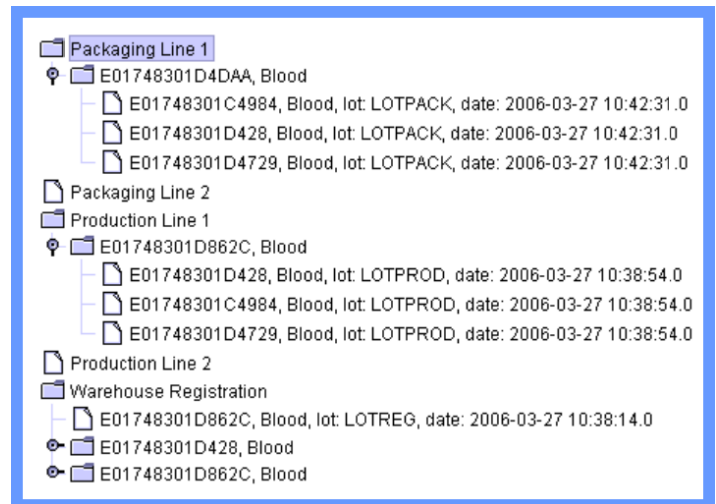


COLD CHAIN

Some materials and products in the pharmaceutical and food industry are dependent on the ambient temperature during their whole life cycle. Wrong environmental temperatures can corrupt materials and products. The Cold Chain system has been developed to detect these problems early and to give the possibility of initiating counteractive measures to prevent the deterioration of materials and products.

The temperature control system is able to:

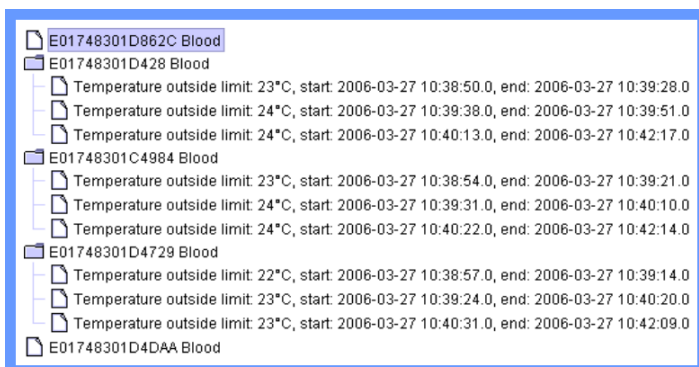
- collect, record and display the surrounding temperature and the period during which it infringes the acceptable limit.
- collect, record and display the movements inside the facilities and between the operating sites (traceability)
- manage the lot number
- verify the correctness of materials and products for the current production and/or packaging step



The Cold Chain system allows complete temperature control of materials and products because it covers the whole production process, beginning from the delivery of materials in the warehouse, to transport of final products to the customer.

Every step is recorded inside the system.

For every material and product, the system records the temperatures which fall outside the programmed range of temperature, and the time.



The Cold Chain system uses RFID technology.

In particular, for this project, special RFID tags are used.

These are semi-passive tags with an integrated temperature sensor which allows the monitoring of the temperature in a programmable measurement interval.

This temperature information is collected by an RFID reader and can be processed afterwards according to the user's need.

The used tags are credit-card sized RFID labels that work at 13,56 MHz, which is considered the "universal" frequency because it can be used world-wide.

Thanks to these RFID tags, the system is able to record the time during which the temperature strays outside the programmed range.

The tag records both the time during which the temperature is outside the programmed range and the maximum temperature reached during this time.

The system allows the programming of a range of temperatures, outside of which the temperature and time data are recorded.

The Cold Chain system has been developed on a pilot scale in the research centre of T.I. Engineering Deutschland GmbH in Luckenwalde.



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