How accurate can we measure dishwasher performance?

Outcomes of the CECED dishwasher ringtest presented at EEDAL Turin 2003 - Session 20
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**Purposes of the ringtest**

- Allow all laboratories testing dishwashers to compare their practise with other experts
- How good is the accuracy of EN 50242 : 2003 in measuring Energy label values for dishwashers?
- How close stay European labs to the standard? Which labs may act as CECED reference laboratories?
- How big are differences between testing institutes and manufacturer labs?
- In which points are improvements of the standard necessary?
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History of the standard EN 50242:2003

- EN 50242:1998 basic standard as referred to in Energy label directive
- + A1:1999 – clarification for spinach soiling and drying cabinet operation
- + A2:2001 – special regulation for program end detection
- + A3:2003 – refinement of testing procedure in many relevant points
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Energy consumption is absolute in kWh

Cleaning performance is relative to the reference machine

Drying performance is relative to the reference machine
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- **Cleaning tests**
  - Soiled dishes
  - Drying cabinet

- **Drying test**
  - Clean dishes

- **Noise tests**

- **Wash & Dry**
  - Evaluation

- **Strong human influence**
<table>
<thead>
<tr>
<th>Type</th>
<th>Type of soil</th>
<th>Number of items with these evaluation points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soup plates</td>
<td>oat flakes</td>
<td>5  4  3  2  1  0  Points Index</td>
</tr>
<tr>
<td>Dinner plates</td>
<td>egg</td>
<td>1  3  2  7  5</td>
</tr>
<tr>
<td>Dinner plates</td>
<td>meat</td>
<td>1  5  23</td>
</tr>
<tr>
<td>Dessert plates</td>
<td>egg</td>
<td>2  3  1  17  23</td>
</tr>
<tr>
<td>Dessert plates</td>
<td>spinach</td>
<td>25</td>
</tr>
<tr>
<td>Cups</td>
<td>tea</td>
<td>3  4  2  25</td>
</tr>
<tr>
<td>Saucers</td>
<td>tea</td>
<td>3  4  2  25</td>
</tr>
<tr>
<td>Oval platter</td>
<td>tea</td>
<td>20</td>
</tr>
<tr>
<td>Large serving bowl</td>
<td>margarine</td>
<td>4  7  1  42</td>
</tr>
<tr>
<td>Small serving bowl</td>
<td>spinach</td>
<td>51</td>
</tr>
<tr>
<td>Dish</td>
<td>spinach</td>
<td>5</td>
</tr>
<tr>
<td>Crockery</td>
<td></td>
<td>4  5  5  5</td>
</tr>
<tr>
<td>Glasses</td>
<td></td>
<td>4  5  5  5</td>
</tr>
<tr>
<td>Soup spoons</td>
<td>milk</td>
<td>12  30  5  2  10  5  209  3  261</td>
</tr>
<tr>
<td>Forks</td>
<td>oat flakes</td>
<td>3  2  1  6  5</td>
</tr>
<tr>
<td>Knives</td>
<td>egg</td>
<td>6  6  4  4  2</td>
</tr>
<tr>
<td>Dessertspoons</td>
<td></td>
<td>12  30  5  2  10  5  209  3  261</td>
</tr>
<tr>
<td>Teaspoons</td>
<td></td>
<td>5  7  54</td>
</tr>
<tr>
<td>Serving cutlery</td>
<td></td>
<td>5  7  53</td>
</tr>
<tr>
<td>Cutlery</td>
<td></td>
<td>5  7  53</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>36  60  9  9  7  2  1    17</td>
</tr>
</tbody>
</table>
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Results from the 19 laboratories
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energy label: cleaning ratios

- Machine H
- Machine L

Lab 01, Lab 02, Lab 03, Lab 04, Lab 05, Lab 06, Lab 07, Lab 08, Lab 09, Lab 10, Lab 11, Lab 12, Lab 13, Lab 14, Lab 15, Lab 16, Lab 17, Lab 18, Lab 19

- > 1.12
- > 1.00
- > 0.88
- > 0.76
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energy label: drying ratios

- Lab 01
- Lab 02
- Lab 03
- Lab 04
- Lab 05
- Lab 06
- Lab 07
- Lab 08
- Lab 09
- Lab 10
- Lab 11
- Lab 12
- Lab 13
- Lab 14
- Lab 15
- Lab 16
- Lab 17
- Lab 18
- Lab 19

> 1.08
> 0.93
> 0.78
> 0.63
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energy label: energy efficiency

- < 1.06 kWh
- < 1.15 kWh
- < 1.45 kWh
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Preliminary conclusions

- Energy measurement is reasonable within 1 class
- Cleaning performance may differ by 2 classes
- Drying performance may differ up to 3 classes
- Better machines -> more stable results?
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Improvements

• Improvement and alignment of the laboratory practise is necessary

• Need to clarify identified points in the standard. Outcome will be forwarded to CENELEC TC59X WG2 and IEC 59A

• Regular ring-testing is necessary to exchange experience and align and verify laboratory practises
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Thanks for your attention.

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