

# Progress towards development of an isothermal calorimeter

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This study overtakes the development of an isothermal calorimeter designed by Alexandrov. This calorimeter measure the heat of combustion of flammable gases like methane in a continuous measurement. The operation of this device is described as follows:

Gas is burned in a combustion chamber. The heat produced in the combustion is used to evaporate a certain amount of a refrigerant or another kind of fluid that can be used as heat carrier. Then the heat is removed from the system thanks to several peltier elements making the refrigerant to condensate again. To measure the heat flux an electrical heater was placed inside the combustion chamber used to keep the temperature of the refrigerant at 25°C in steady state. The heat provided by this electric compensation heater will be different when gas is being burnt from when it is not, and this difference will be used to calculate the heat power of the gas used.

There is a lack of study in calorimetry using this kind of device, some the last studies were done many years ago and they required to be updated. With that purpose, PTB in collaboration with University of Valladolid is performing this study, where the work of this isothermal gas calorimeter is deeply analysed seeking possible weaknesses and who to improve its performance and to enhance accuracy of the measurements. This includes accuracy of the mass flow controllers, reducing noise in electrical heating, humidity measurements in the outlet stream, etc.

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