EUROMET PROJECT FINAL REPORT

1. Ref. No.: 411		2. Subject Field: thermore	metry	
3 Type of collaboration: traceability				
4A. Partners (insti NPL, PTB, SMIS, SP,	I, IMGC, INM, IPQ, NMi,	4B.	CEC funded? Yes	
5. Participating countries: DE DK ES FR FI GB IT NL PT SE SI TR				
6. Title: Traceability in infrared radiation thermometry from -50°C to 800°C (TRIRAT)				
7. Progress: Objectives The overall objective of the four-year TRIRAT project was to provide within Europe improved, sub-Kelvin accuracy in infrared radiation thermometry at industrial levels in the range from -50°C to 800°C. The effectiveness of the traceability system in which accuracy is transferred from the highest metrological level down to industry was crucial in achieving this goal. This would include international intercomparisons for radiation thermometry in this range, with an inherent accuracy, approaching 0.2 K. A restriction was made to the class of single-spot, single-channel radiation thermometers.				
Work program Two possible traceability schemes II and I were established in phase one, "Research and Development", of the project. Subsequently they were evaluated in phase two "Comparison of regional medium-temperature MT scales (150°C to 800°C) and low-temperature LT scales (-50°C to 300°C)". Each phase took two years for completion.				
Results and achievements In phase one more than 50 reference blackbody radiators (BBRs), either continuously variable in temperature (scheme II) or operating at a fixed-point (scheme I), have been developed, further improved and characterized. In addition to the BBRs 4 MT- and 6 LT- radiation thermometers (RTs) were developed, tested and extensively characterized. Two sets of RTs were selected to serve as transfer instruments in phase two. In the MT range two local scales consisting of fixed-points were compared showing differences within 50 mK, much less than the transfer standards uncertainty of 0.3 K. However when comparing thirteen local temperature scales (scheme II), differences larger than 2 K were observed. Further analysis showed that the differences could be traced back and explained qualitatively to specific features of the participant BBR configuration in combination with characteristics of the RT used. Similarly, in the LT range, more than 75 % of the local temperature scales were found equivalent within 1 K using scheme II while the RTs demonstrated their use to a level of 450 mK. The final output of TRIRAT is a series of recommendations for the standardization and testing of infrared RTs for use as transfer devices. The wealth of experience gained during the project has facilitated improved realization of non-contact thermometry scales throughout Europe. An important adjunct to the comparisons is that the results will be used to underpin traceability of local scales in Europe by submission into the international mutual recognition arrangement database providing the technical basis for wider agreements negotiated for international trade, commerce and regulatory affairs. 8. Coordinator's name: Dr Eric W. M. van der Ham Address: NMi Van Swinden Laboratorium B.V. P.O. box 654 2600 AR Delft, the Nederlands Telephone: +31 15 2691586 Telefax: +31 15 2612971 E-mail: EvdHam@NMi.nl				
9. Completion date: April 1 st 2002	10. Coordi Ezcuzta	nator's signature:	11. Date March 1	: 8 th 2003