



# GERG

## Young Researcher's Prize

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Development of an accurate,  
modern, adaptable, isothermal gas  
calorimeter

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# Introduction

- Natural gas network
- Final user billing
- Gas counters
- Different new gases
  - Biogas
  - Biomethan
  - Biogas enriched



# Commercial gas calorimeters

- Union Instrument or Cuttler-Hammer



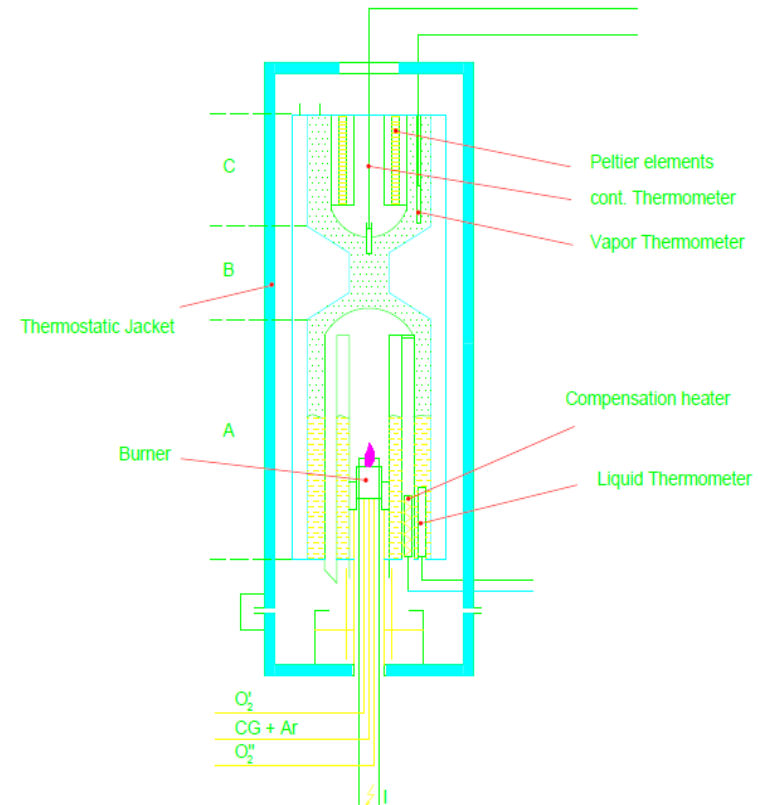
UNION Model CWD2005 Calorimeter



- Indirect measurement of the enthalpy of combustion (wobee Index)
- Bad conectivity
- Maintenace
- Calibration required
- Uncertainty  $\approx 2\%$  UI;  $0.2\%$  CH

# Alexandrov Calorimeter

- Low maintenance
- Uncertainty  $\approx 0.2\%$
- Computer controlled.
- No calibration required.
- Wide range of gas mixtures (methane and biogas)
- Direct measurement of heat of combustion



- Tested with methane
  - Low uncertainty
  - Low deviation from bibliographic value
- Binary mixtures (CH<sub>4</sub> & CO<sub>2</sub>)
- Synthetic biogas mixtures (CH<sub>4</sub>, CO<sub>2</sub>, N<sub>2</sub>, C<sub>2</sub>H<sub>6</sub>, H<sub>2</sub>)
- Real Biogas and Biomethan

# Aknowledgement

- European project EMRP-ENG54 Metrology for Biogas.



- Economy and Competitivity Ministry project ENE2013-47812-R



- PTB, UVa



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