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Grip Design to Accommodate Numerous Specimens for Versatile Mechanical Testing Device for In-reactor Testing

Modular grip design enables in-reactor creep/tensile testing of diverse sub-sized specimens.

Researchers at Purdue University have developed a versatile mechanical testing device for in-reactor (nuclear reactor) testing. This rig can test a variety of creep and tensile specimen geometries and is designed to operate in the harsh environment of in-situ reactor testing. The device has a modular design, which allows it to hold and test a variety of specimen geometries. The mechanical properties of creep and tension are crucial for validating material performance in a reactor. Additionally, this design can also be used outside of a reactor. The compact grip design is suitable for testing sub-sized specimens in small apparatuses, such as in-situ creep capsules. It eliminates high stresses in unwanted areas (which is a problem with traditional grip designs) and allocates the stresses in the gauge length of the specimen (a new feature of this grip design).

Advantages

- Directs stresses along gauge length.

- Capable of in-reactor testing for a variety of sub-sized specimen geometries

- Compact enough to fit in small test apparatuses.

Applications

- Sub-size tensile/creep testing

- In-reactor testing

- Power plants

- Engine control systems

- Spacecrafts (re-entry)

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Category
Aerospace & Defense/Hypersonics & Propulsion Systems

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Technology Validation:

This technology has been validated through fabrication and testing of a prototype.

Related Publications:

Owen, D. J. (2022). The design, development, and testing of an advanced nuclear reactor in-situ creep capsule that accommodates multiple specimen geometries. Purdue University Graduate School. https://doi.org/10.25394/PGS.21330561.v1

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