



<b>Fellow</b>	<b>Host Institution No.1:</b> Instituto Superior Técnico <b>Host Institution No.2:</b> CATEC	<b>Country:</b> Portugal <b>Country:</b> Spain
DC13	<b>Supervisor (academic):</b> Prof. F. Montemor <b>Supervisor (industrial):</b> Dr. Fernando Lasagni	<b>WP No:</b> 4
<b>Title: Advancing the durability of polymeric, metallic parts and coated components in sCO<sub>2</sub> power systems</b>		
<p><b>Research Objectives:</b> (1) To understand the mechanisms of degradation of different polymer chemistries (Polyolefin, PTFE, urethanes) in environments simulating sCO<sub>2</sub> conditions. (2) To study an innovative system based on the introduction of self-healing polymer ability to minimize mechanical damage and formation of voids and cracks. (3) To select the most corrosion-resistant coatings applied on steel plates for coated parts. (4) To recommend the most suitable polymer matrix for coated components. (5) To investigate metallic alloys and post treatments (including coatings but not limited) for additive manufacturing technologies with corrosion resistance. (6) To understand different quality inspection techniques for nondestructive evaluation of the components. (7) To investigate the applicability of NDTs depending on the type and size of the allowable defect.</p> <p><b>Expected Results:</b> A ranking of the corrosion resistance of different polymers. A novel system carrying self-healing for enhanced corrosion protection and parts durability. Knowledge beyond the state of art on the degradation mechanisms and degradation rates of polymer containing and AM metallic alloys parts. A set of guidelines and recommendations towards an optimized selection of polymers for multi-material and metal coating options. A screening of metallic alloys and their feasibility to produce HX for sCO<sub>2</sub> purposes. A comparative analysis of different NDTs where the most suitable technique will be selected.</p>		
<p><b>Mobility rules (eligibility of applicants):</b> more information <a href="#">here</a></p> <ul style="list-style-type: none"><li>• Researchers funded by Doctoral Networks should comply with the mobility rules: in general, they must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting organisation for more than 12 months in the 36 months immediately before their recruitment date<sup>1</sup>.</li><li>• In addition, they:<ul style="list-style-type: none"><li>○ must not have a doctoral degree at the date of their recruitment.</li><li>○ can be of any nationality.</li></ul></li></ul>		
<p><b>Applicant - specifications:</b> in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:</p>		

<sup>1</sup> This rule applies to the first contract only (Instituto Superior Técnico)





- **Earned degree:**
  - MSc in Materials or Chemical Engineering (or related area). Preference will be given to candidates with good knowledge on materials.
- **Background (preferential):**
  - Materials science and engineering
  - Polymers
  - Corrosion
  - Additive Manufacturing
- **Additional background that will be valued in the selection process:**
  - Laboratory experience
- **English language:**
  - A certified C1 level of English is required

**Scheme:**

- M1-M24: the applicant is employed by Instituto Superior Técnico
- M19-M24: the applicant is seconded to Nuovo Pignone Tecnologie Srl
- M25-M36: the applicant is employed by CATEC, without undergoing another selection process.

**Locations (place of work):**

- M1-M18: the applicant will be employed by Instituto Superior Técnico and located at the Research Centre CQE:
  - Instituto Superior Técnico
  - Av Rovisco Pais, Lisbon, Portugal
  - Google Maps: <https://goo.gl/maps/t5zUn93PS8U5dTf5A>
- M19-M24: the applicant will be seconded to Nuovo Pignone Tecnologie Srl
  - Nuovo Pignone Tecnologie Srl (BH)
  - Via Felice Matteucci, 2 - 50127 Firenze (FI), Italy
  - Google Maps: <https://goo.gl/maps/qtdksCCsMXrNPKxNA>
- M25-M36: the applicant will be hired by CATEC
  - Parque Tecnológico y Aeronáutico de Andalucía
  - C/ Wilbur y Orville Wright 19 - 41309 La Rinconada (Sevilla), Spain
  - Google Maps: <https://goo.gl/maps/wPR1TqniJN7Y7qyi6>

**Planned secondments:** DC13 is expected to carry out the following secondment:

- Nuovo Pignone Tecnologie: explore advanced coating application methods for sCO<sub>2</sub>.

**How to apply:** submit application package (see below) to Prof. Fatima Montemor ([mfontemor@tecnico.ulisboa.pt](mailto:mfontemor@tecnico.ulisboa.pt)) before May 31<sup>st</sup> 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (<https://europa.eu/europass/en/create-europass-cv>)

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- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development (max 3 pages)*
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - D4: Summarise your strengths and weaknesses.
  - D5: Describe a time when you had to deliver a challenging project. What was your role and what was the outcome?
  - D6: Where do you see yourself in 10 years?
  - D7: Why should you be selected for the position?
- Letters of recommendation (not mandatory)
- The application package must not exceed 15 Mb

**Contract:**

- Start date (estimate): September 2023
- Type: full-time exclusive
- Annual gross salary:
  - Instituto Superior Tecnico: € 34,395.00
  - CATEC: € 33,650.00
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

**Equal Opportunity Employers:**

IST and CATEC are Equal Opportunity Employers. We believe that no one should be discriminated against because of their differences, such as age, disability, ethnicity, gender, gender identity and expression, religion or sexual orientation. All employment decisions shall be made without regard to age, race, creed, color, religion, sex, national origin, ancestry, disability status, sexual orientation, gender identity or expression, genetic information, marital status, citizenship status or any other basis as protected by European laws.

