The CSP plant Noor II is located in Morocco and uses 62,500 stainless steel tubes.

Renewable Energy Production Uses a Stainless Steel Tube Solution from BENTELER Distribution

Renewable energy is an important contributor to a sustainable future. Concentrated solar power (CSP) is one way to produce energy cleanly. BENTELER Distribution provides a solution of specially manufactured stainless steel tubes to its customer RIOGLASS SOLAR, who is the market leader in CSP technology.

The world's demand for energy is growing continuously. Until 2035 the energy consumption will increase by 36 percent, according to the International Energy Agency (IEA). Without straining the energy systems any further, concentrated solar power (CSP) is a sustainable solution to meet the future demands. Sun power offers the opportunity to produce renewable and clean energy on a large scale.

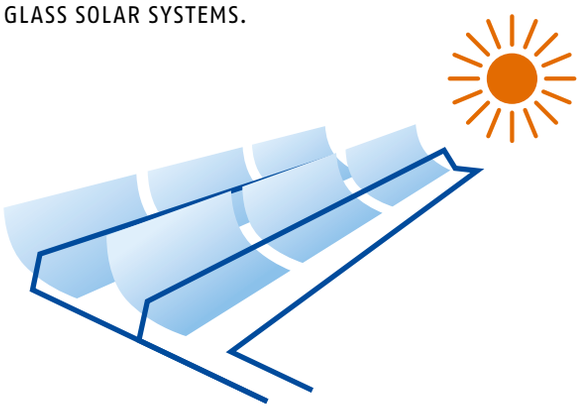
The market leader in CSP technology

RIOGLASS SOLAR, founded in 2007, specializes in concentrating mirrors and heat collecting elements (HCEs), also known as absorber tubes, for the CSP industry. HCEs are used in large scale power plants which utilize the sun's energy to generate sustainable and environmental friendly electricity. The company has installed so far more than 6 million mirrors and over 1.6 million receivers worldwide. Innovative design, advanced technology and highly automated manufacturing processes play a paramount role for the RIOGLASS solution.

Stainless steel tubes are an essential part of CSP technology

In most cases, CSP technology includes curved mirrors on huge fields. The mirrors concentrate the sun's

radiation and reflect it back to an absorber tube, the HCE, which is positioned at the focal point of the parabolic mirror. The HCE consists of a steel tube with a special, proprietary selective coating. A glass envelope with vacuum conditions encapsulates the tube. This maximizes the heat inside and minimizes heat losses. A heat transfer fluid, mostly synthetic oil, runs through the steel tubes. The bundled sun's energy heats up the fluid to a temperature of 380 to 430 degrees Celsius. The heated oil is then directed to a heat exchanger. It generates steam from water, which spins a turbine to generate electricity. "We designed the heat collecting elements for sustaining superior optical efficiency for 25 years of operation under extreme conditions. They also need to comply with the strictest standards and requirements of the boiler and pressure vessel as well as pressure piping," says Yaniv Shitrit, Global Procurement Manager at RIOGLASS SOLAR SYSTEMS.



The special RIOGLASS coating needs to adhere reliably to the stainless steel tube. For this to work, the stainless steel tube must have a very low roughness value of 0.18 µ on its outer surface. The inner surface should be clean from any beads as the heat transfer fluid needs to run smoothly and fast through the tube.

BENTELER Distribution provides a flexible solution with specially constructed stainless steel tubes

Since 2015, RIOGLASS has collaborated with BENTELER Distribution in various projects around the world, such as the CSP power plant of Ilanga in South Africa. This award winning CSP plant uses 39,221 stainless steel tubes with a dimension of 70 x 2 mm. BENTELER Distribution, a division of the BENTELER Group, provides services and solutions around various high quality steel tubes for industries such as energy, automotive and construction. Comprehensive processing services and the BENTELER specialists' vast application expertise help each customer find the best solution for their specific purpose. The global presence, dense network and digitalized processes make access to BENTELER Distribution easy for customers.

In 2017, RIOGLASS finalized the CSP power plant complex Noor II, located in Morocco, with an installed capacity of 200 megawatt (MW). It uses nearly 62,500 stainless steel tubes with the dimensions of 80 x 2.2 mm and a length of 4,386 mm, mainly delivered by BENTELER Distribution. This adds up to more than 1,000 tons in total. "RIOGLASS had very high requirements to these specific tubes. The diameters and the inner and outer surfaces are custom fabrications. Together with Marcegaglia we could make it happen for RIOGLASS, and provided the needed quantity of more than 2,000 high quality tubes per week," says Umberto Albarosa, Global Procurement Manager at BENTELER Distribution Italy. BENTELER Distribution works together closely with Marcegaglia, especially when it comes to high quality stainless steel tubes. Marcegaglia SpA is one of the leading industrial enterprises in the steel processing sector. Its division Marcegaglia Specialties is dedicated to the processing of stainless steel tubes, flat products and cold-drawn bars.

"BENTELER Distribution has been very flexible in meeting our high quality requirements towards our stainless steel tubes and has been our trusted partner for several projects, including the world's first solar thermal power plant to ever use an 80 mm, 4,386 stainless steel tube," concludes Yaniv Shitrit.

RIOGLASS, BENTELER Distribution and Marcegaglia are already working on the next project in South Africa: the CSP plant of Kathu which will need around 40,000 stainless steel tubes in total.