

# DIN EN 13203-4:2017-07 (E)

## Gas-fired domestic appliances producing hot water - Part 4: Assessment of energy consumption of gas combined heat and power appliances (mCHP) producing hot water and electricity

---

<b>Contents</b>		<b>Page</b>
European foreword .....		4
<b>1</b>	<b>Scope .....</b>	<b>5</b>
<b>2</b>	<b>Normative references .....</b>	<b>5</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>5</b>
<b>4</b>	<b>General test conditions .....</b>	<b>8</b>
4.1	Reference conditions .....	8
4.2	Measurement uncertainties .....	8
4.3	Test conditions .....	9
4.3.1	General .....	9
4.3.2	Test room .....	9
4.3.3	Water supply .....	9
4.3.4	Steady-state .....	9
4.3.5	Initial adjustment of the appliance .....	9
4.3.6	Electrical supply .....	10
4.3.7	Delivered electrical energy .....	10
<b>5</b>	<b>Determination of the energy consumption and electrical energy generation of the appliance .....</b>	<b>10</b>
5.1	General .....	10
5.2	Tapping cycles .....	10
Table 1 - Load profile S .....		12
Table 2 - Load profile M .....		13
Table 3 - Load profile L .....		14
Table 4 - Load profile XL .....		15
Table 5 - Load profile XXL .....		16
Table 6 - Load profile 3XL .....		17
Table 7 - Load profile 4XL .....		18
5.3	Measurement of the energy recovered by the useful water .....	19
5.4	Calculation of gas energy .....	19
5.4.1	Calculation of the daily gas energy consumption in summer mode .....	19
5.4.2	Calculation of daily gas energy consumption in winter mode .....	20
5.4.3	Daily gas energy consumption seasonally weighted .....	20
5.5	Calculation of electrical energy .....	21
5.5.1	Calculation of the delivered electrical energy .....	21
Figure 1 - Electrical measurements - Test points .....		21
5.5.2	Calculation of the produced electrical energy .....	23
5.5.3	Calculation of electrical auxiliary energy .....	24

5.6	Measurement of energy consumption and production in standby mode .....	24
5.6.1	General .....	24
5.6.2	Calculation of daily gas energy consumption in standby mode .....	24
5.6.3	Calculation of daily auxiliary energy in standby mode .....	25
5.7	Measurement of auxiliaries consumption in off mode .....	26
6	Determination of the wasted water .....	26
7	Eco design Related Product Data .....	27
7.1	Water heating energy efficiency .....	27
7.2	Annual fuel consumption (AFC) .....	28
7.3	Annual electricity delivery (AED) .....	28
Annex A (informative) Examples of test conditions .....		30
A.1	Diagrams of test conditions .....	30
Figure A.1 --Initial adjustment of the appliance with storage tank maintained in temperature .....		30
Figure A.2 --Initial adjustment of the appliance without storage tank maintained in temperature .....		31
Figure A.3 - Tapping cycle - Test cycle for measurement of the energy consumption of the appliance with storage tank maintained in temperature .....		32
Figure A.4 - Standby mode with control cycles .....		33
Annex B (informative) Test rig and measurement devices .....		34
B.1	General .....	34
Figure B.1 - Example of test rig .....		34
B.2	Pressure measurement .....	35
Figure B.2 -- Example of pressure measurement device .....		35
B.3	Temperature measurement .....	35
Figure B.3 -- Example of temperature measurement device .....		36
Figure B.4 -- Example of position of thermocouples - Method of surfaces .....		37
Figure B.5 -- Useful and delivered flow rates and temperatures .....		38
Annex C (normative) Test points .....		39
Figure C.1 - Thermal performances for mCHP systems with combined storage tank for central heating and domestic hot water - Test points .....		39
Figure C.2 - Thermal performances for mCHP systems with storage tank for domestic hot water only - Test points .....		40
Annex ZA (informative) Relationship between this European Standard and the requirements of Commission Regulation (EC) n° 814/2013 .....		41
Table ZA.1 -- Correspondence between this European Standard and Commission Regulation (EC) n° 814/2013 .....		41
Annex ZB (informative) Relationship between this European Standard and the requirements of Commission Regulation n° 812/2013 .....		42
Table ZB.1 -- Correspondence between this European Standard and Commission Regulation (EC) n° 812/2013 .....		42

<b>Annex ZC (informative) Relationship between this European Standard and the requirements of Commission Regulation (EU) n° 813/2013 .....</b>	<b>43</b>
<b>Table ZC.1 -- Correspondence between this European Standard and Commission Regulation (EC) n° 813/2013 .....</b>	<b>43</b>
<b>Annex ZD (informative) Relationship between this European Standard and the requirements of Commission Delegated Regulation (EU) n° 811/2013 .....</b>	<b>44</b>
<b>Table ZD.1 -- Correspondence between this European Standard and Commission Regulation (EC) n° 811/2013 .....</b>	<b>44</b>
<b>Bibliography .....</b>	<b>45</b>