



European Technical Assessment

ETA 21/0642
of 17.01.2022



General part

Technical Assessment Body issuing the ETA: ITeC	
ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment).	
Trade name of the construction product	Roomsystem WFP & Roomsystem RFP
Product family to which the construction product belongs	Prefabricated Fire-Resistant Building Units.
Manufacturer	DENIOS SE Dehmer Straße 54-66 D-32549 Bad Oeynhausen Germany
Manufacturing plant(s)	According to Annex N kept by ITeC.
This European Technical Assessment contains	15 pages including 1 annex which forms an integral part of this assessment and Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of	European Assessment Document EAD 340503-00-1106.

General comments

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential annex(es)).

Specific parts of the European Technical Assessment

1 Technical description of the product

The prefabricated fire resistant roomsystems WFP (Walk-in Fire Protected) and RFP (Rack Fire Protected) are designed as box-like units with a structural double frame made of steel elements in accordance with EN 1090-2¹. The types and external dimensions of the roomsystems WFP and RFP are given in table 1. The roomsystems' dimensions can be smaller provided that the structural elements sizes are maintained, as well as the distances between each other. Examples of the roomsystems WFP and RFP are shown in figure 1 and 2.

Table 1: Designation and maximum dimensions of the roomsystems WFP and RFP.

Roomsystem designation			Maximum external dimensions (mm)		
Type	Version	Size	Length	Width	Height
WFP	X	6	3018	2952	2876
		10	4478		
		14	5938		
		22	8858		
	M	6	3018	2656	
		14	5938		
RFP	Standard	315.30	3660	1784	3594
		615.30	6882		
		815.30	9342		
	V50	315.30	3660	1784	3581
		615.30	6882		
		815.30	9342		



Figure 1: Example of roomsystem WFP.

¹ EN 1090-2 Execution of steel structures and aluminium structures. Part 2: Technical requirements for steel structures.



Figure 2: Examples of roomsystem RFP.

The internal frame is built with C-shaped profiles and the external frame with L-shaped profiles, both made from 3 mm thick bended sheets of structural steel S235JR (1.0038) according to EN 10025-2² or S250GD (1.0242) according to EN 10346³. The individual structural profiles are connected to each other with steel blind lock rivets of Ø 4,8 mm or Ø 6,4 mm. The external frame is fixed to the internal frame with self-drilling steel screws of Ø 5,5 mm x 150 mm (wall) and Ø 5,5 mm x 180 mm (roof), at a maximum distance of 400 mm.

The structural frames are independently fixed to the base (external frame to the concrete slab and internal frame to the spill sump). The spill sump is made of 5 mm thick bended sheets of structural steel S235JR (1.0038) according to EN 10025-2 or stainless steel according to EN 10088-4⁴ with same yield strength or higher, covered with a steel grid designed for a maximum load of 10 kN/m² (WFP) and 12,5 kN/m² (RFP). The roomsystems WFP and RFP are

² EN 10025-2 Hot rolled products of structural steels. Part 2: Technical delivery conditions for non-alloy structural steels.

³ EN 10346 Continuously hot-dip coated steel flat products for cold forming. Technical delivery conditions.

⁴ EN 10088-4 Stainless steels. Part 4: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes.

installed by means of anchors on a flat concrete slab designed to withstand the design loads, taking account of soil characteristics and with at least the same resistance to fire as the roomsystem.

The enclosure (walls and roof) of the roomsystems WFP and RFP is made of self-supporting sandwich panels with mineral wool insulation core, CE marked in accordance with EN 14509⁵. The panels have a thickness of 100 mm and the two galvanised steel sheet facings of 0,6 mm thickness (the roof panels have at the upper face a trapezoidal profiled sheet with 37 mm high ribs). The density of the mineral wool is 100 kg/m³ for the wall panels and 90 kg/m³ for the roof panels. An intumescent strip of width 50 mm and 1 mm thickness is placed in the joints between panels, which are sealed with 6 mm x 3,5 mm EPDM gaskets. The panels are fixed to each other with self-drilling steel screws of Ø 5,5 mm x 25 mm at a maximum distance of 405 mm (inside) and 500 mm (outside).

The roomsystems WFP and RFP have fire resistant doors CE marked in accordance with EN 16034⁶. The doors can be single or double leaf hinged, or sliding doors. The single or double leaf hinged doors are installed in a metal-concrete frame and can be installed in the roomsystems' short and long side (or in both). The frame steel profiles have the same specification as the roomsystems' structural frame and the concrete has a minimum compressive strength of C25/30. The sliding doors are fixed to the structural steel frame of roomsystems' WFP and RFP and can also be installed on the roomsystems' short and long side (also, in more than one side).

Additional equipment can be installed, such as: door hold-open devices, technical ventilation, lightning, wiring, electrical control systems, signal devices, cooling/heating systems, earthing rails or access ramps, etc. All elements that penetrate the roomsystems WFP and RFP walls are fire protected by means of penetration seals or overflow dampers to reinstate the resistance to fire performance of the constructive element. Heavy equipment is fixed on rails suspended from the main structure of the roomsystem (not suspended from the panels).

The roomsystems WFP and RFP are fully prefabricated and assembled at the factory and transported to site in three-dimensional format. The sole operation needed on site is to lay and fix the roomsystem on the concrete slab.

The assessed components of the roomsystems WFP and RFP are listed in Annex 1.

⁵ EN 14509 Self-supporting double skin metal faced insulating panels. Factory made products. Specifications.

⁶ EN 16034 Pedestrian doorsets, industrial, commercial, garage doors and openable windows. Product standard, performance characteristics. Fire resisting and/or smoke control characteristics.

2 Specification of the intended use(s) in accordance with the applicable EAD

The roomsystems WFP and RFP are designed as fire resistant building units with a fluid tight base sump, used to host services and/or store goods in safe conditions⁷ in case of fire, both because a potential fire outside the room should not affect the contents inside the roomsystem (fire from outside) and because a fire initiated inside the room should not spread and affect the outside of the roomsystem (fire from inside).

The WFP roomsystem (Walk-in Fire Protected) is designed to be accessible to authorised personnel for goods handling, while RFP roomsystem (Rack Fire Protected) is designed only as a rack storage room. The roomsystems WFP and RFP are not intended to be used as a permanent workplace.

The roomsystems WFP and RFP can be used indoors and outdoors. For outdoor uses, the edge of the roof at the short side of the roomsystem can also act as a rain gutter, and a downspout is installed inside the corner profile to drain the water.

The roomsystems WFP and RFP are calculated for wind loads according to EN 1991-1-4⁸ and snow loads according to EN 1991-1-3⁹. According to the manufacturer, the roomsystems standard version is designed for a maximum wind load of $Q_{k,w} = 0,585 \text{ kN/m}^2$ and a maximum snow load of $S_k = 2,500 \text{ kN/m}^2$ and the roomsystems reinforced version is designed for a maximum wind load of $Q_{k,w} = 1,064 \text{ kN/m}^2$ and a maximum snow load of $S_k = 5,860 \text{ kN/m}^2$. Structural calculation has not been part of the assessment carried out in this ETA.

The provisions made in this ETA are based on a working life of the structural elements of at least 25 years, provided that the conditions laid down in the manufacturer's instructions for the installation, use and maintenance are met. The working life of every component of the roomsystem will be in accordance with the relevant harmonised technical specification (see table 2 and section 3.2.4 of this ETA). These provisions are based upon the current state of the art and the available knowledge and experience.

The indications given as to the working life cannot be interpreted as a guarantee, but are to be regarded only as a means for choosing the appropriate product(s) in relation to the expected economically reasonable working life of the works.

⁷ The resistance to fire assessment carried out in this ETA is in accordance with the EN 13501-2 classification system and, therefore, the insulation criteria are those defined in EN 1363-1 (i.e. temperature increase at the constructive element surface of the protected side not greater than 140 °C –mean value– and not greater than 180 °C –at any point–). In the case that the stored goods or services can be damaged in these conditions, further analysis can be necessary.

⁸ EN 1991-1-4 Eurocode 1: Actions on structures. Part 1-4: General actions. Wind actions.

⁹ EN 1991-1-3 Eurocode 1: Actions on structures. Part 1-3: General actions. Snow loads.

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

3.1 Performance of the product

The assessment of Fire-Resistant roomsystems WFP and RFP has been performed in accordance with EAD 340503-00-1106 for *Prefabricated Fire-Resistant Building Units (20.02.2020)*.

Table 2: Performance of the product.

Product: Roomsystems WFP & RFP		Intended use: Prefabricated Fire-Resistant Building Unit	
Basic requirement	Essential characteristic	Performance	
BWR 2 Safety in case of fire	Reaction to fire	See table 3	
	Resistance to fire	REI 120 / REI 90 (see Annex 1)	
	External fire performance (roof panels)	NPA ¹⁰	
	Propensity to undergo continuous smouldering (MW panels)	The panels do not show propensity to undergo continuous smouldering	
Other essential characteristics	Durability	Panels	Compliance with DUR2 test in EN 14509
		Doors	See table 4
		Dampers	See table 5
		Penetration seals	See table 6

¹⁰ NPA: No Performance Assessed.

Table 3: Reaction to fire performance of the components of the roomsystems WFP and RFP.

Component		Performance
Steel structural elements		A1
Mechanical fixings		A1
Metal-concrete door frame		A1
Sump (steel)		A1
Panels	TRIMO FTV Power-T	A2-s1,d0
	TRIMO SNV Power-T	A2-s1,d0
Doors ¹¹	--	--
Fire dampers ¹²	--	--
Penetration seals	HILTI CFS-CC	E
	PROMAT PROMASTOP-Modulstein	NPA
	KAISER DS90/74	E
	ROXTEC System B/G-WBGE	B-s1,d0
	ARMACELL System Armaflex Protect	E
	ROLF KUHN ROKU 1000 Sealant	NPA
	KAISER SYSTEM LS 90	E
	HILTI CFS-IS Sealant	E
	PROMAT PROMASEAL Mastic	NPA
	DEN BRAVEN FP Acrylic Sealant	E
	PROMAT Promatect-H calcium silicate board	A1

¹¹ Not relevant (characteristic not considered in EN 16034 and EN 14351-1).

¹² Not relevant (characteristic not considered in EN 15650).

Table 4: Durability performance of the fire resistant doors according to EN 16034.

Product	Durability of ability to release	Durability of self-closing		
		Cycling	Corrosion	
TECKENTRUP T90-1 FSA 62	Release maintained	C5	Achieved	
TECKENTRUP T90-2 FSA 62	Release maintained	C5	Achieved	
TECKENTRUP EI60/EI2120-C5-Sa 72-1 DF	Release maintained	C5	Achieved	
TECKENTRUP EI60/EI2120-C5-Sa 72-2 DF	Release maintained	C5	Achieved	
PORTAFEU EIFeu 1VP 120	Release maintained	C5	NPA	
PORTAFEU EIFeu 2VP 120	2 symmetrical leaves	Release maintained	C0	NPA
	2 asymmetrical leaves	Release maintained	C0	NPA
PORTAFEU EIFeu 1VI 120	Release maintained	C0	NPA	
PORTAFEU EIFeu 2VI 120	2 symmetrical leaves	Release maintained	C0	NPA
	2 asymmetrical leaves	Release maintained	C0	NPA
HEINEN HEI ₂ 120	1 leaf	NPA	C5	NPA
	2 symmetrical leaves	NPA	C5	NPA
	2 asymmetrical leaves	NPA	C5	NPA
DENIOS Fire protection telescopic sliding door	Release maintained	C0	Achieved	

Table 5: Durability performance of the fire dampers according to EN 15650.

Product	Durability of response delay	Durability of operational reliability
STRULIK BEK-K90	Pass	NPA
STRULIK BR-Ü DN 315	Pass	Pass (10000 cycles)
TROX FK-EU 500	Pass	Pass (10000 cycles)

Table 6: Durability performance of the penetration seals according to EAD 350454-00-1104.

Product	Use category*
HILTI CFS-CC	Type Y ₁
PROMAT PROMASTOP-Modulstein	NPA ¹³
KAISER DS90/74	Type Z ₂
ROXTEC System B/G-WBGE	Type X ¹⁴
ARMACELL System Armaflex Protect	Type Y ₂
ROLF KUHN ROKU 1000 Sealant	NPA ¹³
KAISER SYSTEM LS 90	Type Z ₂
HILTI CFS-IS Sealant	Type Y ₂
PROMAT PROMASEAL Mastic	NPA ¹³
DEN BRAVEN FP Acrylic Sealant	NPA ¹⁵
PROMAT Promatect-H calcium silicate board	NPA ¹⁶

* Environmental use categories are defined in section 1.2.1 of EAD 350454-00-1104.

In roomsystems WFP and RFP intended for outdoor use according to section 2, penetration seals assessed for categories Type X, Type Y₂ or Type Y₁ are to be installed, depending on the environmental conditions.

The working life of the penetration seals is 10 years according to EAD 350454-00-1104.

¹³ German National Approval issued for this product.

¹⁴ Use category in function of the steel used (see ETA 11/0313).

¹⁵ DEN BRAVEN FP Acrylic Sealant is CE marked (DoP _ [EN] _ 001 _ No 11001211-1001) according to EN 15651-1 *Sealants for non-structural use in joints in buildings and pedestrian walkways. Part 1: Sealants for facade elements*, meeting the durability requirements for external use established in the standard.

¹⁶ PROMAT Promatect-H is CE marked (DoP No. 0749-CPR-06/0206-2018/2) according to EAD 350142-00-1106 *Fire protective board, slab and mat products and kits*, meeting the durability requirements for use category Type Y (environmental use categories are defined in section 1.2.3 of EAD 350142-00-1106).

3.2 Methods used for the assessment

3.2.1 Reaction to fire

The metal components are classified in accordance with Commission Decision 96/603/EC, as amended by 2000/605/EC and 2003/424/EC.

The rest of the roomsystems' components have been tested according to the methods referred to in EN 13501-1¹⁷ and are classified according to the Commission Delegated Regulation (EU) No 2016/364.

3.2.2 Resistance to fire

The roomsystems' elements have been classified in accordance with EN 13501-2¹⁸, tested according to the following methods:

- Walls according to EN 1364-1¹⁹.
- Roof according to EN 1365-2²⁰.
- Doors according to EN 1634-1²¹.
- Fire dampers according to EN 1366-2²².
- Penetration seals according to EN 1366-3²³.

The resistance to fire performance of the structural frame, including the fixing screws between outer and inner frames, was tested (EN 1364-1 for walls and EN 1365-2 for roofs) and assessed by means of the thermal insulation –provided by the sandwich panels– of the structural frame at the side not exposed to fire. The temperature of the steel elements at the protected side did not increase more than 180 °C and, therefore, mechanical properties were not decreased in accordance with EN 1993-1-2²⁴. Then, even in the case of loss of mechanical performance of the structural frame at the fire exposed side, the loadbearing capacity (R) of the structural frame at the protected side is kept during 120 minutes.

¹⁷ EN 13501-1 Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests.

¹⁸ EN 13501-2 Fire classification of construction products and building elements. Part 2: Classification using data from fire resistance tests, excluding ventilation services.

¹⁹ EN 1364-1 Fire resistance tests for non-loadbearing elements. Part 1: Walls.

²⁰ EN 1365-2 Fire resistance tests for loadbearing elements. Part 2: Floors and roofs.

²¹ EN 1634-1 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Part 1: Fire resistance test for door and shutter assemblies and openable windows.

²² EN 1366-2 Fire resistance tests for service installations. Part 2: Fire dampers.

²³ EN 1366-3 Fire resistance tests for service installations. Part 3: Penetration seals.

²⁴ EN 1993-1-2 Eurocode 3: Design of steel structures. Part 1-2: General rules. Structural fire design.

3.2.3 Propensity to undergo continuous smouldering

The propensity of the mineral wool panels to undergo continuous smouldering has been tested and assessed in accordance with EN 16733²⁵, taking into account the rules in Annex 1 of EAD 340503-00-1106.

3.2.4 Durability

The durability of the roomsystems' components have been assessed in accordance with the relevant harmonised technical specification, according to the following methods:

- Structural elements according to EN 1090-2²⁶.
- Panels (for walls and roof) according to EN 14509²⁷, clause 5.2.3.
- Doors according to EN 16034, clause 4.5 and 5.4.
- Fire dampers according to EN 15650²⁸, clause 4.3.3.
- Penetration seals according to EAD 350454-00-1104²⁹, clause 2.2.9.

²⁵ EN 16733 Reaction to fire tests for building products. Determination of a building product's propensity to undergo continuous smouldering.

²⁶ EN 1090-2 Execution of steel structures and aluminium structures. Part 2: Technical requirements for steel structures.

²⁷ EN 14509 Fire resistance tests for non-loadbearing elements. Part 1: Walls.

²⁸ EN 15650 Ventilation for buildings. Fire dampers.

²⁹ EAD 350454-00-1104 Fire stopping and fire sealing products. Penetration Seals (September 2017).

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

According to the Decision 2003/728/EC of the European Commission, the system of AVCP (see EC delegated Regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table applies.

Table 7: AVCP System.

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Metal frame building kits Prefabricated building units	In building works	Any	1

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

All the necessary technical details for the implementation of the AVCP system are laid down in the Control Plan deposited with the ITeC and agreed in accordance with EAD 340503-00-1106, section 3.

The Control Plan is a confidential part of the ETA and only handed over to the notified product certification body involved in the assessment and verification of constancy of performance.

The factory production control operated by the manufacturer shall be in accordance with the above-mentioned Control Plan.

Issued in Barcelona on 17 January 2022
by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart
Technical Director, ITeC

ANNEX 1. List of assessed components

The following components have been assessed in the framework of ETA 21/0642. The resistance to fire performance of the bare roomsystems WFP and RFP (i.e. the structural double frame and the panels enclosure) is REI 120. Depending on the additional components selected and incorporated into the roomsystems WFP and RFP, the resistance to fire performance is REI 90 or REI 120 as shown in tables A.2 to A.4 below.

The resistance to fire has been assessed both considering the fire exposure from outside and from inside the roomsystems.

The structural steel elements for the double frame of the roomsystems WFP and RFP will be in accordance with EN 1090-2 and the manufacturing Control Plan associated to ETA 21/0642.

Table A.1: Panels according to EN 14509 for roomsystems' enclosure.

Product	Application	Characteristics	Resistance to fire
TRIMO FTV Power-T	Walls	Thickness: 100 mm Density of MW core: 100 kg/m ³	EI 120
TRIMO SNV Power-T	Roof	Thickness: 100 mm Density of MW core: 90 kg/m ³	EI 120

Table A.2: Fire resistant doors according to EN 16034.

Product	Description	Maximum* external dimensions (width x height)	Resistance to fire
TECKENTRUP T90-1 FSA 62	1 leaf, hinged	1350 mm x 2000 mm	EI ₂ 90
TECKENTRUP T90-2 FSA 62	2 leaves, hinged	3000 mm x 3000 mm	EI ₂ 90
TECKENTRUP EI60/EI2120-C5-Sa 72-1 DF	1 leaf, hinged	1350 mm x 2000 mm	EI ₁ 60 / EI ₂ 120
TECKENTRUP EI60/EI2120-C5-Sa 72-2 DF	2 leaves, hinged	3000 mm x 3000 mm	EI ₁ 60 / EI ₂ 120
PORTAFEU EIFeu 1VP 120	1 leaf, hinged	1224 mm x 2575 mm	EI ₁ 30 / EI ₂ 120
PORTAFEU EIFeu 2VP 120	2 leaves (symmetrical), hinged	2438 mm x 2575 mm	EI ₁ 30 / EI ₂ 120
	2 leaves (asymmetrical), hinged	1814 mm x 2575 mm	EI ₁ 30 / EI ₂ 120
PORTAFEU EIFeu 1VI 120	1 leaf, hinged	1542 mm x 3400 mm	EI ₁ 45 / EI ₂ 120
PORTAFEU EIFeu 2VI 120	2 leaves (symmetrical), hinged	3156 mm x 3400 mm	EI ₁ 45 / EI ₂ 120
	2 leaves (asymmetrical), hinged	2948 mm x 3400 mm	EI ₁ 45 / EI ₂ 120
HEINEN HEI ₂ 120	1 leaf, hinged	1425 mm x 3035 mm	EI ₁ 60 / EI ₂ 120
	2 leaves (symmetrical), hinged	3156 mm x 3035 mm	EI ₁ 60 / EI ₂ 120
	2 leaves (asymmetrical), hinged	2948 mm x 3035 mm	EI ₁ 60 / EI ₂ 120
DENIOS Fire protection telescopic sliding door	2 leaves (symmetrical), sliding	9382 mm x 4827 mm	EI ₁ 60 / EI ₂ 120

* The dimensions of the doors installed in the roomsystems can be smaller according to EN 16034 to match the design unit dimensions.

Table A.3: Fire overflow dampers according to EN 15650.

Product	Duct external diameter	Mounting & fixing conditions	Resistance to fire
STRULIK BEK-K90	Ø 125 mm	Dampers' installation conditions in the panels according to table A.1 are in accordance with the resistance to fire tests field of application. Information is kept in the roomsystems' manufacturing Control Plan.	EI 120 (ho i↔o) S
	Ø 160 mm		
	Ø 200 mm		
STRULIK BR-Ü DN 315	Ø 315 mm		EI 120 (ho i↔o) S
TROX FK-EU 500	500 mm x 500 mm		EI 120 (ho i↔o) S

Table A.4: Penetration seals according to EAD 350454-00-1104 for roomsystems' penetrating services.

Product	Application	Mounting & fixing conditions	Resistance to fire
HILTI CFS-CC	Cables seal collar	Seal's installation in the panels according to table A.1 and penetrating services characteristics are in accordance with the resistance to fire tests field of application. Information is kept in the roomsystems' manufacturing Control Plan.	EI 90
PROMAT PROMASTOP-Modulstein	Cables / pipes seal		EI 90
KAISER DS90/74	Cables seal box		EI 120
ROXTEC System B/G-WBGE	Cables seal module		EI 90
ARMACELL System Armaflex Protect	Pipes seal		EI 120
ROLF KUHN ROKU 1000 Sealant	Cables seal		EI 90 / EI 120*
KAISER SYSTEM LS 90	Cables seal		EI 90 / EI 120*
HILTI CFS-IS Sealant	Cables seal		EI 90 / EI 120*
PROMAT PROMASEAL Mastic	Cables seal		EI 90 / EI 120*
DEN BRAVEN FP Acrylic Sealant	Cables seal		EI 90 / EI 120*
PROMAT Promatect-H calcium silicate board	Cables seal		EI 120

* Performance in function of the protected cables (information kept in the roomsystems' manufacturing Control Plan).