

## Original Paper

# An Approach to Synchronise Effective Areas of Pressure Balances

W. Sabuga<sup>1</sup> and T. Priruenrom<sup>2</sup> 

(1) Physikalisch-Technische Bundesanstalt (PTB), Bundesallee 100, 38116 Brunswick, Germany

(2) National Institute of Metrology (Thailand) (NIMT), 3/4-5 Moo 3, Klong 5, Klong Luang, Pathumthani 12120, Thailand

 **T. Priruenrom**  
Email: [tasanee@nimt.or.th](mailto:tasanee@nimt.or.th)

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### Abstract

A method to synchronise effective areas of pressure balances is presented. By this method, the effective areas of piston-cylinder assemblies (PCAs) with their uncertainties determined from dimensional characteristics of the piston and the cylinder or from a calibration against reference pressure standards can be adjusted to achieve an optimal agreement with the effective area ratios determined by cross-float measurements between the PCAs. The approach is based on the weighted least squares' method and leads to minimum discrepancies between the initial effective areas and the cross-float area ratios on one side, and the synchronised effective areas on the other side. Examples of the new method's application to five gas-operated PCAs and five oil-operated PCAs of PTB, and to five gas-operated PCAs of NIMT, which are used as primary pressure standards in the two institutes, are presented.

### Keywords

Piston-cylinder assembly – Dimensional effective area – Cross-float effective area ratio – Synchronised effective area