



C-V-Therm Combined Sensor For Primary Aluminium

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Introduction

The measurement of the cathode lining voltage drop (CVD) is a well-established method of monitoring cathode condition in many aluminium smelters. Current methods include the use of an iron rod strategically placed in the cell to measure voltage drop. The use of an iron rod is generally regarded as cumbersome, labour intensive and often gives poor accuracy and reliability of measurement.

Heraeus Electro-Nite, the market leader in molten metal sensor technology, has developed a quick, easy and reliable method of measuring cryolite bath temperature and cathode lining voltage drop in a single combined sensor.

Measuring technique

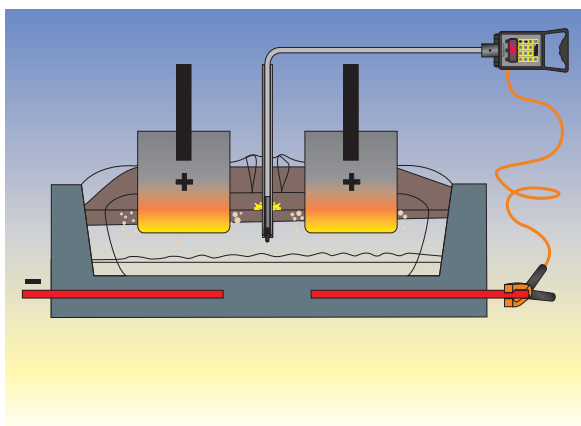
Based upon the well-established Positherm®-Al technology, the C-V-Therm consists of a Positherm®-Al temperature sensor with a thin molybdenum wire attached, to provide a bath contact with the Al metal pad. Dedicated measuring and display instrumentation, Digilance C-V-Therm includes data storage and infra-red transfer capabilities. The electrical circuit through the cathode lining is completed by a cable connection from the measuring instrument to the cell busbar.

The measuring technique is a simple 2-stage process, completed in about 15 seconds. In the first stage a sensor is connected to the Digilance C-V-Therm and immersed into the cryolite bath. The bath temperature is determined after about 12 seconds via visual and audible signals. The second stage of the measurement cycle consists of immersing the sensor into the metal pad for a further 3 seconds to determine voltage drop across the cathode lining. Bath temperature, pot number and cathode voltage drop are sequentially displayed on the instrument.

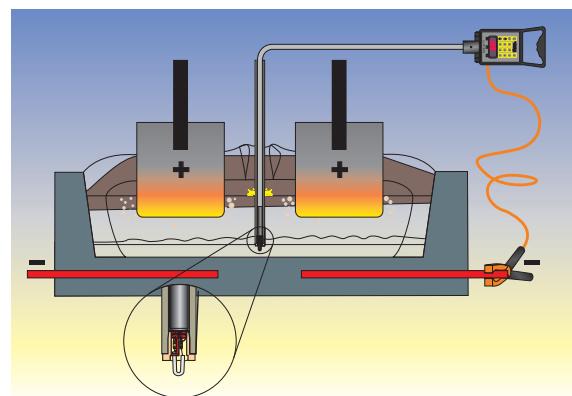
Benefits

- Quick and easy shop floor test
- Accurate, reproducible bath temperature & Cathode Voltage Drop
 - Temperature pre-calibrated $\pm 0.5^{\circ}\text{C}$ at gold melting point (1064°C)
 - CVD reproducibility normally $\pm 2.5\text{mV}$
- Reduced CVD labour costs
- Dedicated state-of-the-art instrumentation

Stage 1: Temperature



Stage 2: CVD



Instrument

Digilance C-V-Therm is a hand held, battery operated, temperature and CVD measuring device for use with C-V-Therm and Positherm®-Al sensors in primary aluminium reduction cells. Temperature and CVD measurements are logged together with a pot number, date and time of dip. Up to 500 measurements can be stored in the instrument memory.

Digilance C-V-Therm comes equipped with a serial infrared interface and PC software package, to enable data to be rapidly and reliably transferred from the instrument to a PC, with little or no risk of human errors. The software program also provides access to reviewing and modifying measurement parameters set in the Digilance C-V-Therm.

Housed in a robust aluminium case, the precision electronics are protected from the most demanding and adverse environmental conditions encountered in the molten metals industry.



The instrument has been developed to allow measurements with the C-V-Therm sensors as well as Positherm®-Al sensors, giving the flexibility and autonomy for selecting the correct type of probe.

The Positherm®-Al sensor, together with the Digilance C-V Therm, measures temperature. The C-V-Therm sensor, together with the Digilance C-V Therm, measures both temperature and cathode lining voltage drop.

C-V-Therm Sensor



Positherm®-Al



Applications

- Inducation of cathode condition and performance
- Assists of optimisation of cell voltage
- Highlights cathode lining abnormalities such as sludge build up
- Comparison of different cathode types, suppliers, etc.

Ordering Information

Description	Code
Digilance C-V-Therm	AI31750201
Sensors	
Positherm Aluminium - 400 mm (50pcs/end caps)	TC106304
Combined Temperature and CVD sensor - 700 mm (50pcs/box)	AV106307
Lances	
<i>Temperature Lances</i>	
Lance, length 1200 mm, 45 degree bend	LC38016000
Lance, length 1600 mm, 45 degree bend	LC38016002
Lance, length 2000 mm, 45 degree bend	LC38016004
<i>Lances for CV-Therm Measurement</i>	
2,4 m. lance 90° Bend	AL10500000
2,4 m. lance 45° Bend	AL10500001
2,8 m. lance 60° Bend	AL10500012

