**Task:**

<table>
<thead>
<tr>
<th>Application field:</th>
<th>Geology / Metallurgy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material:</td>
<td>Quartz</td>
</tr>
<tr>
<td>Feed size:</td>
<td>0,02 mm</td>
</tr>
<tr>
<td>Feed quantity:</td>
<td>30 g</td>
</tr>
<tr>
<td>Material specification(s):</td>
<td>dry</td>
</tr>
<tr>
<td>Customer requirements(s):</td>
<td>0,1 µm</td>
</tr>
<tr>
<td>Subsequent analysis:</td>
<td>Particle size analysis</td>
</tr>
</tbody>
</table>

**Solution**

<table>
<thead>
<tr>
<th>Selected Instrument(s):</th>
<th>High Energy Ball Mill Emax</th>
<th>Planetary Ball Mill PM 100</th>
</tr>
</thead>
</table>

**Configuration(s)**

**Item nos.:**

- 1 x High Energy Ball Mill Emax 200-230 V, 50/60 Hz
- 2 x Grinding jar Emax zirconium oxide 50 ml
- 1 x Grinding balls, zirconium oxide, Ø 0.1 mm, 500 g, approx. 135 ml
- 1 x PM 100, 230 V, 50/60 Hz
- 1 x Grinding jar "comfort", zirconium oxide, 50 ml

Please note: Other electrical versions of the instrument(s) are available with different item numbers.

**Parameter(s):**

- Emax: 2000 rpm
- PM100: 650 rpm

**Time:**

- 4 h
- sampling at 10 min, 30 min, 1 h, 2 h, 3 h, 4 h

**Achieved result(s):**

- All values as D90 in µm

*Emax PM100*

- 0 min 10.31 µm 10.31 µm
- 10 min 0.49 µm 0.94 µm
- 30 min 0.41 µm 0.90 µm
- 1 h 0.35 µm 0.81 µm
- 2 h 0.31 µm 0.79 µm
- 3 h 0.26 µm 0.78 µm
- 4 h 0.22 µm 0.77 µm

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The application report is based solely on the processing of the available sample material in the indicated amount. No legal claims shall be derived from this test report. Subject to technical modification and errors.

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Remark(s): Only one grinding jar was filled for the grinding test in the Emax, the other grinding jar was used empty for counter balancing.

Emax and PM100:
A 50 ml grinding jar of zirconia was filled with 176 g grinding balls 0.1 mm of zirconia and 27 g of sample + 25 ml water.

The material was ground in the Emax at 2000 rpm and in the PM100 at 650 rpm up for 4 h.

After 10 min, 30 min, 1 h, 2 h, 3 h, 4 h the particle size distribution has been measured.
In the PM100, after 1 h no more significant size reduction is noticeable.
In the Emax, after 4 h a fineness of 0.22 µm could be measured.

Recommendation: The High Energy Ball Mill Emax is suitable to grind the sample material under the above mentioned conditions.