Appendix H, *VDI scheme rules for products where no EN standard exist (Not related to KEYMARK)*

Contents

1 Basis for surveillance and certification

The following document deals only with insulation products for 'industrial applications'.

This guidance paper regulates the surveillance and certification of insulation materials with properties the manufacturer is going to declare beyond the European product standards for various, for instance application-technical reasons. Further, the surveillance of insulation materials without European product standard is regulated.

In all cases the VDI scheme rules apply analogously amended by this appendix in the cases a) and b).

a) Insulation materials covered by European standards which have to fulfil application specific requirements for the protection of the user

   Pre-condition is that these products fulfil the requirements of European standards. The fulfilment of special requirements is to be noted in the product datasheet as well as in the VDI certificate.

b) Insulation materials without European standards

   Basically, surveillance has to be performed according to the VDI scheme rules analogously. The testing details for factory production and third party control have to be elaborated together with manufacturers and users. The Annex of Appendix H will be amended and serve as certification basis.

c) Insulation systems (for instance insulated plastic pipe systems)

   Basically, surveillance has to be performed according to the VDI scheme rules analogously. The testing details for factory production and third party control have to be elaborated together with manufacturers and users.

The general conditions are laid down in the guideline VDI 2055 Part 2. In this paper the regulations for surveillance and certification are put together.

For testing and surveillance of materials and systems registered test bodies may be called. In this case the registered test body will act as surveillance body on the basis of agreed surveillance contracts.

A registered test body shall provide proof that it is capable of at least performing the determination of the following properties:

- maximum service temperature
- chloride ion content
- apparent density
- water vapour permeability
- thermal conductivity over a temperature range of at least 150 K

If the product complies with the declared properties published in the manufacturer’s product data sheet the certification body issues the certificate and grants the right to use the symbol “Überwacht nach VDI 2055”.

Factory production and third party control as well as the evaluation of conformity are regulated in the VDI scheme rules. All properties monitored according to Appendix H have to be marked as "Überwacht nach VDI 2055" in the product data sheet.

The right to use symbol "Überwacht nach VDI 2055" of the voluntary quality assurance system is granted by the certification body, once all information in the product data sheet has been confirmed by the supervision body and the properties and performances of the insulation material (declared values and/or design values for the recommended application) have been proven.

2 Surveillance of special properties and fulfilment of special requirements for products covered by a harmonized European standard

2.1 Precondition

Precondition for the surveillance of special properties and fulfilment of special requirements is a certificate according to KEYMARK or VDI for the surveillance of the required properties according to the European product standards and the scheme rules.

2.2 Performance

Product properties according to EN standards as well as special properties are listed in the Annexes. The owner of the certificate arranges with the certification body respectively with the registered testing body the special properties and requirements in the certification contract respectively in the surveillance contract.

In Table 1 those AGI working documents are listed which define special requirements for insulation materials covered by European standards.

Table 1: European Standards and AGI Working Documents for Insulation Materials for operational installations in the industry and in the technical building equipment

Abbreviation	Product	European Standard	AGI Working Document
EPB	Expanded perlite board	EN 15501	Q 141
CMS	Calcium-magnesium-silicate fibre	-	Q 140
CS	Calcium-silicate	EN 14306	Q 142
FEF	flexible elastomeric foam	EN 14304	Q 143-1
	microporous insulant		Q 144
MW	mineral wool	EN 14303	Q 132
PF	phenolic foam	EN 14314	-
PEF	polyethylene foam	EN 14313	Q 134-1
EPS	expanded polystyrene	EN 14309	Q 133-1
XPS	extruded polystyrene foam	EN 14307	Q 133-2

Abbreviation	Product	European Standard	AGI Working Document
PUR/PIR in situ	polyurethane / polyisocyanurate in-situ dispensed foam	EN 14319-1	Q 138
	polyurethane / polyisocyanurate in-situ sprayed foam	EN 14320-1	
PUR/PIR	polyurethane / polyisocyanurate foam	EN 14308	Q 133-3
CG	cellular glass	EN 14305	Q 137

2.3 Certification

In case of a positive evaluation result of the special properties and requirements listed in the test report the certificate will be amended by these ones.

3 Surveillance of insulation materials without European product standard

Surveillance will be done according to the VDI Scheme Rules. Special requirements have to be fixed with respect to the insulation material.

The following properties have to be tested at least for insulation products:

- Thermal conductivity in the range of the minimum and maximum service temperature
- Heat transfer resistance in the range of the minimum and maximum service temperature
- Reaction to fire
- minimum and maximum service temperature
- Dimensions
- Apparent density

4 Certification of insulation systems

Basis for the certification are the Guidelines VDI 2055 Part 3 and VDI 4610 Part 1.

Annex A

Properties for mineral wool products (MW) according the harmonized European product standard as well as additional properties and requirements for specific applications beyond the European Product standard in relation to the voluntary surveillance under INSULATION VDI/KEYMARK or only VDI.

	Product **Symbol** European product standard Intended Use				Factory made mineral wool products **MW** EN 14303 ThIBEII		
	Characteristics		Property	Symbol	FPC	INSULATION VDI/ KEYMARK	Only VDI
Section 4.2	Reaction to fire		Reaction to fire	Class	M	IT, +3P	
	Thermal resistance		Thermal conductivity (curve) *)	$\lambda_D(\vartheta/\vartheta_m)$	M	IT, +3P	
			Thickness (dimensions)	d_N	M	IT, +3P	
	Dimensions		Length, width	l, b	M	IT, +3P	
	Durability of thermal resistance against ageing/degradation		Dimensional stability (not necessary if Maximum Service Temperature declared)	DS(TH)	M	IT, +3P	
Section 4.3 (if relevant)	Acoustic absorption index		Sound absorption	AW	M	IT, +3P	
	Water permeability		Water absorption	WS	M	IT, +3P	
	Water vapour permeability		Water vapour diffusion resistance	s_d	M	IT, +3P	
	Compressive strength		Compressive stress or compressive strength for flat products	CS(10\Y)	M	IT, +3P	
	Rate of release of corrosive substances		Trace quantities of water-soluble ions and the pH-value	CL	M	IT, +3P	
				F NA SI	M M M	IT, +3P IT, +3P IT, +3P	
				pH	M	IT, +3P	
	Release of dangerous substances to the indoor environment		Release of dangerous substances	-	M	IT, +3P	
	Continuous glowing combustion		Continuous glowing combustion	-	M	IT, +3P	
	Durability of thermal resistance against high temperature		Maximum Service Temperature (4.2 property if no Dimensional stability declared)	ST(+)	M	IT, +3P	
If relevant	Additional properties for specific applications		Airflow resistivity	AF	M	-	IT, +3P
			Appearance	-	-	-	+3P
			Dynamic stiffness	SD	M	-	IT, +3P
			Apparent density ***)	ρ	M	-	+3P
	Special require-ments for specific applica-tions beyond the European Product standard	AGI working document Q132 **)	AGI Insulation designation code	-	-	-	confirmed
			Thermal conductivity AGI Q132	Limit Curves	-	-	confirmed
			AS quality	CL10	M	-	confirmed
		Pipe insulation for multi-purpose insulation products	Thermal conductivity of multi-purpose products on pipes *)	$\lambda_{design}(\vartheta_m)$	-	-	IT, +3P
			Compression resistant lamella mats ≥ 10 kPa	CS(10)10	M	-	confirmed
			Reaction to fire on pipes for multi-purpose products	Class	-	-	IT, +3P

Annex B

Properties for flexible elastomeric foam products (FEF) according the harmonized European product standard as well as additional properties and requirements for specific applications beyond the European Product standard in relation to the voluntary surveillance under INSULATION VDI/KEYMARK or only VDI.

	Product **Symbol** European product standard Intended Use				Factory made mineral wool products **FEF** EN 14304 ThIBEII		
	Characteristics	Property	Symbol	FPC	INSULATION VDI/ KEYMARK	Only VDI
Section 4.2	Reaction to fire	Reaction to fire	Class	M	IT, +3P	
	Thermal resistance	Thermal conductivity (curve) *)	$\lambda_D(\vartheta/\vartheta_m)$	M	IT, +3P	
		Thickness (dimensions)	d_N	M	IT, +3P	
	Dimensions	Length, width	l, b	M	IT, +3P	
	Durability of thermal resistance against ageing/degradation	Dimensional stability (not necessary if Maximum Service Temperature declared)	DS(TH)	M	IT, +3P	
Section 4.3 (if relevant)	Acoustic absorption index	Sound absorption	AW	M	IT, +3P	
	Water permeability	Water absorption	WS	M	IT, +3P	
	Water vapour permeability	Water vapour diffusion resistance	MUi	M	IT, +3P	
	Rate of release of corrosive substances	Trace quantities of water-soluble ions and the pH-value	CL	M	IT, +3P	
			F NA SI	M M M	IT, +3P IT, +3P IT, +3P	
			pH	M	IT, +3P	
	Durability of thermal resistance against high temperature	Maximum Service Temperature (4.2 property if no Dimensional stability declared)	ST(+)	M	IT, +3P	
		Minimum Service Temperature	ST(-)	M	IT, +3P	
If relevant	Additional properties for specific applications	Appearance	-	-	-	+3P
		Apparent density ***)	ρ	M	-	+3P
	Special requirements for specific applications beyond the European Product standard (AGI working document Q143 **)	AGI Insulation designation code	-	-	-	confirmed
		Thermal conductivity AGI Q143	Limit Curves	-	-	confirmed

Annex C

Properties for District heating pipes – Pre-insulated flexible pipe systems according the European product standard EN 15632-1 requirements for voluntary surveillance under VDI

Property	Symbol	FPC	VDI
Linear thermal conductance	Λ_l	-	IT, +3P
Dimensions of the pipe system	-	M	IT, +3P
Cell size of the insulation layers	-	M	IT, +3P
Apparent density of the insulation layers	ρ	M	IT, +3P
Appearance	-	M	IT, +3P
Calculation of heat loss under buried conditions with the results of linear thermal conductance	-	-	Confirmed

Annex D

Properties for cellular glass products (CG) according the harmonized European product standard as well as additional properties and requirements for specific applications beyond the European Product standard in relation to the voluntary surveillance under INSULATION VDI/KEYMARK or only VDI.

	Product **Symbol** European product standard Intended Use				Factory made mineral wool products **CG** EN 14305 ThIBEII	
	Characteristics	Property	Symbol	FPC	INSULATION VDI/ KEYMARK	Only VDI
Section 4.2	Reaction to fire	Reaction to fire	Class	M	IT, +3P	
	Thermal resistance	Thermal conductivity (curve) *)	$\lambda_D(\vartheta/\vartheta_m)$	M	IT, +3P	
		Thickness (dimensions)	d_N	M	IT, +3P	
	Dimensions	Length, width	l, b	M	IT, +3P	
	Durability of thermal resistance against ageing/degradation	Dimensional stability (not necessary if Maximum Service Temperature declared)	DS(TH)	M	IT, +3P	
Section 4.3 (if relevant)	Acoustic absorption index	Sound absorption	AW	M	IT, +3P	
	Compressive strength	Compressive stress or compressive strength for flat products	CS(10\Y)	M	IT, +3P	
		Point Load	PL(P)	M	IT, +3P	
	Tensile/Flexural strength	Bending strength	BS	M	IT, +3P	
		Tensile strength parallel to faces	TP	M	IT, +3P	
		Tensile strength perpendicular to faces	TR	M	IT, +3P	
	Water permeability	Short term water absorption	WS	M	IT, +3P	
		Long term water absorption	WL(P)	M	IT, +3P	
	Water vapour permeability	Water vapour diffusion resistance	MUi	M	IT, +3P	
	Rate of release of corrosive substances	Trace quantities of water-soluble ions and the pH-value	CL	M	IT, +3P	
			F NA SI	M M M	IT, +3P IT, +3P IT, +3P	
			pH	M	IT, +3P	
	Durability of thermal resistance against high temperature and aging	Maximum Service Temperature (4.2 property if no Dimensional stability declared)	ST(+)	M	IT, +3P	
		Minimum Service Temperature	ST(-)	M	IT, +3P	
If relevant	Additional properties for specific applications	Appearance	-	-	-	+3P
		Apparent density ***)	ρ	M	-	+3P
	Special require-ments for specific applica-tions beyond the European Product standard (AGI working document Q137 **)	AGI Insulation designation code	-	-	-	confirmed
		Thermal conductivity AGI Q137	Limit Curves	-	-	confirmed

Annex E

Properties for insulation products for the use in chimneys for voluntary surveillance under VDI

Characteristics	Property	Symbol	FPC	VDI
Reaction to fire	Reaction to fire	Class	M	IT, +3P
Thermal resistance	Thermal conductivity (curve) *)	$\lambda_D(\vartheta/\vartheta_m)$	M	IT, +3P
	Thickness (dimensions)	d_N	M	IT, +3P
Dimensions	Length, width	l, b	M	+3P
	Apparent density ***)	ρ	M	+3P
	Determination of soot fire resistance	-	M	IT, +3P

FPC Factory Production Control (direct and indirect testing)
IT Initial Testing (if property declared)
M manufacturer
ThIBEII Thermal insulation of building equipment and industrial installations
+3P Third Party Control (Routine inspections at least once per year and audit testing once per year) if property delcared
*) When thermal conductivity is declared as a table derived from the equation rounded upwards to the next 0,001 W/(m·K)
**) Thermal Insulation products as defined in the AGI working document Q must be Third Party controlled
***) The density as an additional property is only important in the sense of logistic matters (transport, storage, handling)

Requirements for all applications according European product standard section 4.2 (minimum declaration)

Requirements for specific applications according European product standard section 4.3 (if relevant)

Additional properties and requirements for specific applications beyond the European Product standard (if relevant) part of the technical data sheet