Press Release

Freiburg
June 17, 2013
No. 12/13
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Fraunhofer ISE and CGA Technologies S.p.A. Conclude Licensing Contract

FracTherm® Technology in Roll-Bond Solar Absorbers

The Fraunhofer Institute for Solar Energy Systems ISE and the Italian company CGA Technologies S.p.A. have concluded a liscensing contract for the FracTherm® technology, which was developed and patented by Fraunhofer ISE. The technology uses a procedure with which bionic channel structures are patterned after nature to create an efficient flow through solar absorbers. The licensing agreement pertains to thermal absorbers for solar collectors, manufactured by CGA Technologies using the so-called roll-bond process. With the licensing contract, the research institute and the company are bringing two technologies together to form one product.

The FracTherm® technology is based on an algorithm that creates a multiply branched pattern, similar to that found in the veins of leaves or in the human body. With these structures, a uniform flow distribution with low pressure drop is achieved, resulting in lower energy consumption for the pump. This technology is used for designing the channel structures of solar absorbers, a main component of solar thermal collectors. The job of the absorber is to convert the solar radiation into heat, which is then transported by means of a heat transfer fluid. In the roll-bond process, the channel structure is printed with a separating ink on an aluminum sheet. A second sheet is then rolled over the first sheet and they are cladded together except for the areas printed with the separating ink. In a further step, pressurized air is applied to inflate the flow channels through which the solar fluid is to flow. When the channels produced in this way are visible on both sides of the absorber they are called Double-Side-Inflated panels (DSI), as opposed to One-Side-Flat panels

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(OSF). "The FracTherm® technology allows for flexibility in designing the channel network. The manufacture of such complex structures puts high demands on the production technology and its possibilities", says Dr.-Ing. Michael Hermann, Head of Team "Heat Exchangers and Collector Development" at Fraunhofer ISE. "Roll-bond technology is well suited for this purpose. Sophisiticated tools are not required since screen printing is used to realize the channel structure."

Michael Hermann developed the FracTherm® technology at Fraunhofer ISE on a doctoral scholarship from Deutsche Bundesstiftung Umwelt (DBU, engl. German Federal Environment Foundation). In 2008 Hermann was distinguished with the International Bionic Award for his dissertation work. From 2008 to 2011 in the EU project "BIONICOL" (www.bionicol.eu), both licensing partners Fraunhofer ISE and CGA Technologies, together with the companies TiSUN GmbH, INTERPANE Entwicklungs- und Beratungsgesellschaft GmbH (E&B) and Tyforop Chemie GmbH, developed and tested the first collector prototypes using FracTherm® roll-bond absorbers. In this project special focus was put on corrosion prevention. Corrosion prevention has been completely satisfied with CGA Technologies R&D activities and Tyforop products. The product is completely reliable.

Through a partnership in 2012 between CGATechnologies and the Finnish company Savosolar Oy, spectrally selective roll-bond solar absorbers can meanwhile be offered commercially. In the usual production process, absorber tubes are connected to pre-coated metal sheets. In the roll bonding process, however, the coating is applied to the finished absorber. Up to now, the spectrally selective coating was applied onto the test absorbers using the sputter coating system of Fraunhofer ISE. From now on, series products can be coated with Savosolar's technology. CGA Technologies and Savosolar Oy also have developed a market-ready collector with roll-bond absorber inside, which

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will be marketed shortly by Savosolar Oy. "The constructive cooperation in the BIONICOL project was extremely helpful to us. We learned a lot about the solar absorber development and as a result were able to customize our production to meet the requirements", says Giorgio Colugnati, who is responsible for the roll-bond technology at CGA Technologies. "Through the cooperation with Fraunhofer ISE and Savosolar, we can now offer the solar thermal market a product that combines high efficiency with an attractive and flexible design." Solar collectors can also take on other geometries and are not limited to the classical rectangular form. In the BIONICOL project, triangular FracTherm® absorbers, for example, were already realized. Herewith, new possibilities open up not only for the classical market but also for niche markets in the area of innovative solar thermal design. At the **Intersolar 2013 in Munich (19–21 June)**, a collector with a spectrally selective FracTherm® roll-bond absorber will be presented at the **booth of the company Savosolar Oy (B1.320).** The company CGA Technologies will also be available at the booth to provide information about the new products.

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About CGA Technologies S.p.A.

CGA Technologies is a world leader in the manufacture of high efficiency 99.5% aluminum evaporators for domestic refrigeration and heat exchangers for radiation heating and cooling system and also for solar thermal applications.. Founded in 1976, the company had its beginnings in the manufacture of aluminum evaporators for domestic refrigeration using roll-bond technology developed during the last 20 years in new products . CGA Technologies is an important partner for European and worldwide corporations in the field of renewable energies, but also for an increasingly larger number of companies that are working in the R&D, production and marketing of the most innovative technologies in a wide range of applications, including automotive. http://www.cgaspa.it

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About Fraunhofer ISE

With a staff of about 1300, 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, 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.
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Roll-bond absorber with FracTherm® channel design. © CGA Technologies S.p.A.