

DIN 4108-4:2020-11 (E)

Thermal insulation and energy economy in buildings - Part 4: Hygrothermal design values

Contents

Page

Foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions.....	11
4 Hygrothermal characteristic values.....	11
4.1 Building materials, building types and building components and elements.....	11
4.2 Moisture content in equilibrium	27
4.3 Conversion factors for the moisture content	28
4.4 Thermal resistance of air layers.....	29
4.5 Surface resistance	29
4.6 Specific heat capacity.....	29
4.7 Floors and ceilings	29
5 Glazing, windows, doors and curtain walling.....	31
5.1 Windows, window doors, external doors and roof windows.....	31
5.1.1 Design values for windows, window doors,external doors and roof windows as in DIN EN 14351-1.....	31
5.1.2 Air permeability as a function of design features of windows, window doors and external doors.....	32
5.2 Insulating glass units as in DIN EN 1279-5.....	33
5.2.1 Design values for the thermal transmittance.....	33
5.2.2 Design values for the total solar energy transmittance (solar factor) and light transmittance	33
5.3 Design values for curtain walling.....	35
5.3.1 Design values for thermal transmittance.....	35
5.3.2 Design value for total solar energy transmittance (solar factor) and light transmittance	36
6 Rooflights.....	36
6.1 Individual rooflights and continuous rooflights of plastic materials.....	36
6.2 Glass constructions in roof areas (e.g. glass roofs)	38
7 Design values for industrial, commercial and garage doors and gates	39
8 Calculation of insulation thicknesses for pipelines	39
Annex A (normative) Determination of design values for masonry made from masonry units as in DIN EN 771.....	43
A.1 General	43
A.2 Extrapolation of the dry values of thermal conductivity $\lambda_{10,dry,unit}$ of units at the upper limit of the declared density and determination of $\lambda_{10,dry,unit,100\%}$	43
A.3 Influence of moisture content and determination of $\lambda_{design,unit,100\%}$	45
A.4 Consideration of the influence of joints and determination of $\lambda_{design,mas,100\%}$	45
A.4.1 Numerical calculations.....	45
A.4.2 Simplified method for composite components as in DIN EN ISO 6946	45
A.4.3 Tabular method	45

A.5	Classification of thermal conductivity $\lambda_{\text{design,mas,100\%}}$ and determination of the design value λ_B	46
	Bibliography	47
Tables		
Table 1	Design values for thermal conductivity and guideline values for water vapour resistance factors	12
Table 2	Line 5 of Table 1 for thermal insulating materials in accordance with harmonized European Standards	23
Table 3	Moisture content in equilibrium of building materials	27
Table 4	Conversion factors for wall building materials	28
Table 5	Conversion factors for thermal insulation	29
Table 6	Thermal resistances of floors and ceilings	29
Table 7	Design value for the thermal transmittance of external doors $U_{D,BW}$ as a function of the design features	32
Table 8	Air permeability as a function of design features of windows, window doors and external doors	32
Table 9	Correction factors ΔU_g for calculating the design values $U_{g,BW}$	33
Table 10	Total solar energy transmittance and light transmittance as a function of the design features, the U_g value and the thermal transmittance	34
Table 11	Correction factors c as a function of the emissivity ε_n	35
Table 12	Guideline values for light transmittance τ_{D65}, U_t- and g-values	37
Table 13	Design value $U_{D,BW}$ as a function of design features	39
Table 14	Determination of insulation thicknesses while maintaining the minimum requirement of the German Energy Savings Ordinance (EnEV) – 100 % requirement	40
Table 15	Determination of insulation thicknesses while maintaining the minimum requirement of the German Energy Savings Ordinance (EnEV) – 50 % requirement	42
Table A.1	Gradients of the thermal conductivity- density curve	44
Table A.2	Determination of $\lambda_{\text{design,mas,100\%}}$ for masonry with various joint materials	46