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European Technical Assessment

ETA 20/1229
of 2024/05/01

General Part

Technical Assessment Body Issuing the European Technical Assessment:	**Element Materials Technology Rotterdam B.V.**
Trade Name of the Construction Product:	**HENSOTHERM® 410 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 Landstrasse 11 D-21039 Börnsen Germany
Manufacturing Plant(s):	**Rudolf Hensel GmbH** Lauenburger Landstrasse 11 D-21039 Börnsen Germany
This European Technical Assessment Contains:	33 pages including 3 Annexes which form an integral part of this assessment
This European Technical Assessment is Issued in Accordance with Regulation (EU) No 305/2011, On the Basis Of:	EAD 350402-00-1106 Fire Protective Products: Reactive Coatings For Fire Protection of Steel Elements
This Version Replaces:	ETA 20/1229, dated 15/04/2021

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1. Technical Description of the Product

HENSOTHERM® 410 KS is a spray or brush/roller applied intumescent coating formulated for the fire protection of structural steel elements.

In accordance with EAD 350402-00-1106: September 2017, HENSOTHERM® 410 KS may be considered as a reactive coating kit that includes one or more primers and/or topcoats (Option 3).

2. Specification of the Intended Use(s) in Accordance with the Applicable European Assessment Document (hereinafter EAD)

The intended use of HENSOTHERM® 410 KS is to fire protect various sizes of structural steel I/H beams and columns, circular and rectangular/square hollow columns for design temperatures in the range of 350°C to 750°C and various resistance to fire periods in accordance with EN 13381-8:2013.

A pass performance against the slow heating curve to EN 13381-8:2013 Annex A is claimed for the product.

The provisions made in this ETA are based on an assumed working life of the applied coating for the intended use of at least 10 years for environmental categories Types Z_2, Z_1, and Y. EAD 350402-00-1106: September 2017 also allows to assume 25 years working life where the ETA applicant can offer sufficient additional documented proof for technical examination.

Rudolf Hensel GmbH have supplied additional information for Type Z_2 to both Warringtonfire and BAM, who have both independently verified that the data supplied demonstrates the use of HENSOTHERM® 410 KS for a working life of 25 years in environmental condition Type Z_2.

Therefore, 25 years working life is assumed for environmental category Type Z_2.

The above provisions are made provided that it is subject to appropriate use and maintenance according to the 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.

The product has been assessed as being compatible with the following primers:

Primer				
Primer Reference	**Primer Type**	**Tested Nominal Primer DFT (µm)**	**Permitted Primer Thickness Range (µm)[1]**	
			Minimum	**Maximum**
HENSOGRUND 1966 E[2]	Solvent based alkyd	60	30	90
HENSOGRUND WB Green[2]	Water based acrylic	73	37	110
HENSOGRUND WB Green[2]	Water based acrylic	177	36	266
(HENSOGRUND WB Green + HENSOTOP WB Green)[4]	Water based acrylic + Water based acrylic	92 + 92 (184)	46 + 46 (92)	138 + 138 (276)
HENSOGRUND WB Green (Tested on sweep blasted galv. layer: ~70µm)[3]	Water based acrylic	62	31	93

DFT: Dry Film Thickness

[1] The permitted theoretical minimum and maximum DFTs cannot 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 provided the thickness is within the tolerance given. The approval does not cover galvanized steel.

[3] The approval is applicable to specific primer only (trade name and type) and no generic approach is possible. The approval covers galvanized steel.

[4] The approval is applicable to specific primer/primer set (trade name and type) and no generic approach is possible. The approval does not cover galvanized steel.

The product has been assessed as having passed the requirements for durability according to EAD 350402-00-1106: September 2017 with and without the following topcoats:

Topcoat Reference[1]	Topcoat Description	Tested Nominal Topcoat DFT (µm)	Permitted Topcoat Thickness Range (µm)		Approved Topcoat Colours	Durability Approvals Based On The Carried Out Testing			
			Minimum	Maximum[2]		Type Z_2	TypeZ_1	Type Y	Type X
No Topcoat	-	-	-	-	-	✓			
HENSOTOP WB (Previously known as HENSOTOP 84 AQ	Water based	58	Manufacturer recommended[A]	87	All	✓			
HENSOTOP WB Green	Water based	71	71[A]	107	All	✓	✓	✓	
HENSOTOP 2K PU	Two component polyester	75	75[A]	113	All	✓	✓	✓	

DFT: Dry Film Thickness

[1] The approval is limited to the specific product (trade name and type) and no generic approach is possible.

[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.

[A] Tests on the product were performed using specimens with and without topcoat to demonstrate that addition of the topcoat has no influence on the insulation efficiency. The product is found to be equally suitable with and without topcoat for environmental condition Type Z_2. Therefore, topcoat thickness can be reduced to the to the minimum recommended by the manufacturer. For environmental condition Types Z_1 and Y the stated minimum topcoat DFT applies.

Where the topcoat name HENSOTOP 84 AQ is noted to have changed in the table above, Rudolf Hensel GmbH has issued a Declaration of Conformity for Consistent Product Quality stating that the renaming of the product has no effect on the composition of the product, which Rudolf Hensel GmbH has confirmed continues to be produced using the same raw materials and according to the same formulation and manufacturing process, with the same quality control measures applied.

The product was subjected to the identification testing in accordance with the methods of identification defined in Table 4 of EAD 350402-00-1106: September 2017. Tests for 'fingerprinting' as described in Annex E (Thermoanalytical analyses (TG) and Infrared spectroscopy analyses (IR)) have been done and reported in the Element test report No. ERO041588-1.

The product has a performance determined for a reaction to fire classification in accordance with EN 13501-1: 2018.

The reaction to fire classification is valid for the fire protection of a steel substrate of minimum 0.8mm thickness.

The protection system comprising of HENSOTHERM® 410 KS intumescent coating without a primer and a topcoat is classified as: E.

The reaction to fire classification is valid for the following product parameters:

- Permitted intumescent coating: 'HENSOTHERM® 410 KS'
- Intumescent coating colour: No variation allowed other than as detailed in a relevant classification report
- Intumescent coating thickness: Up to 2mm allowed
- Intumescent coating specific gravity: No variation allowed other than as detailed in a relevant classification report
- Construction: No variation allowed other than as detailed in a relevant classification report
- Composition: No variation allowed other than as detailed in a relevant classification report

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
Assessment method	Essential characteristic	Product performance
BASIC WORKS REQUIREMENT 2: SAFETY IN CASE OF FIRE		
EN 13501-1:2018	Reaction to fire	E (without a primer and a topcoat)
EN 13501-2:2023	Resistance to fire[1]	(R15 – R90) I/H Beam and Columns (R15 – R90) Circular and Rectangular/Square Hollow Columns (see Annex A[2])
BASIC WORKS REQUIREMENT 3: HYGIENE, HEALTH AND THE ENVIRONMENT		
Indoor air quality to DIN EN 16516:2020-10 and AgBB scheme published in 2021	Content, emission and or release of dangerous substances	Use categories: IA1 and IA2 (see Annex B)
BASIC WORKS REQUIREMENT 4: SAFETY AND ACCESSIBILITY IN USE		
EAD 350402-00-1106: September 2017 Clause 2.2.4 and Clause 2.2.5	Adhesion and Durability	• Primer and topcoat compatibility • Type Y durability • Type Z_1 durability • Type Z_2 durability
EAD 350402-00-1106: September 2017 Table 4	Identification	Thermoanalytical analyses (TG) and Infrared spectroscopy analyses (FTIR)

[1]The product was exposed to the smouldering fire (slow heating regime) defined in Annex A of EN 13381-8: 2013 and satisfied the requirements.

[2]Table of results for additional times (e.g. 105 minutes) also form part of this ETA.

4. Assessment and Verification of Constancy of Performance (hereinafter AVCP) System Applied, with reference 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 5 in EAD 350402-00-1106 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 Element Materials Technology Rotterdam B.V.

Issued in Amsterdam, Netherlands on 2024/05/01

By

Pascal Coget

TAB Manager

Annex A - Product Performance: Resistance to Fire

1 This Annex relates to the use of HENSOTHERM® 410 KS for the fire protection of I/H beams and columns as well as circular and rectangular/square hollow columns. The precise scope is given in Tables of Results which show the total dry film thickness of HENSOTHERM® 410 KS (excluding primer and topcoat) required to provide resistance to fire classifications in accordance with EN 13501-2:2023 for sections at various design temperatures and section factors.

2 The product is assessed on the basis of:
i) Testing in accordance with the principles of EN 13381-8: 2013.
ii) A design assessment 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/surface area exposure).

4 The data shown is applicable to steel sections blast cleaned to ISO 8501-1 Sa2.5 or equivalent and primed with the compatible primers. Specifications of suitably tested and assessed primers and topcoats are listed in this document. The primer and topcoat permitted dry film thicknesses are also provided in the body of this ETA. The data is also applicable to galvanized steel sections with the relevant preparation as indicated in the body of this ETA.

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 The product has been exposed to the slow heating regime (IncSlow) defined in Annex A of EN 13381-8:2013 and have satisfied the requirements to provide classification according to EN 13501-2:2023.

7 Following the EN 13381-8:2013 clause 15, for section factors below the extended minimum given in Tables of Results, the same coating thickness as that applied to the extended minimum section factor shall be applied.