MATERIALS INDUSTRIAL RESEARCH

AND TECHNOLOGY CENTER

COMPANY PROFILE

MIRTEC S.A. - Materials Industrial Research and Technology Center is a technological center, active in applied research, technological development, certification and quality control in a wide range of materials and products.

The company was founded by the merge of three renowned Greek technological centers with over 25 years of experience:

- **MIRTEC S.A.** (Metallurgical Industrial Research & Technology Development Center),
- **CERECO S.A.** (Ceramics and Refractories Technological Development Company), and
- **CLOTEFI S.A.** (Clothing, Textile and Fibres Technology Development),

While each had a unique focus and expertise, today, within MIRTEC S.A., they share the same vision of excellence, offering to clients services in a wider range of materials and allowing them to achieve improved Products, Processes, Performance and Profitability.

MIRTEC S.A. operates under the supervision of the Greek Ministry of Development and its shareholders are the Greek State and private companies.

Vision

To be the Reference in Industrial partnership and to keep exceeding client expectations.

Mission

Our mission is to support industry through leading edge technology and transfer knowledge to our clients, thus improving their competitiveness and competence by adding value to their products.

Why choose MIRTEC

Expertise – Gathering the long-standing experience of three renowned technological centres, MIRTEC holds a unique expertise and know-how in a wide range of materials and industries. This stems from years of research and laboratory experience and our systematic communication and collaboration with European and Greek technological centres, institutes and universities.

Innovation – We participate in a large number of research projects, keeping up to date with the latest developments in materials and processes. Focusing our activities on industrial innovation, we add technological value to our clients' products, improving performance and profitability.

Integrated solutions – We provide integral solutions in almost all aspects of materials - metals, ceramics and refractories, organic, fibrous, textile materials and composites - ranging from testing and analyses to quality control and certification and from consultancy in legislation issues to customized solutions for products' improvement or development with focus on efficient and economical uses of energy and recourses and ensuring environmental protection.

Flexibility and speed of service – We have an uncluttered structure and a flexible organization backed up by our ability to adapt to the needs and particular requirements of our clients. We can provide a quick turnaround service and cost-effective solutions in testing, technical consultancy and materials development consultancy.

Focus on the client – Reliability and Integrity, Confidentiality and the Focus on the client: these constitute the solid foundation of our company, bringing more and more clients who put their trust in us.

Infrastructure – Our laboratories are equipped with state-of-the-art equipment for products testing and analyses, new products' development and pilot scale production.

Staff – The scientific qualifications and continuous investment in our staff, with an extensive industrial experience, build a responsive company that combines expertise with effectiveness and reliability, commercial understanding and integrity.

Areas of Expertise

Our technological areas of expertise include:

- Metallic materials
- Technical ceramics, conventional ceramics and refractory materials
- Construction materials
- Minerals & powders
- Thermal spray coatings
- Organic, fibrous and textile materials
- Industrial by-products
- Computer modelling
- Environmental control & protection

MIRTEC continuously strives to expand its expertise and to promote R&D synergies through close interaction within the areas above.

Main activities

- Applied & industrial research projects
- Product & materials processing development
- Pilot scale production
- Technical consulting
- Case studies
- Testing, analysis quality control services
- Industrial inspection
- Industrial auditing
- Product certification
- Quality management system certification
- Health & safety at work
- Environmental services
- Technology transfer
- Training & certification of personnel

MIRTEC is the only Hellenic Certification Body with private laboratories.

Collaborators – Clients

During our long course of professional and research activity, we have developed close ties with a wide range of clients and collaborators, which include:

- Most of the Greek universities & research organizations
- Many universities and research organizations abroad
- Large Greek and multinational corporations
- Small and medium enterprises in the materials sector
- Public organizations

The large and continuously expanding list of collaborators and clients constitutes a figure print of the company's contribution to the technological development and the wide span of its activities. At the same time, this reflects one of the most precious assets of the company, which is a guarantee for its further progress and dynamic development.

Certification Services

MIRTEC is an Accredited Certification Body for Systems and Products Certification.

System Certification Services

Accreditation according to ELOT EN ISO/IEC 17021-1 for:

- Quality management, ELOT EN ISO 9001
- Environmental management, ELOT EN ISO 14001
- Occupational health & hazard management, ELOT 1801 & OHSAS 18001
- Managerial capability of organizations implementing projects of public interest, ELOT 1429
- Energy management systems, ELOT EN ISO 50001
- Food safety management systems, ELOT EN ISO 22000

Products Certification Services

Accredited according to ELOT EN ISO/IEC 17065 - Notified body for product certification according to the following European Directives and Regulations:

- Pressure equipment (2014/68/EU)
- Transportable pressure equipment (2010/35/EU)
- Simple pressure vessels (2014/29/EU)
- Appliances burning gaseous fuels (Regulation (EU) 2014/26)
- Marine equipment (2014/90/EU)
- Lifts and safety components for lifts (2014/33/EU)
- Machinery (2006/42/EC)
- Construction products (Regulation (EU) 305/2011)

MIRTEC is also accredited for product certification according to National & European Standards:

- Fire-extinguishers performance certification (ELOT EN 3, ELOT EN 1866, ELOT 1066)
- Concrete steel reinforcement (EN 10080 & ELOT 1421-2,3)
- Welding procedure and welders certification (EN 15614 series, EN 9606 series)
- Cementitious adhesives for tiles (EN 12004 E2:2008, category 3/C)

Personnel Training & Certification

- Accreditation according to ISO/IEC 17024 for certified personnel for the periodic inspection, maintenance & recharging of fire-extinguishers
- ISO Quality management auditors
- Lift inspectors
- Lifting machinery inspectors
- Building energy efficiency inspectors

Organic, fibrous and textile materials

Technological services - Quality Control- Certification Services

MIRTEC's organic, fibrous and textile materials division offers specialized knowledge in this area by providing:

- Product certification
- Quality control services
- Technical consultancy
- Development of technical specifications for textile materials and clothing, both for public organizations and private companies

With fully equipped laboratories, we can perform almost 300 different tests according to European and international standard test methods.

We are a member of the Oeko-Tex® Association for Textiles Ecology and authorized to provide relevant certification, i.e. products certification according to the Oeko-Tex® Standard 100 and processes certification according to Oeko-Tex® Standard 1000.

A wide range of harmful substances can be effectively detected and the compliance of polymeric and textile materials to the REACH regulation can be appraised.

Materials can be characterized in terms of their composition, chemical, structural, physical and mechanical properties, functional properties (e.g. flame retardance, water resistance/proofness) and their behavior during use (e.g. artificial weathering, water resistance/proofness, color stability, dimensional stability).

Special equipment for determination of textile comfort properties, namely a Kawabata evaluation system and a skin model, is also available. The former provides a powerful tool to evaluate a wide range of mechanical properties in the elastic region (non-destructive testing) and the latter allows assessment of water vapor permeability (breathability) and thermal resistance of bi-dimensional structures.

Organic, fibrous and textile materials

Research & Development

Our Technological areas of interest include:

- Functionalization of textiles and polymers (e.g. flame retardancy, UV resistance, antimicrobial, self-healing properties)
- Personal protective equipment (e.g. ballistic armours, PPE for firefighters/ first responders)
- Synthesis of polymeric nano/micro-particles (spheres or capsules)
- Upgrading and applications of sustainable materials (biodegradable, bio-based, recycled polymers and plastics)
- Textile surface treatments and wet processes (e.g. functional finishing, thermal spray coatings, enzymatic treatments, bacteria dyeing)
- Natural fibres (particularly cotton) study and applications
- Characterization of textiles and plastics in terms of chemical and physicomechanical properties, ageing studies and lifetime prediction

Ceramics, Refractories & Building Materials

Technological services - Quality Control - Certification Services

MIRTEC's Ceramics and Refractories materials division offers specialized knowledge in the area of ceramics, refractories & building materials.

We provide:

- Product certification
- Quality control services
- Testing & analysis
- Technical consultancy
- Industrial inspection
- Product sampling

MIRTEC's labs are accredited according to ELOT EN ISO/IEC 17025 for testing of ceramics, concrete, cement, aggregates, clays, adhesives, asphalts and water. Today we carry out more than 40 Accredited tests and (as the EC directives impose the need of control in most of the construction materials), we continuously increase the number of accredited testing in order to satisfy our clients' needs for quality control.

Our experts also provide technical support and consulting services on management system certification, quality control and products' quality improvement. A large number of industrial companies ranging from producers to users of ceramic products are covered by these services.

In our facilities, the clients can expand the capabilities of their own laboratories in order to obtain reliable data and professional discrete advice from an independent organization.

MIRTEC's labs provide Testing and Analysis Services in:

- Raw Materials
- Construction Ceramics (Brick - Roofing Tiles)
- Refractory Products
- Ceramic Tiles
- Marbles
- Sanitary Ware
- Table Ware
- Cement
- Concrete
- Aggregates
- Mortars
- Tiles Adhesives
- Concrete Chemical Additives
- Asphalt
- Cement Tubes
- Concrete Cubes
- Pavement Curbs
- Pavement Tiles
- Ornamental Stones
- Structural Lime

Ceramics, Refractories & Building Materials

Research & Development

MIRTEC's Ceramics & Refractories division for over 25 years applies competitive and collaborative research in the field of ceramics & refractories and has developed a strong cooperation network with the most important universities and research centers worldwide, remaining in the frontier of international technology in this area.

In the field of Ceramics, we have successfully completed more than 100 National and European Projects and we have fulfilled a plethora of bilateral industrial contracts with Greek and European Industries.

We are always driven by clients' unique needs to find innovative solutions utilizing our expertise and technology capabilities in ceramic processing.

Our technological areas of expertise include:

- Porous Ceramics: Ceramic catalytic converters, membranes, shoot filters
- Porous metal-ceramic composites
- Special ceramic materials with low thermal expansion
- Ceramic superconductors
- Materials and technologies for SOFC (H_2 production)
- Tailor made spray dried ceramic powders & ceramic nanomaterials
- Thin films (RF/DC sputtering)
- Thermal spray coatings using powders, solutions, suspensions & inks via APS, LPPS, HVOF, SPPS/SPS systems
- Thermal barrier coatings
- Biocompatible materials
- New building materials
- Environmentally friendly solutions, suspensions, inks
- Laser Induced breakdown spectroscopy

Our activities, as reliable and trustworthy research partner, well-established both in Greece and Europe relate to:

- Process optimization and industrial scaling up
- Development of new improved products
- Pilot scale production
- Exploitation of R&D results
- Know-how development and technology transfer to the industry

Metallic Materials & Metallurgy

Technological services - Quality Control - Certification Services

We provide:

- Testing and Analysis
- Technical Consulting
- Industrial Inspection
- Product Certification
- Innovation Technology Transfer

MIRTEC is accredited to ELOT EN ISO/IEC 17025 to carry out tests on metallic materials, products & welded joints at its laboratories:

- Chemical analysis
- Mechanical & hydraulic testing
- Nondestructive testing
- Metallography & microscopy
- Concrete
- Steel reinforcing bars testing
- Fire extinguishers performance

Industrial Inspections are also offered for:

- Lifts
- Lifting Machinery
- Pressure Equipment
- Vehicles for the Transportation of Dangerous Goods (according to ADR)
- Tourist Lifts
- Natural Gas Pipelines
- Metallic Construction & Products

Research & Development

Our Technological areas of expertise in the field of metallic materials include:

- Design new alloys, lightweight structures
- Studies of industrial metal processes - Simulation & optimization
- Studies of corrosion and protection of metallic construction
- Design of thermal and surface treatments
- Failure analysis of equipment (e.g. shafts, heat exchangers, pressure vessels)
- Metallic materials characterization
- Joining of materials & structures
- Diagnosis of materials deterioration
- Non-destructive assessment of materials
- Numerical Modeling & structural safety & integrity

Cables and Electrotechnical Products

MIRTEC's cables and electrotechnical division offers specialized knowledge in this area by providing:

- Product Certification
- Quality control services
- Technical consultancy

With fully equipped laboratories, we can perform more than 300 different tests according to European and international standard test methods.

We are member of the ETICS Scheme (European Testing Inspection Certification System) for cables and electrotechnical products and authorized to provide relevant certification, i.e. cable products certification according to the HAR® mark and ENEC® mark.

We are also member of the IECEE Scheme (System for Conformity Assessment Schemes for Electrotechnical Equipment and Components Association) for electrotechnical products (such as luminaires, household appliances, etc) and authorized to provide relevant certification, i.e. CB Certificate.

By acquiring the right to use MIRTEC's mark you avoid the multiple testing and certification of devices, thus saving time and money. Apart from that, it enables you to export your products without problems worldwide. Also, your clients' trust in product quality and safety substantially increases if the product is ENEC marked.

MIRTEC is also a Notified Body to Regulation (EU) No *305*/2011.

Plastic pipes and fittings testing laboratory

MIRTEC's plastic pipes & fittings testing laboratory is accredited according to EN ISO 17025 and is fully equipped to perform tests according to International and European standards. Apart from Type tests, the laboratory performs tests for pipe samples from construction sites of public and private infrastructures.

Other services on plastic pipes and fittings include:

- Plastic welder certification and testing
- Destructive testing on gaseous fuel plastic pipe distribution networks
- Consulting services and failure analysis

Except for plastic pipes, MIRTEC's laboratory perform numerous tests on polymer raw material and finished products, checking mechanical and physical properties but also performing qualitative and quantitative analysis.

Environmental Control & Protection

Technological services - Quality Control - Certification Services

Our company is especially sensitive and has developed an intense scientific activity in environmental control and protection. By beneficially exploiting our knowledge in a wide range of materials, we can provide innovative integrated solutions to problems related to environmental management, in industrial production units, social organizations and individuals.

Our Environmental services include:

Analytical services for controlling and monitoring the environmental quality, pollution level assessment

- Water, wastewater, soil, ores, sludge etc. measurements of Cr 6+ and heavy metals
- Monitoring of parameters in biological treatments
- Measurements of solid samples of unknown origin through leaching and classification
- In field measurements
- Solid fuels testing

The most approved scientifically methods are applied for the realization of the measurements according to national and international standards. In this way the reliability of the measurements is secured, conforming to environmental legislation and fulfilling the needs of quality and environmental management systems (EN 14001, EMAS).

Consulting and awareness services

- Technical consulting activity along with laboratory support in the application of environmental management systems (EN 14001, EMAS).
- Consulting services in environmental innovation and promotion of technological applications concerning the environmental management.
- Training (organizing seminars and educational programs, promotion activities, information and awareness in environmental matters).
- Collaboration with organizations, local authorities, research institutions, environmental organizations.

Environmental Control & Protection

Research & Development

We have successfully accomplished numerous industrial projects dealing with environmental applications and development of innovative anti-pollution technologies.

The company supports sustainable production processes through utilization of industrial wastes and supports circular economy using industrial by-products and end-of-life products for various high end applications.

Our R&D activity in the area of environmental protection includes:

- Development of ceramic filters for environmental protection
- Automobile catalytic converters, purification filters & membranes
- Management of industrial by-products (inertization)
- Utilization/valorization of industrial by-products for new product development.

Indicative Case studies include:

- Utilization of short metallic fibers for the development of porous metallic products
- Integrated Approach to manage end-of-life aircraft insulation products for building applications
- Utilization of industrial byproducts/wastes for the development of mortars with reduced environmental footprint
- Use of dust from filters of electric arc furnaces in steel Industry (EAFD) as raw materials in bricks and roof tiles
- Use of metallurgical slags as Inert additive in concrete or as raw materials in bricks and roof tiles
- Use of fly ash by-product from power plants for adsorbent structures for cleaning industrial hazardous wastewaters
- Use of wastes from aluminum industry for the production of refractory masses.

Production Capabilities

Utilizing our know-how and modern facilities including equipment for powder production and processing, shaping equipment and industrial furnaces, today we are able to produce, upon a client's request, a great number of innovative products in pilot scale.

Indicative products include:

- Ceramic powders with custom-designed composition, grain size, morphology
- Flowable ceramic spray dried powders of tailor-made compositions
- Shaped ceramics with tailor-made composition
- Special ceramic materials with very low or controllable thermal expansion
- Ceramic nanomaterials in the form of environmentally friendly water-based solutions, suspensions, inks
- Ablation & sputtering targets, ceramic filters, honeycomb ceramic structures, sand blasting orifices, special refractories, etc.
- Thermal spraying coatings of tailor-made compositions
- Crucibles, boats, tubes, rods, discs or special geometries

Promotion of innovation and technology transfer

Promotion of Innovation -both in services and products- and technology transfer, are basic strategic targets for MIRTEC. They are accomplished by networking worldwide with established technology transfer centres in the field of Materials, with the aim to stimulate competitiveness and profitability of its clients.

MIRTEC, as partner of the Enterprise Europe Network (EEN) – Hellas consortium, informs and supports the enterprises of the Materials sector on issues of innovation and technology transfer, and facilitates the networking process for the development of new technological, commercial or research cooperation. Related services provided by MIRTEC include:

- Networking of SMEs
- Promoting Eco-sustainable tools to SMEs
- Promoting Green Public Procurement
- Cultural Heritage innovation

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