

Challenges facing

DTEC has improved CMT welding and can now weld 1.5 mm sheets without destroying anodised or powder outer coatings.

Photo: DTEC

Preparing the way for the mass market, increasing process speeds and lowering costs – how all this is intended to happen will be discussed at the SMEThermal, which is being held on 4th March in Berlin.

solar thermal

The solar thermal market is on route to becoming a mass market. Nobody yet knows what consequences this will have for the industry, or which technologies and production processes will prevail. One thing is sure, however: the times when collector production was more of a manufacturing than an industrial process are gone for good. Until now no international platform has specifically focussed on the challenges facing the industry. This omission is now being rectified by the 1st Solar Thermal Materials, Equipment and Technology Conference (SMEThermal), which is being held on 4th March in the German capital of Berlin.

The first providers of turnkey collector plants have now appeared, who will report on their experiences in Berlin. One of them is DTEC GmbH from Austria. The company is currently building a rotary laser welding system with four laser sources for German manufacturer Viessmann Werke GmbH & Co. KG. "We've also developed for Viessmann a non-destructive testing system for the weld seams using a pneumatic process," reports Managing Director Michael Dietl. DTEC welds the frame profiles of the collector. Many other manufacturers apply bonding technologies instead. Bonding also becomes more and more important for

the fixation of front glass and rear panel (see page 54). The specific challenges of bonding in collector manufacture are another subject treated in Berlin.

The largest companies in the industry, such as GreenOneTec Solarindustrie GmbH in Austria or Viessmann Werke GmbH & Co. KG in Germany, produce everything under one roof, ranging from tube heat exchangers and absorbers to complete collectors. However, Holger Kahl from German supplier Reimann und Kahl GbR does not believe that this considerable production depth will become standard: "Many manufacturers will continue to purchase meander arrays or absorbers in future." Reimann und Kahl produces meander and harp absorbers, but also offers bending machines that Kahl believes become worthwhile if at least 100,000 m² of collector surface area are produced each year.

Need to reduce cycle times

Reduced cycle times will provide a substantial step towards mass production. For this reason, Reimann und Kahl are working on increasing the speed at which the machines can produce meanders. Smaller radii are also among the latest improvements. In ad-

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dition, the intention is to prevent oval deformation of the tubing during bending. "This is because in the laser welding process, any distortion can cause the spot welds to miss the tubes and thus create holes in the metal sheeting," explains Kahl.

How to reduce cost

As ever, the greatest challenge facing the solar thermal industry is cost reduction. As a large amount of expensive copper is used in collectors, the best way is to reduce the amount of metal used. Tubes with wall thickness of just 0.4 mm must also be machine-processed to form meanders.

The machines can also easily bend tube heat exchangers made of stainless steel and aluminium. According to Kahl, every now and then there are requests for aluminium, as collectors made completely of aluminium are easy to manufacture. However, in order to prevent contact corrosion, the entire solar circuit must be adapted, and this is what has hindered its market introduction until now. Nevertheless, Helge Steckmann, Managing Director of Ultrasonics Steckmann GmbH, believes that the key challenge will be to move away from copper in order to reduce costs. Furthermore, given increasingly scarce resources, he feels that copper should be reserved for applications in the electronic industry where it is irreplaceable. When electric cars come on line, the cost of copper is anyway likely to increase sharply, as considerably more copper can be found in electric cars than in traditional vehicles with combustion engines.

More than two thirds of all flat plate collectors currently produced contain copper absorbers. KME Group S.p.A. from Italy assumes that copper, as a tried and tested natural product that can be excellently recycled, will remain the dominating material. The group offers all components needed from the roof to the cellar, ranging from copper sheeting and copper pipes to connection components. Brand new: the KME Group's copper roofs are now also available as a solar roof with integrated absorber.

The ultrasonic welding machines from Ultrasonics can weld both copper and aluminium absorbers. Speed is also an important factor with ultrasonic welding. Steckmann is nevertheless critical that the discussion tends to focus on just the speed with which the sonotrode welds the sheet to the tube. "But what really matters is the entire process – from pressing the start button to removing the absorber," according to Steckmann. Depending on the number of welding seams, the ultrasonic machines take between 2 and 2.5 minutes.

The impression that the focus on turn-key plants is displacing ultrasonic welding with laser welding technology is contradicted by Helge Steckmann. "We've just increased our turnover by around 200 percent and now sell machines to Poland, Hungary, China, Austria and South America." As long as there are small- and medium-sized absorber and collector manufacturers, ultrasonic welding is unbeatable thanks to the low investment costs.

Jens-Peter Meyer

Further information:

www.solarpraxis.de/index.php?id=1643



Ranging from sheeting to tubes, the KME Group produces everything from copper that is needed for collectors. The photo shows the group's tube plant in Italy. Photo: KME Group