

DIN EN 15316-5:2017-09 (E)

Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 5: Space heating and DHW storage systems (not cooling), Module M3-7, M8-7

Contents		Page
European foreword		5
Introduction		6
1	Scope	8
2	Normative references	10
3	Terms and definitions	10
4	Symbols and abbreviations	11
4.1	Symbols	11
4.2	Subscripts	11
5	Description of the methods	11
5.1	Output of the method	11
5.2	Extension of the method	11
5.3	Technologies covered and schematisation of the hot water storage system	12
5.4	Principles for hot water storage systems	13
6	Calculation of storage systems	14
6.1	Output data	14
6.2	Calculation time steps	17
6.3	Input data	17
6.3.1	Source of data	17
6.3.2	Product data	17
6.3.3	System design data	19
6.3.4	Control	19
6.3.5	Operating conditions	19
6.3.6	Constants and physical data	20
6.4	Calculation procedure	21
6.4.1	Applicable time-step	21
6.4.2	Operating conditions calculation	21
6.4.3	Energy calculation (storage modelled with multi volumes - Method A)	21
6.4.4	Simplified calculation procedure (storage modelled with a single volume - Method B)	26
6.4.5	Thermal losses	28
6.4.6	Calculation of the auxiliary energy	28
6.4.7	Recoverable, recovered thermal losses	28
7	Quality control	29
8	Compliance check	29
Annex A (informative) Template for input data and choices		31
A.1	Model information	31
A.2	Product description data	31
A.2.1	Storage type	31
A.2.2	Type of energy use (services)	31

A.2.3	Storage fuel	31
A.2.4	CE marking	32
A.2.5	Dimension	32
A.2.6	Energy input/output	32
A.2.7	Multiple energy input/output	33
A.2.8	Stand-by thermal losses	33
A.2.9	Factors for energy recovery	34
A.3	Design data	35
A.3.1	Localization	35
A.3.2	Hydraulic connection	35
A.3.3	Storage control type	35
A.3.3.1	Type of control	35
A.3.3.2	Adaptation of thermal losses for monthly or annual step time	36
A.4	Operative conditions for method A - hourly calculation time step	36
A.5	Operative conditions for Method B - bin, monthly or annual calculation time step	37
Annex B (informative) Default Input data		38
B.1	Model information	38
B.2	Product description data	38
B.2.1	Storage type	38
B.2.2	Type of energy use (services)	38
B.2.3	Storage fuel	38
B.2.4	CE marking	38
B.2.5	Dimension	38
B.2.6	Energy input/output	38
B.2.7	Multiple energy input/output	39
B.2.8	Stand-by thermal losses	39
B.2.9	Factors for energy recovery	41
B.3	Design data	41
B.3.1	Localization	41
B.3.2	Hydraulic connection	41
B.3.3	Storage control type	41
B.3.3.1	Type of control	41
B.3.3.2	Adaptation of thermal losses for monthly or annual step time	41
B.4	Operative conditions for method A - hourly calculation time step	41
B.5	Operative conditions for Method B - bin, monthly or annual calculation time step	42
Annex C (normative) Selection of methods		43
C.1	Method A - Model based on a representation of stratified temperature in the storage	43
C.1.1	Applicability of the stratified model	43
C.1.2	Selection of the number of volumes to model the storage unit	43
C.2	Method B - Model based on a representation of an homogenous temperature in the storage	43
Annex D (informative) Alternative presentation for Method A		44
D.1	Step 2 - Direct withdrawal of a heat quantity (volume to withdraw)	44
D.1.1	General	44
D.1.2	Additional	46
D.2	Step 3 - Temperature of the storage after volume withdrawal	46
D.3	Step 6 - indirect heat input and output	47
D.4	Rearrange temperatures in the storage to a natural state	49
D.5	Heat exchanger - additional	50
D.5.1	General	50
D.5.2	Indirect heat input in the storage, using a solar collector loop	50
D.5.3	Indirect heat output from the storage to the space heating service	51
Bibliography		52