

# DIN EN 15316-4-2:2017-09 (E)

Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-2: Space heating generation systems, heat pump systems, Module M3-8-2, M8-8-2

---

<b>Contents</b>		<b>Page</b>
European foreword .....		4
Introduction .....		5
1	Scope .....	6
2	Normative references .....	9
3	Terms and definitions .....	9
4	Symbols and abbreviations .....	13
4.1	Symbols .....	13
4.2	Subscripts .....	13
5	Description of the methods .....	14
5.1	General .....	14
5.2	Multiple heat generators .....	14
5.3	System boundary .....	15
5.3.1	General .....	15
5.3.2	Physical factors taken into account: .....	15
5.4	Schematisation of the heat pump for heating .....	15
5.5	Energy input needed to meet the heat requirements for heat pumps system .....	16
5.6	Auxiliary energy (WHW;gen;aux) .....	18
5.7	Recoverable, recovered and unrecoverable heat losses .....	18
5.8	Calculation by zones .....	18
5.9	Combined heating and domestic hot water preparation .....	19
6	Generation with heat pump systems - Energy calculation (hourly, bin) - Method A .....	19
6.1	Output data .....	19
6.2	Input data .....	20
6.3	Multiple heat generators .....	26
6.4	Calculation time steps .....	26
6.5	Flow chart .....	26
6.6	Energy requirements for space heating and DHW mode for the time step considered .....	27
6.7	COP and energy used for heating, storage and domestic hot water .....	28
6.8	Auxiliary energy (WH;gen;aux) .....	39
6.9	Energy used from the heat source .....	39
6.10	Calculation of back-up heater .....	40
6.11	Total losses and total recoverable heat losses of the generation subsystem .....	40
7	Method B - Monthly and annual energy calculation method .....	43
7.1	Calculation time steps .....	43
7.2	Output data .....	43
7.3	Principle of the calculation method B .....	43
7.4	Additional input Data .....	44
7.5	Construction of the bins - Step 1 .....	46
7.6	Determination of energy requirement of the single bins - Step 2 .....	50
7.7	Determination of thermal performance of the heat pump (step 3) .....	52
7.8	Determination of back-up energy of the single bins (step 4) .....	53

7.9	Calculation of auxiliary energy input (step 5) .....	53
7.10	Calculation of recoverable generation subsystem losses (step 6) .....	53
7.11	Calculation of the energy from the heat source (step 7) .....	54
7.12	Calculation of the total driving energy input to cover the requirements (step 8) .....	54
8	Quality control .....	54
8.1	Hourly, bin or monthly method .....	54
8.2	Main sources of errors .....	55
9	Compliance check .....	55
Annex A (normative) Template for input data .....		56
A.1	Heat pump description data .....	56
A.2	System design data .....	60
A.3	Operating conditions .....	62
Annex B (informative) Default values .....		64
B.1	Heat pump description data .....	64
B.2	System design data .....	68
B.3	- Operating conditions .....	70
Annex C (informative) Tables of COP and energy at full load .....		72
C.1	General .....	72
C.2	Air - Water electrically driven heat pumps .....	72
C.3	COP and energy for exhaust air/ water electrically driven heat pump .....	73
C.4	COP and energy for water or brine/ water electrically driven heat pump .....	74
C.5	Air/water combustion-engine driven heat pumps .....	75
Annex D (normative) Adaptation of the COP to different conditions of temperature conditions .....		77
D.1	Principle .....	77
D.2	Application to electrically-driven heat pump .....	78
D.3	Application to thermally-driven heat pumps .....	78
D.4	Correction of COP with adaptation to the operational temperature spread .....	79
D.5	Tests results form EN 14825 .....	82
D.6	Input data for the calculation of COP and capacity at operating conditions .....	82
Bibliography .....		84