

DIN EN 15316-4-3:2007-10 (E)

Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-3: Heat generation systems, thermal solar systems

Contents	Page
Foreword	4
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Symbols and abbreviations	10
5 Principle of the method	11
5.1 Building heat requirements influence the energy performance of a thermal solar system	11
5.2 The thermal solar system influences the energy performance of the building	12
5.3 Performance of the thermal solar system	12
5.4 Heat balance of the heat generation sub-system, including control	12
5.5 Auxiliary energy	16
5.6 Recoverable, recovered and unrecoverable thermal losses	16
5.7 Calculation periods	16
6 Thermal solar system calculation	16
6.1 Calculation procedures	16
6.2 Method A - using system data (results from system tests)	17
6.2.1 General	17
6.2.2 Definition of heat use applied to the thermal solar system	17
6.2.3 Output from thermal solar system	18
6.2.4 Auxiliary energy consumption of thermal solar system auxiliaries	20
6.2.5 System thermal losses	20
6.2.6 Recoverable losses	20
6.3 Method B - using component data (results from component tests)	20
6.3.1 General	20
6.3.2 Definition of heat use applied to the thermal solar system	21
6.3.3 Output from thermal solar system	22
6.3.4 Auxiliary energy consumption of thermal solar system auxiliaries	25
6.3.5 System thermal losses	25
6.3.6 Recoverable losses	26
6.3.7 Determination of reduced operation time of non-solar heat generator(s)	27
Annex A (informative) Examples on determination of thermal performance of thermal solar systems	28
A.1 General	28
A.2 Solar domestic hot water preheat system	28
A.2.1 General	28
A.2.2 Determination of the heat use to be applied	29
A.2.3 Determination of system data	29
A.2.4 Determination of X, Y and thermal solar system output	29
A.2.5 Determination of the auxiliary energy consumption	30
A.2.6 Determination of the thermal losses of the thermal solar system	30
A.2.7 Determination of the recoverable losses of the thermal solar system	30

A.3	Solar combisystem	31
A.3.1	General	31
A.3.2	Determination of the heat use	31
A.3.3	Determination of system data	32
A.3.4	Determination of X, Y and thermal solar system output	32
A.3.5	Determination of the auxiliary energy consumption	33
A.3.6	Determination of the thermal losses of the thermal solar system	34
A.3.7	Determination of the recoverable losses of the thermal solar system	34
A.3.8	Determination of the reduction of auxiliary energy consumption of the back-up heater	35
Annex B (informative) Informative values for use in the calculation methods		36
B.1	System type coefficients	36
B.2	Thermal solar system default values	36
B.2.1	General	36
B.2.2	Typical values	37
B.2.3	Penalty values	38
B.3	Storage tank capacity correction coefficient fst	38
B.4	Reference temperature ref	39
B.5	Solar irradiance on the collector plane and incidence angle modifier	40
B.6	Thermal losses of the solar storage tank	41
B.7	Thermal losses of the distribution between the thermal solar system and the back-up heater	41
B.8	Recoverable part of system losses	41
Annex C (informative) Product classification		42
C.1	Solar collectors	42
C.2	Solar hot water heaters	42
C.3	Storage tanks	42
Annex D (informative) Savings calculation		44
Bibliography		45