BS EN 14319-2:2013

BSI Standards Publication

Thermal insulating products for building equipment and industrial installations — In-situ formed dispensed rigid polyurethane (PUR) and polyisocyanurate foam (PIR) products

Part 2: Specification for the installed insulation products

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PRI/72, Rigid cellular materials.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2013.

ISBN 978 0 580 53440 9

ICS 91.100.60

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14319-2

January 2013

ICS 91.100.60

English Version

Thermal insulating products for building equipment and industrial installations - In-situ formed dispensed rigid polyurethane (PUR) and polyisocyanurate foam (PIR) products - Part 2: Specification for the installed insulation products

Produits isolants thermiques destinés aux équipements de bâtiment et aux installations industrielles - Produits en mousse rigide de polyuréthanne (PUR) et de polyisocyanurate (PIR) injectée, formés en place - Partie 2: Spécifications relatives aux produits isolants après mise en œuvre

Wärmedämmstoffe für die technische Gebäudeausrüstung und für betriebstechnische Anlagen in der Industrie - An der Verwendungsstelle hergestellter Wärmedämmstoff aus Polyurethan (PUR) und Polyisocyanurat (PIR)-Gießschaum - Teil 2: Spezifikation für die eingebauten Produkte

This European Standard was approved by CEN on 24 November 2012.

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Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 14319-2:2013: E

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Foreword

This document (EN 14319-2:2013) has been prepared by Technical Committee CEN/TC 88 “Thermal insulating materials and products”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2013, and conflicting national standards shall be withdrawn at the latest by July 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This European Standard consists of two parts which form a package. The first part is the harmonised part satisfying the mandate and the CPD and which is the basis for the CE marking covering the products, which are placed on the market. The second part, which is the non-harmonised part, covers the specification for the installed products. Both parts need to be used for the application of the insulation products in the end-use applications covered by EN 14319.

Attention is drawn to the need to take into account any complementary member state rules (e.g. installation rules) which together with Part 2 of this European Standard ensures the fitness for purpose of the installed product.

This European Standard is one of a series for expanded perlite, exfoliated vermiculite and polyurethane/polyisocyanurate in-situ formed insulation products used in building equipment and industrial installations, but this standard may be used in other areas where appropriate.

The reduction in energy used and emissions produced during the installed life of insulation products exceeds by far the energy used and emissions made during the production and disposal processes.

EN 14319, *Thermal insulating products for building equipment and industrial installations — In-situ formed dispensed rigid polyurethane (PUR) and polyisocyanurate foam (PIR) products* consists of the following parts:

— *Part 1: Specification for the rigid foam dispensed system*

— *Part 2: Specification for the installed insulation products* (the present document)

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies requirements for in-situ formed dispensed polyurethane (PUR) and polyisocyanurate (PIR) foam products for the insulation of building equipment industrial installations, for example storage vessels, pipes and ducts used for the supply of fuels, oil, other liquids, hot and cold water, air and other gases.

Depending on the type of foam products complying with this standard, they may have service temperature ranges which lie within the limits of ± 200 °C.

This Part 2 of this European Standard is a specification for the installed insulation product.

This Part 2 of this European Standard describes, when taken together with Part 1 of EN 14319, the product characteristics that are linked to the essential requirements of the EU Construction Products Directive. It also specifies the checks and tests to be used for the declarations made by the installer of the product.

This European Standard does not specify the required levels of all properties to be achieved by a product to demonstrate fitness for purpose in a particular application. The required levels are to be found in regulations or non-conflicting standards.

This European Standard does not cover factory made rigid polyurethane (PUR) or polyisocyanurate (PIR) foam products or in-situ products intended to be used for the insulation of buildings.

The products are not intended for use for direct airborne sound insulation or acoustic absorption applications.

NOTE Foam products are either called flexible or rigid. The flexible products are used in upholstery and mattresses and are characterised by their ability to deflect, support and recover to their original thickness continually during their in-use phase. Those that are not flexible are termed rigid and do not possess these flexible characteristics. They are mostly used for thermal insulation purposes and vary widely in their compression strength values. Once the cell structure is crushed in a rigid foam, it does not recover its thickness fully. Some of these rigid foams are very low in density with very low compression strengths and are sometimes described “commercially” as “soft foams” or “semi-rigid” foams. This note has been included to clarify that all foams with such descriptions are covered by this standard’s used of the term rigid foam.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14319-1:2013, Thermal *insulating products for building equipment and industrial installations — In-situ formed dispensed rigid polyurethane (PUR) and polyisocyanurate foam (PIR) products — Part 1: Specification for the rigid foam dispensed system*

EN ISO 9229:2007, *Thermal insulation — Vocabulary (ISO 9229:2007)*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 9229:2007 and the following apply.

3.1.1
polyurethane foam PUR
(in-situ formed products)
rigid cellular plastics insulation material or product with a structure based on polymers mainly of the polyurethane type

3.1.2
polyisocyanurate foam PIR
(in-situ formed products)
rigid cellular plastics insulation material or product with a structure based on polymers mainly of the polyisocyanurate type

3.1.3
polyurethane foam PU
rigid cellular plastics insulation materials or products including both polymer types based mainly on polyurethane (PUR) or mainly on polyisocyanurate (PIR) groups

3.1.4
rigid foam dispensing system
kit of constituent components which when dispensed generates the rigid polyurethane (PUR) foam or the rigid polyisocyanurate (PIR) foam characterised by the specified properties of the foam generated

3.1.5
isocyanate component
liquid isocyanate product which is one of the components of the rigid foam dispensed system

3.1.6
polyol component
liquid polyhydroxyl product containing an expanding agent, catalysts and other additives which is one of the components of the rigid foam dispensed system

3.1.7
machine
equipment used to mix and dispense the foam

3.1.8
mixing ratio
proportions of the components of the rigid foam dispensing system specified by the manufacturer to be dispensed to generate the rigid polyurethane or polyisocyanurate foam

Note 1 to entry: This can be expressed either as a weight or a volume ratio or both.

3.1.9
installation
process of dispensing the mixture of the components into the cavity to be insulated

Note 1 to entry: The procedure involves dispensing discrete amounts of foam system, according to the manufacturer's technical information, so that the height of the foam in the cavity increases by a specified height each time, until it reaches the desired height.

3.1.10
industrial storage vessel
storage vessel used as building equipment or located in industrial installations

3.1.11
injection hole
hole cut in the inner or outer face of a cavity through which the foam system can be dispensed into the cavity

3.1.12
declared installed aged thermal resistance
time average value of the thermal resistance of the installed insulation over 25 years (see 5.2)

3.1.13
declared installed insulation thickness
the insulation thickness as installed by the installer (see 5.1)

3.2 Symbols and abbreviations

Symbols used in this standard:

d	is the declared installed insulation thickness	m
λ_D	is the declared aged thermal conductivity	W/(m·K)
R_D	is the declared installed aged thermal resistance	m^2K/W

Abbreviations used in this standard:

PUR is **R**igid **P**oly**U**rethane Foam

PU is Rigid **P**oly**U**rethane Foam including PUR and PIR types

PIR is **R**igid **P**oly**I**socyanurate Foam

4 Requirements

4.1 General

The installer shall use a PUR or PIR foam system that complies with EN 14319-1.

NOTE The range of properties exhibited by PUR products is very wide. The same is true for PIR products and these two ranges often overlap. Although not in every case, generally PIR products have a higher upper service temperature and can perform better in reaction to fire tests. In all cases, for both PIR and PUR products, their individual performance claimed by the manufacturer are described by the levels of properties obtained. Accordingly, therefore, all the declaration clauses will be completed using the term PU to include both PUR and PIR products (see 3.1.3).

4.2 Suitability of the building equipment or industrial installation for the installation of the product

The installer shall inspect the building equipment or industrial installation in accordance with manufacturer's technical information and any national rules, in order to determine whether it is suitable for application of the product (see Annex B).

5 In-situ measurements and calculations

5.1 Declared installed insulation thickness

The declared installed insulation thickness, d, shall be measured in accordance with procedure given in Annex A. However, the value shall not be less than the minimum thickness specified by the client or the manufacturer’s technical information.

5.2 Declared installed thermal resistance, R_D

The declared installed aged thermal resistance R_D for the installed insulation shall be declared according to the thermal conductivity versus temperature curve given by the manufacturer in accordance with the procedure given in EN 14319-1.

NOTE 1 The correction of the values of thermal conductivity due to the influence of moisture and temperature can be calculated using the procedures given in EN ISO 10456.

NOTE 2 For calculating the thermal resistance of complete building elements involving the use of these products, the procedures given in EN ISO 6946 can be used.

5.3 Foam quality checks carried out by the installer

The installer shall carry out those on site checks defined by the manufacturer, and check compliance with EN 14319-1 prior to commencing the application of the foam, generate test samples in accordance with either the procedures in Annex G of EN 14319-1:2013 and by any procedures required by the local rules of a Member State.

6 Guidelines for installation

National Practice, National Standards, National Regulations or Local Rules may exist, for example the dispensing conditions and the mixing ratio. In the absence of national regulations, national standards or any local rules, the manufacturer's technical information shall be followed together with the procedure given in Annex C.

7 Installer's declaration

The installer shall declare to the customer that the work has been carried out in accordance with the requirements of this Part 2 of this standard using a foam system that complies with EN 14319-1.

The installer shall also state at least the following information:

a) date of the installation;

b) declared installed insulation thickness;

c) declared installed aged thermal resistance according to 5.2;

d) for the installed product, the trade name, designation code of the foam system (complying with EN 14319-1, from which it has been generated);

e) the number of the EC certificate of conformity.

Annex A
(normative)

Method for the determination of the declared installed insulation thickness

The installer may assume that the thickness of the cavity is as specified by the specifier. Alternatively, the installer may assume that the average length of the spacing blocks which are used to define and maintain the separation of the inner and outer layers determining the space into which the insulation is to be installed, shall be the installed insulation thickness.

In cases of dispute, the average of a number of direct measurements (e.g. using calipers) of the shortest distance between the inner and outer layers creating the cavity shall be used to determine the installed insulation thickness.

Annex B
(normative)

Suitability of the building equipment or industrial installation to receive the insulation product

B.1 Building equipment or industrial installation

The installer shall ensure that the building equipment and industrial installations are suitable to receive the dispensed insulation. This assessment shall take into account all aspects of the proposed installation.

In particular, the surfaces which are to be bonded to the foam shall be clean, dry and free of extraneous materials. Vapour barriers shall be provided if necessary.

B.2 Site survey

The site survey includes the following:

— Description of the building equipment or industrial installation cavity to be insulated.

— Determination of the limits of the area to be insulated.

— Checking the existence of any dust, water or oils on the surfaces likely to interfere with the adhesion of the dispensed foam.

— Checking the general condition of the cavity and its consistency.

— Checking the existence of any expansion joints or ventilation holes.

— Checking that if the cavity has metal surfaces, that these have been suitably protected from atmospheric corrosion by a suitable coating.

Annex C
(normative)

Installation guidelines

C.1 General

The following installation procedure shall be followed for each separate installation or once a day, whichever is the more frequent.

C.2 Suitability of cavity

Enough spacers shall be used to ensure the declared installed insulation thickness can be accurately determined by adequately supporting the two faces. These surfaces may need to be supported externally to ensure that the installed thermal insulation thickness is accurately maintained during the dispensing of the foam system and its reaction and expansion to fill the annular space.

The installer shall ensure that the temperature of the surfaces creating the cavity is within the temperature limits declared by the manufacturer for his system.

C.3 Dispensing machine preparation

C.3.1 General

Set the dispensing machine to the output, the mixing ratio and the components delivery lines to the temperatures and pressures specified by the foam system supplier. This data shall be recorded.

C.3.2 Mixing ratio

Check that the mixing ratio is correct by measuring the output separately from the two component delivery lines.

For fixed output dispensing machines, monthly confirmation of the mixing ratio shall be carried out; and for variable output dispensing, daily confirmation shall be carried out.

The value of the mixing ratio shall not differ by more than 5 % in weight from the value indicated by the foam system supplier.

C.4 Dispensing procedure

The dispensing procedure shall consist of dispensing the foam system into the cavity, through injection holes if necessary, by means of the dispensing machine in accordance with the manufacturer's technical information, where the foam system then expands and hardens forming the foam.

The foam shall be applied in lifts such that the total height will be built up in discrete lifts with average heights according to the manufacturer’s technical information.

Bibliography

[1] EN ISO 6946, *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method (ISO 6946)*

[2] EN ISO 10456, *Building materials and products — Hygrothermal properties —Tabulated design values and procedures for determining declared and design thermal values (ISO 10456)*

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