

Material type

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Utilization

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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 of Ø50 mm 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 Ø50 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:	400V 3/N/PE, 50 Hz 6 kW, 15 A
Fluid Property:	CO ₂ , 50 l/h, 3 7 bar
Certified Reference Standard:	RDC 1146
Database Connection:	Yes

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 0.1 g

Technical information

Weight per unit:	N/A
Number of tests:	12

