

Press Release

Freiburg
November 23, 2012
No. 24/12
Page 1

Fraunhofer ISE Inaugurates New Test Stand for Solar Thermal Collectors

Comprehensive Stress Tests under Different Climates

On 23 November 2012, the Fraunhofer Institute for Solar Energy Systems ISE officially put its new test stand for solar thermal collectors into operation. With this test stand, the scientists aim to simulate mechanical loads under extreme climate conditions e. g. wind or snow loads, analyzing their effects on the solar collectors. Fraunhofer ISE and PSE AG, both located in Freiburg, jointly developed this special mechanical load test stand housed in a climate chamber. The test results shall serve as input for new test procedures and improve the quality and safety standards for solar thermal collectors over the long term. Now with the newly created experimental possibilities, new materials, material savings and optimizations can be analyzed under real-like conditions in order to save costs on collectors and mounting elements.

With the new test stand, Fraunhofer ISE is able to investigate complex questions about the mechanical stability of solar thermal collectors, including their mounting system for roof and façade applications. The test stand can handle collectors up to a maximum of nine square meters and loads up to seven tons push and pull. Another notable feature is that the mechanical load tests can be carried out under extreme temperatures from -40 °C to +60 °C. Additionally, it is possible for the first time to simulate cyclical as well as asymmetric loads, like varying amounts of accumulated snow on the collector, and also how the loads are realistically created through the piling up of snow and ice." We see a large potential in the new system," says Korbinian Kramer, Group Leader of Test Center and Quality Assurance at Fraunhofer ISE. "The new test stand enables a more detailed investigation of the connecting techniques and mounting

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Press Release

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No. 24/12
Page 2

system under different temperatures and realistic load cases. This is a decisive advantage over the established test procedures in which the loads are merely applied perpendicularly and at room temperature.”

During the joint development and the manufacture of the new test stand by PSE AG, there were many challenges to overcome. “The requirements for the test stand were very complex: for example, high flexibility with regard to possible loads and at the same time very large mechanical loads. We employed a lot of technical ingenuity in order to implement all the degrees of freedom necessary for the load tests,” explains Frank Luginsland, Department Head of Technology at PSE AG.

Based on a detailed analysis of the loads, the scientists at Fraunhofer ISE develop a test method which is generally applicable for the different types of collector constructions, compact systems and mountings under different climatic conditions. In the medium-term, this leads to the further development and improvement of solar thermal components. This new test method is offered to manufacturers who want to verify the safety and quality of their product with little effort from their side. Through such tests, both material savings and optimization can be achieved which lead to reduced costs in the installation of large solar systems. The work and the test stand are supported through “MechTest”, a project sponsored from the Federal Ministry for the Environment, Conservation and Nuclear Safety (BMU).

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About Fraunhofer ISE

With a staff of 1200, the Fraunhofer Institute for Solar Energy Systems ISE, based in Freiburg, is the largest solar energy research institute in Europe. Fraunhofer ISE is committed to promoting energy supply systems which are sustainable, economic, safe and socially just. It creates the technological foundations for supplying energy efficiently and on an environmentally sound basis in industrialized,

Press Release

Freiburg
November 23, 2012
No. 24/12
Page 3

threshold and developing countries. To this end, the institute develops materials, components, systems and processes for a total of eight different business areas: Energy-Efficient Buildings, Applied Optics and Functional Surfaces, Solar Thermal Technology, Silicon Photovoltaics, Photovoltaic Modules and Systems, Alternative Photovoltaic Technology, Renewable Power Supply and Hydrogen Technology. Fraunhofer ISE also has numerous accredited test facilities.

About PSE AG

PSE AG provides highly specialized solar testing systems and solar consulting expertise to customers around the world. PSE Solar Test Stands are used by test labs and manufacturers for performance and durability measurements and certification to international standards. PSE Solar Consulting conducts rural electrification consulting and manages international research projects. PSE Conference Management organizes major scientific solar conferences. PSE AG was established in 1999 as a spin-off company of the Fraunhofer Institute for Solar Energy Systems ISE and currently has a staff of 65.

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Press Release

Freiburg
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No. 24/12
Page 4

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New mechanical load test stand at Fraunhofer ISE. To investigate the stability and safety of solar thermal collectors under wind and snow loads, the test stand is housed in a climate chamber. ©Fraunhofer ISE

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