

LEAD PARTNER



Agencia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

PARTNERS



Consiglio Nazionale delle Ricerche
Istec Istituto di Scienza e Tecnologia dei Materiali Ceramici



certificazione materiali per costruzioni
ENEA CNR



ENTERPRISES



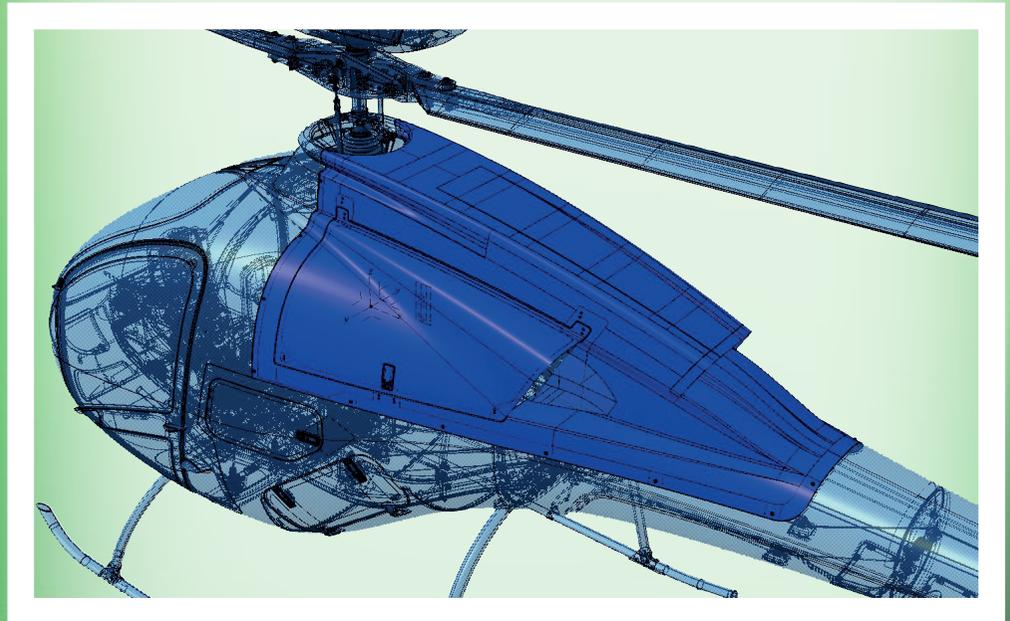
APPLICATIONS

- Development of preceramic prepregs to obtain fire-resistant panels and components in BasKer-PMC and association to thermal-insulating and fire-resistant basalt felts, produced exploiting secondary raw materials (recycling of composites).
A full-scale (1 or 2 m²) demonstrator of a thermal-insulating / fireproof panel will be produced.
- Composite reinforced with short or long carbon fiber and refractory inorganic matrix.
A full-scale demonstrator of a thermostructural panel will be produced.
- Development of engineered and multi-material fire-resistant recyclable solution based on the combination of new materials composites with traditional materials, focusing on the areas of interest of the project: aeronautics, naval and construction.
The possibility to produce a full-scale fireproof structural helicopter-component will be investigated.



FIRE MAT

FIRE resistant MATERIALS & composites



CONTACT

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THE PROJECT

FIREMAT is meant to overcome the main technological limits arising from the application of polymeric matrix composites (PMCs), which result from their low resistance to temperature, combined with their non-recyclability.

On the other hand, ceramic matrix composites (CMCs), which boast excellent thermal resistance, are too expensive and time-consuming to produce.

FIREMAT will develop new materials and processes, focusing on their integration into multi-material solutions, and on the engineering and development of design methodologies aimed at fulfilling a smart-production.

In addition, the project will study the durability, sustainability and environmental impact of the designed materials along with the patentability and go-to-market strategy. The TRL 4/5 already acquired about fire resistant PMC within the EEE-CFCC project (eee-cfcc.it) will be implemented at TRL 6 by improving the formulations, the processes, the pilot-scale production of semifinished materials and full-scale demonstrative prototypes.

FIREMAT takes advantage of the background and know-how of **ENEA TEMAF**, **ISTEC-CNR**, **CERTIMAC**, **MUSP** and **ROMAGNA TECH** (all the partners are part of the High-Technology Network of the Emilia-Romagna Region) to produce long and short fiber-reinforced composites for **high temperature and fireproof applications**, aiming at **exhaust pipe applications and fireproof thermal-insulating panels**.

GOALS

FIREMAT aims at:

- reinforcing the Emilia-Romagna composite materials sector, overcoming the current working temperature limits of polymer-based fiber-reinforced composites;
- promoting the circular local economies by developing recyclable materials, exploiting secondary raw materials.
- supporting the industrial partners realizing, with net shape techniques, real scale demonstrators in high-T composites, to prove their applicability up to 800-1000°C.

The project will produce two types of innovative heat-resistant materials:

- recyclable and fireproof **composites reinforced with basalt fiber** (for the structural parts near the turbine engine of an helicopter and ventilated facades);
- **composites reinforced with long or short carbon fibers** (virgin/recycled) with a nano-structured refractory matrix (for thermal barriers and exhaust pipes)

ACTIVITIES

FIREMAT carries on existing collaborations, started in the previous project EEE-CFCC.

The activity plan includes **5 phases**, aiming at developing the new fire-resistant composites, optimizing the production processes and semifinished materials, developing real scale demonstrators to be qualified and aged in the expected operating conditions. Scientific and industrial partners agreed about the target performances and demonstrators (representative of heat shields, exhaust pipes and ventilated facades), and will enquire about their feasibility and possible implementation at industrial level.

The materials will be characterized in terms of thermomechanical, thermophysical and durability properties, then they will be tested in the expected working conditions and aged following accelerated protocols in order to prove their applicability and expected performances.

Along with the R&D activity, **FIREMAT** will set up an IPR policy and carry out know-how protection actions. The project communication and results dissemination activity will be realized from the beginning to the end of the project, to maximize the possible impact on local companies.

Phase 1: Composite based on basalt fibers and preceramic matrix
Coordinator - ENEA TEMAF

Phase 2: Composite based on carbon fibers and inorganic polymer matrix
Coordinator - ISTEC-CNR

Phase 3: Materials qualification in expected working conditions
Coordinator - CertiMaC

Phase 4: Materials engineering and component modeling
Coordinator - MUSP

Phase 5: Target definition, Go-to-market strategy, IPR management
Coordinator - ENEA TEMAF

Dissemination Activity: Coordinator Romagna Tech

