DIN V 18599-3:2007-02 (E)

Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting - Part 3: Net energy demand for air conditioning

Contents

Page

Foreword 4

Introduction 6

1 Scope 7

2 Normative references 9

3 Terms and definitions, symbols and units 10
3.1 Terms and definitions 10
3.2 Symbols, units and subscripts 13

4 Calculation methods 18
4.1 Characteristic value method 18
4.2 Special system designs 18

5 Use of balance parameters in other calculations 19
5.1 General considerations 19
5.2 Supply air volume flow of constant air volume systems 19
5.3 Supply air volume flow of systems with time-dependent or usage-dependent volume flow control 19
5.4 Supply air volume flow of systems with control of the volume flow as a function of the cooling load 20
5.5 Monthly mean supply air temperatures 22

6 Calculation of the delivered energy for air transport 23
6.1 Constant air volume systems 23
6.2 Variable air volume systems 24
6.2.1 Calculation principles 24
6.2.2 Systems with time-dependent or usage-dependent control of the volume flow 26
6.2.3 Systems with control of the volume flow as a function of the cooling load 26

7 Calculation of the energy needs for heating, cooling, humidification and dehumidification 27
7.1 Selecting a type of system 27
7.2 Conversion of energy characteristic values for freely-selected operating times and supply air temperatures 31
7.3 Conversion of energy characteristic values for systems with freely-selectable recovered heat coefficients 34
7.4 Denormalizing the energy characteristic values 35

8 Maximum power values 35
8.1 Design parameters for specific external air and extract air conditions 35
8.2 Determination of the enthalpy of supply air 37
8.3 Maximum heating power 39
8.4 Maximum cooling power 40
8.5 Maximum power for steam generation 41

Annex A (normative) Energy characteristic values for thermal conditioning of air 42

A.1 General 42

Annex B (normative) Component usage times 45

B.1 General 45

Annex C (normative) Method and boundary conditions for determining the energy need for thermal air conditioning 45

C.1 General 45
C.2 Method and boundary conditions 45

Annex D (informative) System types, schematic diagrams 45

D.1 General 45

-- Prestandard -- Figures Page Figure 3 -- Sections of ventilation ductwork with constant resistance and with variable resistance 24

Figure 4 -- Correction factors to account for the daily operating time of a VAC system 34

Tables Table 1 -- Symbols 13

Table 2 -- Subscripts 17

Table 3 -- Monthly mean supply air temperature for ventilation systems without a cooling function 22

Table 4 -- Monthly mean supply air temperature for ventilation systems with neither reheating nor cooling functions 23

Table 5 -- Variant numbers of VAC systems in connection with the energy characteristic values according to Annex A 30

Table 6 -- Design parameters for specific external air conditions 35

Table 7 -- Design parameters for extract air conditions in the zone 36

Table A.1 -- Specific energy characteristic values for a whole year 42

Table A.2 -- Specific energy characteristic values for the month of January 45

Table A.3 -- Specific energy characteristic values for the month of February 45

Table A.4 -- Specific energy characteristic values for the month of March 45

Table A.5 -- Specific energy characteristic values for the month of April 45

Table A.6 -- Specific energy characteristic values for the month of May 45

Table A.7 -- Specific energy characteristic values for the month of June 45

Table A.8 -- Specific energy characteristic values for the month of July 45

Table A.9 -- Specific energy characteristic values for the month of August 45

Table A.10 -- Specific energy characteristic values for the month of September 45

Table A.11 -- Specific energy characteristic values for the month of October 45

Table A.12 -- Specific energy characteristic values for the month of November 45

Table A.13 -- Specific energy characteristic values for the month of December 45

Table B.1 -- Annual relative component usage times ti,14°C,12h for tv,mech = 12 h and V,mech = 14 °C 45

Table B.2 -- Annual relative component usage times ti,r,22°C,12h for tv,mech = 12 h and V,mech = 22 °C 45

Table C.1 -- Default supply air humidity values 45

Table C.2 -- Default zone extract air temperature values 45

Table D.1 -- Schematic diagrams of system designs 45