

Application Report

eltherm



Heating technology for particle accelerator

Electrical heat tracing – for the generation of high purity vacuum in test facilities

Modern electrical heat tracing technology plays a decisive role in many fields, e.g. for the generation of high purity vacuum. For this application handmade heating jackets and mats are produced by eltherm which are custom-fit and correspond to the requirements of the customers.

Essential for the generation of optimal vacuum conditions

One application of heating jackets and mats is to heat vacuum pumps, piping systems and vacuum chambers in order to guarantee optimal conditions for high purity vacuum within a particle accelerator ring. For this application products are produced which heat the vacuum systems up to 300°C to generate high purity vacuum.

Use at CERN:

At CERN (Conseil Européen pour la Recherche Nucléaire – European Organization for Nuclear Research) eltherm heating jackets and mats are used for the so-called Large Hadron Collider (LHC). For this application eltherm delivered more than 3000 heating jackets and mats to CERN.

Advantages of the eltherm heating jackets and mats are as follows:

- Easy to remove and to exchange
- Easy to install
- Applicable in sophisticated applications
- High life time
- Tailor-made to the shape of vessels, pipes, valves or pumps (customized)
- Operating temperature from 0° up to 900° C
- Efficient heating system
- Optimum heat distribution
- For hazardous areas too
- Including insulation

The eltherm philosophy: „We are in the business of developing heat tracing systems

eltherm's range of products for production of heat tracing systems combines high quality heating cables and components with individual systems. As a manufacturer of heating cables with a comprehensive range of resistance heating cables with PTFE-, FEP-, PFA- as well as glass-fibre insulation, self-regulating heating cable, measuring and control devices and accessories eltherm advises its customers on the planning phase already. This ensures that all the heat tracing equipment is exactly tuned to the whole system, and that the system meets the specification and the sometimes extreme requirements.

Beyond this, eltherm also offers complete systems, developed in close cooperation, for use in other markets, e.g. Chemical-, Petrochemical-, Automotive- or Food-Industry.

Heating jackets and its application

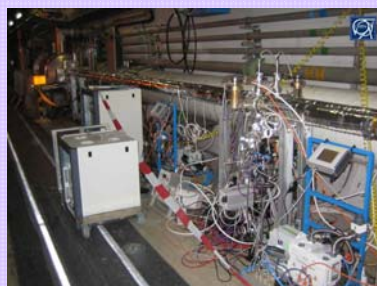
• Heated vacuum system



• Heating jacket from eltherm



• Large Hadron Collider (CERN)



Source: eltherm projects 2006
CERN

Siegener Zeitung dated 21.07.2006 – Total circulation: 60.807 (with changes through eltherm)

Company from Burbach delivers to CERN:

Heat for the Nuclear Explosion

eltherm provides heating technology for the biggest particle accelerator in the world

Regional Economy Heating technology from Burbach guarantees optimal vacuum conditions within the particle accelerator ring.

ch **Burbach/Geneva**. Hectic rush at the construction site, time is running short. There are activities deep in the tunnel below the Swiss ground. In 2007, the biggest particle accelerator in the world will start running in Geneva. 9500 scientists and employees of the European Research Center CERN will let proton rays clash together in the particle accelerator ring which is 27 km long and costs 1.9 Mrd. Euro. This experiment can only work if the elementary particles circulate in a vacuum.

For this reason, the eltherm Elektrowärmetechnik GmbH currently delivers heating jackets and mats for the so-called Large Hadron Collider (LHC). "A major order with a volume of 800.000 Euro", says Frank von der Heyden, Managing Director. "This is the biggest order in the history of our company since the company foundation in 1991", he also points out. The jackets and mats will work in a temperature range of 300° C and are used to heat pumps, piping systems and chambers in order to improve those vacuum conditions. Heat for the nuclear explosion.

This little detail in the major particle physics laboratory in the world is very important for the experimental physicists. They indeed need the best and most precise tools. The international scientists want to research the composition of the

matter with the mentioned LHC. The accelerator speeds up the protons to nearly speed of light and detectors make them visible. The LHC brings the proton rays to clash with the help of energy from 14 so-called TeV. TeV is an energy unit which is common within the particle physics. A TeV is nearly the kinetic energy of a flying mosquito. What makes the LHC so exceptionally? It is the concentration of this energy to a tiny volume which is by one million times smaller than the one of the mosquito.

But before the scientists can research the so-called super symmetric particles, the controversial "Higgs-Boson" as well as the "Quark-Gluon-Plasma", the team from eltherm has to do their work. A part of the 64 employees of eltherm currently sews the self-produced heating cables with the corresponding isolations into a backing fabric of the mats and jackets. These mats and jackets are custom-made to the shape of the respective objects "just like a tailor-made suit, which can be taken off again at any time – for example for maintenance work", explains von der Heyden.

The order for the production of the special "heating jackets" contributes to the "very good capacity" of the company.



Handcraft: This picture shows how the self-produced heating cables with the corresponding isolations are sewed into a backing fabric of mats and jackets.

The corporate development continues to be successful. The specialists for electrical heat tracing which are located in the industrial park in Burbach with production for industry and plant engineering, chemical industry as well as building services-, building-, environmental- and waste water engineering are booming. In 2004, the gross sales amounted to 6.5 Mio. Euro, in 2005 the gross sales increased to over 7.5 Mio. Euro. In 2006, a gross sales of more than 9 Mio. Euro is expected, says eltherm Managing Director Frank von der Heyden: "We are growing stronger than the market!". Therefore, investments have been made in the past and are also expected for the future. Investments in the employees and in manufacturing. During the last 2 years the number of employees has been increased by 15% per year. Only in 2006, the company invested about 1.6 Mio. Euro in its production line.

eltherm: „Innovations in heat tracing“

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