EUROMET PROJECT
FINAL REPORT

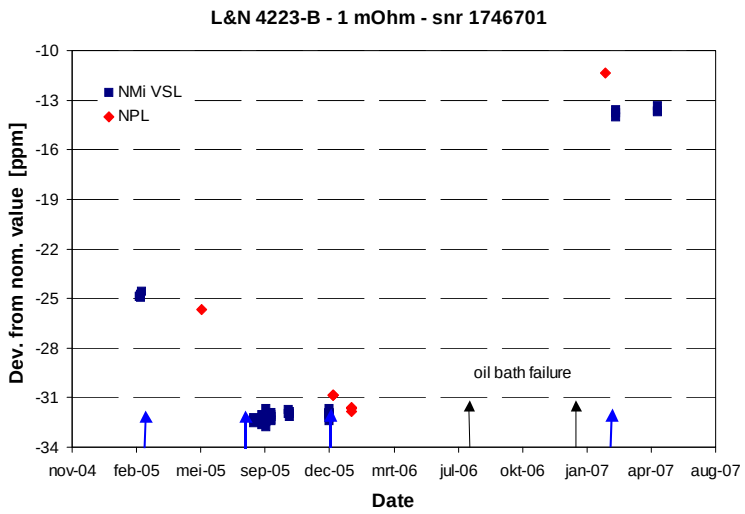
1. Ref. No.: **835**	2. Subject Field: ELECTRICITY
3 Type of collaboration: COMPARISON	
4A. Partners: NMi VSL, NPL	4B. CEC funded? No
5. Participating countries: NL, UK	
6. Title: Comparison of low-ohmic resistors (100 μΩ, 1 mΩ, 10 mΩ and 100 mΩ)	

7. Progress:

The aim of this project was to evaluate the NMi VSL and NPL low ohmic measurement set-ups and in addition it aimed to determine at what level resistance comparisons of low-ohmic resistance values can be performed.

A set of four L&N resistors of nominal values 100 μΩ, 1 mΩ, 10 mΩ and 100 mΩ (type 422x-B) was used as transfer standard. The resistors were placed in oil at 23 °C and were measured at three different dissipation levels. The measurement scheme was NMi – NPL – NMi – NPL – NMi. The measurements lasted from February 2005 up to May 2007.

The graph below shows the result for the 1 mΩ resistor, which is quite typical for the results obtained on the other resistors. The (blue) arrows on the x-axis indicate the transport dates.



The results of NMi in the first measurement period, from February 2005 – October 2005, indicate an unexpectedly large drift or shift, possibly caused by the traveling. During the second loop, NPL suffered twice from an oil bath failure, resulting in oil temperatures of up to above 50 °C. This caused a (very) significant step in value of all resistors, making also this second loop useless for the comparison.

In conclusion, the results of the comparison are dominated by the (transport and temperature) behaviour of the traveling standards that were used. For all four resistors shifts of several to many ppm were found, that made it impossible to achieve sensible degree of equivalence values – i.e. at the aimed sub-ppm level.

Further details of the measurement set-ups and the results are given in an extra presentation (enclosed).

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9. Completion date:	10. Coordinator´s signature:	11. Date:
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