Technische Universität München
Chair of Geodesy – Geodetic Laboratory
80290 München Germany

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Munich, January 20th, 2015

Remarks on the Invar rod calibration contract 14-72-07

Rod no: 26296, 26909, 27690

At the Geodetic Laboratory of the Technische Universität München invar levelling rods are calibrated according to the normative regulations of DIN 18717 which is identical to ISO 12858-1.

The stated requirements are:

- Thermal expansion coefficient ≤ 1 ppm/K
  This is achieved by all three rods.
- Rod scale factor ≤ 26.6 ppm for 3m rods
  This is achieved by all three rods.
- Index correction ≤ 0.05 mm
  This is achieved by all three rods.
- Deviation from rectangularity between the tape axis of the rod and the setup plate ≤ 5' = 0.0833°
  This is **not achieved** by all three rods.

This does not mean that the setup plate itself is not planar, but that the whole plane is tilted.
As a result of the misalignment between the rod tape axis and the setup plate, different setup positions of the rod will lead to different index errors which at the far ends of the setup plate will exceed 0.05 mm.
For practical use, it should be considered to set up the rod close to its reference point and avoid setups at the setup plate boundaries.

The detected rod tape straightness variations are harmless until it is guaranteed that the rod tape is free to move within its slide.

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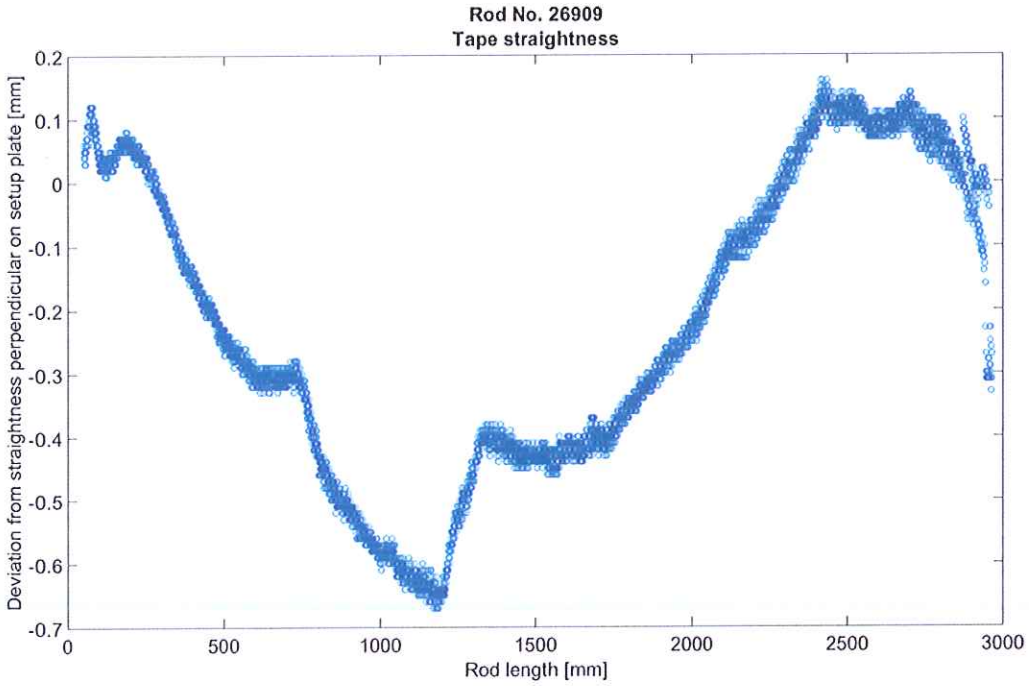
Calibration Report

Invar rod (Type, No): GPCL3 26909

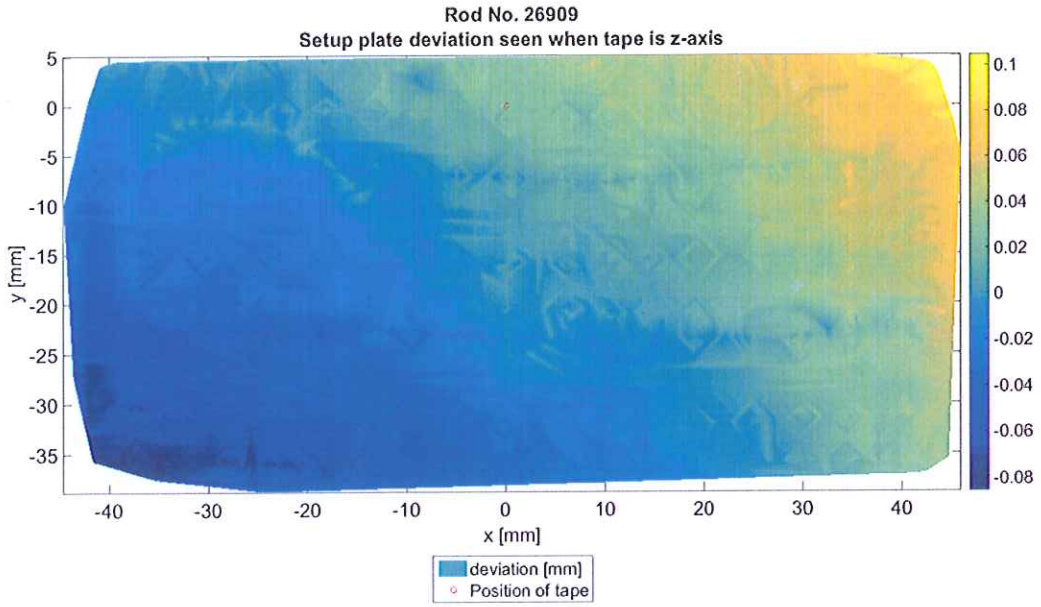
Contract: 14-72-07

Date of calibration: 20.01.2015

Rod tape straightness



Setup plate planarity



Deviation from rectangularity between rod tape regression and setup plate: 0.0974°

Calibration: Dr.-Ing. Peter Wasmeier

Geodätisches Prüflabor am Lehrstuhl für Geodäsie der TU München
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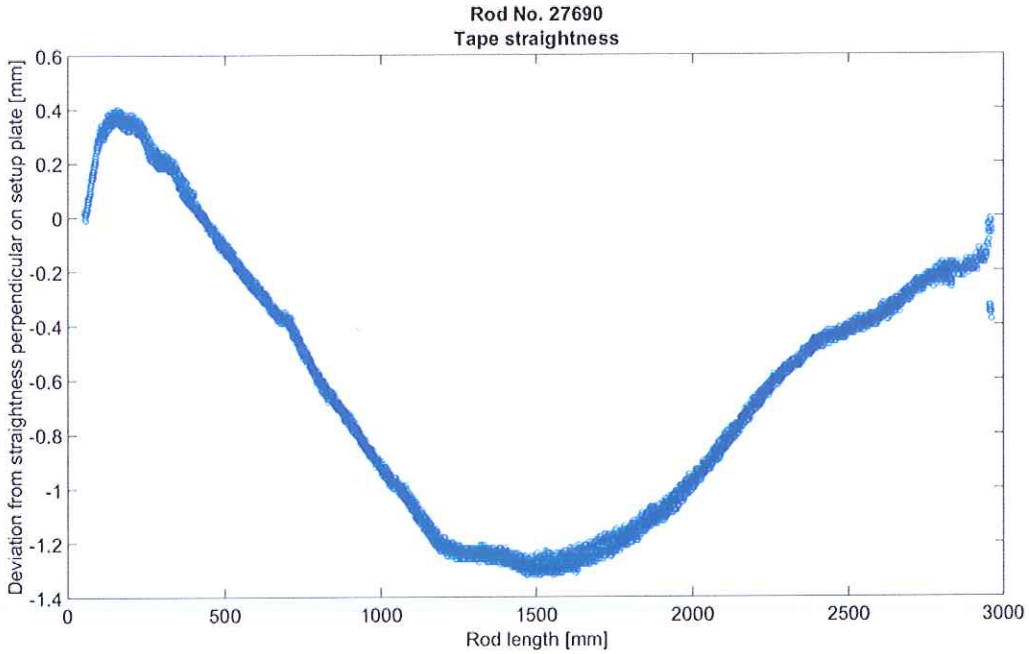
Calibration Report

Invar rod (Type, No): GPCL3 27690

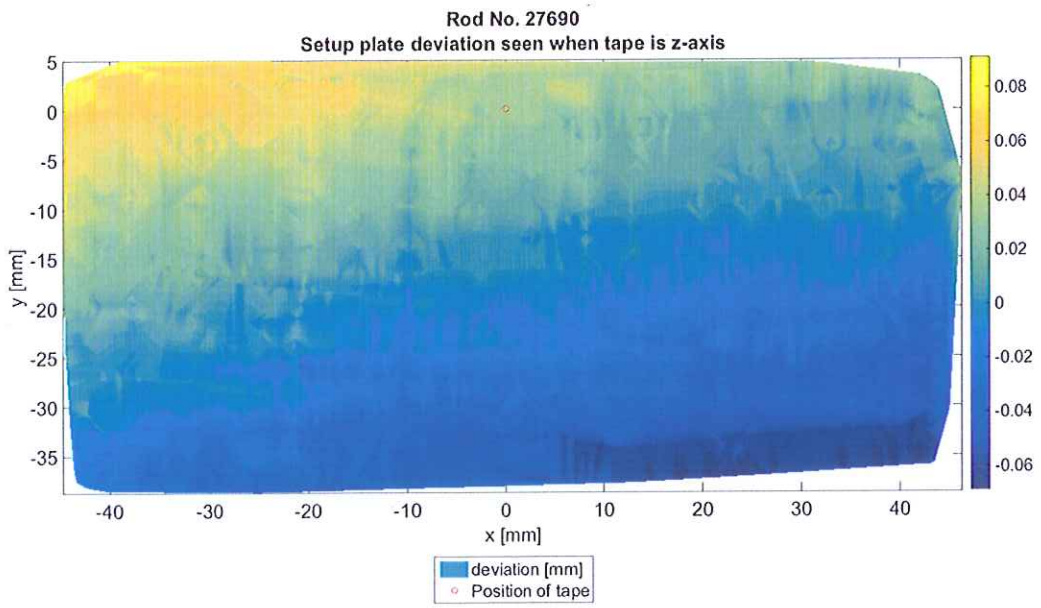
Contract: 14-72-07

Date of calibration: 20.01.2015

Rod tape straightness



Setup plate planarity



Deviation from rectangularity between rod tape regression and setup plate: 0.1439°

Calibration: Dr.-Ing. Peter Wasmeier

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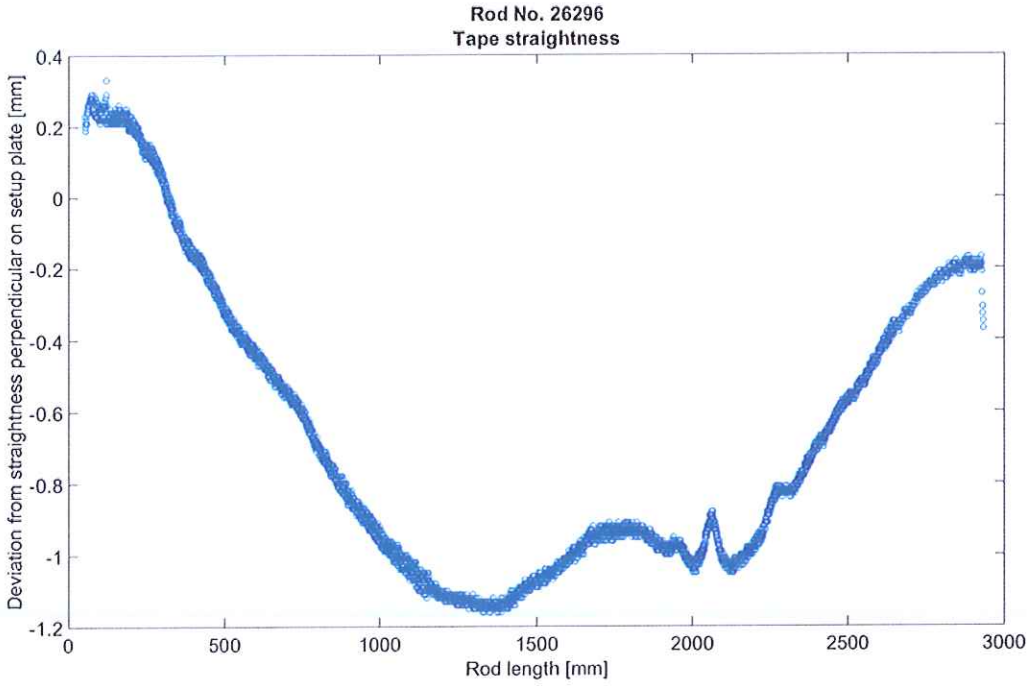
Calibration Report

Invar rod (Type, No): GPCL3 26296

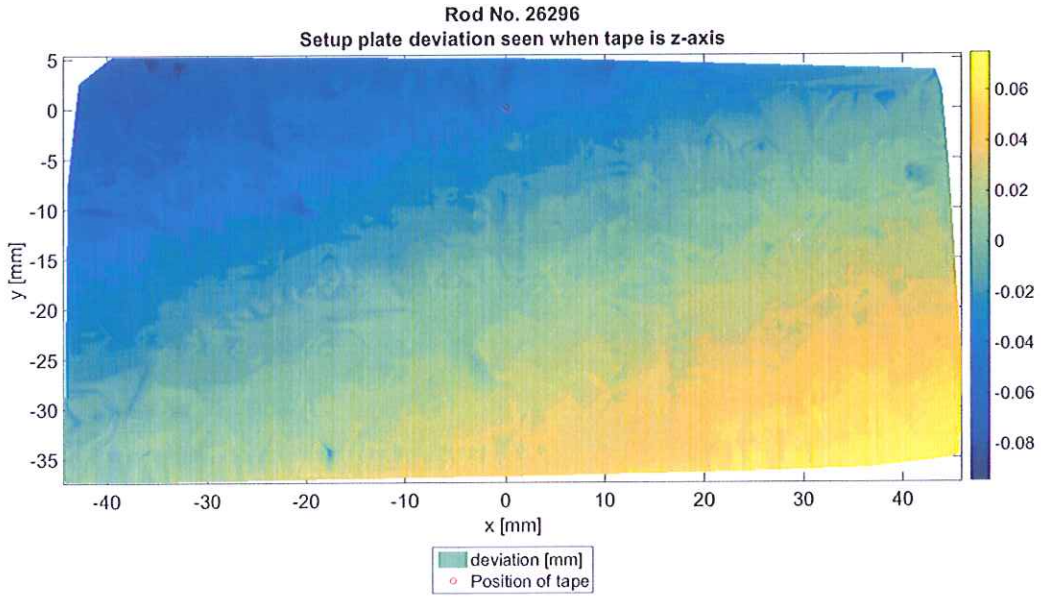
Contract: 14-72-07

Date of calibration: 20.01.2015

Rod tape straightness



Setup plate planarity



Deviation from rectangularity between rod tape regression and setup plate: 0.1624°

Calibration: Dr.-Ing. Peter Wasmeier

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