# DIN EN 13164:2015-04 (E)

## Thermal insulation products for buildings - Factory made extruded polystyrene foam (XPS) products - Specification (includes Amendment A1:2015)

## Contents

Page


Foreword ..... 5

1 Scope ..... 7

2 Normative references ..... 7

3 Terms, definitions, symbols, units, abbreviated terms ..... 8
3.1 Terms and definitions ..... 8
3.2 Symbols, units and abbreviated terms ..... 9

4 Requirements ..... 11
4.1 General ..... 11
4.2 For all applications ..... 12
4.2.1 Thermal resistance and thermal conductivity ..... 12
4.2.2 Length, width, squareness, flatness ..... 12
4.2.3 Thickness ..... 13
4.2.4 Reaction to fire of the product as placed on the market ..... 13
4.2.5 Durability characteristics ..... 13
4.3 For specific applications ..... 14
4.3.1 General ..... 14
4.3.2 Dimensional stability under specified conditions ..... 14
4.3.3 Deformation under specified compressive load and temperature conditions ..... 14
4.3.4 Compressive stress or compressive strength ..... 15
4.3.5 Tensile strength perpendicular to faces ..... 15
4.3.6 Compressive creep ..... 16
4.3.7 Water absorption ..... 16
4.3.8 Freeze-thaw resistance ..... 17
4.3.9 Water vapour transmission ..... 17
4.3.10 Release of dangerous substances ..... 18
4.3.11 Reaction to fire of the product in standardized assemblies simulating end-use applications ..... 18
4.3.12 Continuous glowing combustion ..... 18
4.3.13 Shear strength ..... 18

5 Test methods ..... 18
5.1 Sampling ..... 18
5.2 Conditioning ..... 18
5.3 Testing ..... 19
5.3.1 General ..... 19
5.3.2 Thermal resistance and thermal conductivity ..... 19

6 Designation code ..... 21

7 Assessment and Verification of the Constancy of Performance (AVCP) ..... 22
7.1 General ..... 22
7.2 Product Type Determination (PTD) ..... 22
7.3 Factory Production Control (FPC) ..... 22

8 Marking and labelling ..... 22

**Annex A** (normative) **Determination of the declared values of thermal resistance and thermal conductivity** ..... **24**
**A.1 General** ..... **24**
**A.2 Input data** ..... **24**
**A.3 Declared values** ..... **24**
**A.3.1 General** ..... **24**
**A.3.2 Case where thermal resistance and thermal conductivity are declared** ..... **24**
**A.3.3 Case where only thermal resistance is declared** ..... **25**
**Annex B** (normative) **[A1] Product type determination [A1] ([A1] PTD [A1]) and Factory production control (FPC)** ..... **26**
**Annex C** (normative) **Determination of the aged values of thermal resistance and thermal conductivity** ..... **30**
**C.1 General** ..... **30**
**C.2 Procedure for XPS foam without diffusion tight facings** ..... **30**
**C.2.1 Principle** ..... **30**
**C.2.2 Sample preparation** ..... **30**
**C.2.3 Procedure** ..... **30**
**C.3 Procedure for XPS foam for use with diffusion tight facing on both sides** ..... **31**
**C.3.1 Principle** ..... **31**
**C.3.2 Ageing procedure** ..... **31**
**C.4 Determination of value after ageing: "aged value"** ..... **31**
**C.4.1 Determination of aged value for XPS products without diffusion tight facings on both sides** ..... **31**
**C.4.2 Determination of aged value for XPS products for use with diffusion tight facing on both sides** ..... **32**
**C.5 Blowing agent** ..... **33**
**C.6 Product grouping** ..... **33**
**Annex D** (normative) **XPS multi-layered insulation products** ..... **34**
**D.1 General** ..... **34**
**D.2 Requirements** ..... **34**
**D.2.1 For all applications** ..... **34**
**D.2.2 For specific applications** ..... **35**
**D.3 Test methods** ..... **35**
**D.4 Evaluation of conformity** ..... **35**
**Annex E** (informative) **Additional properties** ..... **36**
**E.1 General** ..... **36**
**E.2 Behaviour under cyclic loading** ..... **36**
**E.3 Compressive modulus of elasticity** ..... **36**
**E.4 Bending strength** ..... **36**
**E.5 Determination of volume percentage of closed cells** ..... **36**

**Annex F** (informative) **Plan for cutting test specimen** ..... 38

**Annex ZA** (informative) **[A1] Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation [A1]** ..... 40

**ZA.1 Scope and relevant characteristics** ..... 40

**ZA.2 Procedures for AVCP of factory made extruded polystyrene products** ..... 41

**ZA.2.1 Systems of AVCP** ..... 41

**ZA.2.2 Declaration of Performance (DoP)** ..... 45

**ZA.3 CE Marking and labelling** ..... 48

**Bibliography** ..... 50

**Tables**

**Table 1 — Tolerances of length, width, squareness and flatness** ..... 13

**Table 2 — Classes for thickness tolerances** ..... 13

**Table 3 — Dimensional stability under specified conditions** ..... 14

**Table 4 — Levels for deformation under specified compressive load and temperature conditions** ..... 15

**Table 5 — Levels for compressive stress or compressive strength** ..... 15

**Table 6 — Levels for tensile strength, perpendicular to faces** ..... 16

**Table 7 — Levels for long term water absorption by total immersion** ..... 16

**Table 8 — Levels for long term water absorption by diffusion** ..... 17

**Table 9 — Test methods, test specimens and conditions** ..... 19

**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 !PTD" and minimum product testing frequencies** ..... 26

**Table B.2 – Minimum product testing frequencies for the reaction to fire characteristics** ..... 28

**Table E.1 — Test methods, test specimens, conditions and minimum testing frequencies** ..... 37

**Table ZA.1 — Relevant clauses for factory made extruded polystyrene foam and intended use** ..... 40

**Table ZA.2 — Systems of AVCP** ..... 42

**Table ZA.3.1 — Assignment of AVCP tasks for factory made extruded polystyrene foam products under system 1 for reaction to fire and system 3 (see Table ZA.2)** ..... 42

**Table ZA.3.2 — Assignment of AVCP tasks for factory made extruded polystyrene foam products under system 3 (see Table ZA.2)** ..... 44

**Table ZA.3.3 — Assignment of AVCP tasks for factory made extruded polystyrene foam products under combined system 4 for reaction to fire and system 3 (see Table ZA.2)** ..... 44

**Figures**

**Figure ZA.1 — Example CE marking information of products under AVCP system 3"** ..... 49