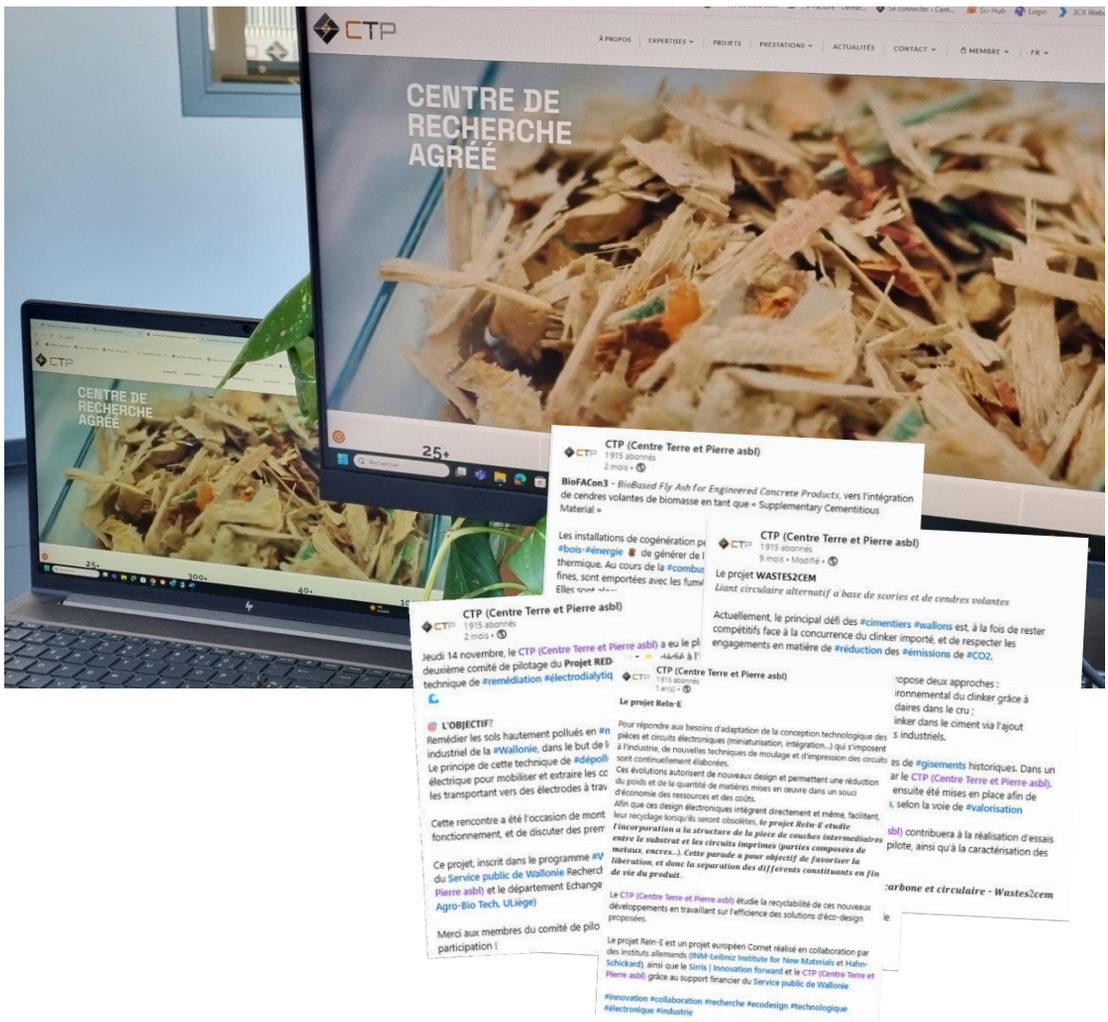
This vibration allows smaller particles (fines) to pass through the sieve, while larger particles (rejects) accumulate above the sieve.

Typical applications :

- **Food industry**: sieving of powders, granules, spices, dairy products, etc.
- **Pharmaceuticals**: separation of fine powders, granules, etc.
- **Chemical industry**: classification of powdered or granulated chemical products.
- **Recycling**: separating recyclable materials by size.



COMMUNICATION



The CTP is committed to developing a communications strategy and working on communication tools that create impact and add value for our current and/or future clients.

Our modernised, more interactive and efficient website went online in April 2024.
It serves as a first point of reference when you do your research, giving you an overview of our services and analyses.

LinkedIn remains our most active channel, where we regularly share updates on the progress of certain innovative projects and highlight our partnerships.

Have you heard of the Centre Terre et Pierre? Most people haven't.
Most people in the Tournai region are unaware that a research centre has been located there since 1996. That's why it was important to promote CTP on a platform like Facebook, which is more family-oriented, local, and broadly accessible.

Objective 2025: even greater visibility, but this time with the help of videos illustrating the Centre's activities. This will also enable us to develop our YouTube channel!

SHAREHOLDINGS

FINANCIAL

sa labotour

Specialist in the characterisation of road and construction products

www.labotour.com

REMIND Wallonia

Reverse Mineral Industry in Wallonia is a platform of industrial, technological and scientific excellence, accelerating the circular economy in Wallonia

www.remind-wallonia.be

Reverse Metallurgy

Provides governance for the **« Reverse Metallurgy »** project, the aim of wich is to create an internationally recognised platform of industrial, technological and scientific excellence in reverse metallurgy in Wallonia, creating added value and jobs

https://reverse-metallurgy.net/en/

OTHERS

WAPI 2040 animation territoriale de la Wallonie picarde

Chèques-entreprises

Wal-Tech

GREEN WIN FROM INNOVATION TO BUSINESS

CCI WALLONIE PICARDE

PÔLE MECATECH LE PÔLE DE COMPÉTITIVITÉ WALLON EN GÉNIE MÉCANIQUE

District Cleantech

S3

WIN4C
Stratégie de Spécialisation Intelligente

PLASTIWIN

alterre

SME Society for Mining, Metallurgy & Exploration

SIM Société de l'industrie minérale

CHOQ EN WALLONIE PICARDE

BROWNFIELD ACADEMY

PUBLICATIONS & EVENTS

PUBLICATIONS

A Mathematical Model for Enhancing CO_2 Capture in Construction Sector Using Hydrated Lime
Natalia Vidal de la Pena , Séverine Marquis, Stéphane Jacques, Elise Aubry, Grégoire Léonard and Dominique Toye
Minerals **2024**, 14, 889.
https://doi.org/10.3390/min14090889

Valorization of mineral waste through accelerated carbonation
Grigoletto, S., Kameni Wontcheu, A. F., Aubry, E., Marquis, S., & Courard, L. (16 April 2024). [Poster presentation]. 1st International Conference on Mineral Carbonation for Cement and Concrete, Aachen, Germany.
https://hdl.handle.net/2268/316639

Improving the physical properties of municipal waste incinerator bottom ash by accelerated carbonation: conditions and properties
Kanjo, I. E., Hubert, J., Tchuindjang, J. T., Michel, F., Marquis, S., Descamps, P., Dupont, L., & Courard, L. (2024) - 22nd Scientific Conference of the Francophone Network for Research and Training on Concrete (RF)²B, Rennes, France.
https://hdl.handle.net/2268/321048

Recyclable in-mold and printed electronics with polymer separation layers
Yannic Brasse, Mariano Laguna Moreno,Simon Blum, Tim Horter, Florian Janek, Kerstin Gläser, Carl Emmerechts, Jean-Michel Clanet, Michèle Verhaert,Benoît Grymonprez and Tobias Kraus
https://pubs.rsc.org/en/content/articlelanding/2024/su/d4su00092g

Process for the production of phosphoric acid
I-DEPOT Filing (BOIP)

PRESENTATIONS

DUN³ES project presentation
Sand Seminar – Durability – Recyclability – 30/05/2024 – Stéphane Neirynck

Attractivité Forum
Centr'Expo Mouscron - Stéphane Neirynck - 30/05/2024

The MC² ecosystem in Tournai: a new Walloon hub for decarbonising the earth and stone sector
Business Wapi article – September 2024 – page 11

The RECYPALE wind turbine project
SIM – Mineral Industry Congress and Exhibition – Article in Recycling & Recovery – September 2024 – No. 86, p.34

REMIND WALLONIA Day – Discussions and updates on the various projects in progress
October 2024

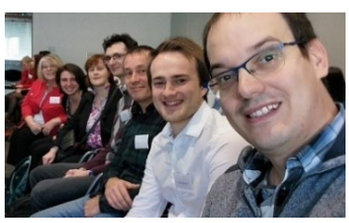
Why is natural aggregate a 'sustainable' product?
FEDIEX – Enghien – 25/10/2024 – Stéphane Neirynck

Recovery chain under development –VALOCELL project
RECYCLEPRO article – 16/11/2024 – Mathieu Henry
https://recyclepro.eu/fr/nouvelles/la-filiere-de-valorisation-se-met-en-place/

Accelerating the circularity of materials for a resilient, low-carbon European industry
FECC – 25/11/2024 – Stéphane Neirynck

Circular economy
Rotary Club of Ath – Stéphane Neirynck – 03/12/2024



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WAPINVEST represented by David NAESSENS
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Olivier BONTEMS

UMONS

UMons represented by Céline THILLOU

ULB

ULB represented by Aurore DE BOOM

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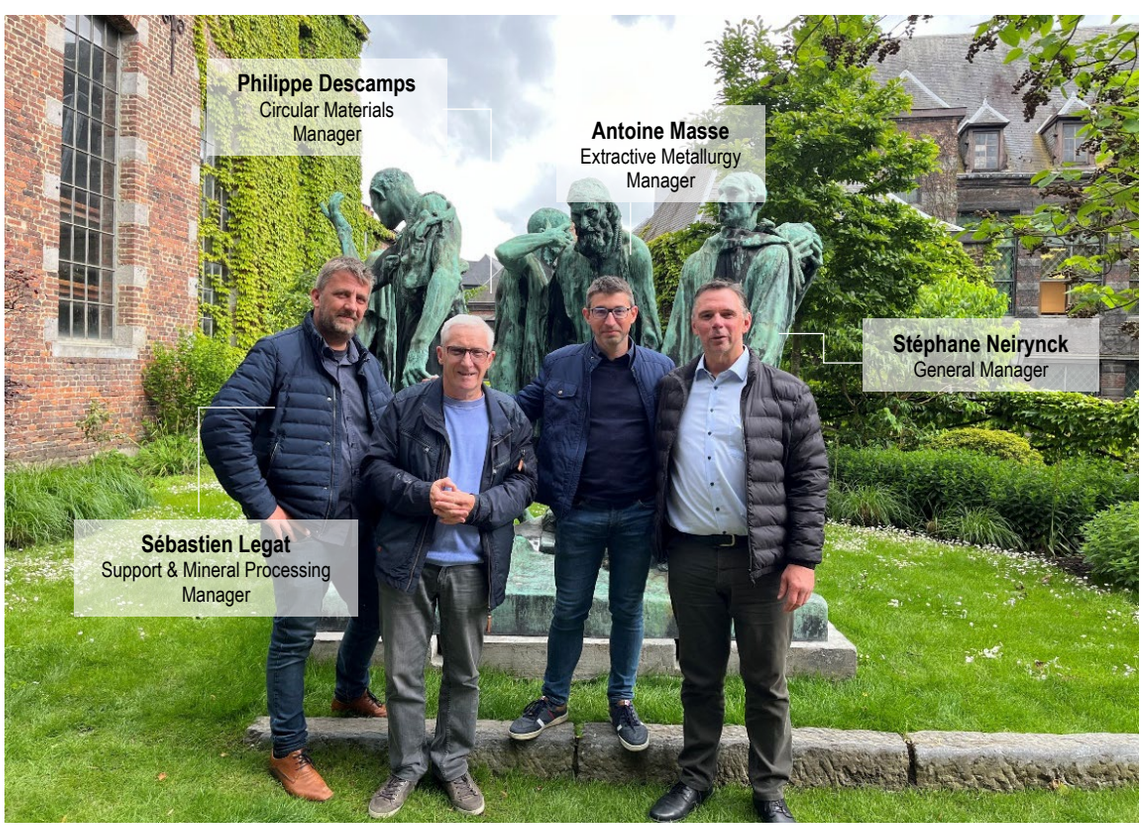


BALANCE SHEET 2024

2024
5.432 K€
Turnover

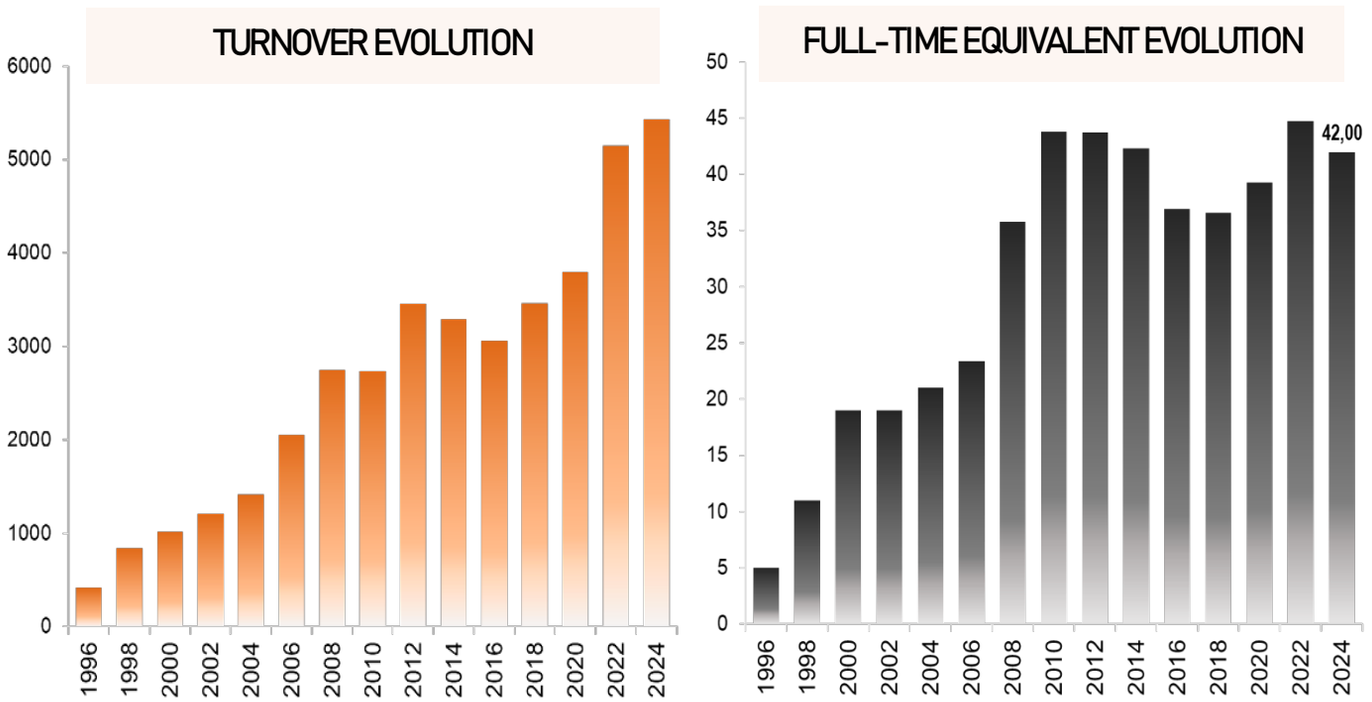
2024
5.237 K€
Liabilities

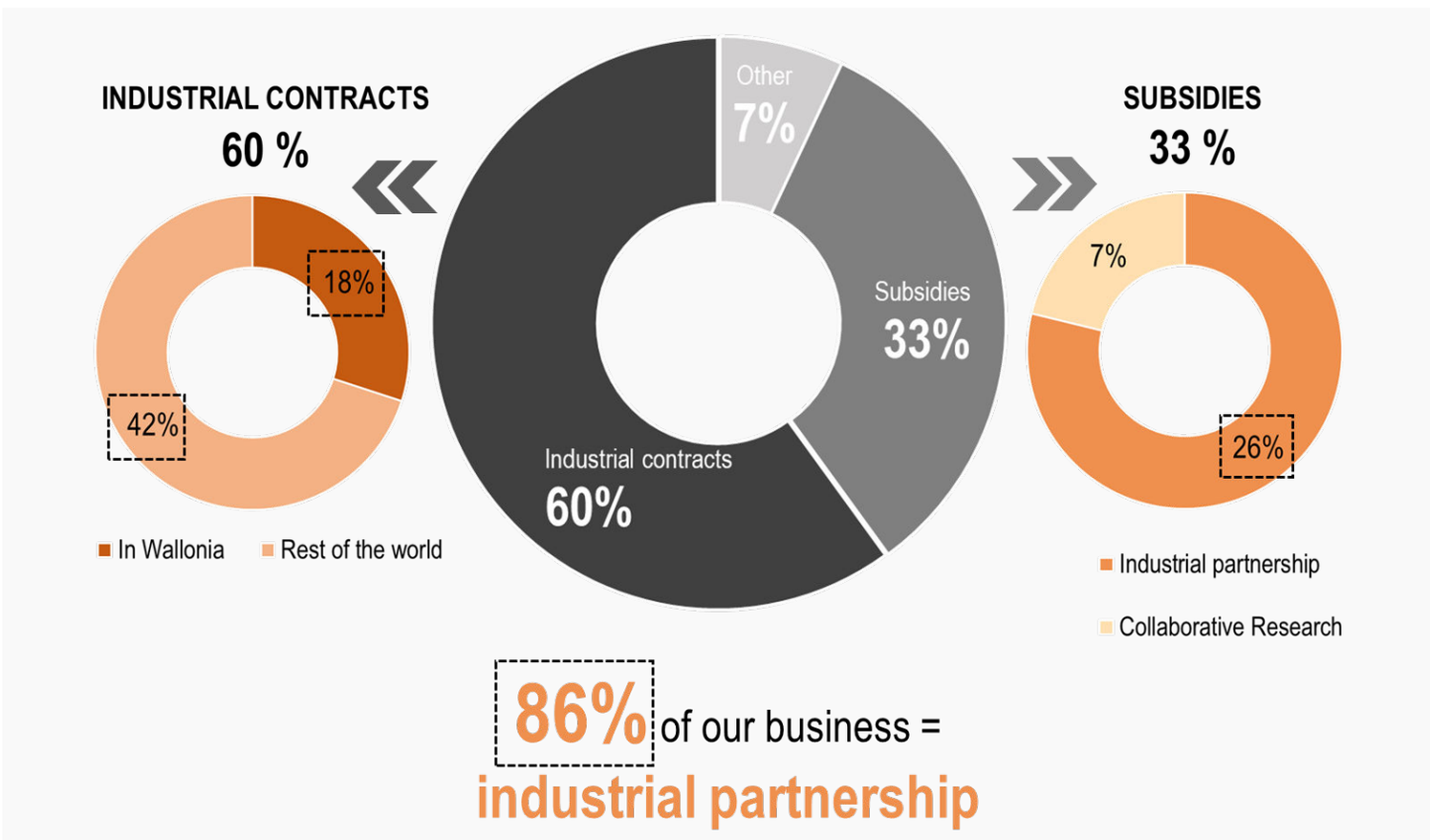
2024
593 K€
Cash Flow

2024
10 K€
Investments

	2024	2023
Assets		
Client invoices	3.240	3.937
Operating subsidies	1.777	1.417
Other assets	415	356
TOTAL	**5.432**	**5.710**
Liabilities		
Supplies	149	333
Misc. services and goods	1.556	1.708
Staff	3.028	3.048
Depreciation, provisions and write-downs	397	192
Other liabilities	107	161
TOTAL	**5.237**	**5.442**
Cash flow	**593**	**460**
Investments	**10**	**130**
Investment subsidies (equipment and buildings)		

BALANCE SHEET 2024





86% of our business = **industrial partnership**

CENTRE TERRE ET PIERRE ASBL

Chaussée d'Antoing 55 – 7500 Tournai, Belgium

CTP

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