

# RDC-193

## Name RAPOPORT SWELLING TEST

Material type  
**GRANULAR  
PITCH  
ELECTRODES  
LINING**

Utilization  
**R&D  
IN-PLANT  
LAB**

General description  
The resistance towards the deterioration of cathode carbon materials, used as bottom blocks of an aluminium electrolysis cell, following an attack by sodium and electrolyte is one of the predominant properties affecting the lifetime of a cell. The knowledge of the cathode expansion due to sodium penetration is essential for the optimization of the cell design. The Rapoport expansion test has specifically been developed for this purpose.

The measurement is conducted with the RDC-193 apparatus, consisting of a small electrolysis reduction cell where the length change of the cathode material can be measured. A cathode sample with a diameter of 30 mm and a length of 60 mm is placed into a graphite crucible surrounded by electrolyte bath with a given cryolite ratio. After heating the furnace to 980 °C, the electrolysis process is started for a given period of time and the length change of the cathode sample is recorded. The Rapoport expansion is calculated as the maximum expansion expressed as a percentage of the initial length of the sample.

|                       |                             |                                 |
|-----------------------|-----------------------------|---------------------------------|
| Technical information | <b>Standard Method:</b>     | ISO 15379-1                     |
|                       | <b>Property:</b>            | Rapoport Expansion [%]          |
|                       | <b>Sample:</b>              | Cathode Ø30 x 60 mm             |
|                       | <b>Process Time:</b>        | ~24 hours                       |
|                       | <b>Installation:</b>        | Floor standing under fume hood  |
|                       | <b>Dimensions (LxWxH):</b>  | 120 x 80 x 190 cm               |
|                       | <b>Weight:</b>              | 530 kg                          |
|                       | <b>Electrical Property:</b> | 230V 1/N/PE, 50 Hz<br>2 kW, 9 A |
|                       | <b>Fluid Property:</b>      | Argon, 100 l/h, 10 bar          |
|                       | <b>Database Connection:</b> | No                              |
|                       | <b>Consumable:</b>          | Standard bath granulates        |

### Additional Recommended Equipment:

Drilling machine (RDC-157 or RDC-179)

Saw (RDC-140 or RDC-148)

Drying oven (min. temperature 180 °C)

