

EuP-Directive

Importance and challenge for the industry

Lot 23: „Domestic and commercial hobs and grills“



Subject and Participants

- only domestic hobs
- participants BSH, Electrolux and Miele
- first Test results by Schott
- details of the procedure by CENELEC TC 59X/WG 10



Contents

- Challenges
- Basic Criteria
- First Test results
- Conclusions



Challenges

- Cooking habit is specific for each country
- Size of household is variable
- Availability of gas or electric energy depends on regional supplies
- No European standard up to now for household cooktops



Draft Mandate

- measurement method for all types of household gas and electric hobs
- a procedure that adequately takes into account the variety of food
- different sizes of cookware, loads and different usage patterns
- a procedure which reproduces everyday household routine
- an investigation or development of a procedure for the definition of verification tolerance values based on measurement uncertainty



Test under household conditions

- reference for whole cooking process (heating up and continued cooking)
- energy optimized process (incorrect or improper use not considered), e.g. preference with lid
- height of energy consumption is a reference for real cooking process
- fixed continued cooking time (independent from system)
- for efficiency measurement cookware shall be standardized due to high variability of cookware
- frying is not yet considered



Extent of measuring method

- comparison of heater technology inclusive controls
- energy optimized process to avoid temperature overshoot
- residual heat taken into account
- method considering the ranges of different hotplate diameters
- different loads for different hotplate sizes



Basic Criteria

Easy to perform

- application with standard equipment
- time effective method
- low environmental pollution for lab personal
- automatable method



Basic Criteria

Uncertainty

- method without food
- boiling point depending from altitude and ambient pressure
- high repeatability
- high reproducibility
- clear criteria for process control (time for reducing power, continued cooking power level, end)
- standardized cookware or calibration method for suitable cookware



Basic Criteria

Results

- energy consumption per cooking process
- annual energy consumption for a hob
- adapted to hobs with different layouts
- consider the habit of different European countries
- primary performance criteria like cooking results (preserving vitamins etc.) and cooking time are not affected by the energy efficiency method



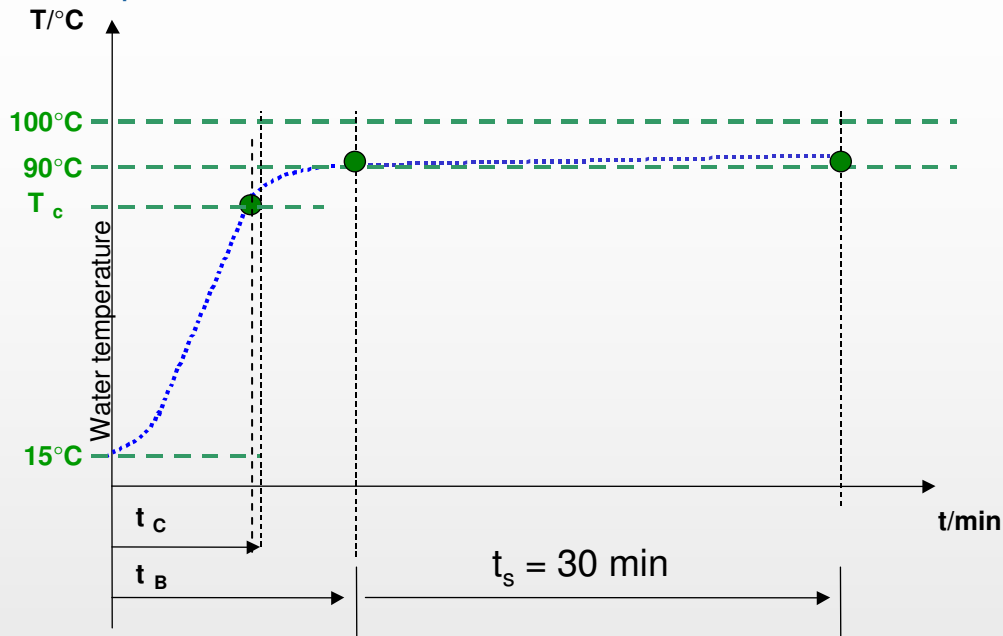
Energy consumption for cooktops in accordance to the EuP - directive 2005/32/EC

First test results
based on 90°C - test method



90°C - test method

Description:



Measurement categories:

t_b [min]	= boiling time
t_c [min]	= time when power setting is changed
t_s [min]	= simmering (ongoing cooking time)
T_c [°C]	= temperature when setting is changed
W_c [Wh]	= energy consumption until setting is changed
W_b [Wh]	= boiling time energy consumption
W_s [Wh]	= simmering energy consumption
W_t [Wh]	= total energy consumption
P_n [W]	= nominal power
P_s [W]	= simmering power
ED_b [%]	= power on time during boiling time
ED_s [%]	= power on time during simmering

- tested: heater including control
- start conditions: water temperature 15°C
- heat up phase with nominal power
- singular change of power setting ^{*)} with control/ knob, water temperature must remain $\geq 90^\circ\text{C}$ (as close as possible to 90°C) for 30 minutes.
- start of simmering when 90°C water temperature is reached.
- pot with lid, without stirrer with a mineral-insulated thermocouple (position and geometry have to be defined)

^{*)} T_c and P_c have to be identified during preliminary tests.



Test results with different pot types

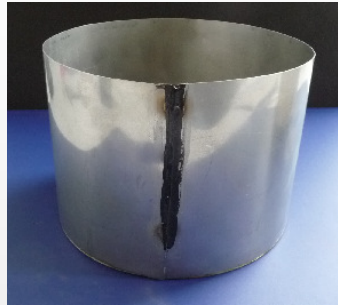
- a) standard utensils (available in the market)
- b.) laboratory pots



Description of the “laboratory pots”

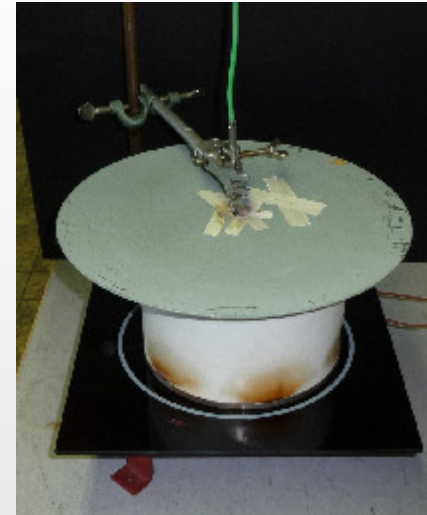
laboratory pot type S (stainless steel wall):

material of the wall: 1.4301 (X5CrNi 18-9)
thickness of the wall: 0,5 mm
height of the wall: 120 mm (inside)
glue: silicon
bottom: steel C45, 180mm, 6mm



lid

material: aluminium
diameter: 298 mm
thickness: 2 mm



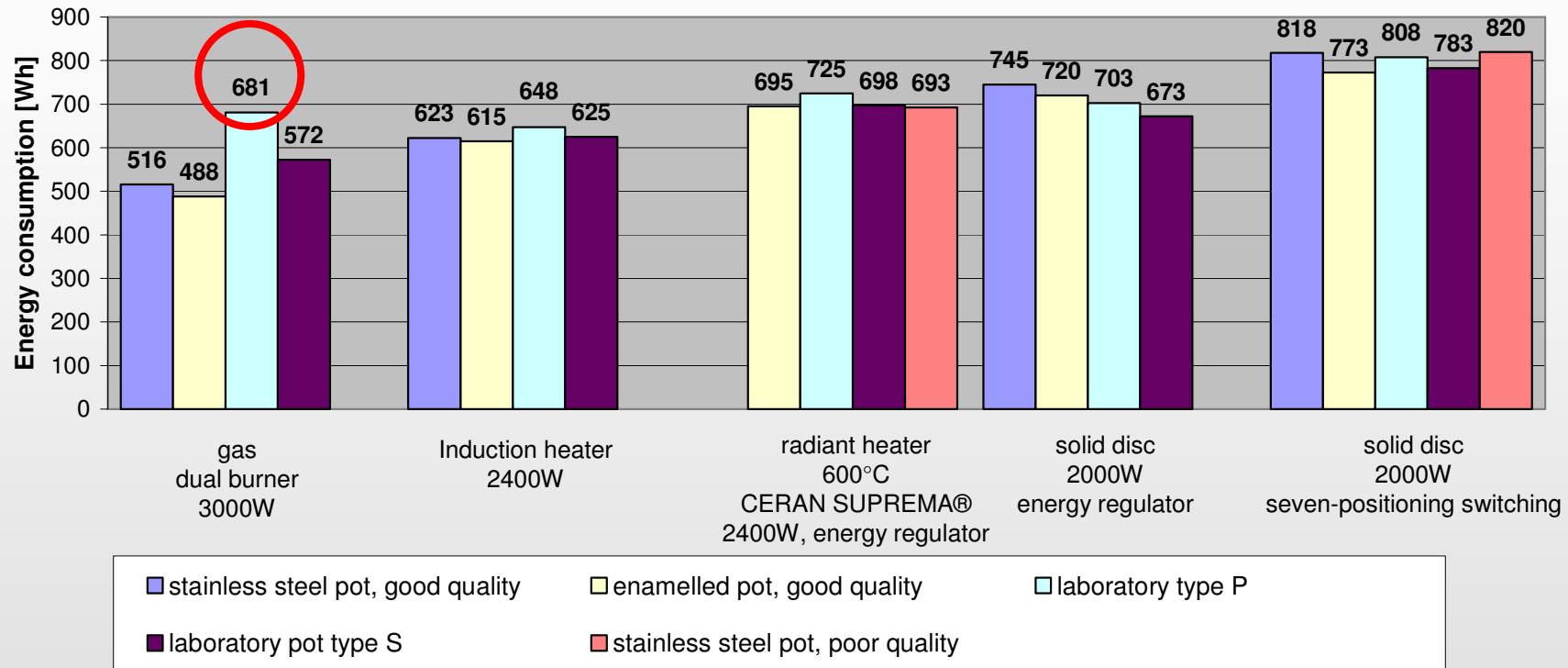
laboratory pot type P (plastic wall):

material of the wall: EOSINT P PA 2200 (Polylaurinlactam)
thickness of the wall: 6 mm
height of the wall: 120 mm (inside)
glue: silicon
bottom: steel C45, 180mm, 6mm



Test results with different pot types:

total energy consumption with conversion factor to primary energy of 2.5



Conclusions

- basic criteria are fulfilled
- applicable for all countries and sizes of household
- details like sizes of cookware and loads have to be decided
- procedure applicable for gas and electric appliances

