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European Technical Assessment

**ETA-14/0464
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General Part

Technical Assessment Body issuing the European Technical Assessment:

Technical and Test Institute for Construction Prague

Trade name of the construction product **FAST S**

Product family to which the construction product belongs Product area code: 4
External Thermal Insulation Composite Systems (ETICS) with renderings

Manufacturer **P.W.FAST sp. z o.o.**
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Poland

Manufacturing plant(s) **P.W.FAST sp. z o.o.**
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This European Technical Assessment contains 35 pages including 4 Annexes which form an integral part of this assessment.
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Specific Parts

1 Technical description of the product

1.1 Composition of the product (kit)

Table 1

Use and variant	Component	Coverage [kg/m ²]	Thickness [mm]
Adhesive 1	FAST Normal S Powder requiring addition of water 0.20 l/kg Use as adhesive and supplementary adhesive	3 – 6 (dry powder)	/
Adhesive 2	FAST Specjal / FAST Specjal M Powder requiring addition of water 0.20 l/kg Use as adhesive and supplementary adhesive	3 – 6 (dry powder)	/
Adhesive 3	FAST Specjal DS Ready-to-use paste Use as adhesive and supplementary adhesive	2.0 – 3.0 (paste)	/
Thermal insulation product 1	EPS BOARD Factory made expanded polystyrene (EPS TR100) See Annex No. 2	N/A	50 – 250
Anchors	Plastic anchors See Annex No. 3	N/A	N/A
Base coat 1	FAST Specjal / FAST Specjal M Powder requiring addition of water 0.20 l/kg	3 – 5 (dry powder)	3 – 5
Reinforcement 1	AKE 145 / R 117 A101 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 2	AKE 170 / R 131 A101 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 3	117S Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 4	SECCO E 145 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 5	SECCO E 160 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 6	REDNET EU 145 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 7	REDNET EU 160 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 8	Valmieras SSA-1363-160 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)

Reinforcement 9	OPTIMA-NET 150 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 10	OPTIMA-NET 165 Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 11	E118L Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 12	E123L Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 13	E132L Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 14	E137L Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Reinforcement 15	E132LY Glass fibre mesh, one or two layers Embedded in base coat See Annex No. 4	0.16 – 0.20 (per layer)	< 1.0 (per layer)
Key coat 1	FAST Grunt M Ready-to-use liquid Use with finishing coat 1 - 5, 7, 13 - 34	0.35 l/m ² (liquid)	< 0.2
Key coat 2	FAST Grunt S-T Ready-to-use Use with finishing coat 8 - 12	0.35 l/m ² (liquid)	< 0.2
Finishing coat 1	FAST Baranek Spotted structure, particle size 2.0 mm Powder – mineral binder, requiring addition of water 0.20 - 0.22 l/kg	2.2 (dry powder)	~ 2.0
Finishing coat 2	FAST Baranek Spotted structure, particle size 2.5 mm Powder – mineral binder, requiring addition of water 0.20 - 0.22 l/kg	2.8 (paste)	~ 2.5
Finishing coat 3	FAST Baranek Spotted structure, particle size 3.0 mm Powder – mineral binder, requiring addition of water 0.20 - 0.22 l/kg	3.5 (paste)	~ 3.0
Finishing coat 4	FAST Kornik Ribbed structure, particle size 2.0 mm Powder – mineral binder, requiring addition of water 0.20 - 0.22 l/kg	2.2 (dry powder)	~ 2.0
Finishing coat 5	FAST Kornik Ribbed structure, particle size 3.0 mm Powder – mineral binder, requiring addition of water 0.20 - 0.22 l/kg	3.5 (paste)	~ 3.0
Finishing coat 6	FAST WD (WET. DRY Dash) Surface treated by crushed stones Powder – mineral binder, requiring addition of water 0.18 l/kg	12.5 (dry powder)	~ 8 - 10
Finishing coat 7	FAST MS Smooth finish powder requiring addition of water 0.22 – 0,28 l/kg	3.0 – 4.5 (dry powder)	~ 2 - 3

Finishing coat 8	FAST Baranek S Spotted structure, particle size 1.0 mm Ready-to-use paste, binder based on silicate	1.7 (paste)	~ 1.0
Finishing coat 9	FAST Baranek S Spotted structure, particle size 1.5 mm Ready-to-use paste, binder based on silicate	2.6 (paste)	~ 1.5
Finishing coat 10	FAST Baranek S Spotted structure, particle size 2.0 mm Ready-to-use paste, binder based on silicate	3.5 (paste)	~ 2.0
Finishing coat 11	FAST Kornik S Ribbed structure, particle size 2.0 mm Ready-to-use paste, binder based on silicate	2.2 (paste)	~ 2.0
Finishing coat 12	FAST Kornik S Ribbed structure, particle size 3.0 mm Ready-to-use paste, binder based on silicate	3.5 (paste)	~ 3.0
Finishing coat 13	FAST Baranek A Spotted structure, particle size 1.0 mm Ready-to-use paste, binder based on acrylic	1.7 (paste)	~ 1.0
Finishing coat 14	FAST Baranek A Spotted structure, particle size 1.5 mm Ready-to-use paste, binder based on acrylic	2.6 (paste)	~ 1.5
Finishing coat 15	FAST Baranek A Spotted structure, particle size 2.0 mm Ready-to-use paste, binder based on acrylic	3.5 (paste)	~ 2.0
Finishing coat 16	FAST Akryl + Spotted structure, particle size 1.0 mm Ready-to-use paste, binder based on acrylic	2.8 (paste)	~ 1.0
Finishing coat 17	FAST Akryl + Spotted structure, particle size 1.5 mm Ready-to-use paste, binder based on acrylic	2.8 (paste)	~ 1.5
Finishing coat 18	FAST Akryl + Spotted structure, particle size 2.0 mm Ready-to-use paste, binder based on acrylic	3.5 (paste)	~ 2.0
Finishing coat 19	FAST Kornik A Ribbed structure, particle size 2.0 mm Ready-to-use paste, binder based on acrylic	2.2 (paste)	~ 2.0
Finishing coat 20	FAST Kornik A Ribbed structure, particle size 3.0 mm Ready-to-use paste, binder based on acrylic	3.5 (paste)	~ 3.0
Finishing coat 21	FAST Granit Mosaic structure, particle size 1.5 mm Ready-to-use paste, binder based on acrylic	1.7 - 3.5 (paste)	~ 1.5
Finishing coat 22	FAST Baranek SI Spotted structure, particle size 1.0 mm Ready-to-use paste, binder based on siloxane	1.7 (paste)	~ 1.0
Finishing coat 23	FAST Baranek SI Spotted structure, particle size 1.5 mm Ready-to-use paste, binder based on siloxane	2.6 (paste)	~ 1.5
Finishing coat 24	FAST Baranek SI Spotted structure, particle size 2.0 mm Ready-to-use paste, binder based on siloxane	3.5 (paste)	~ 2.0
Finishing coat 25	FAST Kornik SI Ribbed structure, particle size 2.0 mm Ready-to-use paste, binder based on siloxane	2.2 (paste)	~ 2.0
Finishing coat 26	FAST Kornik SI Ribbed structure, particle size 3.0 mm Ready-to-use paste, binder based on siloxane	3.5 (paste)	~ 3.0
Finishing coat 27	FAST Baranek SIL Spotted structure, particle size 1.0 mm Ready-to-use paste, binder based on silicone	1.7 (paste)	~ 1.0

Finishing coat 28	FAST Baranek SIL Spotted structure, particle size 1.5 mm Ready-to-use paste, binder based on silicone	2.6 (paste)	~ 1.5
Finishing coat 29	FAST Baranek SIL Spotted structure, particle size 2.0 mm Ready-to-use paste, binder based on silicone	3.5 (paste)	~ 2.0
Finishing coat 30	FAST SIL + Spotted structure, particle size 1.0 mm Ready-to-use paste, binder based on silicone	1.7 (paste)	~ 1.0
Finishing coat 31	FAST SIL + Spotted structure, particle size 1.5 mm Ready-to-use paste, binder based on silicone	2.6 (paste)	~ 1.5
Finishing coat 32	FAST SIL + Spotted structure, particle size 2.0 mm Ready-to-use paste, binder based on silicone	3.5 (paste)	~ 2.0
Finishing coat 33	FAST Kornik SIL Ribbed structure, particle size 2.0 mm Ready-to-use paste, binder based on silicone	2.2 (paste)	~ 2.0
Finishing coat 34	FAST Kornik SIL Ribbed structure, particle size 3.0 mm Ready-to-use paste, binder based on silicone	3.5 (paste)	~ 3.0
Key coat 3	FAST Grunt S Ready-to-use liquid Use under silicate protective coat 1	0.08 - 0.10 l/m ² (liquid)	< 0.2
Key coat 4	FAST Grunt SIL Ready-to-use liquid Use under silicone protective coat 2	0.05 - 0.17 l/m ² (liquid)	< 0.2
Key coat 5	FAST Grunt G Ready-to-use liquid (apply in one or two layers, it is possible to dilute second layer with water 1:1) Use acrylic and siloxane protective coat 3 and 4	0.05 - 0.25 l/m ² (liquid)	< 0.2
Protective coat 1	FAST F-S Ready-to-use liquid, binder based on silicate (ready to use liquid, two layers, dilute up to 5 % of volume with FAST Grunt S) Use with finishing coat 1 - 5 and 8 - 12	0.10 - 0.20 l/m ² per layer (liquid)	< 0.2
Protective coat 2	FAST Silikon Ready-to-use liquid, binder based on silicone (one or two layers, first layer to be diluted up to 10 % of volume with water) Use with finishing coat 1 - 5 and 27 - 34	0.12 l/m ² per layer (liquid)	< 0.2
Protective coat 3	FAST SI-SI Ready-to-use liquid, binder based on siloxane (one or two layers, first layer to be diluted up to 10 % of volume with water) Use with finishing coat 1 - 5 and 13 - 26	0.10 - 0.20 l/m ² per layer (liquid)	< 0.2
Protective coat 4	FAST F-AZ Ready-to-use liquid, binder based on acrylic (one or two layers, first layer to be diluted up to 10 % of volume with water) Use with finishing coat 1 - 5 and 13 - 26	0.10 - 0.20 l/m ² per layer (liquid)	< 0.2

Types of the ETICS can be distinguished, depending on the fixing method of thermal insulation:

Table 2

Component	Type of ETICS	
	Bonded ETICS with supplementary anchors	Mechanically fixed ETICS with anchors with supplementary adhesive
Adhesive	ADHESIVE 1 - 3 Min. 40 % area covered by adhesive	ADHESIVE 1 - 3 Min. 40 % area covered by adhesive
Thermal insulation product	Thermal insulation product 1	Thermal insulation product 1
Anchors	See Annex No. 3	See Annex No. 3

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

This product is an External Thermal Insulation Composite System (ETICS) with renderings (rendering system). The product is a kit, comprising from number of components.

The ETICS may include special fittings (e.g. base profiles, corner profiles ...) to treat details of ETICS (connections, apertures, corners, parapets, sills ...). Special fittings are not listed nor assessed in this ETA.

The ETICS is installed in accordance with Manufacturer's installation instructions.

The ETICS may be used on new or existing (retrofit) vertical building walls. The walls can be made of masonry (bricks, blocks, stones, etc.) or concrete (cast on site or as prefabricated panels). The surface can be rendered or unrendered.

The ETICS is designed for use on vertical walls but can also be used on horizontal or inclined surfaces which are not exposed to precipitation.

The ETICS is a non-load-bearing construction element and it does not contribute directly to the stability of the wall on which it is installed.

The ETICS provides additional thermal insulation and protection from effect of weathering.

The provisions made in this ETA are based on an assumed intended working life of at least 25 years, provided that the ETICS installed and maintained properly. The indications given as to the working life of the construction product cannot be interpreted as a guarantee, but are regarded as means for expressing the expected economically reasonable working life of the product.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advice his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

3 Performance of the product and references to the methods used for its assessment

Table 3

Essential characteristic	Assessment method (EAD clause)	Performance
Reaction to fire of ETICS	Cl. 2.2.1.1	See cl. 3.1.1
Reaction to fire of thermal insulation material	Cl. 2.2.1.2	No performance assessed (See Annex No. 2 for component characteristic)
Façade fire performance	Cl. 2.2.2	No performance assessed
Propensity to undergo continuous smouldering of ETICS	Cl. 2.2.3	No performance assessed
Content, emission and/or release of dangerous substances – leachable substances	Cl. 2.2.4	No performance assessed
Water absorption of the base coat and the rendering system	Cl. 2.2.5.1	See cl. 3.2.1
Water absorption of the insulation product	Cl. 2.2.5.2	No performance assessed (See Annex No. 2 for component characteristic)
Water-tightness of the ETICS: hygrothermal behaviour	Cl. 2.2.6	See cl. 3.2.2
Water-tightness: freeze thaw performance	Cl. 2.2.7	See cl. 3.2.3
Impact resistance	Cl. 2.2.8	See cl. 3.2.4
Water vapour permeability of the rendering system (equivalent air thickness s_d)	Cl. 2.2.9.1	See cl. 3.2.5
Water vapour permeability of thermal insulation product (water-vapour resistance factor)	Cl. 2.2.9.2	No performance assessed (See Annex No. 2 for component characteristic)
Bond strength between the base coat and the thermal insulation product (mortar or paste)	Cl. 2.2.11.1	See cl. 3.3.1
Bond strength between the adhesive and the substrate	Cl. 2.2.11.2	See cl. 3.3.2
Bond strength between the adhesive and the thermal insulation product	Cl. 2.2.11.3	See cl. 3.3.3
Fixing strength (transverse displacement)	Cl. 2.2.12	No performance assessed
Wind load resistance of ETICS – pull-through tests of fixings	Cl. 2.2.13.1	See cl. 3.3.4
Wind load resistance of ETICS – static foam block test	Cl. 2.2.13.2	No performance assessed
Wind load resistance of ETICS – dynamic wind uplift test	Cl. 2.2.13.3	No performance assessed
Tensile test perpendicular to the faces of the thermal insulation product – in dry conditions	Cl. 2.2.14.1	No performance assessed
Tensile test perpendicular to the faces of the thermal insulation product – in wet conditions	Cl. 2.2.14.2	No performance assessed
Shear strength and shear modulus of elasticity test of ETICS	Cl. 2.2.15	No performance assessed
Render strip tensile test	Cl. 2.2.17	See cl. 3.3.5
Bond strength after ageing of finishing coat tested in the rig	Cl. 2.2.20.1	See cl. 3.4.2
Bond strength after ageing of finishing coat not tested in the rig	Cl. 2.2.20.2	See cl. 3.4.3
Tensile strength of the glass fibre mesh	Cl. 2.2.21.1 Cl. 2.2.21.2	No performance assessed (See Annex No. 4 for component characteristic)
Airborne sound insulation of ETICS	Cl. 2.2.22.1	See cl. 3.4.1

Essential characteristic	Assessment method (EAD clause)	Performance
Dynamic stiffness of the thermal insulation product	Cl. 2.2.22.2	No performance assessed (See Annex No. 2 for component characteristic)
Air flow resistance of the thermal insulation product	Cl. 2.2.22.3	No performance assessed (See Annex No. 2 for component characteristic)
Thermal resistance and thermal transmittance of ETICS	Cl. 2.2.23	See cl. 3.4.4
Thermal resistance of the thermal insulation product	Cl. 2.2.23.1	No performance assessed (See Annex No. 2 for component characteristic)

Table 4 – Table 26 lay down assessments of essential characteristics of specific combinations of ETICS components. Any combination of components not meeting the criteria of Table 4 – Table 25 is assessed as “No performance assessed” in regard to the relevant essential characteristic.

3.1 Safety in case of fire (BWR 2)

3.1.1 Reaction to fire of ETICS

Table 4

Reaction to fire of ETICS: B – s1, d0	
Component	Reaction to fire valid for general use of ETICS:
Adhesive	Adhesive 1 – 3 max. heat of combustion 4,81 MJ/m ²
Thermal insulation product	Thermal insulation product 1 Max. apparent density (EN 1602): 15 kg/m ³
Anchors	In accordance with Table 1
Base coat	Base coat 1 in thickness of min. 5 mm max. heat of combustion 0,13 MJ/m ²
Reinforcement	Reinforcement 1 - 15 in max. two layers Provided reinforcement 1 has max. heat of combustion 1,31 MJ/m ²
Key coat	In accordance with Table 1
Finishing coat	
Decorative coat	

Table 5

Reaction to fire of ETICS: B – s1, d0	
Component	Reaction to fire valid only for ETICS in lower part of wall:
Adhesive	Adhesive 1 and 2 max. heat of combustion 0,14 MJ/m ²
Thermal insulation product	Thermal insulation product 1 Max. apparent density (EN 1602): 15 kg/m ³
Anchors	In accordance with Table 1
Base coat	Base coat 1 in thickness of min. 5 mm max. heat of combustion 0,13 MJ/m ²
Reinforcement	Reinforcement 1 - 15 in max. two layers max. heat of combustion 1,31 MJ/m ²
Key coat	In accordance with Table 1
Finishing coat	Finishing coat 21 FAST Granit max. heat of combustion 2,90 MJ/m ²
Decorative coat	In accordance with Table 1

3.2 Hygiene, health and the environment (BWR 3)

3.2.1 Water absorption of the base coat and the rendering system

Table 6

Water absorption of the reinforced base coat		
ETICS configuration requirements:	After 1 h [kg/m ²]	After 24 h [kg/m ²]
FAST Specjal / FAST Specjal M	0.13	0.49

Table 7

Water absorption of the complete rendering				
ETICS configuration requirements:			After 1 h [kg/m ²]	After 24 h [kg/m ²]
Base coat	Finishing coat	Key coat Decorative coat		
FAST Specjal / FAST Specjal M	FAST Baranek	key coat of Table 1 protection coat FAST SI-SI	0.04	0.65
	FAST Baranek	key coat and protection coat of Table 1	0.03	0.46
	FAST Kornik		0.02	0.47
	FAST WD (WET, DRY Dash)		0.10	0.47
	FAST MS		0.05	0.29
	FAST Baranek S FAST Kornik S		0.05	0.39
	FAST Baranek A FAST Akryl + FAST Kornik A		0.06	0.74
	FAST Granit		0.10	0.87
	FAST Baranek SI FAST Kornik SI		0.03	0.76
	FAST Baranek SIL FAST SIL + FAST Kornik SIL		0.05	0.84

3.2.2 Water-tightness of the ETICS: hygrothermal behaviour

Table 8

Water-tightness of the ETICS: hygrothermal behaviour
Hygrothermal cycles have been performed on products tested in the hygrothermal rig. The ETICS passed the test and is assessed as resistant to hygrothermal cycles .

3.2.3 Water-tightness: freeze thaw performance

Table 9

Water-tightness: freeze thaw performance
<p><u>Applies to Finishing coats 1 – 18, 22 – 24 and 30 - 34:</u> The ETICS is freeze-thaw resistant, because the water absorption of both, reinforced base coat and the rendering system, are less than 0.5 kg/m² after 24 hours.</p> <p><u>Applies to Finishing coat 1 with protection coat FAST SI-SI, Finishing coat 19 – 21, 25 -26 and 27 - 29:</u> The ETICS is freeze-thaw resistant, because none of the following defects occurred during the testing on both, reinforced base coat and the rendering system:</p> <ul style="list-style-type: none">- Blistering or peeling of the finishing coat,- Failure or cracking associated with joints between thermal insulation product boards or profiles fitted with the ETICS,- Detachment of the finishing coat,- Width of cracks bigger than 0.2 mm allowing water penetration to the thermal insulating layer.

3.2.4 Impact resistance

Table 10

Impact resistance (products tested after hygrothermal cycles on the rig)					
ETICS configuration requirements:			Cracks	Max. impact diameter [mm]	Impact resistance category
Base coat	Finishing coat	Reinforcement, key coat, decorative coat			
FAST Specjal / FAST Specjal M	FAST Baranek FAST Kornik	Single standard mesh In accordance with Table 1	Yes – 3 J Yes – 10 J	50 – 3 J 54 – 10 J	III
	FAST WD (WET, DRY Dash)		No – 3 J No – 10 J	No – 3 J No – 10 J	I
	FAST MS		Yes – 3 J Yes – 10 J	21 – 3 J 67 – 10 J	III
	FAST Baranek S FAST Kornik S		Yes – 3 J Yes – 10 J	47 – 3 J 67 – 10 J	III
	FAST Granit		Yes – 3 J Yes – 10 J	28 – 3 J 58 – 10 J	III
	FAST Baranek SI FAST Kornik SI		Yes – 3 J Yes – 10 J	20 – 3 J 56 – 10 J	III
	FAST Baranek SIL FAST SIL + FAST Kornik SIL		Yes – 3 J Yes – 10 J	50 – 3 J 54 – 10 J	III

Table 11

Impact resistance (products tested after immersion in water)					
ETICS configuration requirements:			Cracks	Max. impact diameter [mm]	Impact resistance category
Base coat	Finishing coat	Reinforcement, key coat, decorative coat			
FAST Specjal / FAST Specjal M	FAST Baranek A FAST Akryl + FAST Kornik A	Single standard mesh In accordance with Table 1	No – 3 J No – 10 J	No – 3 J No – 10 J	I

Table 12

Impact resistance (products tested after immersion in water)					
ETICS configuration requirements:			Cracks	Max. impact diameter [mm]	Impact resistance category
Base coat	Finishing coat	Reinforcement, key coat, decorative coat			
FAST Specjal / FAST Specjal M	FAST Baranek FAST Kornik for particle size 1.0 mm and 1.5 mm	Double standard mesh In accordance with Table 1	Yes – 3 J Yes – 10 J	28 – 3 J 50 – 10 J	III
	FAST Baranek FAST Kornik for particle size ≥ 2.0 mm		No – 3 J No – 10 J	No - 3 J 26 - 10 J	I
	FAST WD (WET, DRY Dash)		No performance assessed		
	FAST MS		No – 3 J No – 10 J	No - 3 J 39 - 10 J	I
	FAST Baranek S FAST Kornik S		No – 3 J No – 10 J	No - 3 J 21 - 10 J	I
	FAST Baranek A FAST Akryl + FAST Kornik A for particle size 1.0 mm and 1.5 mm		Yes – 3 J Yes – 10 J	30 – 3 J 68 – 10 J	III
	FAST Baranek A FAST Akryl + FAST Kornik A for particle size ≥ 2.0 mm		No – 3 J No – 10 J	No - 3 J No - 10 J	I
	FAST Granit		No – 3 J No – 10 J	No - 3 J 40 - 10 J	I
	FAST Baranek SI FAST Kornik SI		No – 3 J No – 10 J	No - 3 J 41 - 10 J	I
	FAST Baranek SIL FAST SIL + FAST Kornik SIL for particle size 1.0 mm and 1.5 mm		Yes – 3 J Yes – 10 J	36 – 3 J 46 – 10 J	III
	FAST Baranek SIL FAST SIL + FAST Kornik SIL for particle size ≥ 2.0 mm		No – 3 J No – 10 J	No - 3 J No - 10 J	I

3.2.5 Water vapour permeability of the rendering system (equivalent air thickness s_d)

Table 13

Water vapour permeability of the rendering system (equivalent air thickness s_d)			
ETICS configuration requirements:			Equivalent air thickness s_d [m]
Base coat	Finishing coat	Reinforcement and key coat and decorative coat	
FAST Specjal / FAST Specjal M thickness 3 mm	FAST Baranek FAST Kornik	Single standard mesh and In accordance with Table 1	0.2
	FAST WD (WET, DRY Dash)		0.4
	FAST MS		0.5
	FAST Baranek S FAST Kornik S		0.3
	FAST Baranek A FAST Akryl + FAST Kornik A		0.4
	FAST Granit		0.3
	FAST Baranek SI FAST Kornik SI		0.3
	FAST Baranek SIL FAST SIL + FAST Kornik SIL		0.3

Table 14

Water vapour permeability of the rendering system (equivalent air thickness s_d)			
ETICS configuration requirements:			Equivalent air thickness s_d [m]
Base coat	Finishing coat	Reinforcement and key coat and decorative coat	
FAST Specjal / FAST Specjal M thickness 5 mm	FAST Baranek FAST Kornik	Double standard mesh and In accordance with Table 1	0.3
	FAST WD (WET, DRY Dash)		No performance assessed
	FAST MS		0.5
	FAST Baranek S FAST Kornik S		0.4
	FAST Baranek A FAST Akryl + FAST Kornik A		0.6
	FAST Granit		0.5
	FAST Baranek SI FAST Kornik SI		0.4
	FAST Baranek SIL FAST SIL + FAST Kornik SIL		0.4

3.3 Safety and accessibility in use (BWR 4)

3.3.1 Bond strength between the base coat and the thermal insulation product (mortar or paste)

Table 15

Bond strength between the base coat and the thermal insulation product (mortar or paste)					
ETICS configuration requirements:		Conditioning before the test	Rupture type	Bond strength [kPa]	
Insulation product	Base coat			Min.	Mean
EPS BOARD Factory made expanded polystyrene (TR100)	FAST Specjal / FAST Specjal M	Initial state (dry condition)	In the insulation product	83	98
		After hygrothermal cycles		96	100

3.3.2 Bond strength between the adhesive and the substrate

Table 16

Bond strength between the adhesive and the substrate					
ETICS configuration requirements:		Conditioning before the test	Rupture type	Bond strength [kPa]	
Substrate	Adhesive (and tested thickness)			Min.	Mean
Concrete	FAST Normal S	Initial state (dry condition)	In the adhesive	540	630
		2 days immersion and 2 hours drying		540	610
		2 days immersion and min. 7 days drying		1180	1330
	FAST Specjal / FAST Specjal M	Initial state (dry condition)	In the adhesive	230	300
		2 days immersion and 2 hours drying		260	350
		2 days immersion and min. 7 days drying		1200	1280
	FAST Specjal DS	Initial state (dry condition)	In the adhesive	636	662
		2 days immersion and 2 hours drying		550	564
		2 days immersion and min. 7 days drying		1220	1242


3.3.3 Bond strength between the adhesive and the thermal insulation product

Table 17

Bond strength between the adhesive and the thermal insulation product					
ETICS configuration requirements:		Conditioning before the test	Rupture type	Bond strength [kPa]	
Insulation product	Adhesive (and tested thickness)			Min.	Mean
EPS BOARD Factory made expanded polystyrene (TR100)	FAST Normal S	Initial state (dry condition)	In the insulation product	124	135
		2 days immersion and 2 hours drying		109	121
		2 days immersion and min. 7 days drying		119	131
	FAST Specjal / FAST Specjal M	Initial state (dry condition)	In the insulation product	122	135
		2 days immersion and 2 hours drying		108	120
		2 days immersion and min. 7 days drying		115	128
	FAST Specjal DS	Initial state (dry condition)	In the insulation product	107	110
		2 days immersion and 2 hours drying		102	101
		2 days immersion and min. 7 days drying		104	107

3.3.4 Wind load resistance of ETICS – pull-through tests of fixings

Table 18

Wind load resistance of ETICS					
Assessed by means of: pull-through tests of fixings					
ETICS configuration requirements:		Tested position	Test conditions	Failure load per fixing [kN]	
Insulation product	Fixing			Individual	Mean
EPS BOARD Factory made expanded polystyrene (TR100) Thickness: ≥ 50 mm or ≥ 70 mm for countersunk assembly Tensile strength in dry condition: ≥ 109 kPa	Surface assembly or countersunk assembly with Anchors in accordance with Annex No. 3 Plate diameter: ≥ 60 mm Plate stiffness: ≥ 0.3 kN/mm	R_{panel} 	Dry condition 23 °C and 50 % relative humidity of air	0.500 0.449 0.463 0.471 0.453	0.47

Load / displacement graph:

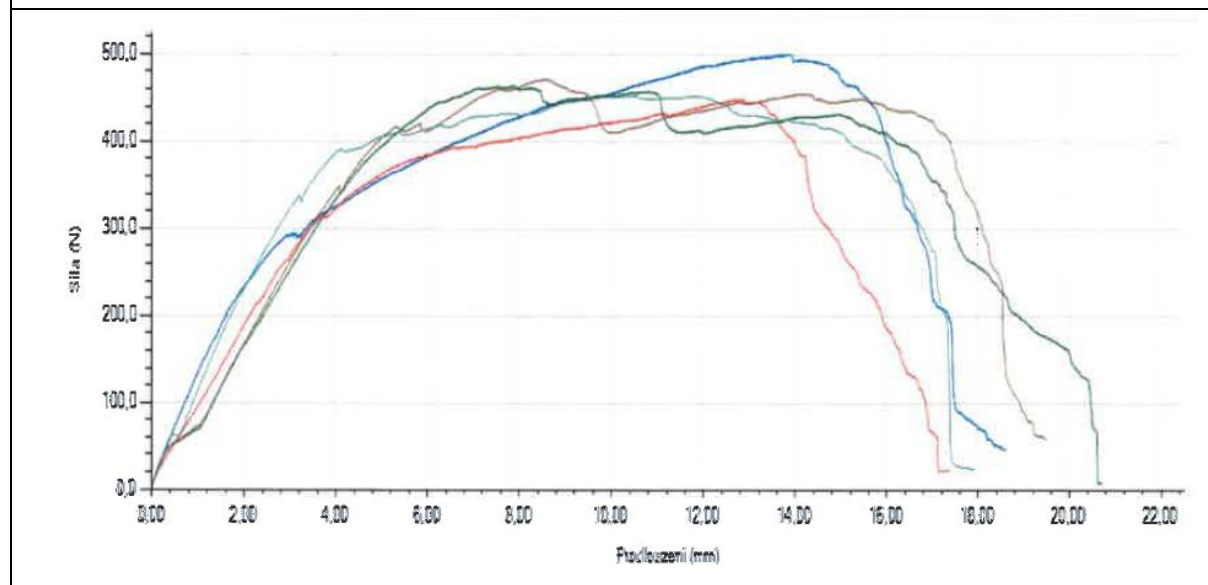
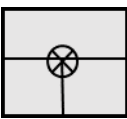
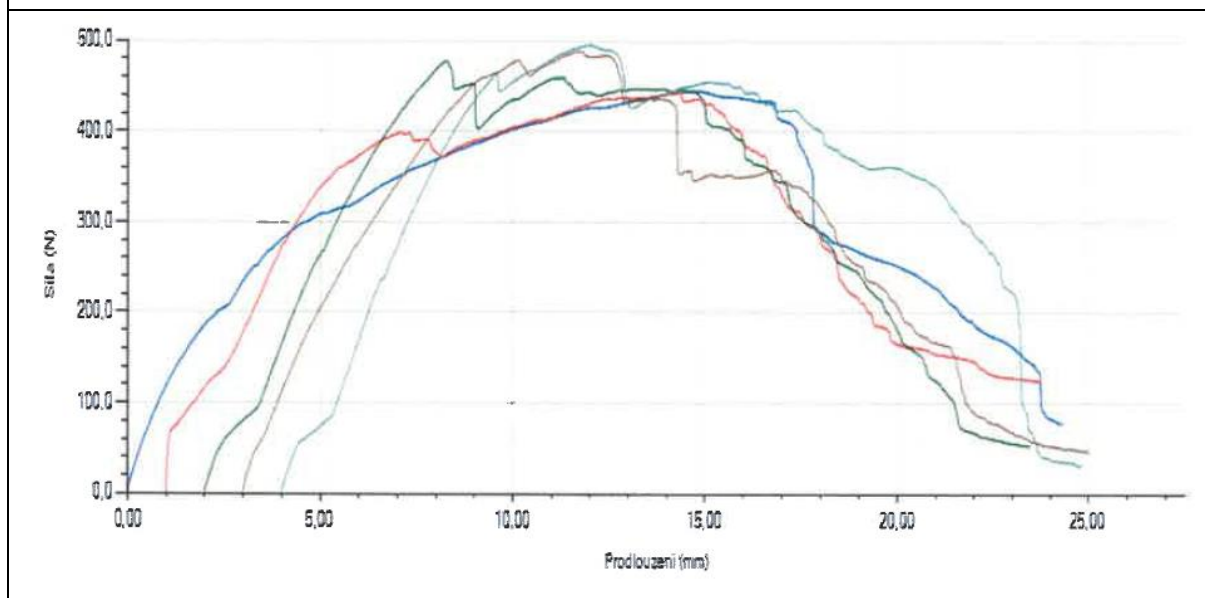


Table 19

Wind load resistance of ETICS					
Assessed by means of: pull-through tests of fixings					
ETICS configuration requirements:		Tested position	Test conditions	Failure load per fixing [kN]	
Insulation product	Fixing			Individual	Mean
<p>EPS BOARD Factory made expanded polystyrene (TR100) Thickness: ≥ 50 mm or ≥ 70 mm for countersunk assembly Tensile strength in dry condition: ≥ 109 kPa</p>	<p>Surface assembly or countersunk assembly with Anchors in accordance with Annex No. 3 Plate diameter: ≥ 60 mm Plate stiffness: ≥ 0.3 kN/mm</p>	<p>R_{joint}</p> 	<p>Dry condition 23 °C and 50 % relative humidity of air</p>	<p>0.446 0.444 0.478 0.490 0.496</p>	<p>0.471</p>

Load / displacement graph:



3.3.5 Render strip tensile test

Table 20

Render strip tensile test					
ETICS configuration requirements:		W _{rk} of the flat side of the test specimen [mm]		W _{rk} of the patterned side of the test specimen [mm]	
Base coat	Reinforcement	Warp direction	Weft direction	Warp direction	Weft direction
FAST Specjal / FAST Specjal M	AKE 145 / R 117 A101	0.05	0.05	No performance assessed	
	AKE 170 / R 131 A101	0.05	0.05		
	117S	0.05	0.05		
	SECCO E 145	0.05	0.11		
	SECCO E 160	0.05	0.05		
	REDNET EU 145	0.05	0.11		
	REDNET EU 160	0.05	0.05		
	Valmieras SSA-1363-160	0.05	0.05		
	OPTIMA-NET 150	No performance assessed			
	OPTIMA-NET 165				
	E118L				
	E123L				
	E132L				
	E137L				
E132LY					

3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation of ETICS

Table 21

Airborne sound insulation of ETICS			
ETICS configuration requirements:	$\Delta R_{w,direct}$ [dB]	$\Delta(R_w + C)_{direct}$ [dB]	$\Delta(R_w + C_{tr})_{direct}$ [dB]
Substrate wall: 305 kg/m ² Adhesive: in accordance with Table 1 Bonded area: fully bonded Insulation product 1: in accordance with Table 1 Insulation thickness: min. 50 mm Insulation density: 20 kg/m ² Anchors: max. 6 pcs/m ² Anchor nail material: all Mass of rendering system: min. 9.7 kg/m ²	- 4	- 4	- 3

3.4.2 Bond strength after ageing of finishing coat tested in the rig

Table 22

Bond strength after ageing of finishing coat tested in the rig								
ETICS configuration requirements:				Rupture type	Bond strength [kPa]			
Insulation product	Base coat	Finishing coat	Key coat Decorative coat		Individual	Mean		
EPS BOARD Factory made expanded polystyrene (TR100)	FAST Specjal / FAST Specjal M	FAST Baranek A / FAST Akryl +	In accordance with Table 1	In the insulation product	85	96		
					110			
					88			
					97			
					FAST Baranek SI	In the insulation product	104	104
				110				
				101				
				100				
					FAST Baranek SIL / FAST SIL +	In the insulation product	104	100
				90				
				96				
				103				
					FAST Kornik	In the insulation product	99	109
				126				
				105				
				103				
		FAST MS	In the insulation product	107	114			
	120							
	108							
	135							
		FAST Baranek S	In the insulation product	101	112			
	115							
	104							
	106							
				126				
				108				

Table 23

Bond strength after ageing of finishing coat tested in the rig						
ETICS configuration requirements:				Rupture type	Bond strength [kPa]	
Insulation product	Base coat	Finishing coat	Key coat Decorative coat		Individual	Mean
EPS BOARD Factory made expanded polystyrene (TR100)	FAST Specjal / FAST Specjal M	FAST WD (WET, DRY Dash)	In accordance with Table 1	In the insulation product	84	82
					81	
					80	
					82	
					83	

3.4.3 Bond strength after ageing of finishing coat not tested in the rig

Table 24

Bond strength after ageing of finishing coat NOT tested in the rig							
ETICS configuration requirements:				Rupture type	Bond strength [kPa]		
Insulation product	Base coat	Finishing coat	Key coat Decorative coat		Individual	Mean	
EPS BOARD Factory made expanded polystyrene (TR100)	FAST Specjal / FAST Specjal M	FAST Granit	In accordance with Table 1	In the insulation product	86	81	
					73		
					81		
					79		
					87		
		FAST Kornik A		In the insulation product	77	80	
					84		
					75		
					83		
		FAST Kornik SI		In the insulation product	82	80	
					81		
					75		
					88		
		FAST Baranek SIL / FAST SIL +		In the insulation product	70	81	
					77		
					75		
					79		
		FAST Baranek		With protective coat FAST F-S	In the insulation product	83	80
						88	
						81	
79							
With protective coat FAST Silikon	In the insulation product		75	81			
			72				
			85				
			82				
						79	
						81	
						86	
						77	
						75	
						81	
						82	
						79	
						81	

Table 25

Bond strength after ageing of finishing coat NOT tested in the rig						
ETICS configuration requirements:				Rupture type	Bond strength [kPa]	
Insulation product	Base coat	Finishing coat	Key coat Decorative coat		Individual	Mean
EPS BOARD Factory made expanded polystyrene (TR100)	FAST Specjal / FAST Specjal M	FAST Baranek	With protective coat FAST SI-SI	In the insulation product	86	81
					73	
					81	
					79	
					87	
			With protective coat FAST F-AZ	In the insulation product	77	80
					84	
					75	
					83	
					82	

3.4.4 Thermal resistance and thermal transmittance of ETICS

Table 26

Thermal resistance and thermal transmittance of ETICS (R_{ETICS})	
Thermal resistance	$[(m^2 \cdot K)/W]$
R_{render}	0.02
R_{ETICS}	≥ 1.00

See Annex No. 1 for information on calculation of thermal transmittance of ETICS
In order to meet criteria of EAD 040083-00-0404, the R_{ETICS} calculated in line with Annex No. 1 has to be min. 1.0 ($m^2 \cdot K)/W$.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

The applicable AVCP system is 2+ for any use except for uses subject to regulations on reaction to fire. For uses subject to regulations on reaction to fire the applicable AVCP systems regarding reaction to fire are 1 or 2+ depending on the conditions defined hereafter.

According to the Decision 97/556/EC as amended by Decision 2001/596/EC of the European Commission the systems of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Table 27

Product	Intended uses	Class(es) (reaction to fire)	Systems of assessment and verification of constancy of performance
External thermal insulation composite system/kits with rendering (ETICS)	in external wall subject to fire regulations	A ⁽¹⁾ – B ⁽¹⁾ – C ⁽¹⁾	1
		A ⁽²⁾ – B ⁽²⁾ – C ⁽²⁾ A (without testing) D – E – F	2+
	in external wall not subject to fire regulations	any	2+
⁽¹⁾ Materials for which the reaction to fire performance is susceptible to change during the production process ⁽²⁾ Materials for which the reaction to fire performance is not susceptible to change during the production process			

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD: 040083-00-0404

The manufacturer and the Technical and Test Institute for Construction Prague have agreed on a Control Plan which is deposited at the Technical and Test Institute for Construction Prague and it accompanies the ETA. The Control Plan specifies the type and frequency of checks/tests conducted on raw materials, manufactured and subcontracted components.

The manufacturer has defined special techniques of installation that shall always be followed.

Installation shall be done by qualified personnel trained in the special installation techniques defined by the manufacturer.

Notified body has to carry out the initial inspection of the manufacturing plant and of factory production control. Notified body also carries out continuous surveillance, assessment and evaluation of factory production control at least once per year.

Issued in Prague 29/07/2023

by

Ing. Jiří Studnička, Ph.D.

Head of the Technical Assessment Body (TAB)

Annexes:

- Annex No. 1 Thermal transmittance of ETICS
- Annex No. 2 Thermal insulation product 3 – expanded polystyrene (EPS)
- Annex No. 3 Mechanical fixing device – anchors
- Annex No. 4 Reinforcement – glass fibre mesh

Annex No. 1 Thermal transmittance of ETICS

$$U_c = U + \Delta U [W/m^2 \cdot K]$$

U_c is corrected thermal transmittance of the entire wall, including thermal bridges.

U is thermal transmittance of the entire wall, including ETICS, without thermal bridges.

ΔU is correction term of the thermal transmittance for mechanical fixing devices.

$$U = \frac{1}{R_{ETICS} + R_{substrate} + R_{se} + R_{si}} [W/m^2 \cdot K]$$

$$R_{ETICS} = R_{insulation} + R_{render} [m^2 \cdot K/W]$$

Where: $R_{insulation}$ = insulation thickness / thermal conductivity coefficient [$m^2 \cdot K/W$]

$R_{render} = 0.02 [m^2 \cdot K/W]$

$R_{substrate}$ thermal resistance of the substrate wall [$m^2 \cdot K/W$].

R_{se} external surface thermal resistance [$m^2 \cdot K/W$].

R_{si} internal surface thermal resistance [$m^2 \cdot K/W$].

$$\Delta U = \chi_p \times n + \sum \Psi_i \times l_i [m^2 \cdot K/W]$$

Where: χ_p is point thermal transmittance value of the anchor [W/K]. Specified by the ETA for anchors or as follows:

0.002 [W/K] For anchors with a plastic screw/nail, stainless steel screw/nail with the head covered by at least 15 mm plastic material, or with a minimum 15 mm air gap at the head of the screw/nail.

0.004 [W/K] For anchors with a galvanized carbon steel screw/nail with the head covered by at least 15 mm plastic material or a minimum 15 mm air gap at the head of the screw /nail.

0.008 [W/K] For all other anchors (the worst case).

n is number of anchors per m^2 . In case n is more than 16, the U_c calculation does not apply.

Ψ_i is linear thermal transmittance value of the profile [W/m·K].

l_i is length of the profile per m^2 .

The influence of thermal bridges can also be calculated as described in EN ISO 10211. If there are more than 16 pcs of anchors per m^2 the declared χ_p shall not be used. The EN ISO 10211 calculation shall be used in such case.

Annex No. 2 Thermal insulation product 3 – expanded polystyrene (EPS)

Factory made expanded polystyrene (EPS)	
Generic type	
Requirements:	
Harmonized technical specification:	EN 13163
Content of graphite:	Allowed
Composite insulation product:	No
Multi-layered insulation product	No
Facing:	No
Coating:	No
Max. thermal conductivity coefficient λ_D :	max. 0.065 W/(m·K)
Short-term water absorption:	max. 1.0 kg/m ²
Length:	L(2)
Width:	W(2)
Thickness:	T(1)
Squareness in the direction of length and width:	S(5)
Flatness:	P(5)
Dimensional stability:	DS(70,-)2 DS(N)2
Reaction to fire of thermal insulation material:	E
Water vapour permeability of thermal insulation product (water-vapour resistance factor) μ :	20 – 70 [-]
Tensile test perpendicular to the faces of the thermal insulation product – in dry conditions:	min. 100 kPa
Shear strength:	min. 20 kPa
Shear modulus:	min. 1000 kPa

Annex No. 3 Mechanical fixing device – anchors

Plastic anchors for fixing external thermal insulation composite systems with rendering	
Generic type	
Requirements:	
Harmonized technical specification:	ETAG 014 or EAD 330196-00-0604 or EAD 330196-01-0604 or superseding harmonized technical specification
Setting:	to be screwed-in or nailed-in and: 1) to be installed flush with the insulation product with or without additional, flat, plate 2) to be installed countersunk (incision depth max. 20 mm) to the surface of the insulation product, without additional plate does not apply to multi-layered insulation products
Diameter of the anchor plate:	min. 60 mm
Load resistance of the anchor plate:	min. 0.471 kN
Plate stiffness:	min. 0.3 kN/mm
Material of the nail	plastics or metal

Annex No. 4 Reinforcement – glass fibre mesh

Specific type: AKE 145 / R 117 A101	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.145 to 0.159 kg/m ²
Heat of combustion:	6.64 MJ/kg
Mesh size:	in warp direction: 3.5 to 4.5 mm in weft direction: 4.0 to 5.0 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: AKE 170 / R 131 A101	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.160 to 0.176 kg/m ²
Heat of combustion:	6.54 MJ/kg
Mesh size:	in warp direction: 3.0 to 4.0 mm in weft direction: 3.3 to 4.3 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: 117S	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.148 to 0.155 kg/m ²
Heat of combustion:	7.32 MJ/kg
Mesh size:	in warp direction: 3.0 to 4.0 mm in weft direction: 4.4 to 5.4 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 2 % in weft direction: min. 2 %

Specific type: SECCO E 145	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.131 to 0.159 kg/m ²
Heat of combustion:	Max. 4.16 MJ/kg
Mesh size:	in warp direction: 5.5 to 4.0 mm in weft direction: 4.6 to 3.6 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 40 % in weft direction: min. 40 %

Specific type: SECCO E 160	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.140 to 0.171 kg/m ²
Heat of combustion:	Max. 6.12 MJ/kg
Mesh size:	in warp direction: 5.0 to 4.0 mm in weft direction: 4.0 to 3.7 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: REDNET EU 145	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.131 to 0.159 kg/m ²
Heat of combustion:	Max. 4.16 MJ/kg
Mesh size:	in warp direction: 5.5 to 4.0 mm in weft direction: 4.6 to 3.6 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 40 % in weft direction: min. 40 %

Specific type: REDNET EU 160	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.140 to 0.171 kg/m ²
Heat of combustion:	Max. 6.12 MJ/kg
Mesh size:	in warp direction: 5.0 to 4.0 mm in weft direction: 4.0 to 3.7 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: Valmieras SSA-1363-160	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.143 to 0.157 kg/m ²
Heat of combustion:	Max. 6.77 MJ/kg
Mesh size:	in warp direction: 3.42 to 3.78 mm in weft direction: 4.09 to 4.51 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: OPTIMA-NET 150	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.145 to 0.157 kg/m ²
Heat of combustion:	Max. 6.57 MJ/kg
Mesh size:	in warp direction: 3.5 to 4.5 mm in weft direction: 4.0 to 5.0 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: OPTIMA-NET 165	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.157 to 0.173 kg/m ²
Heat of combustion:	Max. 4.76 MJ/kg
Mesh size:	in warp direction: 3.1 to 4.1 mm in weft direction: 3.5 to 4.5 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: E118L	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.141 to 0.149 kg/m ²
Heat of combustion:	Max. 6.53 MJ/kg
Mesh size:	in warp direction: 5.6 to 6.1 mm in weft direction: 4.2 to 4.6 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: E123L	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.146 to 0.154 kg/m ²
Heat of combustion:	Max. 8.38 MJ/kg
Mesh size:	in warp direction: 4.8 to 5.3 mm in weft direction: 4.75 to 5.2 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: E132L	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.158 to 0.167 kg/m ²
Heat of combustion:	Max. 6.61 MJ/kg
Mesh size:	in warp direction: 4.8 to 5.3 mm in weft direction: 4.0 to 4.4 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: E137L	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.168 to 0.173 kg/m ²
Heat of combustion:	Max. 7.76 MJ/kg
Mesh size:	in warp direction: 4.7 to 5.2 mm in weft direction: 4.0 to 4.4 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %

Specific type: E132LY	
Requirements:	
Harmonized technical specification:	040016-00-0404 or 040016-01-0404 or superseding harmonized technical specification
Mass per unit area	0.152 to 0.168 kg/m ²
Heat of combustion:	Max. 7.35 MJ/kg
Mesh size:	in warp direction: 3.9 to 4.3 mm in weft direction: 4.9 to 5.4 mm
Residual tensile strength retained after alkaline conditioning:	in warp direction: min. 20 N/mm in weft direction: min. 20 N/mm
Residual tensile strength after alkaline ageing	in warp direction: min. 50 % in weft direction: min. 50 %