

## **Emissivity Measurements of Semitransparent Coatings and Low Emitting Surfaces**

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The ability to determine the emissivity of low emitting surfaces with low uncertainties is necessary for applications where heat losses shall be minimized. For example, a systematic reduction of the heat losses of solar thermal absorber coatings in the mid infrared by variation of the composition of the coatings is only feasible if uncertainties in emissivity measurement of 0.005 are achieved. Another example is the temperature control in forming processes of medical reconstruction parts which is very critical. If done by radiation thermometry it requires precise emittance values of often very low emitting metals or alloys. The direct measurement of the emissivity of low emitting surfaces is possible if multiple reflections between the sample and the surrounding in the measurement setup are taken into account. We present the experimental setup within the Reduced Background Calibration Facility (RBCF) at Physikalisch-Technische Bundesanstalt (PTB) and give a detailed description of our evaluation procedure. We also show that coatings if characterized up to the far infrared often become transparent and that the obtained results can be well explained by taking multiple reflections within the coating and interference effects into account. An observed phase difference between emissivity and reflectivity measurements of semitransparent samples can be explained by a physical model for each measurement approach.