

# DIN EN 13165:2016-09 (E)

## Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification (includes Amendment :20 16)

---

Contents	Page
European foreword .....	4
1 Scope.....	7
2 Normative references.....	7
3 Terms, definitions, symbols, units and abbreviated terms .....	8
4 Requirements.....	12
5 Test methods .....	18
6 Designation code.....	21
7 Assessment and Verification of the Constancy of Performance (AVCP) .....	21
8 Marking and labelling .....	22
<b>Annex A (normative) Determination of the declared values of thermal resistance and thermal conductivity .....</b>	<b>24</b>
A.1 General.....	24
A.2 Input data.....	24
A.3 Declared values .....	24
<b>Annex B (normative) <math>\square_{A1}</math> Product type determination <math>\square_{A1}</math> (<math>\square_{A1}</math> PTD <math>\square_{A1}</math>) and factory production control (FPC) .....</b>	<b>26</b>
<b>Annex C (normative) Determination of the aged values of thermal resistance and thermal conductivity .....</b>	<b>30</b>
C.1 General.....	30
C.2 Sampling and test specimen preparation .....	30
C.3 Determination of the initial value of thermal conductivity.....	31
C.4 Determination of the accelerated aged value of thermal conductivity.....	32
C.5 Fixed increment procedure.....	35
C.6 Declaration of the aged values of thermal resistance and thermal conductivity .....	37
<b>Annex D (normative) PU multi-layered insulation products.....</b>	<b>39</b>
D.1 General.....	39
D.2 Requirements.....	39
D.3 Test methods .....	40
D.4 Evaluation of conformity.....	40
<b>Annex E (informative) Additional properties.....</b>	<b>41</b>
E.1 General.....	41
E.2 Bending strength.....	41
E.3 Shear behaviour .....	41
E.4 Compressive stress at 2% deformation.....	41
E.5 Long term water absorption by diffusion .....	41
E.6 Freeze-thaw resistance.....	41
E.7 Apparent density.....	42
<b>Annex ZA (informative) <math>\square_{A1}</math> Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation <math>\square_{A1}</math> .....</b>	<b>43</b>
<b>Bibliography .....</b>	<b>54</b>

## Tables

Table 1 — Tolerances on length and width .....	13
Table 2 — Classes for thickness tolerances.....	13
Table 3 — Deviation from flatness.....	13
Table 4 — Test conditions for dimensional stability under specified temperature and humidity conditions.....	14
Table 5 — Levels for dimensional stability for test conditions 1, 2, 3 .....	15
Table 6 — Levels for dimensional stability for test condition 4 .....	15
Table 7 — Levels for deformation under specified compressive load and temperature conditions .....	15
Table 8 — Levels for compressive stress or compressive strength.....	16
Table 9 — Levels for tensile strength perpendicular to faces .....	16
Table 10 — Levels for one sided wetting behaviour .....	17
Table 11 — Test methods, test specimens and conditions .....	20
Table A.1 — Values for $k$ for one sided 90 % tolerance interval with a confidence level of 90 %.....	25
Table B.1 — Minimum number of tests for $\langle A_1 \rangle$ PTD $\langle A_1 \rangle$ and minimum product testing frequencies.....	26
Table B.2 — Minimum product testing frequencies for the reaction to fire characteristics.....	28
Table C.1 — $\langle A_2 \rangle$ Safety increments to be added to the measured accelerated aged value of thermal conductivity $\langle A_2 \rangle$ .....	33
Table C.2 — $\langle A_2 \rangle$ Increments for calculating the aged value of thermal conductivity $\langle A_2 \rangle$ .....	37
Table E.1 — Test methods, test specimens, conditions and minimum testing frequencies .....	42
Table ZA.1 — Relevant clauses for factory made rigid polyurethane foam and intended use .....	44
Table ZA.2 — Systems of AVCP .....	45
Table ZA.3.1 — Assignment of AVCP tasks for factory made rigid polyurethane foam products under system 1 for reaction to fire and system 3 (see Table ZA.2) .....	46
Table ZA.3.2 — Assignment of AVCP tasks for factory made rigid polyurethane foam products under system 3 (see Table ZA.2) .....	47
Table ZA.3.3 — Assignment of AVCP tasks for factory made rigid polyurethane foam products under combined system 4 for reaction to fire and system 3 (see Table ZA.2).....	47

## Figures

Figure C.1 — Flow chart of the alternative ageing procedures .....	31
Figure C.2 — Illustration of the acceleration test.....	34
Figure ZA.1 — $\langle A_1 \rangle$ Example CE marking information of products under AVCP system 1 and system 3 $\langle A_1 \rangle$ .....	53