

CO₂ Reactivity Anode

RDC-146

Electrodes

Lab

General Description

During the electrolysis, CO₂ is formed at the bottom of the anode, where the carbon anode reacts with the oxygen from the electrolyte bath. Depending on the anode quality, a back reaction can occur between the CO₂ and the anode, which increases the net anode consumption. If a selective attack of the binder matrix occurs, carbon particles get excavated from the anode and end up in the electrolysis bath. This phenomenon is referred to as carbon dusting. It leads to a higher bath resistivity and temperature to the extent that the current efficiency may be decreased. It may also trigger spikes formation. It is of primary importance to produce anodes with a minimum CO₂ reactivity to avoid such performance problems, which have a strong influence on the smelter cost.

The measurement is conducted with the RDC-146 apparatus, where a core sample with a 50 mm diameter and a length of 60 mm is placed in a furnace at 960°C with a saturated CO₂ atmosphere for 7 hours. After cooling, the sample is weighed and tumbled with steel balls using the RDC-181 apparatus, to remove any loosely bound particles. The final weight of the residual body is then measured. The following three results are reported:

- CO₂ reactivity residue: corresp. to the residual sample.
- CO₂ reactivity dust: corresp. to the removed grains.
- CO₂ reactivity loss: corresp. to the loss due to CO₂ burning.

RDC-146 is available with one or three furnaces, in which two samples per furnace can be placed simultaneously.



Technical Information

Standard Method	ISO 12988-1
Property	Residue [%] Loss [%] Dust [%]
Sample	Core Ø 50 x 60 mm
Process Time	~ 12 hours
Installation	Floor standing under fume hood
Dimensions (LxWxH)	175 x 70 x 190 cm
Weight	465 kg
Electrical Property	400 V 3/N/PE, 50 Hz 6 kW, 15 A
Fluid Property	CO ₂ : 600 l/h, 3-7 bar
Certified Reference Material	RDC 1146
Database Connection	No

Additional Recommended Equipment

Drilling Machine (RDC-157 or RDC-179)
Saw (RDC-140 or RDC-148)
Tumbling Apparatus (RDC-181)
Drying oven (min. temperature 180°C)
Weighing scale with an accuracy of 0.1 g

Certified Reference Material



RDC 1146

Weight per unit	N/A
Number of tests	12

Video

