Metso

Taking that extra step for predictability

Research & Testing

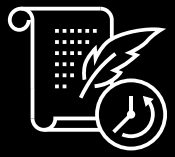



Skellefteå
Pori
Sala
Tampere
Lappeenranta
Frankfurt
Mâcon
Sudbury, ON
Manchester, PA
Cananea
Suzhou
Tianjin
Ahmedabad
Bengaluru
Jakarta
Arequipa
Belo Horizonte
Calama
Sorocaba
Centurion
West Perth

Unique know-how and leading process tools to help you reach your sustainability targets



Global network of testing and research centers



Over 120 years of experience with pilot and bench scale testing



Testing for mining applications, mineral processing, hydro-and pyro metallurgy, aggregates, simulation and process optimization

Research and testing

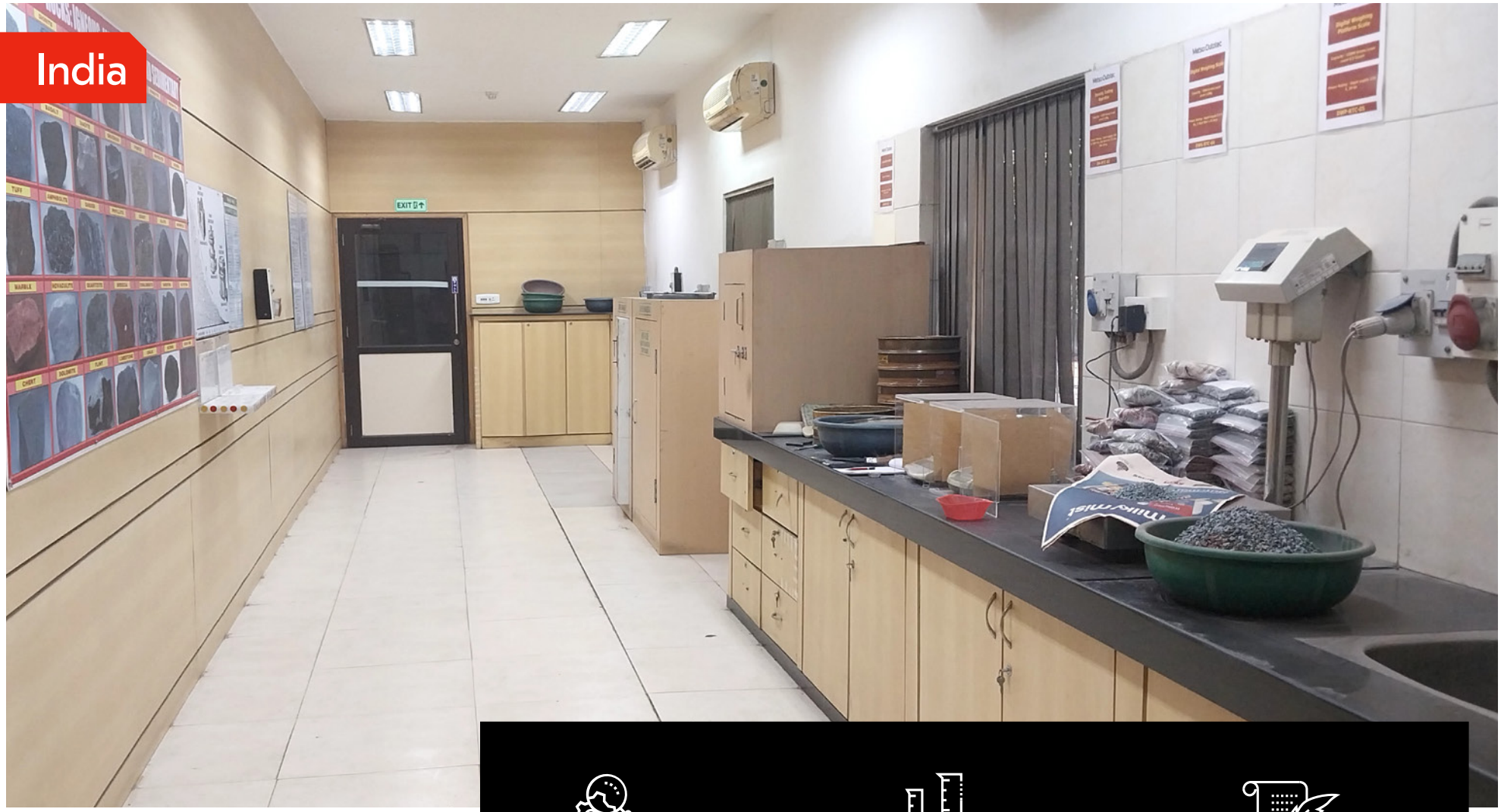
With a unique portfolio of testing and process expertise as well as process simulation, Metso is a leader in the industry with advanced and reliable research capabilities. These help to predict and gather data to deliver optimized and sustainable flowsheets as well as support mining operations to improve recovery, resource efficiency and sustainability.

Research and test services include evaluation of ore deposits and types, mineralogical characterization, feed material testing, sampling, material selection, analytical chemistry, and flowsheet development. Our experimental research is carried out in our specialized laboratories, for example our fluid dynamics laboratory and full-scale testing plant.

Benefits:

- Quick, reliable, and representative results that can be easily scaled up
- Improves process understanding based on calculations, literature studies, and tests
- Offers solutions from bench scale, laboratory and pilot testing
- Ensures optimal product selection and flowsheet optimization
- Ensures sufficient data for engineering and plant delivery
- Provides performance and research data to our simulation tool
- Ensures optimal plant performance over the life of operation
- Ensures high quality of our products
- Offers audit and on-site survey and process optimization

India

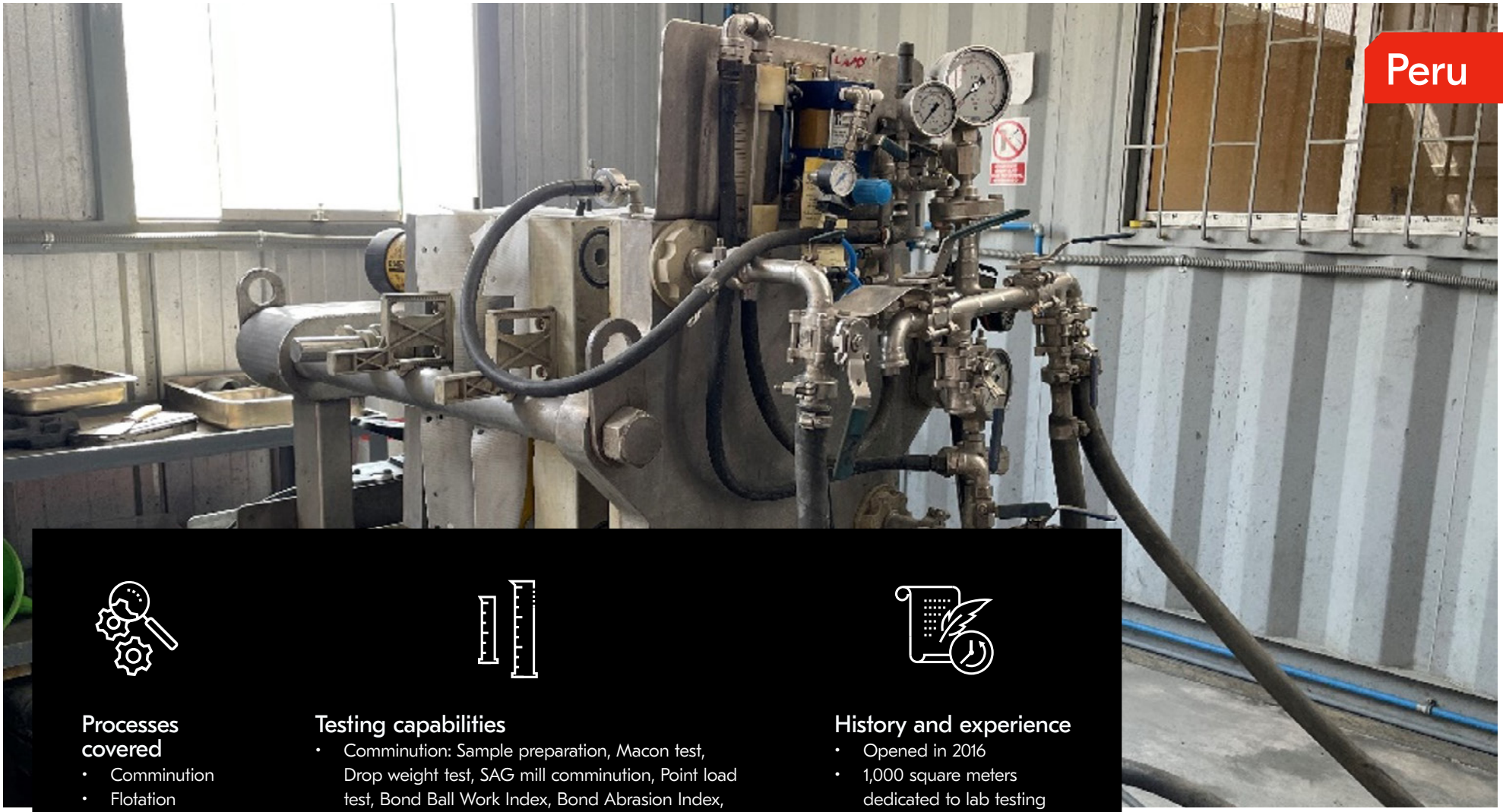


Ahmedabad Test Center

Processes covered
- Crushing

Testing capabilities
- Crushability & abrasiveness
- Sieve analysis
- Solid density
- Elongation
- Gradation

History and experience
- Opened in 2009
- More than 4,000 test reports generated worldwide
- Experience in geological property and material testing



Peru

Processes covered

- Comminution
- Flotation
- Thickening
- Filtration
- Leaching

Testing capabilities

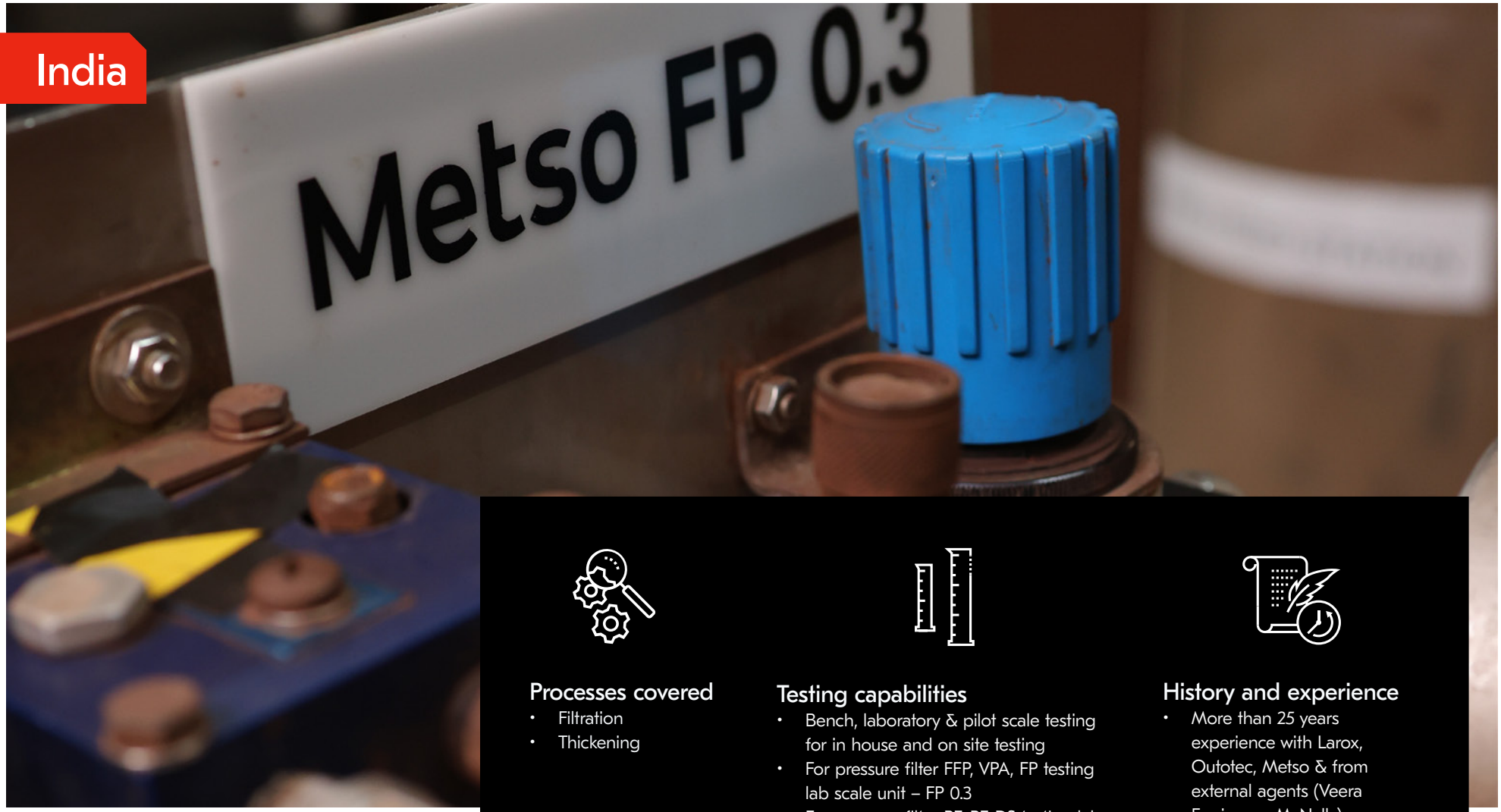
- Comminution: Sample preparation, Macon test, Drop weight test, SAG mill comminution, Point load test, Bond Ball Work Index, Bond Abrasion Index, Abrasion for HRCTM, Specific Gravity, Bulk Density
- Flotation: Grinding and regrinding, Rougher test, Kinetics test, Differential Flotation, Open cycle test, Locked cycle test
- Thickening: Static thickening, Dynamic thickening test for sizing and upgrade of HRT, HCT & Paste thickeners. Determination of yield stress and viscosity
- Filtration: Pressure: PF: 0.1 m^2, FP 0.3, Labox: 100 cm^2; Vaccum: Buchner (belt filter); SC leaf (filter); Leaching: Bottle roll test and Column leaching test

History and experience

- Opened in 2016
- 1,000 square meters dedicated to lab testing
- This lab provides external services focused on process optimization and geomet programs. Internally, we use the data for sizing and upgrade of equipment

Arequipa Test Center

India



Bengaluru Test Center

Processes covered

- Filtration
- Thickening

Testing capabilities

- Bench, laboratory & pilot scale testing for in house and on site testing
- For pressure filter FFP, VPA, FP testing lab scale unit – FP 0.3
- For pressure filter PF, PF-DS testing lab scale unit – PF 0.1
- For vacuum filter RT, RT-GT, RB testing bench scale unit - Buchner
- For all pressure filter testing bench scale unit – Labox 100
- For pressure filter deciding test bench scale unit - Labox 25
- For HRT thickener testing bench scale unit – 99 mm test rig

History and experience

- More than 25 years experience with Larox, Outotec, Metso & from external agents (Veera Engineers, McNally)
- 2,200 square meters with analysis setup and auxiliaries to carry out the successful test campaign
- Maintains close relationships with the Indian public and private labs for dewatering studies



Chile

Processes covered

- Thickening
- Filtration
- HIG5 (in Santiago)

Testing capabilities

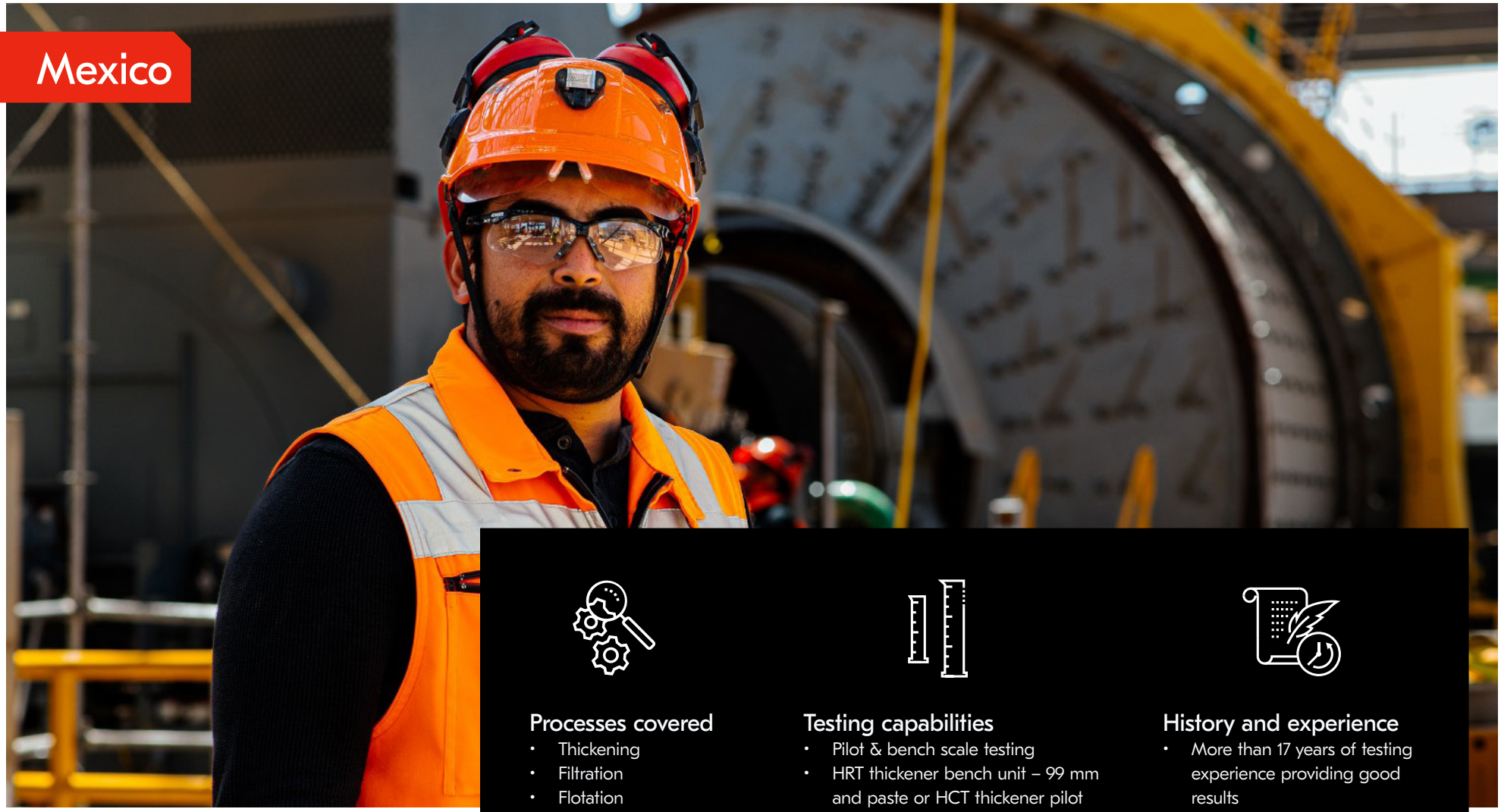
- Pilot & bench scale testing
- Pilot unit filter press horizontal – FP 0.3
- Pilot unit filter press vertical – PF 0.1
- Bench unit belt filter – Pannevis Buchner
- Bench unit press filter – Labox 100 (PVDF)
- Pilot LSF R2 (polishing filter)
- HRT thickener bench unit – 99 mm (SS)
- Paste or HCT thickener pilot unit – 190 mm
- Pilot flotation unit – Concorde cell

History and experience

- More than 25 years experience with Larox, Supaflo, Outokumpu
- Maintains close relationships with Chilean investigation centers

Calama Test Center

Mexico



Cananea Test Center

Processes covered

- Thickening
- Filtration
- Flotation
- Automation

Testing capabilities

- Pilot & bench scale testing
- HRT thickener bench unit – 99 mm and paste or HCT thickener pilot Unit -190 mm
- Pilot unit filter press horizontal – PF 0.1 and vertical FP 0.3
- Bench unit belt filter – Pannevis Buchner
- Bench unit press filter – Labox 100
- Tank cell unit
- Pilot flotation unit – Concorde cell
- Courier unit
- Pilot HIG container unit

History and experience

- More than 17 years of testing experience providing good results
- High customer satisfaction
- In addition to the laboratory tests, onsite test is done to guarantee better results

South Africa



Processes covered

- Filtration
- Thickening

Testing capabilities

- Pilot & bench scale testing
- Pilot unit filter press horizontal – FP 0.3
- Pilot unit filter press vertical – PF 0.1
- Bench unit belt filter – Pannevis Buchner
- Bench unit press filter – Labox 100 (PVDF)
- HRT thickener bench unit – 99 mm (SS)
- Paste or HCT thickener pilot unit – 190 mm

History and experience

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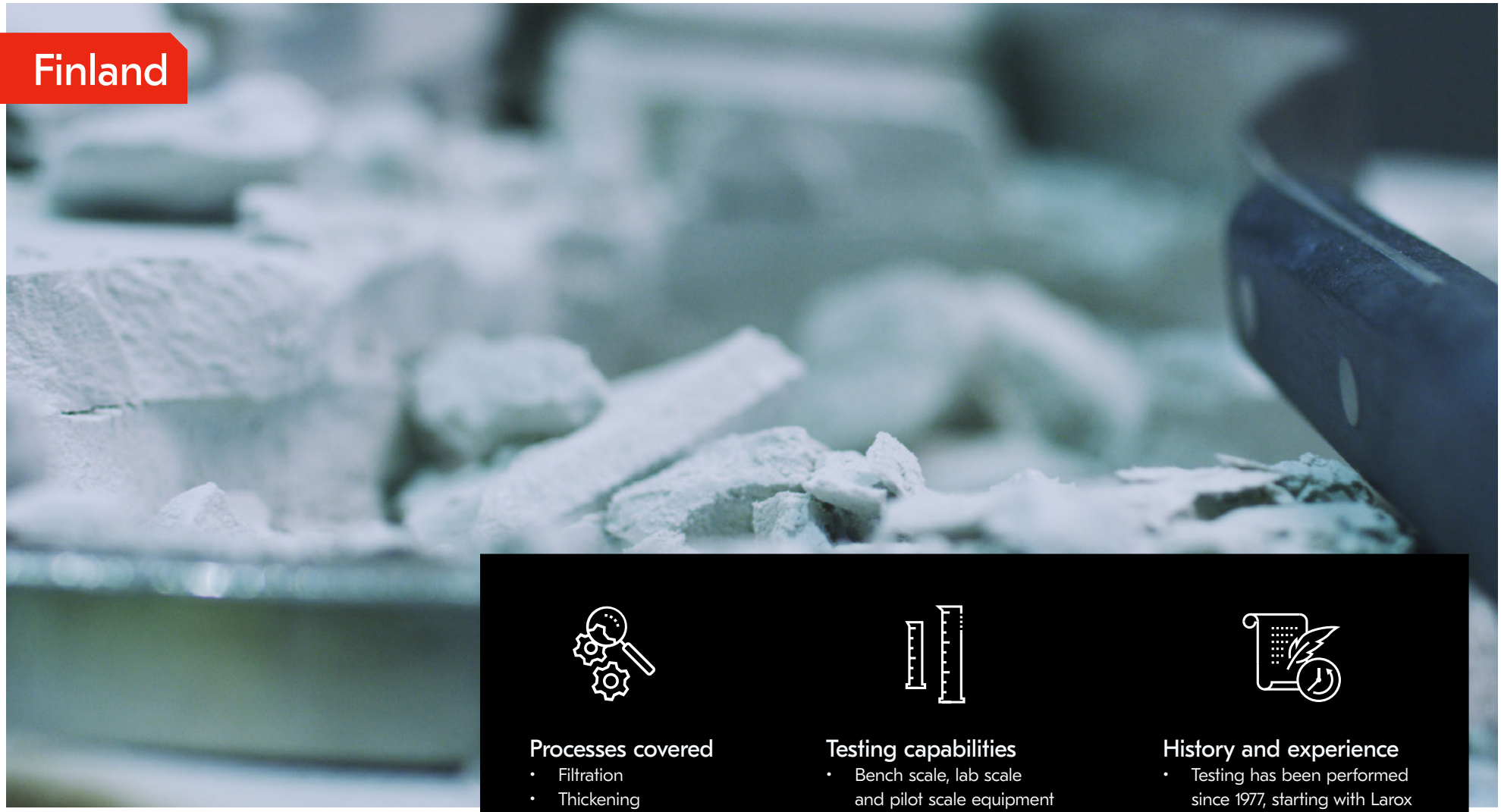
Centurion Test Center

Finland



Lappeenranta

Dewatering Technology Center (DTC)

Processes covered

- Filtration
- Thickening
- Process water treatment

Testing capabilities

- Bench scale, lab scale and pilot scale equipment
- Pressure, vacuum and polishing filter testing
- HRT, HCT and IPS thickening testing
- Geotechnical analysis (e.g. proctor, Atterberg limits, transportable moisture limit)
- Different dewatering analysis capability

History and experience

- Testing has been performed since 1977, starting with Larox test equipment
- In 2015, Outotec invested in a new Dewatering Technology Center which allows all the different technology testing on the premises
- The process and testing group has over 100 years of experience on different filtration technologies

Indonesia



Processes covered

- Filtration
- Thickening

Testing capabilities

- Thickener (HRT, HCT, Paste)
- Clarifier
- IPS
- Horizontal Vacuum Belt Filter (HVBF)
- Pressure filtration (PF, FFP, VPA)
- Witness and support for Screening, Flotation, Leaching, Bio-oxidation testing with our partner

History and experience

- Opened in 2023
- Provides testing for customers in Asia

Jakarta Test Center

France



Mâcon Rock Laboratory

Processes covered
- Crushing
- Screening

Testing capabilities
- Crushability and abrasiveness
- Bond impact work index
- Sand flow
- Sieve analyzes
- Density measurement
- Methylene blue test (clay content)

History and experience
- Long history of testing
- Analyzing rock samples for more than 50 years
- 1000 samples analysis per year



Finland

Technology areas

- Analytical services
- Materials research
- Fluid dynamics
- Mineral processing
- Hydrometallurgy
- Pyrometallurgy

Available services

- Chemical and mineralogical characterization studies
- Process, flowsheet and equipment development
- Process mass and energy balance modeling
- Batch, semi-continuous and continuous test work
- Test work executed in laboratory and pilot plant scale

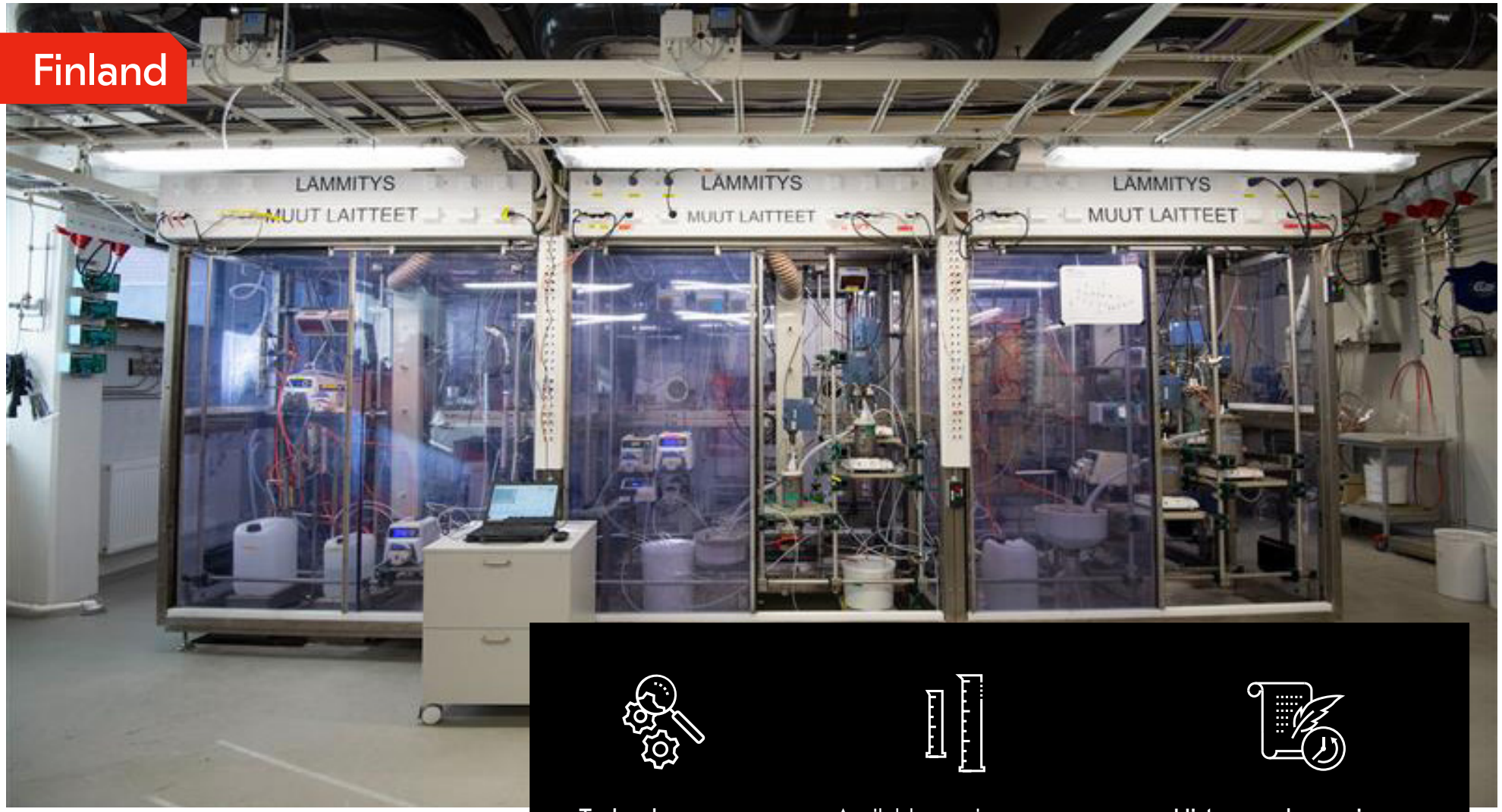
History and experience

- In the forefront since 1949
- 10 extensive laboratories and pilot plants for minerals processing, hydrometallurgy, smelting and materials research

Pori

Metso Research Center (MRC)

Finland



Pori

Metso Research Center

Hydrometallurgy

Technology areas

- Hydrometallurgical metals refining
- Design and sizing of new and existing processes and equipment

Available services

- All basic unit operations and equipment utilized in hydrometallurgy
- Cyanide laboratory
- Batch and continuos autoclaves
- Leaching, solvent extraction, precipitation and electrolytic recovery
- Battery precursor technology

History and experience

- Long history of developing tailored process solutions for customers
- Fully renovated hydrometallurgical laboratory in 2024
- Battery precursor pilot in 2024

Finland



Pori

Metso Research Center

Mineral processing

Technology areas

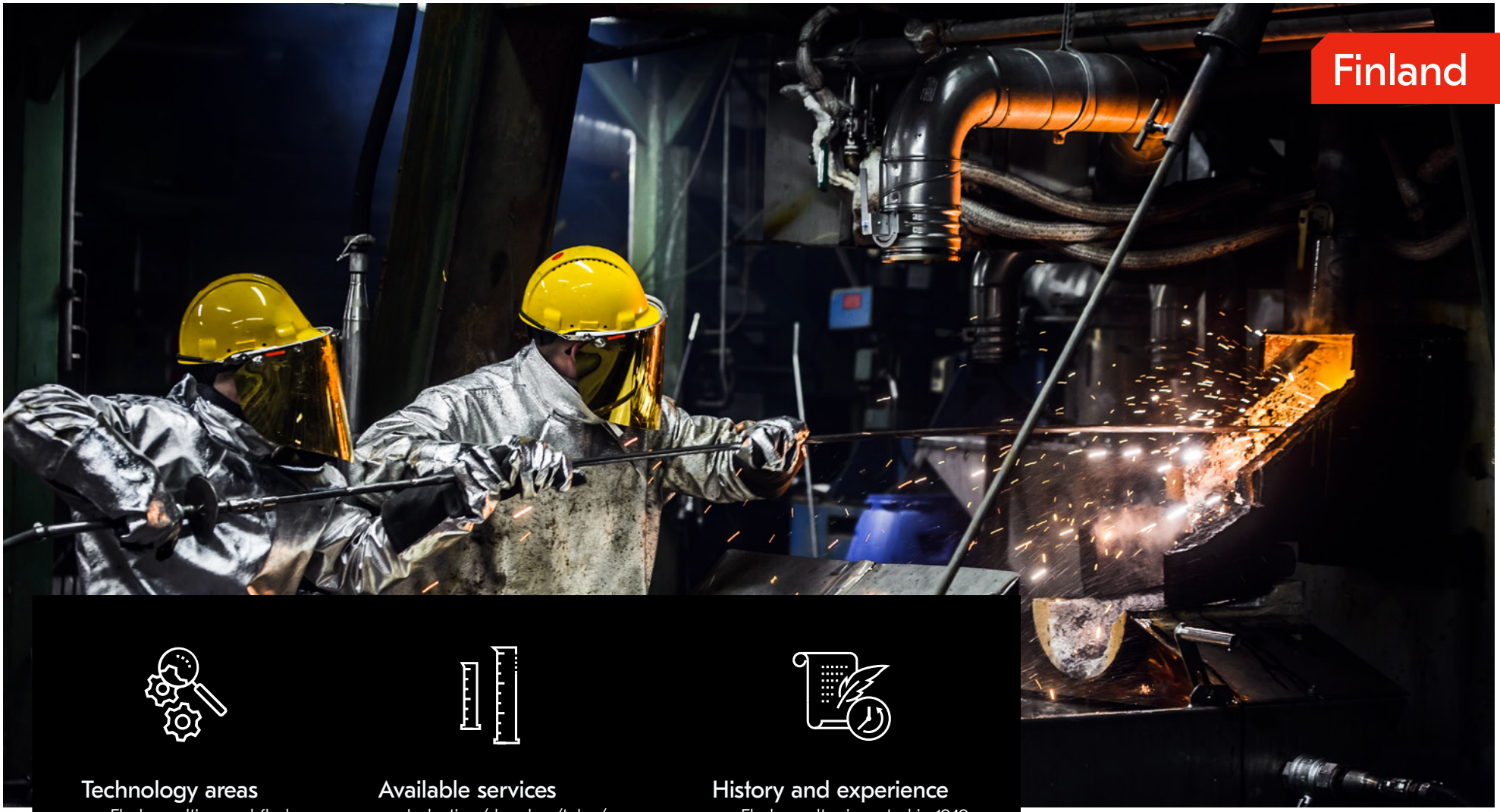
- Chemical and mineralogical characterization
- Mineral processing
- Dewatering

Available services

- Mineralogy studies
- Beneficiation technologies
- Process, flowsheet and equipment development
- Process simulation
- Site audits
- Development of full plant solutions for mineral processing

History and experience

- Fully renovated mineral processing laboratory in 2024
- Long history of green- and brownfield process flowsheet development for customers
- New technology development
- Supporting engineering and CAPEX OPEX estimations
- Feasibility studies



Finland

Technology areas

- Flash smelting and flash converting
- Ferroalloys production
- Pyrometallurgical prosecing of secondary feed materials
- Electric furnaces

Available services

- Induction/chamber/tube/ vacuum furnaces
- Fluid bed furnace (lab only)
- Pelletizing/sintering/rotary kiln
- Electric arc furnaces (AC, DC and 3-in-line)
- Flash smelting and flash converting
- Kaldo L0.05 (TBRC)
- DRI Smelting Furnace pilot

History and experience

- Flash smelter invented in 1949
- Long history of developing smelting technologies
- New Kaldo L0.05 furnace to study e-scrap processing and other recycling processes
- New DRI Smelting Furnace pilot facility enabling the decarbonization of steel industry

Pori

Metso Research Center

Pyrometallurgy

Australia



Perth Technology Centre

Processes covered

- Filtration
- Thickening
- Concorde Fine Flotation

Testing capabilities

- Thickener (HRT, HCT, Paste)
- Clarifier
- IPS
- Concorde
- Horizontal Vacuum Belt Filter (HVBF)
- Pressure Filtration (PF, FFP, VPA)
- Polishing Filtration (LSF)
- Tube press

History and experience

- More than 20 years experience providing high-quality testing
- Maintains ISO certifications in Quality (ISO 9001), Environment (ISO 14001) and Safety (ISO 45001)

Sweden



Processes covered

- Slurry pumps are tested using clear water
- Our slurry pumps are used in a wide variety of industrial minerals and other applications
- Hydrocyclone rig

Testing capabilities

- Performance test (QHP) according to ISO 9906:2013 acceptance grade 3B
- NPSH3 according to ISO 9906:2012
- Vibration test (ISO 10816-1:1995/Amd.1), Sound pressure level (ISO 1680), Temperature rise test (internal procedure), Hydrostatic pressure test (HI 14.6-2016)

History and experience

- "Small" slurry pump performance testing since 1984 and computerized 1990 - still in operation but will be replaced (ongoing project)
- "Large" slurry pump performance was modernized 2018

Sala Test Center

Sweden



Skellefteå Test Laboratory

Processes covered

- All rubber products that Metso manufactures including grinding consumables, slurry handling, filtration and material transportation
- Rubber testing and development of materials, processes and internal test methods
- Mill lining research and analysis, as well as deeper quality control analysis on rubber compounds
- Development of new rubber compounds, with focus on sustainability and wear resistance

Testing capabilities

- Wide range of equipment to test the properties of rubber: Tensile tests, rheology, wear tests, rebound resilience, heat build-up, cracking, tear strength, bonding, hardness, absorption etc.
- For rubber analysis: Thermogravimetric analyzer (TGA) and Gas chromatograpghy (GC)

History and experience

- Previously part of the Ersmark factory, relocated to Skellefteå in northern Sweden
- Recently invested in new and more efficient equipment (lab mixer cut and chip tester and rubber process analyzer)
- Rubber lab has been operating in this region since 1946



Brazil

Processes covered

- Crushing
- Grinding
- Filtration
- Magnetic separation
- Screening
- Sedimentation

Testing capabilities

- Pilot & bench scale testing
- Industry testing

History and experience

- Approximately 50 years of experience
- Well known for crushing evaluations with high accuracy for simulations

Sorocaba Test Center

China



Suzhou Test Center

Processes covered

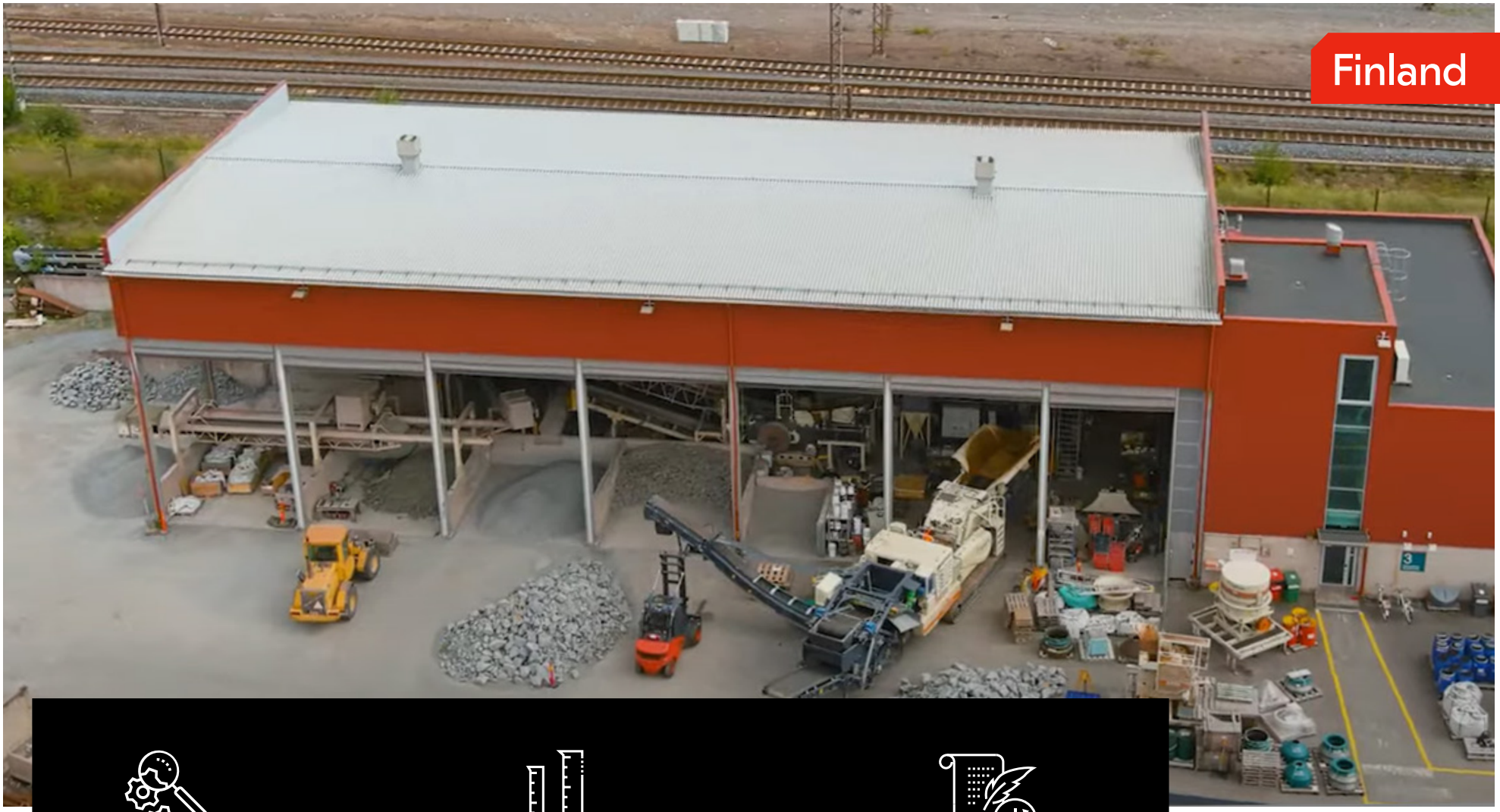
- Filtration
- Thickening
- Flotation (limited)
- Crushing (Tianjin Plant)

Testing capabilities

- Crushing test (Tianjin plant)
- Flotation test (cooperation with BLs or third party)
- HRT, HCT, Paste thickening test (Bench scale and pilot scale)
- Pressure filtration (PF/TPS, FFP, VPA)
- Vacuum filtration (RT Buchner)

History and experience

- Opened in 2008
- 16 years experience providing high quality testing
- In the past 4 years, this location has conducted more than 70 tests each year



Finland

Processes covered

- Crushing
- Screening

Testing capabilities

- Full scale crushing performance, prototyping and pilot testing
- Various rock test methods and screen analyzes in rock laboratory (Bench)
- Laboratory jaw crusher test for chamber optimization and research

History and experience

- Over 60 years experience of rock testing
- Existing Research Center opened in 2008

Tampere Research Center

China



Tianjin Test Center

Processes covered
- Crushing
- Screening

Testing capabilities
- Solid density
- Crushability
- Abrasiveness

History and experience
- Opened in 2012
- More than 1,600 test reports generated worldwide



United States

Processes covered

- Crushing
- Grinding
- Screening
- Separation
- Filtration
- Pyro processing

Testing capabilities

- Bench and pilot scale testing for:
  - Comminution
  - Beneficiation
  - Pyro metallurgical

History and experience

- Testing performed for more than 100 years (first documented test in 1921)
- Consolidated Test Center opened in August 2022

Manchester, PA

Metso Test Center (MTC)

Notes

Metso is a frontrunner in sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. We improve our customers' energy and water efficiency, increase their productivity, and reduce environmental risks with our product and service expertise. We are the **partner for positive change.**

Metso

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