

CLASSIFICATION OF FIRE RESISTANCE FIRES-JR-031-16-NURE

OBO function maintenance with BITNER cables

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FUNCTION IN FIRE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION IN ACCORDANCE WITH DIN 4102-12: 1998-11

FIRES-JR-031-16-NURE

Name of the product: OBO function maintenance with BITNER cables

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1. INTRODUCTION

This expert judgement report with classification defines the function in fire classification assigned to element OBO function maintenance with BITNER cables in accordance with the classes given in DIN 4102-12: 1998-11.

This test was carried out according to standard STN 92 0205 and meets requirements of DIN 4102-12: 1998-11. Basic deviation in process and carrying out of test between these standards is in measuring and in control of temperature in the test furnace. According to STN 92 0205, plate thermometers according to EN 1363-1 are used. According to DIN 4102-12: 1998-11, common thermocouples of construction which was used for this measurement till issue of EN 1363-1 are used. Measurement by plate thermometers acc. to EN 1363-1 can be considered as stricter method of temperature control in test furnace in compare with thermocouples used till issue of EN 1363-1. Therefore, it is possible to use results of test according to STN 92 025 for classification of tested cables according to DIN 4102-12: 1998-11, but not conversely.

This expert judgement report defines field of application which is outside the field of direct application according test standard or outside the field of extended application according to relevant extended application standard. This expert judgement expresses the opinion of the FIRES and is based on the experience or internal rules of FIRES.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The product, OBO function maintenance with BITNER cables, is defined as a cable bearing system with cables with circuit integrity maintenance classes.

2.2 PRODUCT DESCRIPTION

Product comprise of Cable bearing system OBO Bettermann – cable mesh trays, cable hangers, cable clips and branching boxes FireBox with accessories (consoles, brackets, supports, hangers, etc.) and power and communication non-halogen cables business BITNER.

Cable mesh tray GR-Magic®

Cable mesh tray is made of steel wire \varnothing 3,9 mm and \varnothing 4,8 mm. Height of side wall is 55 mm and maximum tested width of mesh tray is 400 mm. Mesh trays are fixed together by integrated coupling or by connectors (GSV34). Maximum tested loading is 15kg.m^{-1} . Tested mesh trays are GRM 55 400 and GRM 55 50.

Single cable clip 1015

Cable clip is made of steel sheet thickness 1,5 mm. Clips are used for fixing of cables to ceiling or wall.

Support US 3 and console US 3 K

Support with dimensions (30 x 50) mm is made of steel sheet thickness 2,0 mm. Support is used together with threaded rods to gripping trays or ladders to the ceiling.

Bracket MWAG 12

Bracket is made of steel sheet thickness from 1,5 mm to 2,0 mm. Width of bracket is from 110 mm up to 410 mm. Brackets are used for gripping trays or ladders to the ceiling or wall.

Cable hanger OBO Grip

Hanger M15 with dimensions (35 x 60 x 30) mm is made of steel sheet thickness 0,7 mm.

Hanger M30 with dimensions (50 x 85 x 33) mm is made of steel sheet thickness 1,0 mm.

Hanger M70 with dimensions (104 x 126 x 80) mm is made of steel sheet thickness 1,5 mm.



Branching box FireBox B 100E and B 250E

Branching boxes and lids of boxes FireBox B 100E a B 250E are made from non-halogen duroplast. Transition of cables to box is providing by disruptive cable bushing from ethylene vinyl acetate EVA. Ceramic clamp are used for connection of working conductors of cables in boxes. It is possible to use steel cage clamp for connection of protecting conductor which also ensure electric connection of steel supporting construction of ceramic clamps. Steel cage clamp consists of space shaped steel sheet supporting part and steel strap which ceramic clamps are clap on. Steel supporting part is always fixed across wall of box to building construction. Clamps used in boxes FireBox B 100E are designed for cable conductors with cross-section up to 4 mm². Clamps used in boxes FireBox B 250E are designed for cable conductors with cross-section up to 16 mm². Boxes are fixed at mounting sheets MP 225 UNI.

Cables

Fire resistant power and control cables have E90 fire integrity function which means the assurance of power supply or control under fire conditions for 90 minutes. They are intended for use in buildings with increased fire safety requirements due to high concentration of people, material and cultural assets of high value (sky scrapers, hospitals, shopping centres, tunnels, museums, cinemas, theatres). Cables can be used for power supply or control (lighting, lifts, fire-fighting equipment, pumps). They can be used in fixed installations inside buildings. In case of outdoor application cables should be secured against UV radiation and the external factors. Cables with improved fire characteristic E90 must be installed on the supporting systems tested according to DIN 4102-12.

Cables

Used cables by test:	NHXXH FE180/E90 4x1,5RE	(14 x)
	NHXXH FE180/E90 4x10RE	(3 x)
	NHXXH FE180/E90 4x16RM	(3 x)
	NHXXH FE180/E90 4x50RM	(6 x)
	NHXXCH FE180/E90 4x1,5RE/1,5	(13 x)
	NHXXCH FE180/E90 4x10RE/10	(3 x)
	NHXXCH FE180/E90 4x16RM/16	(2 x)
	NHXXCH FE180/E90 4x50RM/25	(6 x)
	JE-H(St)H FE180/E90 2x2x0,8	(12 x)
	HTKSHekw FE180/E90 1x2x0,8	(14 x)
	HTKSHekw FE180/E90 1x2x1,4	(4 x)
	HTKSHekw FE180/E90 3x2x0,8	(2 x)

The length of cables was 5,5 m and 4,0 m from that was exposed to fire.

More detailed information about product construction is shown in drawings in test report [1].

3. TEST REPORTS AND EXTENDED APPLICATION REPORTS IN SUPPORT OF CLASSIFICATION

3.1 TEST REPORTS AND EXTENDED APPLICATION REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method
[1]	FIRES, s.r.o., Batizovce, SR	OBO Bettermann Polska Sp. z o.o., PL Zakłady Kablowe BITNER spółka jawna, PL	FIRES-FR-076-10-AUNE	22. 04. 2010	DIN 4102-12: 1998-11

[1] Test specimens were conditioned according to EN 1363-1 before the fire resistance test



3.2 TEST RESULTS

No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
[1] DIN 4102-12: 1998-11	1	cable NHXCH FE180/E90 4x1,5RE/1,5	12	90 minutes no failure / interruption
	2	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	3	cable NHXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
	4	cable NHXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
	5	cable NHXH FE180/E90 4x16RM + branching box FireBox B 250E		37 minutes
	6	cable NHXH FE180/E90 4x1,5RE	11	80 minutes
	7	cable NHXH FE180/E90 4x1,5RE		87 minutes
	8	cable NHXH FE180/E90 4x50RM		90 minutes no failure / interruption
	9	cable NHXH FE180/E90 4x50RM		90 minutes no failure / interruption
	10	cable NHXH FE180/E90 4x1,5RE + branching box FireBox B 100E		18 minutes
	11	cable NHXCH FE180/E90 4x1,5RE/1,5	3	67 minutes
	12	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	13	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	14	cable NHXCH FE180/E90 4x10RE/10		90 minutes no failure / interruption
	15	cable NHXCH FE180/E90 4x10RE/10		90 minutes no failure / interruption
	16	cable NHXCH FE180/E90 4x10RE/10	10	90 minutes no failure / interruption
	17	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	18	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	19	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
	20	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
	21	cable NHXCH FE180/E90 4x16RM/16		90 minutes no failure / interruption
	22	cable NHXCH FE180/E90 4x16RM/16		90 minutes no failure / interruption
	23	cable NHXH FE180/E90 4x16RM		90 minutes no failure / interruption
	24	cable NHXH FE180/E90 4x16RM	9	90 minutes no failure / interruption
	25	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	26	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	27	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
	28	cable NHXH FE180/E90 4x1,5RE		41 minutes
	29	cable NHXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
	30	cable NHXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
	31	cable NHXH FE180/E90 4x50RM		90 minutes no failure / interruption
	32	cable NHXH FE180/E90 4x50RM	7	90 minutes no failure / interruption
	33	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	34	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	35	cable NHXH FE180/E90 4x1,5RE		54 minutes
	36	cable NHXH FE180/E90 4x1,5RE	3	90 minutes no failure / interruption
	37	cable NHXH FE180/E90 4x10RE		90 minutes no failure / interruption
	38	cable NHXH FE180/E90 4x10RE		90 minutes no failure / interruption
	39	cable NHXH FE180/E90 4x10RE		90 minutes no failure / interruption
	40	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
	41	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
	42	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption



No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
[1] DIN 4102-12: 1998-11	43	cable NHXCH FE180/E90 4x50RM/25	1	90 minutes no failure / interruption
	44	cable NHXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
	45	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	46	cable NHXCH FE180/E90 4x1,5RE/1,5		90 minutes no failure / interruption
	47	cable NHXH FE180/E90 4x50RM	2	90 minutes no failure / interruption
	48	cable NHXH FE180/E90 4x50RM		90 minutes no failure / interruption
	49	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
	50	cable NHXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
	52	cable JE-H(St)H FE180/E90 2x2x0,8	12	63 minutes
	53	cable JE-H(St)H FE180/E90 2x2x0,8		72 minutes
	54	2 cables HTKSHekw FE180/E90 1x2x0,8	11	34 minutes
	55	2 cables HTKSHekw FE180/E90 1x2x0,8	10	61 minutes
	56	cable JE-H(St)H FE180/E90 2x2x0,8		67 minutes
	57	cable JE-H(St)H FE180/E90 2x2x0,8		72 minutes
	58	2 cables HTKSHekw FE180/E90 1x2x0,8	9	41 minutes
	59	cable JE-H(St)H FE180/E90 2x2x0,8		71 minutes
	60	cable JE-H(St)H FE180/E90 2x2x0,8		65 minutes
	61	2 cables HTKSHekw FE180/E90 1x2x0,8	8	34 minutes
	62	cable JE-H(St)H FE180/E90 2x2x0,8		90 minutes no failure / interruption
	63	cable JE-H(St)H FE180/E90 2x2x0,8		90 minutes no failure / interruption
	64	2 cables HTKSHekw FE180/E90 1x2x0,8	6	63 minutes
	65	cable JE-H(St)H FE180/E90 2x2x0,8		83 minutes
	66	cable JE-H(St)H FE180/E90 2x2x0,8		70 minutes
	67	2 cables HTKSHekw FE180/E90 1x2x0,8	5	56 minutes
	68	2 cables HTKSHekw FE180/E90 1x2x1,4	4	90 minutes no failure / interruption
	69	cable JE-H(St)H FE180/E90 2x2x0,8	1	61 minutes
	70	cable JE-H(St)H FE180/E90 2x2x0,8		90 minutes no failure / interruption
	71 – 73	2 cables HTKSHekw FE180/E90 3x2x0,8		11 minutes
	74	2 cables HTKSHekw FE180/E90 1x2x0,8	2	36 minutes
	75	2 cables HTKSHekw FE180/E90 1x2x1,4		56 minutes

[1] The test was discontinued in 91st minute at the request of test sponsor

Specimens S1 – S50 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S75 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V / 0,03W.

Circuit breakers with rating 3 A were used.



4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 3.2 of DIN 4102 – 12: 1998-11.

4.2 CLASSIFICATION ACCORDING TO DIN 4102-12: 1998-11

The element, **OBO function maintenance with BITNER cables**, is classified according to the following combinations of performance parameters and classes as appropriate.

Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections and number of conductors)	Classification for cable
NHXCH FE180/E90	NHXCH FE180/E90 4x1,5RE/1,5	Cable mesh tray GRM 55 400. Consoles combined of horizontal supports US3 and two threaded rods 2078/M10, anchors FAZ II 10/10. Loading 15kg.m ⁻¹ . Consoles in spacing of 1500 mm. Tracks No. 1 and 2.	E 90	$n \times \geq 1,5 \text{ mm}^2$ $n \geq 2$ E 90
	NHXCH FE180/E90 4x50RM/25		E 90	
NHXH FE180/E90	NHXH FE180/E90 4x1,5RE		E 90	$n \times \geq 1,5 \text{ mm}^2$ $n \geq 2$ E 90
	NHXH FE180/E90 4x50RM		E 90	
HTKSHekw FE180/E90	HTKSHekw FE180/E90 1x2x0,8		E 90	$n \times 2 \times \geq 0,8 \text{ mm}$ $n \geq 1$ E 90
	HTKSHekw FE180/E90 1x2x1,4		E 90	$n \times 2 \times \geq 1,4 \text{ mm}$ $n \geq 1$ E 90
JE-H(St)H FE180/E90	JE-H(St)H FE180/E90 2x2x0,8		E 90	$n \times 2 \times \geq 0,8 \text{ mm}$ $n \geq 2$ E 90
NHXCH FE180/E90	NHXCH FE180/E90 4x1,5RE/1,5	Cable clips 732 fixed to ceiling by anchors FNA II M6/5 in spacing of 600 mm. Track No. 3.	E 90	$n \times \geq 1,5-10 \text{ mm}^2$ $n \geq 2$ E 90
	NHXCH FE180/E90 4x10RE/10		E 90	
NHXH FE180/E90	NHXH FE180/E90 4x1,5RE		E 90	$n \times \geq 1,5-10 \text{ mm}^2$ $n \geq 2$ E 90
	NHXH FE180/E90 4x10RM		E 90	
HTKSHekw FE180/E90	HTKSHekw FE180/E90 1x2x0,8	Single cable clips 1015 fixed to ceiling by anchors FNA II 6/5 in spacing of 600 mm. Tracks No. 4 and 6.	E 90	$n \times 2 \times \geq 0,8 \text{ mm}$ $n \geq 1$ E 90
	HTKSHekw FE180/E90 1x2x1,4		E 90	$n \times 2 \times \geq 1,4 \text{ mm}$ $n \geq 1$ E 90
JE-H(St)H FE180/E90	JE-H(St)H FE180/E90 2x2x0,8		E 90	$n \times 2 \times \geq 0,8 \text{ mm}$ $n \geq 2$ E 90
HTKSHekw FE180/E90	HTKSHekw FE180/E90 1x2x0,8	Single cable clips 1015 fixed to ceiling by dowels MD6 and screws GoldenSprint 4758/6x40 in spacing of 600 mm. Track No. 5.	E 90	$n \times 2 \times \geq 0,8 \text{ mm}$ $n \geq 1$ E 90



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections and number of conductors)	Classification for cable
NHXCH FE180/E90	NHXCH FE180/E90 4x1,5RE/1,5	Cable mesh tray GRM 55 50 fixed to ceiling by mounting plate MPG/65, threaded rods 2078/M8 and anchors FZEA II 10x40/M8. Loading 2,5kg.m ⁻¹ . Consoles in spacing of 1500 mm. Tracks No. 7 and 8.	E 90	Without classification
NHXH FE180/E90	NHXH FE180/E90 4x1,5RE		E 90	Without classification
JE-H(St)H FE180/E90	JE-H(St)H FE180/E90 2x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 2 E 90
HTKSHekw FE180/E90	HTKSHekw FE180/E90 1x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90
NHXCH FE180/E90	NHXCH FE180/E90 4x1,5RE/1,5	Cable hangers OBO Grip 2031 (M15, M30, M70) fixed to ceiling by anchors FNA II 6/M6 in spacing of 600 mm. Track No. 9.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	NHXCH FE180/E90 4x50RM/25		E 90	
NHXH FE180/E90	NHXH FE180/E90 4x1,5RE		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	NHXH FE180/E90 4x50RM		E 90	
JE-H(St)H FE180/E90	JE-H(St)H FE180/E90 2x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 2 E 90
HTKSHekw FE180/E90	HTKSHekw FE180/E90 1x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90
NHXCH FE180/E90	NHXCH FE180/E90 4x1,5RE/1,5	Single cable clips 1015 fixed to ceiling by dowels MD6 and screws GoldenSprint 4758/6x40 or anchors FNA II 6/M6 in spacing of 300 mm. Track No. 10.	E 90	n x ≥ 1,5-16 mm ² n ≥ 2 E 90
	NHXCH FE180/E90 4x16RM/16		E 90	
NHXH FE180/E90	NHXH FE180/E90 4x1,5RE		E 90	n x ≥ 1,5-16 mm ² n ≥ 2 E 90
	NHXH FE180/E90 4x16RM		E 90	
JE-H(St)H FE180/E90	JE-H(St)H FE180/E90 2x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 2 E 90
HTKSHekw FE180/E90	HTKSHekw FE180/E90 1x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90
NHXCH FE180/E90	NHXCH FE180/E90 4x1,5RE/1,5	Cable mesh tray GRM 55 400. Consoles US3K, brackets MWAG12, side holders SH M10, threaded rods 2078/M8, anchors FRS 10x25 and FZEA II 10x40. Loading 15kg.m ⁻¹ . Consoles in spacing of 1500 mm. Tracks No. 11 and 12.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	NHXCH FE180/E90 4x50RM/25		E 90	
NHXH FE180/E90	NHXH FE180/E90 4x1,5RE		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	NHXH FE180/E90 4x50RM		E 90	
NHXH FE180/E90	NHXH FE180/E90 4x1,5RE + branching box FireBox B 100E		Without classification	Without classification
	NHXH FE180/E90 4x16RM + branching box FireBox B 250E		E 90	
JE-H(St)H FE180/E90	JE-H(St)H FE180/E90 2x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 2 E 90
HTKSHekw FE180/E90	HTKSHekw FE180/E90 1x2x0,8		E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90



The element, OBO function maintenance with BITNER cables with circuit integrity maintenance classes are classified to classes according to achieved test results of tested cables at tracks. Other classification is not allowed.

4.3 FIELD OF APPLICATION

This classification is valid for the following end use applications:

- § throughout the period during which circuit integrity is to be maintained, neighbouring building components shall not have a negative effect on circuit integrity;
- § classification for type of cable (by cross-sections and number of conductors) is valid only for tested cable types, number and cross-sections of conductors;
- § classification for cable is valid for all numbers and cross-sections of tested cable type;
- § although testing is only carried out on cables arranged horizontally, test results also apply to cables arranged either diagonally or vertically (e.g. risers), as long as the cable system is supported in transitional areas (i.e. where it switches from a horizontal to a vertical arrangement) in such a manner that the cables will not slip or kink at corners;
- § test results of function in fire test of cables tested at standard supporting construction are also applicable for tested standard supporting construction of other producers;
- § test results of function in fire test of cables tested at standard supporting construction are also applicable for cables of other producers tested at standard supporting construction;
- § test results of function in fire test of cables at nonstandard supporting construction are valid only for tested construction with particular tested cable type and are also applicable for supporting construction with smaller spacing of consoles and smaller loading;
- § test results of cables tested in cable trays or ladders are applicable also for cable trays and ladders with particular construction with smaller width as tested with particular smaller loading;
- § test results of cables tested at cable trays or ladders are applicable also for another products trays and ladders (cross, elbow, T-bend, bends and etc.);
- § maximal length of increasing routing shall be 3500 mm with consistent horizontal placing of cable with minimal length of 300 mm (apart from cable bending) and with maximal spacing of clips of 300 mm, eventually the cables are stabilized by cable transmissions at floor or ceiling with particular fire resistance;
- § for vertical systems, the test results obtained for cables mounted singly on the ceiling using single clips apply. Brackets of proven suitability may also be used, as long as their spacing is equal to that of the single clips tested;
- § results of testing single cables on the ceiling apply also to cables mounted horizontally on walls;
- § results of testing bunched cables on a ladder or tray also apply to support construction attached to a wall. However, such constructions required proof of suitability by means of a test certificate or other document issued by an accredited testing laboratory;
- § test results are applicable only for systems without connection elements (e.g. junction box, branch bar).

5. LIMITATIONS

This classification document does not represent type approval or certification of the product.

The classification is valid until 09. 03. 2021 provided that the product, field of application and standards and regulations are not changed.

Approved:

Ing. Štefan Rástocký
leader of the testing laboratory



Signed:

Bc. Dávid Šubert
technician of the testing laboratory