Fire: EN 13501 – the European Standard

The European Standards

The harmonized European Fire Standards are a set of test standards that have been accepted by all countries within the European Economic Community. This allows manufacturers to produce or import products that have been tested to a common standard without the need to test in each member state. Testing to these standards is now accepted in all EEC countries.

Compliance with the European Standards and regulations is mandatory.

All certified European test laboratories ("Notified Bodies") who are listed with EOTA (European Organisation for Technical Approval) may perform these tests and issue the corresponding test reports

(ITT – Initial Type Testing). In addition there may be national test or building regulation requirements that may need to be observed.

The Declaration of Performance (DoP) and the "KIT" CE label are the two main documents that will normally be required by local authority officers to show that the intended ceiling system will meet the specified performance level. The use of components other than those supplied by OWA will prevent the issuing of a KIT label.

Reaction to fire

If a fire is able to find sufficient flammable materials it will quickly spread through an area. It is therefore crucial to use materials of limited combustibility on key surfaces within a room, such as ceilings and walls. The use of such materials can dramatically reduce the speed flames spread through an area as well as minimise their contribution to the fire.

The European Standard EN 13501-1: Reaction to fire provides a number of performance criteria to measure the fire characteristics of building products. These cover spread of flame and contribution to fire as well the generation of smoke and the production of burning droplets. The table below provides an overview of the available classifications.

Additional requirements		European class according to EN 13501-1
No smoke	No burning droplets falling/dripping	
✓	✓	A1
✓	✓	A2-s1,d0
✓	✓	B-s1,d0 | C-s1,d0
	✓	A2-s2,d0 | A2-s3,d0 B, C-s2,d0 | B, C-s3,d0
✓		A2-s1,d1 | A2-s1,d2 B, C-s1,d1 | B, C-s1,d2
		A2-s3,d2 | B-s3,d2
✓	✓	D-s1,d0
	✓	D-s2,d0 |D-s3,d0
		E | E-d2 | F
✓		D-s1,d2 | D-s2,d2 | D-s3,d2

The additional designations are:

Smoke | s1, s2, s3
s1 = little or no smoke generation
s2 = medium smoke generation
s3 = heavy smoke generation

Burning droplets | d0, d1, d2
d0 = no droplets within 600 seconds
d1 = droplet form within 600 seconds but do not burn for more than 10 seconds
d2 = not as d0 or d1

Country	Test standard	Classification
EC member states	EN 13501-1	A2-s1,d0 | B-s1,d0
Switzerland	Fire safety regulations BSV 2105	RF1 = non-flammable
USA	ASTM E 84 a / ASTM E 1264	Class I / class A

Resistance to fire

Resistance to fire class EN 13501-2	Resistance to fire duration in minutes
REI 30	≥ 30
REI 60	≥ 60
REI 90	≥ 90
REI 120	≥ 120
REI 180	≥ 180

For European categorisation, a reaction to fire classification is always given separately.

Structural elements based on EN 13501-2 encompass the whole structural element and not just the suspended ceiling. This may consist of the roof and the suspended ceiling or the structural floor and suspended ceiling. The entire element should resist the impact of fire on its structural ability for as long as possible. The length of time this can be maintained is the fire resistance duration and will classify it in one of the classes shown.

Test criteria

During the fire resistance test the laboratory will look out for adverse reaction as well as reporting on the following key criteria.

R. The structural element should not collapse or deflect beyond the permitted levels when subjected to the applied load.

E. The integrity of the room must be maintained. No breakthrough of flames is permitted.

I. The temperature on the non-exposed side of the structural element must not rise more than 140 °K above ambient as an average measurement and no more than 180 °K at any one location.

If one of the above criteria is exceeded the test is terminated and the duration achieved prior to failure will dictate the appropriate fire resistance classification.

Due to the diversity of the various structural elements currently available it is impossible to test each individually. We therefore endeavor to test the worst case scenario in each generic construction type.

The following examples show constructions within a test furnace.

The illustration below (fig. 1) shows an example of a typical steel beam construction with the OWA ceiling below.

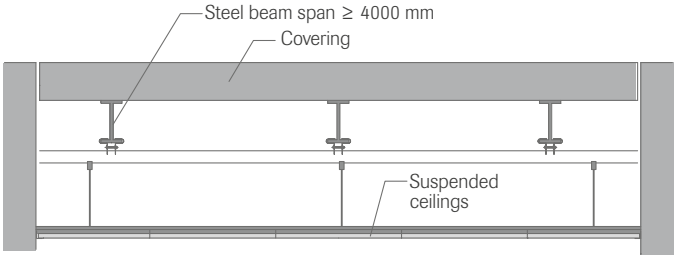


Fig. 1: steel beam floor

OWA Suspended ceilings can also be used to provide fire resistance to timber constructions.

The example below (fig 2) shows a timber floor construction with the OWA ceiling below

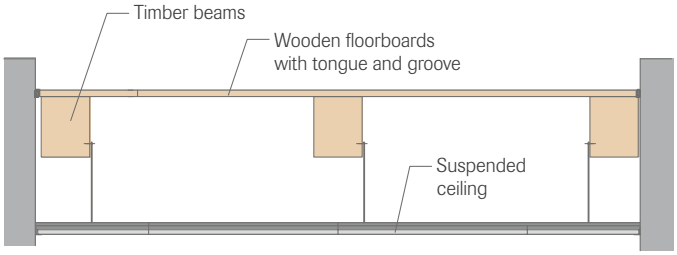


Fig. 2: timber floor

OWA have tested most standard floor and roof constructions with OWAcoustic Ceilings to EN 13501-2 and have achieved up to REI 180 as shown in the following table.

Where an OWAcoustic ceiling is used to provide structural fire resistance it is important that the ceiling is constructed in the same manner as that used in the test. Failure to use the same components and layout may invalidate any certification and prevent us issuing a KIT declaration.

Escape and rescue routes often have services containing combustible materials installed below the structural slabs. For this reason we recommend the use of OWAcoustic self contained fire resistant ceilings (see table on page 6 and 7). With this type of ceiling it is possible to provide fire resistance of EI 30 to the services in the void as well as to the area below. The use of this system can help provide protected escape routes both from fire and smoke.

MFPA Leipzig GmbH

Classification Report

efectis

The European experts in fire safety

ISTITUTO GIORDANO

RAPPORTO DI CLASSIFICAZIONE N. 2360/2488/CPD

On the 1st of July 2013 the new European Construction Products Regulation (CPR) No. 305/2011 came into force and replaced the existing Construction Products Directive (CPD) 89/106/EU.

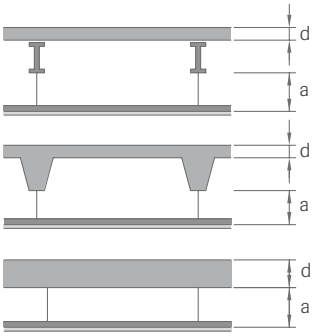
Part of the new regulation is the use of CE labelling for construction products that are regulated by a harmonised European Standard (hEN) or a European Assessment Document (EAD, formerly known as “ETAG”).

In addition a “Declaration of Performance” (DoP) will be issued for all CE labelled construction products. This declaration will show a number of key performance criteria as well as a unique identification code of the product type. This replaces the existing document known as a European Declaration of Conformity

The harmonised European Standard EN13964 (Suspended Ceilings Requirements and test Methods), covers a number of essential requirements including:

- reaction to fire
- mechanical safety
- acoustics
- others
- resistance to fire
- hygiene, health and environmental
- corrosion

Important: in case of resistance to fire a CE label and DoP for the whole kit (ceiling tiles + subconstruction) is mandatory according to EN 13964 ZA 1.1

Loadbearing structure	Types of structure and KIT reference number	Min. thickness of slab (d)	Min. cavity height (a)	Type of suspended ceiling OWAconstruct premium systems
	**Steel beam floor KIT-16-01/2012 - S 3 KIT-16-01/2012 - S 3a**	≥ 120 mm	≥ 200 mm	S 3 S 3a
	Steel beam floor KIT-11-01/2008 - S 3 KIT-11-01/2008 - S 3a	≥ 90 mm	≥ 250 mm ≥ 150 mm ≥ 120 mm	
	Steel beam floor KIT-27-01/2011 - S 3 KIT-27-01/2011 - S 3a	≥ 100 mm	≥ 200 mm	S 3
	Steel beam floor KIT-28-01/2015 - S 3	≥ 90 mm	≥ 250 mm	S 3
	Steel beam floor KIT-29-01/2018 - S 3	≥ 90 mm	≥ 250 mm	S 3
	Steel beam floor KIT-24-01/2014 - S 3	≥ 90 mm	≥ 250 mm	S 3 with mineral wool
	Steel beam floor KIT-17-01/2013 - S 15 cliq	≥ 90 mm	≥ 230 mm	S 15 cliq
	Steel beam floor KIT-18-01/2011 - S 15a cliq	≥ 100 mm	≥ 200 mm	S 15a cliq
	Steel beam floor KIT-19-01/2011 - S 18p/S 6a	≥ 100 mm	≥ 200 mm	S 18p = binder
	Steel beam floor KIT-20-01/2013 - S 1	≥ 90 mm	≥ 185 mm	S 1
	Steel beam floor KIT-30-01/2016 - S 7	≥ 90 mm	≥ 250 mm	S 7
	Steel beam floor KIT-25-01/2014 - S 15 b	≥ 90 mm	≥ 250 mm	S 15 b

Important note:

The KITs listed in the following tables cannot be combined with all OWAcoustic panel designs.

Tables 1 and 2 on pages 12 and 13 must be observed in connection with load-bearing structures and fire resistance durations (REI 30-REI 180).

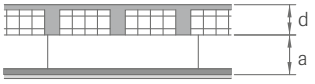
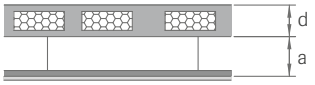
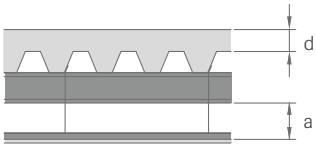
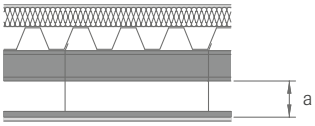
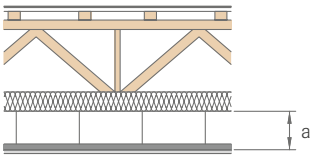
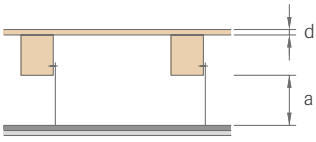
Load-bearing structures such as:
- steel beam floors with reinforced concrete slabs are also valid for steel and prestressed concrete constructions
- timber constructions
- light roof constructions

Please note that only the latest test certificates can be found in the following tables. Expired proofs of usability and systems, which are no longer listed here due to technical reasons, are not available anymore.

Applicability of the tile designs depends on table 1 (page 12) and table 2 (page 13)

OWAcoustic tiles *			Resistance to fire		Tested hanger (max. distance)			
Module	Thickness	Product surfaces	Classification min.	Test report no.	Centre of main tee	Centre of hangers	Hanger OWA-no.	Special characteristics
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	Product surfaces in table 1 (page 12)	**REI 120**	No. 297270/7130/CPD … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	
			REI 90	PB III/08-191-1Ä	1250 mm 1200 mm	1250 mm 1200 mm		
			REI 60					
			REI 30					
1250 x 625 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 60**	Nr. 282291/6095/CPD … and further reports	625 mm	1250 mm		
	14 mm nom.	Product surfaces in table 1 (page 12)						
625 x 625 mm 600 x 600 mm	15 mm 20 mm	Product surfaces in table 1 and 2 (pages 12/13) excepting Sinfonia Silencia	**REI 60**	PB 3.2/14-338-1, PB 3.2/15-411-1 … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	
625 x 625 mm 600 x 600 mm	20 mm	Product surfaces in table 1 and 2 (pages 12/13)	**REI 45**	PB 3.2/17-345-1 … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	
625 x 625 mm 600 x 600 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 120**	PB 3.2/13-320-1 … and further reports	625 mm	750 mm	See page 11	
625 x 625 mm 600 x 600 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 90**	PB 3.2/13-169-1 … and further reports	625 mm 600 mm	1250 mm 1200 mm	See page 11	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	Product surfaces in table 1 (page 12)	**REI 90**	No. 285878/6379/CPD … and further reports	625 mm 600 mm	1250 mm 1200 mm	See page 11	
≤ 2050 (tile length) x 312.5 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 90**	No. 285879/6380/CPD … and further reports	≤ 2130 mm	750 mm	See page 11	- C profile no. 36/70 - only in combination with surface-mounted luminaires
625 x 625 mm 600 x 600 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 90**	PB 3.2/13-018-1 … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	
2400 x 1200 mm	20 mm	Product surfaces in table 2 (page 13)	**REI 60**	PB 3.2/15-411-2 … and further reports	1000 mm	1000 mm	See page 11	
625 x 625 mm 600 x 600 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 30**	PB 3.2/13-322-1 … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	

* Please also see the corresponding data sheets

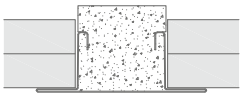
Loadbearing structure	Types of structure and KIT reference number	Min. thickness of slab (d)	Min. cavity height (a)	Type of suspended ceiling OWAconstruct premium systems
	**Reinforced block floor** **KIT-21-01/2013 - S 3** **KIT-21-01/2013 - S 3a**	≥ 200 mm	≥ 250 mm	S 3 S 3a
	**Reinforced concrete hollow slab** **KIT-10-01/2007 - S 3** **KIT-10-01/2007 - S 3a**	≥ 250 mm	≥ 250 mm	S 3 S 3a
	**Composite floor** **KIT-22-01/2009 - S 3** **KIT-22-01/2009 - S 3a**	≥ 70 mm	≥ 200 mm	S 3 S 3a
	**Steel roof construction with corrugated steel sheets insulation** **+ mineral wool** **KIT-23-01/2014 - S 3**	-	≥ 600 mm	S 3
	**Timber roof construction** **KIT-01-01/2005 - S 3** **KIT-01-01/2005 - S 3a**	-	≥ 250 mm	S 3 S 3a
	**Timber floor** **KIT-07-01/2008 - S 3**	timber beam wooden particle board 18 mm + gypsum fireboard 12.5 mm alternative screed structure	≥ 245 mm	S 3

Applicability of the tile designs depends on table 1 (page 12) and table 2 (page 13)

OWAcoustic tiles *			Resistance to fire		Tested hanger (max. distance)			
Module	Thickness	Product surfaces	Classification min.	Test report no.	Centre of main tee	Centre of hangers	Hanger OWA-no.	Special characteristics
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	Product surfaces in table 1 (page 12)	**REI 120**	No. 311867/8160/CPR … and further reports	1200 mm	900 mm	See page 11	
625 x 625 mm 600 x 600 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 180**	No. 234562/2488/CPD … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	Product surfaces in table 1 (page 12)	**REI 120**	No. 281196/6048/CPD … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	
625 x 625 mm 600 x 600 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 30**	PB 3.2/14-140-1	625 mm 600 mm	1250 mm 1200 mm	See page 11	97/30 97/32
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	Product surfaces in table 1 (page 12)	**REI 30**	PB 3222/3473-CR … and further reports PZ_3918_0633_CR PZ_3478_731_07	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	
625 x 625 mm 600 x 600 mm	15 mm	Product surfaces in table 1 (page 12)	**REI 30**	2007 - Efectis RO 574 (E) … and further reports	1250 mm 1200 mm	1250 mm 1200 mm	See page 11	

* Please also see the corresponding data sheets

Suspended ceiling | EI 30 self-contained fire protection units to EN 13501-2

Ceilings with independent fire resistance		Type of suspended ceiling		
EI 30 (a ↔ b) **[a = above, b = below]**	**Types of structure and KIT reference number**	**OWAconstruct premium systems**		
	OWAcoustic ceiling **Barriere** fire resistance from above and below tiles demountable	**Barriere A** clear span, concealed grid, demountable element length ≤ 1500 mm		
		Barriere B clear span, concealed grid, demountable element length ≤ 2250 mm		
		Barriere C clear span, concealed grid, demountable element length ≤ 1250 mm		

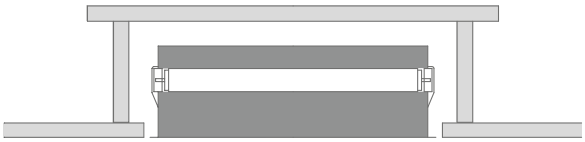
Applicability of the tile designs depends on table 1 (page 12) and table 2 (page 13)

OWAcoustic tiles/ elements			Resistance to fire		Tested hanger (max. distance)	
Module	**Thickness**	**Product surfaces**	**Classifi-cation min.**	**Test report no.**	**Centre of hangers**	**Hanger OWA-no.**
Type A width: 300 mm, 312,5 mm length: ≤ 1500 mm	40 mm	Sternbild Cosmos/N Cosmos/O	**EI 30** a ↔ b	PB 3.2/19-100-1 PB 3.2/19-100-2	**Type A** ≤ 800 mm	Nonius hanger no. 79/...
Type B width: 300 mm, 312,5 mm length: 1800 mm, 2000 mm, 2250 mm	44 mm			PB 3.2/18-300-4 PB 3.2/18-300-5	**Type B** ≤ 625 mm	
Type C width: 625 mm length: 1250 mm	40 mm			PB 3.2/18-262-1 PB 3.2/18-262-3	**Type C** ≤ 625 mm	

Light fittings

When installing recessed luminaires in an OWAcoustic fire resistant ceiling an OWAcoustic fire box should be installed to ensure continuity of fire resistance. It is important to ensure that the performance of the fire box matches that of the installed OWAcoustic ceiling.

Recessed light fittings



OWAcoustic standard ceilings
(steelbeam floor, timber roof construction, steel roof construction, timber floor)

OWAcoustic ceilings with recessed light fittings offer the same fire resistance as closed OWAcoustic ceilings, if the recessed light fittings are encased in a 15 mm thick MINOWA® firebox.

For details, see OWA installation Guide no. 9801 e.

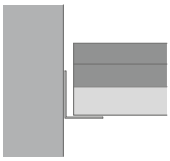
When using 40 mm thick OWAcoustic premium tiles, 40 mm thick MINOWA® tiles should be used and for 20 mm thick OWAcoustic premium tiles, 21mm thick MINOWA® tiles should be used.

Also see information sheet on fire protection enclosure no. 9905 e.

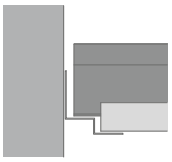
Thickness OWAcoustic tiles	Thickness firebox
14 mm, 15 mm	15 mm
20 mm	21 mm
≥ 40 mm	40 mm

Perimeter trims

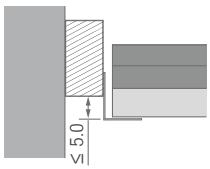
For fire resistant ceilings the perimeter trims should be installed in accordance with corresponding test report. Only approved fire resistant wall fixings should be used (ETA – European Technical Approval). Fixing centre ≤ 250 mm.



Standard wall perimeter
for all standard ceilings

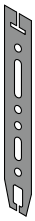


Wall perimeter
for Contura ceilings S 3a

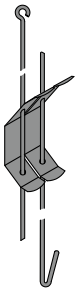


Wall perimeter
with shadow gap

Hangers and suspensions

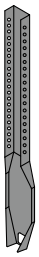


No. 11
Hangers for
exposed systems

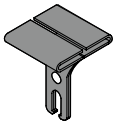


No. 12/.../...*
Double-adjustable hangers
exposed systems

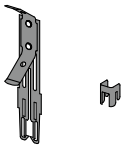
Pre-stressed wire
Ø ≥ 2.0 mm; fixing ends are
bound at least 3 times



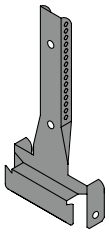
No. 17/45
Nonius hangers for
exposed systems



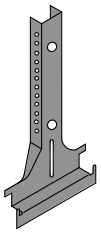
No. 90
Hanger clips, adjustable
for steal beams



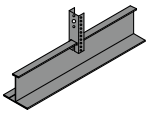
No. 12/44*
“Click”, adjustable hangers



No. 2001
OWAplan



No. 79/...
Bandraster system



No. 09/10
Nonius hanger

*** Adjustable hangers** are **not** to be used with timber constructions REI 90.

Top fixings

Only approved fire resistant top fixings suitable for the substrate should be used (ETA – European Technical Approval).

Verification

For fire resistance requirements relating to OWAcoustic ceilings, it is recommended that you clarify the design for the relevant requirement prior to ordering and installing the ceiling.

When placing an order, please request the documents from your dealer by providing a completed checklist (download right). This is required in order to provide the correct documents (DoP, CE-KIT label).

OWA fire protection documents are only valid if OWAcoustic-tiles and original OWAconstruct system components (as tested) are used.

Table 1

Product surfaces for all KITs	Reinforced concrete/ steel beam floor: fire resistance classification REI in accordance with EN 13501-2 up to *	Timber beam floor/gang-nail trusses/ light roofs: fire resistance classification REI in accordance with EN 13501-2
Bamboo	180	30
Constellation	180	30
Cosmos	180	30
Creaprint Constellation	180	30
Finetta	180	30
Harmony	180	30
Janus (Cosmos, Constellation)	180	30
NEW Sandila	180	30
Plain	180	30
Regular perforated, 20 mm	180	30
Sinfonia dB	180	30
Sinfonia Privacy	180	30
Sinfonia Reflecta	180	30

* Depending on system, tile dimensions and design

Table 2

Product surfaces for KIT 28-01/2015 only for steel beam or concrete floors	Reinforced concrete/ steel beam floor: fire resistance classification REI in accordance with EN 13501-2 up to *	Timber beam floor/gang-nail trusses/ light roofs: fire resistance classification REI in accordance with EN 13501-2
Bolero	60	–
Brillianto A	60	–
Creaprint Sinfonia	60	–
Multi Alpha	60	–
Ocean	60	–
OWAlux	60	–
OWAplan°	60	–
RAW°	60	–
Sinfonia	60	–
Sinfonia Balance	60	–
Sinfonia Humancare	60	–
Sinfonia Silencia°2	45	–

° Only applies to KIT-30-01/2016
°2 Only applies to KIT-29-01/2018

* Depending on system, tile dimensions and design

Notes

Technical assistance

This brochure provides a very brief outline of European Standard EN 13501 and how OWAcoustic ceilings can help meet your fire resistance requirements.

If you require further information or assistance on any aspect of your proposed ceiling installation please contact us or visit our website.

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Product warranties

The information provided in this leaflet is based on the standards and data available at the time of publication. Any performance, warranties or guarantees provided, expressed or implied, are subject to the exclusive use of OWA components and the installation of those components in accordance with our recommendations. Failure to adhere to these conditions will result in the invalidation of any performance claims, warranties or guarantees and rejection of any liability. OWA reserves the right to make any technical improvements to the products, systems or services without prior notice. **All goods and services are supplied in accordance with our current Terms and Conditions of Sale.** Errors excepted!

The information in this brochure is up-to-date at the time of publication. Errors and mistakes excepted. With the publication of this issue, all previous brochures no. 9500 eu/e are invalid. Please contact our competence team OWAconsult for specific advice. Our experts will be happy to answer your questions under the following contact details: tel: +49 9373 201-444 or e-mail: info@owaconsult.de

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