

Thermal Conductivity

RDC - 143

Electrodes Lining Lab

General Description

The thermal conductivity of an electrode is an important property in predicting its thermal shock behavior. A low thermal conductivity leads to a large temperature difference within the carbon block, which can trigger cracking. For anodes and cathodes used in the aluminium industry, thermal conductivity is also an important property for the thermal balance of the cell. A high anode thermal conductivity increases the temperature of the anode head and potentially the air burning.

The measurement is conducted with the RDC - 143 apparatus, where a sample with a height of 20 mm is clamped between two heads, one heated at 60°C and the other cooled to 20°C. The method is based on a comparative measurement: once the thermal equilibrium is reached, the obtained temperature is measured and compared to the one obtained on a reference material with a known conductivity to determine the electrode thermal conductivity.

Levels from approximately 2 W/mK up to more than 180 W/mK can be measured with this equipment if correct reference materials are used and if the sample's diameter is adapted (30 or 50 mm). The sample preparation must be made with the RDC - 140 or the RDC - 149 apparatus to ensure adequate parallelism of the sample's surfaces.



Technical Information

Standard Method	ISO 12987
Property	Thermal Conductivity [W/mK]
Sample	Core Ø 30 or Ø 50 x 20 mm
Process Time	~ 10 minutes
Installation	Draft-free workbench
Dimensions (LxWxH)	88 x 54 x 79 cm
Weight	102 kg
Electrical Property	230 V 1/N/PE, 50 Hz 1.3 kW, 6 A
Certified Reference Material	RDC 1143
Consumable	Distilled water
Database Connection	Yes

Additional Recommended Equipment

Drilling Machine (RDC-157 or RDC-179)
Saw (RDC-140 or RDC-149)
Drying oven (min. temperature 180° C)

Certified Reference Material



RDC 1143A (Anode)

Weight per unit	N/A
Number of tests	N/A



RDC 1143C (Cathode)

Weight per unit	N/A
Number of tests	N/A