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European Technical Assessment

ETA 16/0251 of 13/05/16

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: Warrington Certification	
Trade name of the construction product	**HENSOTHERM® 421 KS**
Product family to which the construction product belongs	35. Fire Protective Products Reactive Coating for the Fire Protection of Steel Elements
Manufacturer	**Rudolf Hensel GmbH Lauenburger Landstr 11, D-21039 Bornsen, Germany**
Manufacturing plant(s)	**Rudolf Hensel GmbH Lauenburger Landstr 11, D-21039 Bornsen, Germany**
This European Technical Assessment contains	46 pages including 1 Annex which form an integral part of this assessment.
	Annex B and Annex C contain confidential information and are not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	ETAG 018-1 edition April 2013 and ETAG 018-2 edition November 2011 used as European Assessment Document (EAD)
This version replaces:	The previous ETA with the same number issued on 13th May 2016

General Comments

1. This European Technical Assessment is issued by Warrington Certification on the basis ETAG 018 Fire Protective Products Part 1: General and Part 2: Reactive Coatings For Fire Protection of Steel Elements, Used as European Assessment Document.

2. This European Technical Assessment is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1.

3. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

4. Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical Description of the Product

HENSOTHERM® 421 KS is a spray or brush/roller applied intumescent paint formulated for the fire protection of structural steel elements.

In accordance with ETAG 018-2 (foreword), HENSOTHERM® 421 KS may be considered as a reactive coating kit that includes one or more primers and/or topcoats (Option 3).

According to the manufacturer's declaration, the product specification has been compared with Annex XVII of REACH and the ECHA Candidate List of Substances of Very High Concern to verify that that it does not contain such substances.

2 Specification Of The Intended Use In Accordance With The Relevant EAD

The intended use of HENSOTHERM® 421 KS is to fire protect various sizes of structural steel 'I/H' shaped sections (beams and columns) and hollow sections (circular and rectangular/square hollow columns as well as rectangular/square hollow beams) up to fire resistance classifications of R120 and R180, respectively. The analyses considered design temperatures in the range from 350°C to 750°C.

HENSOTHERM® 421 KS has been tested and assessed as being capable on maintaining fire resistance performance on 'I/H' shaped sections up to 150 minutes. Therefore, table of results for additional fire resistance periods that are not foreseen by the standard classification classes also form part of the evaluation.

The fire protection coating in conjunction with HENSOGRUND 1966E, HENSOGRUND 2K and HENSOGRUND AQ primers and HENSOTOP 84 and HENSOTOP 84 AQ topcoats has a performance determined for a reaction to fire classification in accordance with EN 13501-1 of Class E.

The provisions made in this ETA are based on an assumed working life of the applied coating for the intended use of 10 years, provided that it is subject to appropriate use and maintenance according to manufacturer's instruction. The indications given on the intended working life cannot be interpreted as a guarantee given by the producer, but are to be used as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

HENSOTHERM® 421 KS has been assessed as being compatible with the following primers:

Primers				
Primer Reference	**Primer Type**	**Tested Nominal Primer DFT (mm)**	**Permitted Primer Thickness Range (mm)[1]**	
			Minimum	**Maximum**
TEKNOLAC PRIMER 0168-00[2]	Alkyd resin, solvent based[2]	0.056	0.028	0.084
TEKNOCRYL AQUA COMBI 2780[3]	Water-borne primer based on acrylate dispersion and alkyd[3]	0.038	0.019	0.057
HENSOGRUND 1966E[2]	Short oil alkyd[2]	0.080	0.040	0.120
HENSOGRUND 2K[2]	Two component epoxy[2]	0.075	0.038	0.113
HENSOGRUND AQ[2]	Water-based acrylic[2]	0.060	0.030	0.090
HENSOGRUND 2K (Galvanized)[4]	Two component epoxy[4]	0.050	0.025	0.075
HENSOGRUND AQ (Galvanized)[4]	Water-based acrylic[4]	0.050	0.025	0.075

[1] The permitted theoretical minimum and maximum DFTs can not be less or exceed the DFT for each product as recommended by the manufacturer. The practical information given by the manufacturer must be followed

[2] The generic approval is applicable to other primers from the same generic group. The approval does not cover galvanized steel

[3] The approval is applicable to the specific primer. The approval does not cover galvanized steel

[4] The approval is applicable to the specific primer. The approval covers galvanized steel

HENSOTHERM® 421 KS has been assessed as being compatible with the following top coats:

Top Coat				
Top Coat Reference[1]	Top Coat Description	Tested Nominal Top Coat DFT (mm)	Permitted Top Coat Thickness Range (mm)	
			Minimum	Maximum[2]
BIORA 20	Acrylic resin, water based	0.061	0.061	0.091
HENSOTOP 84 AQ	Acrylic resin, water based	0.050	0.050	0.075
HENSOTOP 84	Acrylic resin, solvent based	0.050	0.050	0.075
HENSOTOP SB (up to Type Y exposure)	Acrylic resin, solvent based	0.055	0.055	0.082
HENSOTOP SB (up to Type X exposure)	Acrylic resin, solvent based	0.095	0.095	0.142
HENSOTOP WB	Acrylic resin, water based	0.050	0.050	0.075
TEKNOCRYL 100	Acrylic, modified	0.050	0.050	0.075
HENSOTOP 2K PU	Acrylic polyurethan, solvent based	0.070	0.070	0.105

[1] The approval is limited to the specific product

[2] The permitted theoretical maximum DFT cannot exceed the DFT for each product as recommended by the manufacturer. The practical information given by the manufacturer must be followed

HENSOTHERM® 421 KS has been assessed as having passed the requirements for durability according to ETAG 018 Part 2 with and without the following top coats:

Top Coat Reference[1]	Top Coat Description	Approved Top Coat Colours	Durability Approvals Based On The Carried Out Testing			
			Type Z_2	Type Z_1	Type Y	Type X
BIORA 20	Acrylic resin, water based	All Colours	✓	✓		
HENSOTOP 84 AQ	Acrylic resin, water based	All Colours	✓	✓		
HENSOTOP 84	Acrylic resin, solvent based	All Colours	✓	✓		
No Top Coat	-	All Colours	✓	✓	✓	
HENSOTOP WB	Acrylic resin, water based	All Colours	✓	✓	✓	
TEKNOCRYL 100	Acrylic modified top coat	All Colours	✓	✓	✓	
HENSOTOP SB	Acrylic resin, solvent based	All Colours	✓	✓	✓	✓
HENSOTOP 2K PU	Acrylic polyurethan, solvent based	All Colours	✓	✓	✓	✓

[1] The approval is limited to the specific product.

HENSOTHERM® 421 KS was subjected to the identification testing in accordance with the methods of identification defined in Table 5.3 of ETAG 018 Part 2. Tests for 'fingerprinting' have been done as described in Annex E (Thermoanalytical analyses (TG) and Infrared spectroscopy analyses (IR)).

3 Performance Of The Product And References To The Methods Used For Its Assessment

Product: Reactive coating		Intended use: Fire protection of structural steel elements
Verification method	Product characteristic	Performance
MECHANICAL RESISTANCE AND STABILITY		
-	-	-
SAFETY IN CASE OF FIRE		
EN 13501-1	Reaction to fire	Class E
EN 13501-2	Fire resistance	(R15 to R120) - IncSlow (I/H Beams and Columns) and (R15 to R180) - IncSlow (Circular and Rectangular/Square Hollow Column as well as Rectangular/Square Hollow Beams) (see Annex A)*
HYGIENE, HEALTH AND THE ENVIRONMENT		
Manufacturer's declaration	Release of dangerous substances	Product specification doesn't contain dangerous substances given in Annex XVII of REACH and the ECHA Candidate List of Substances of Very High Concern
SAFETY IN USE		
-	-	-
PROTECTION AGAINST NOISE		
-	-	-
ENERGY ECONOMY AND HEAT RETENTION		
-	-	-
ASPECTS OF SERVICEABILITY, DURABILITY AND IDENTIFICATION		
ETAG 018 Part 2 Clause 5.7.1 and Clause 5.7.2.2	Durability and serviceability	• Primer and top coat compatibility • Type X durability • Type Y durability • Type Z_1 durability • Type Z_2 durability
ETAG 018 Part 2 Clause 5.7.3	Identification	Thermoanalytical analyses (TG) and Infrared spectroscopy analyses (IR)

* Table of results for additional fire resistance periods that are not foreseen by the standard classification classes also form part of this ETA.

In addition to the specific clauses relating to dangerous substances contained in this European technical assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

4 Assessment And Verification Of Constancy Of Performance (Hereinafter AVCP) System Applied, With References To Its Legal base

According to the decision 1999/454/EC of the European Commission Decision of date 22 June 1999 on the procedure for attesting the conformity of construction products pursuant to Article 20(2) of Council Directive 89/106/EEC as regards fire stopping, fire sealing and fire protective products, the system of assessment and verification of constancy of performance (see Annex V to the Regulation (EU) No 305/2011) given in the following table apply:

Products	Intended uses	Level or Class	System
Fire protective products (including coatings)	Fire protection of steel elements	Any	1

5 Technical Details Necessary For The Implementation Of The AVCP System, As Provided For In The Applicable EAD.

The manufacturer shall exercise permanent internal control, record and evaluate the results of factory production in accordance with the provisions laid down in the "Control Plan" related to this European Technical Assessment. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. The production control system shall ensure that the product is in conformity with this European Technical Assessment.

The manufacturer may only use verified by Technical Assessment Body initial/raw/constituent materials stated in the technical documentations related to this European Technical Assessment.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

In cases where the provisions of the European technical assessment and its "Control Plan" are no longer fulfilled the certification body shall withdraw the Certificate of Constancy and inform the relevant authorities e.g. NANDO, EOTA.

The Table 8.1 in ETAG 018 Part 2 presents an example of the properties that shall be controlled and minimum frequencies of control. The exact test method and threshold have been laid down in the factory production control plan, operated by the manufacturer and deposited at Warrington Certification.

Signatories

Responsible Officer

D. Podolski* - Senior Certification Engineer

Approved

J. Yuan* - Group Chief Engineer

* For and on behalf of Warrington Certification.

Annex A - Product Performance: Fire Resistance

1 This Annex relates to the use of HENSOTHERM® 421 KS for the fire protection of 'I/H' shaped sections (beams and columns) and hollow sections (circular and rectangular/square hollow columns as well as rectangular/square hollow beams). The precise scope is given in Tables 1 to 42 which show the total dry film thickness of HENSOTHERM® 421 KS (excluding primer and top coat) required to provide classifications of R15 to R120 for I/H sections and R15 to R180 for Hollow sections for various design temperatures and section factors. HENSOTHERM® 421 KS has been tested and assessed as being capable on maintaining fire resistance performance on 'I' and 'H' shaped sections up to 150 minutes. Therefore, table of results for additional fire resistance periods that are not foreseen by the standard classification classes also form part of this European Technical Assessment.

2 The product is approved on the basis of:

i) Approval testing in accordance with the principles of EN 13381-8:2013.

ii) A design appraisal against this ETA adopting the graphical analysis defined in Annex E of EN 13381-8:2013.

3 The data presented in the tables in this Annex refers to both beams (three-sided fire exposure) and columns (four sided exposure).

4 The data shown is applicable to steel sections blast cleaned to ISO 8501-1 Sa 2.5 or equivalent and primed with the compatible primers listed in this ETA. The compatible primers and top coats, and their permitted dry film thicknesses are provided in the body of this ETA. The data is also applicable to galvanized steel sections with the compatible primers.

5 The data for the 'I' and 'H' shaped beams and columns applies also to other shaped steel sections that have re-entrant details such as channels, angles and tees.

6. HENSOTHERM® 421 KS has been exposed to the slow heating regime (IncSlow) defined in Annex A of EN 13381-8: 2013 and has satisfied the requirements to provide classification according to EN 13501-2.