BITNER®
CABLE FACTORY

OFFSHORE CABLES

NEK 606

TYPE APPROVED PRODUCT
DNV·GL
MARITIME

CONTACT DETAILS:

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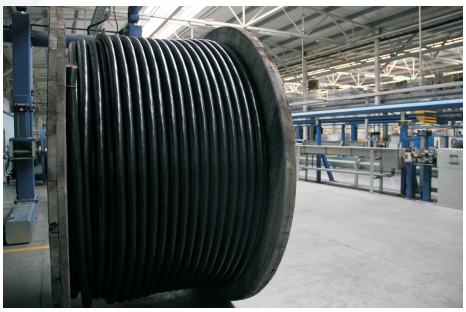


BITNER®

COMPANY PROFILE

CABLE FACTORY BITNER, established in 1996, is a Polish manufacturer of cables based just outside the city of Krakow. The company ethos is based on the most modern technology whilst having the most reliable and proven team of experienced employees.

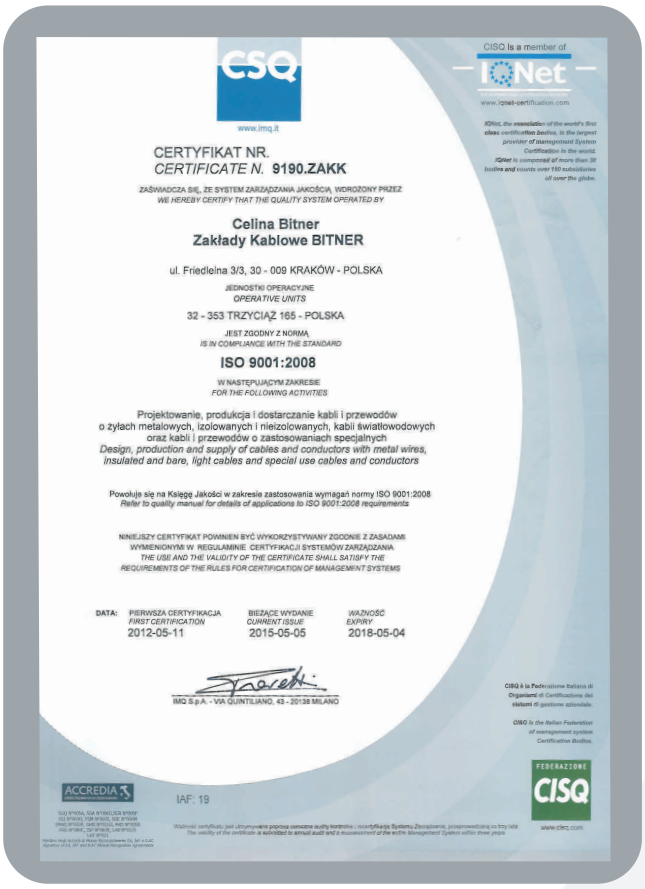
In the production of our cables we use the most up-to-date machinery and superior quality raw materials.

CABLE FACTORY BITNER apply significant pressure on the quality of manufactured products, in accordance with company quality management system's procedures, protection of the environment and workflow. Procedures and requirements are described by integrated Quality and Environmental Management System confirmed by certificates: ISO 9001, AQAP 2120, ISO 14001 and additional homologations and product certificates.

CABLE FACTORY BITNER guarantee professional and complete customer service, flexibility and timely deliveries.

Constant development of product range, modernisation of production processes, IT investments, constant development of employees' qualifications and improvements in logistics allow Cable Factory Bitner to compete effectively on both domestic and export markets.

QUALITY, INNOVATION AND ENVIRONMENTAL PROTECTION



CERTYFIKAT NR.
CERTIFICATE N. **9190.ZAKK**

ZAŚWIADCZA SIĘ, ŻE SYSTEM ZARZĄDZANIA JAKOŚCIĄ WDROŻONY PRZEZ
WE HEREBY CERTIFY THAT THE QUALITY SYSTEM OPERATED BY

Celina Bitner
Zakłady Kablowe BITNER

ul. Friedleina 3/3, 30 - 009 KRAKÓW - POLSKA

JEDNOSTKI OPERACYJNE
OPERATIVE UNITS

32 - 353 TRZYCIĄŻ 165 - POLSKA

JEST ZGODNY Z NORMĄ
IS IN COMPLIANCE WITH THE STANDARD

ISO 9001:2008

W NASTĘPUJĄCYM ZAKRESIE
FOR THE FOLLOWING ACTIVITIES

Projektowanie, produkcja i dostarczanie kabli i przewodów o żyłach metalowych, izolowanych i nieizolowanych, kabli światłowodowych oraz kabli i przewodów o zastosowaniach specjalnych
Design, production and supply of cables and conductors with metal wires, insulated and bare, light cables and special use cables and conductors

Powołuje się na Księgę Jakości w zakresie zastosowania wymagań normy ISO 9001:2008
Refer to quality manual for details of applications to ISO 9001:2008 requirements

NINIEJSZY CERTYFIKAT POWINIEN BYĆ WYKORZYSTYWANY ZGODNIE Z ZASADAMI WYMIENIONYMI W REGULAMINIE CERTYFIKACJI SYSTEMÓW ZARZĄDZANIA
THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE REQUIREMENTS OF THE RULES FOR CERTIFICATION OF MANAGEMENT SYSTEMS

DATA:	PIERWSZA CERTYFIKACJA	BIEŻĄCE WYDANIE	WAŻNOŚĆ
	FIRST CERTIFICATION	*CURRENT ISSUE*	*EXPIRY*
	2012-05-11	2015-05-05	2018-05-04

IMQ S.p.A. - VIA QUINTILIANO, 43 - 20138 MILANO

IAF: 19

A few years ago Cable Factory Bitner - taking into consideration its development strategy, customer requirements and the steady increase in competition - conducted a complete implementation of an ISO 9001, ISO 14001 Quality Management System.
The Quality Management System covers the entire scope of the company's operations, from the preparation of production, through manufacturing, warehousing, logistics, right up to corporate governance and waste management.

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and its partner
CISQ/IMQ-CSQ
hereby certify that the organization

Celina Bitner
Zakłady Kablowe BITNER
32 - 353 TRZYCIĄŻ 165 - POLSKA

for the following field of activities

Design, production and supply of cables and conductors with metal wires, insulated and bare, light cables and special use cables and conductors

Refer to quality manual for details of applications to ISO 9001:2008 requirements

has implemented and maintains a
Quality Management System
which fulfills the requirements of the following standard

ISO 9001:2008

Issued on: 2015 - 05 - 05 Expiry date: 2018 - 05 - 04

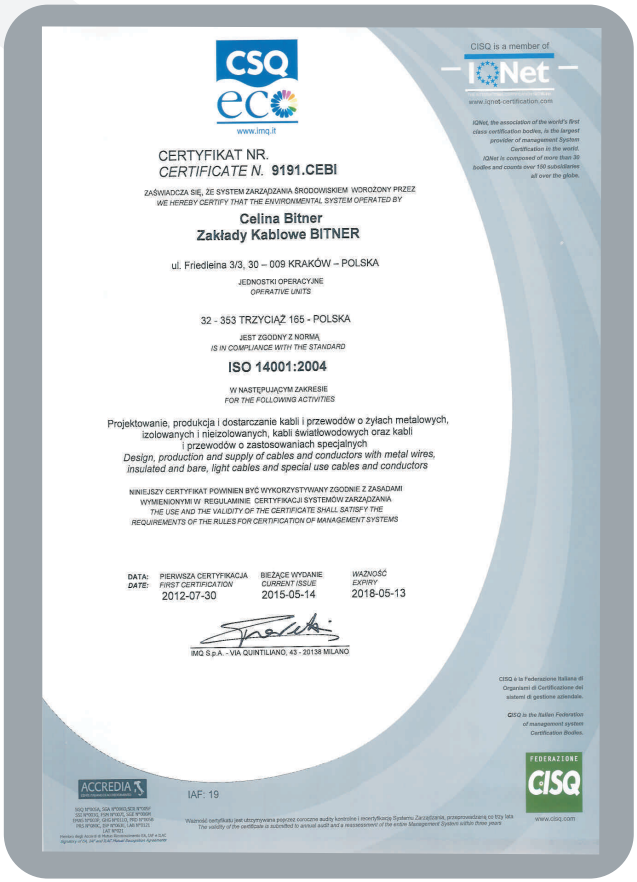
Registration Number: IT – 83990

The status of validity of the certificate can be verified at http://www.cisq.com or by e-mail to fedcisq@cisq.com

Michael Drechsel
President of IQNET

Ing. Claudio Provetti
President of CISQ

IQNet Partners*:
AENOR *Spain* AFNOR Certification *France* AIB-Vincotte International *Belgium* ANCE-SIGE *Mexico* APCER *Portugal* CCC *Cyprus* CISQ *Italy* CQC *China* CQM *China* CQS *Czech Republic* Cro Cert *Croatia* DQS Holding GmbH *Germany* FCAV *Brazil* FONDONORMA *Venezuela* ICONTEC *Colombia* IMNC *Mexico* Inspecta Certification *Finland* IRAM *Argentina* JQA *Japan* KFQ *Korea* MIRTEC *Greece* MSZT *Hungary* Nemko AS *Norway* NSAI *Ireland* PCBC *Poland* Quality Austria *Austria* RR Russia SII Israel SIQ Slovenia SIRIM QAS International Malaysia SQS *Switzerland* SRAC *Romania* TEST St Petersburg *Russia* TSE *Turkey* YUQS *Serbia*
IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.
* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com



CERTYFIKAT NR.
CERTIFICATE N. **9191.CEBI**

ZAŚWIADCZA SIĘ, ŻE SYSTEM ZARZĄDZANIA ŚRODOWISKIEM WDROŻONY PRZEZ
WE HEREBY CERTIFY THAT THE ENVIRONMENTAL SYSTEM OPERATED BY

Celina Bitner
Zakłady Kablowe BITNER

ul. Friedleina 3/3, 30 – 009 KRAKÓW – POLSKA

JEDNOSTKI OPERACYJNE
OPERATIVE UNITS

32 - 353 TRZYCIĄŻ 165 - POLSKA

JEST ZGODNY Z NORMĄ
IS IN COMPLIANCE WITH THE STANDARD

ISO 14001:2004

W NASTĘPUJĄCYM ZAKRESIE
FOR THE FOLLOWING ACTIVITIES

Projektowanie, produkcja i dostarczanie kabli i przewodów o żyłach metalowych, izolowanych i nieizolowanych, kabli światłowodowych oraz kabli i przewodów o zastosowaniach specjalnych
Design, production and supply of cables and conductors with metal wires, insulated and bare, light cables and special use cables and conductors

NINIEJSZY CERTYFIKAT POWINIEN BYĆ WYKORZYSTYWANY ZGODNIE Z ZASADAMI WYMIENIONYMI W REGULAMINIE CERTYFIKACJI SYSTEMÓW ZARZĄDZANIA
THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE REQUIREMENTS OF THE RULES FOR CERTIFICATION OF MANAGEMENT SYSTEMS

DATA:	PIERWSZA CERTYFIKACJA	BIEŻĄCE WYDANIE	WAŻNOŚĆ
DATE:	*FIRST CERTIFICATION*	*CURRENT ISSUE*	*EXPIRY*
	2012-07-30	2015-05-14	2018-05-13

IMQ S.p.A. - VIA QUINTILIANO, 43 - 20138 MILANO

IAF: 19

CABLE FACTORY BITNER, a modern manufacturing company which has 20 thousand square metres of production, warehouse and office space and in addition hectares of land adjacent to the factory for our continued expansion.

Within the factory:
modern machinery: insulating lines, sheathing lines, rubber cable production lines, cable stranding machines, braiding machines, and a fully equipped metal workshop for the production of copper and aluminium conductors.

- ✓ 300-strong team of experienced employees
- ✓ Excellently equipped in-house laboratories
- ✓ Experienced production technology and development department
- ✓ Quality certificates and product certificates;
- ✓ Full range of cables up to 30 kV, with plastic and rubber sheaths and insulation, which are in continuous production.

CABLE FACTORY BITNER has cemented its position as one of the largest manufacturers of cables and wires on the Polish market.

The present position of the company is the result of dynamic development, achieved thanks to numerous investment projects and the dedicated work of the entire team involved.

The quality and effectiveness of operation of the company is confirmed by the steadily growing number of customers and the awards which it has received:

- ✓ the Business Gazelle prize (”Gazela Biznesu”) awarded by “Puls Biznesu” magazine to the company a number of times
- ✓ nomination for Poland NOW emblem ("TERAZ Polska")
- ✓ 1st place and the title of the European Company in a competition organized by “Gazeta Prawna” magazine (2007)
- ✓ the title of Good Company 2007 ("Dobra Firma 2007") in a ranking organized by “Rzeczpospolita” newspaper (20 best Polish companies)
- ✓ the Forbes' Diamonds 2008 commendation ("Diamenty Forbesa 2008") and the Forbes' Diamonds 2009 prize ("Diamenty Forbesa 2009") for the best companies, awarded by FORBES monthly
- ✓ “Elektroprodukt Roku 2008” award

OFFSHORE CABLES

CABLE FACTORY BITNER'S range of Offshore Energy Cables covers Power, Control and Instrumentation. They are certified by DNV-GL, for use on any Offshore installation in what is undoubtedly the harshest and most demanding of environments.

Manufactured in accordance with the latest International Standards, our product range is consistently being reviewed by our R&D departments to bring the client the most currently available in the upstream sector today.

The cables are used by the Oil & Gas Operators on any one of the various types of Upstream Offshore installations such as Fixed or Mobile Rigs, Drillship's, Jack Ups, Floating Production Storage Offloading Vessels (FPSO) situated anywhere around the world.

The safety of the personnel aboard is of paramount importance and BITNER covers the full range of Halogen-Free & Fire Resistant types available. Halogen-Free material reduces the amount of fumes evolved during initial combustion as well as acid and gas emissions during the fire therefore assisting for a quick and safe evacuation and preserving human safety at all time by continuing to provide power and services to directly affected areas of the fire.

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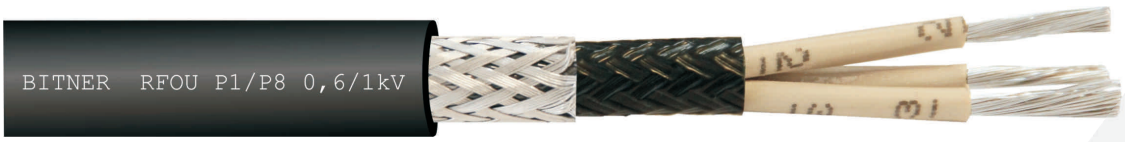
Manufacturing Programme - NEK TS 606:2009

Halogen-Free Mud Resistant Flame Retardant Fire Resistant

RFOU P1/P8 0,6/1kV

Standard NEK TS 606:2009



RoHS 2011/65/EU

LVD 2006/95/WE

Technical data:

Operating temperature: 90°C
Operating voltage: 0,6/1 kV
Min. bending radius during installation: 4xD
Min. bending radius for fixed installation: 4xD
Max. tensile load during installation: 50 N /mm²
Min. installation temperature: -20°C

Standards applied:

IEC 60092-353 - Design
IEC 60228 class 2 - Conductor
IEC 60092-351 - Insulation
IEC 60092-359 - Sheath
IEC 60332-1 - Flame Retardant
IEC 60332-3-22 - Flame Retardant
IEC 60754-1,2 - Halogen-Free
IEC 61034-1,2 - Low Smoke
IEC 61892-4 - Electrical installations

Construction:

Conductor: Stranded/flexible tinned Cu (class 2 as per IEC60228)
Insulation: EPR Rubber (HEPR)
Inner sheath: Halogen-free thermoset compound
Tape over inner sheath: Polyester tape
Armour: Tinned copper wire braiding
Tape over armour: Polyester tape
Outer sheath: SHF2 MUD
Sheath marking: Bitner RFOU 0,6/1kV P1/P8 core x size/braid year metre mark
Outer sheath colour: Black
Flame retardant: IEC 60332-1 / IEC 60332-3-22 Cat. A
Halogen-free: IEC 60754-1/2
Nominal voltage: U_0=0.6 kV
Nominal voltage: U=1 kV
Maximum conductor temperature: 90°C
Operating temperature, flexible: -20/90°C
Operating temperature, fixed: -40/90°C

Application:

Fixed installation for power, control and lighting in both EX and safe areas. For installation in areas exposed to MUD and drilling/cleaning fluids. Meets the MUD resistance requirement in NEK TS 606:2009.

Electrical parameters:

Type/braid [n x mm²]	Resistance at 20°C, max. [Ohm/km]	Resistance at 90°C, max. [Ohm/km]	Reactance at 50 Hz, [Ohm/km]	Reactance at 60 Hz, [Ohm/km]	Current rating IEC 60092-352 Table B.4, Ampere	Short circuit rating 1 second, Ampere
1x10	1,84	2,35	0,129	0,154	70	1,43
1x16	1,16	1,48	0,12	0,145	93	2,29
1x25	0,734	0,936	0,113	0,136	117	3,58
1x35	0,529	0,675	0,111	0,133	147	5,01
1x50	0,391	0,499	0,107	0,129	180	7,15
1x70	0,270	0,344	0,102	0,123	233	10,01
1x95	0,195	0,249	0,099	0,118	285	13,59
1x120	0,154	0,196	0,096	0,116	333	17,16
1x150	0,126	0,161	0,094	0,113	386	21,45
1x185	0,100	0,128	0,093	0,112	444	26,46
1x240	0,0762	0,0972	0,090	0,108	528	34,32
1x300	0,0607	0,0775	0,089	0,107	612	42,9
2x1,5/4	12,2	15,6	0,112	0,135	23	0,21
2x2,5/4	7,56	9,64	0,104	0,124	31	0,36
2x4/4	4,70	5,99	0,096	0,116	43	0,57
2x6/6	3,11	3,96	0,091	0,109	55	0,86
2x10/10	1,84	2,35	0,085	0,102	75	1,43
2x16/16	1,16	1,48	0,081	0,097	100	2,29
2x25/16	0,734	0,936	0,080	0,096	130	3,58
2x35/16	0,529	0,675	0,078	0,093	161	5,01
2x50/25	0,391	0,499	0,077	0,093	196	7,15
3x1,5/4	12,2	15,6	0,112	0,135	20	0,21
3x2,5/4	7,56	9,64	0,104	0,124	58	0,36
3x4/6	4,70	5,99	0,096	0,116	37	0,57
3x6/6	3,11	3,96	0,091	0,109	47	0,86
3x10/10	1,84	2,35	0,085	0,102	65	1,43
3x16/16	1,16	1,48	0,081	0,097	87	2,29
3x25/16	0,734	0,936	0,080	0,096	110	3,58
3x35/16	0,529	0,675	0,078	0,093	137	5,01
3x50/25	0,391	0,499	0,077	0,093	167	7,15
3x70/35	0,270	0,344	0,075	0,09	214	10,01
3x95/50	0,195	0,249	0,074	0,089	259	13,59
3x120/60	0,154	0,196	0,073	0,087	301	17,16
3x150/75	0,126	0,161	0,073	0,087	347	21,45
3x185/95	0,100	0,128	0,073	0,087	397	26,46
3x240/120	0,0762	0,0972	0,072	0,087	468	34,32

RFOU P1/P8 0,6/1kV

Standard NEK TS 606:2009

Electrical parameters cont.:

Type/braid [n x mm^2]	Resistance at 20°C, max. [Ohm/km]	Resistance at 90°C, max. [Ohm/km]	Reactance at 50 Hz, [Ohm/km]	Reactance at 60 Hz, [Ohm/km]	Current rating IEC 60092-352 Table B.4, Ampere	Short circuit rating 1 second, Ampere
4x1,5/4	12,2	15,6	0,112	0,135	20	0,21
4x2,5/4	7,56	9,64	0,104	0,124	28	0,36
4x4/6	4,70	5,99	0,096	0,116	37	0,57
4x6/6	3,11	3,96	0,091	0,109	47	0,86
4x10/10	1,84	2,35	0,085	0,102	65	1,43
4x16/16	1,16	1,48	0,081	0,097	87	2,29
4x25/16	0,734	0,936	0,080	0,096	110	3,58
4x35/16	0,529	0,675	0,078	0,093	137	5,01
4x50/25	0,391	0,499	0,077	0,093	167	7,15
4x70/35	0,270	0,344	0,075	0,090	214	10,01
4x95/50	0,195	0,249	0,074	0,089	259	13,59
4x120/60	0,154	0,196	0,073	0,087	301	17,16
5x1,5/6	12,2	15,6	0,112	0,135	12	0,21
7x1,5/6	12,2	15,6	0,112	0,135	11	0,21
12x1,5/10	12,2	15,6	0,112	0,135	9	0,21
19x1,5/10	12,2	15,6	0,112	0,135	8	0,21
27x1,5/10	12,2	15,6	0,112	0,135	7	0,21
37x1,5/16	12,2	15,6	0,112	0,135	6	0,21
5x2,5/6	7,56	9,64	0,104	0,124	17	0,36
7x2,5/6	7,56	9,64	0,104	0,124	15	0,36
12x2,5/10	7,56	9,64	0,104	0,124	13	0,36
19x2,5/10	7,56	9,64	0,104	0,124	11	0,36
27x2,5/16	7,56	9,64	0,104	0,124	10	0,36
37x2,5/16	7,56	9,64	0,104	0,124	9	0,36

RFOU P1/P8 0,6/1kV

Standard NEK TS 606:2009

Construction:

n x mm²/braid	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Nominal overall diameter [mm]	Weight [kg/km]	Min. bending radius
1x10	4,0	1,0	8,7	12,2	295	74
1x16	5,1	1,0	9,8	13,5	385	81
1x25	6,5	1,2	11,7	15,4	525	93
1x35	7,4	1,2	12,6	16,9	685	102
1x50	8,7	1,4	14,2	18,7	870	113
1x70	10,3	1,4	15,9	20,4	1105	123
1x95	12,2	1,6	18,1	22,8	1435	137
1x120	13,8	1,6	19,9	24,9	1745	150
1x150	15,1	1,8	21,8	26,8	2055	161
1x185	17,0	2,0	24,1	29,3	2560	176
1x240	19,6	2,2	27,1	32,5	3190	195
1x300	21,9	2,4	29,6	35,2	3935	212
2x1,5/4	1,6	1,0	9,9	13,6	295	82
2x2,5/4	2,1	1,0	10,7	14,4	335	87
2x4/4	2,6	1,0	11,8	16,1	445	97
2x6/6	3,2	1,0	12,8	17,1	520	103
2x10/10	4,0	1,0	14,8	19,3	680	116
2x16/16	5,1	1,0	17,0	21,7	955	131
2x25/16	6,5	1,2	20,9	25,9	1335	156
2x35/16	7,4	1,2	22,7	27,9	1595	168
2x50/25	8,7	1,4	26,1	31,9	2250	192
3x1,5/4	1,6	1,0	10,5	14,2	320	86
3x2,5/4	2,0	1,0	11,3	15,6	415	94
3x4/6	2,6	1,0	12,5	16,8	500	101
3x6/6	3,2	1,0	13,6	18,1	605	109
3x10/10	4,0	1,0	15,8	20,3	795	122
3x16/16	5,1	1,0	18,1	22,8	1125	137
3x25/16	6,5	1,2	22,5	27,5	1620	165
3x35/16	7,4	1,2	24,4	29,6	1955	178
3x50/25	8,7	1,4	27,9	33,9	2730	204
3x70/35	10,3	1,4	31,6	38,4	3655	231
3x95/50	12,2	1,6	36,4	43,8	4885	263
3x120/60	13,8	1,6	39,8	47,6	6000	286
3x150/75	15,1	1,8	44,3	52,4	7300	315
3x185/95	17,0	2,0	51,0	58,6	8960	352
3x240/120	19,6	2,2	57,9	66,1	11610	397
4x1,5/4	1,6	1,0	11,4	15,7	350	95
4x2,5/4	2,0	1,0	12,3	16,6	425	100
4x4/6	2,6	1,0	13,6	18,1	590	109
4x6/6	3,2	1,0	15,0	19,5	725	117
4x10/10	4,0	1,0	17,3	22,1	955	133
4x16/16	5,1	1,0	20,2	25,2	1375	152
4x25/16	6,5	1,2	24,8	30,0	1965	180
4x35/16	7,4	1,2	27,0	32,4	2410	195
4x50/25	8,7	1,4	31,1	37,3	3365	224
4x70/35	10,3	1,4	35,1	42,1	4580	253
4x95/50	12,2	1,6	40,4	48,2	6020	290
4x120/60	13,8	1,6	44,6	52,7	7440	317
5x1,5/6	1,6	1,0	12,4	16,7	420	101
7x1,5/6	1,6	1,0	13,5	17,8	540	107
12x1,5/10	1,6	1,0	17,7	22,5	805	135
19x1,5/10	1,6	1,0	21,0	26,0	1100	156
27x1,5/10	1,6	1,0	25,2	30,6	1460	184
37x1,5/16	1,6	1,0	28,3	33,9	1840	204
5x2,5/6	2,0	1,0	13,5	18,0	555	108
7x2,5/6	2,0	1,0	14,7	19,2	655	116
12x2,5/10	2,0	1,0	19,6	24,5	995	147
19x2,5/10	2,0	1,0	23,0	28,2	1360	170
27x2,5/16	2,0	1,0	27,6	33,2	1815	200
37x2,5/16	2,0	1,0	31,3	37,1	2320	223

BFOU P5/P12 0,6/1kV

Standard NEK TS 606:2009

RoHS 2011/65/EU

LVD 2006/95/WE

Technical data:

Operating temperature: 90°C
Operating voltage: 0,6/1 kV
Min. bending radius during installation: 4xD
Min. bending radius for fixed installation: 4xD
Max. tensile load during installation: 50 N/mm²
Min. installation temperature: -20°C

Standards applied:

IEC 60092-353 - Design
IEC 60228 class 2 - Conductor
IEC 60092-351 - Insulation
IEC 60092-359 - Sheath
IEC 60332-1 - Flame Retardant
IEC 60332-3-22 - Flame Retardant
IEC 60331-1, -2, -21 - Fire Resistant
IEC 60754-1,2 - Halogen-Free
IEC 61034-1,2 - Low Smoke
IEC 61892-4 - Electrical installations

Construction:

Conductor: Stranded/flexible tinned Cu (class 2 as per IEC60228)
Insulation: Mica Glass Tape / EPR Rubber (HEPR)
Inner sheath: Halogen-free thermoset compound
Tape over inner sheath: Polyester tape
Armour: Tinned copper wire braiding
Tape over armour: Polyester tape
Outer sheath: SHF2 MUD
Sheath marking: Bitner BFOU 0,6/1kV P5/P12 core x size/braid year metre mark
Outer sheath colour: Black
Insulation integrity: In accordance with IEC 60331
Flame retardant: IEC 60332-1 / IEC 60332-3-22 Cat. A
Halogen-free: IEC 60754-1/2
Nominal voltage: U_0=0,6 kV
Nominal voltage: U=1 kV
Maximum conductor temperature: 90°C
Operating temperature, flexible: -20/90°C
Operating temperature, fixed: -40/90°C

Application:

Fixed installation for power, control and lighting in both EX and safe areas, emergency and critical systems with increased fire safety requirements. For installation in areas exposed to MUD and drilling/cleaning fluids. Meets the MUD resistance requirement in NEK TS 606:2009.

Electrical parameters:

Type/braid [n x mm²]	Resistance at 20°C, max. [Ohm/km]	Resistance at 90°C, max. [Ohm/km]	Reactance at 50 Hz, [Ohm/km]	Reactance at 60 Hz, [Ohm/km]	Current rating IEC 60092-352 Table B.4, Ampere	Short circuit rating 1 second, Ampere
1x10	1,84	2,35	0,129	0,154	70	1,43
1x16	1,16	1,48	0,12	0,145	93	2,29
1x25	0,734	0,936	0,113	0,136	117	3,58
1x35	0,529	0,675	0,111	0,133	147	5,01
1x50	0,391	0,499	0,107	0,129	180	7,15
1x70	0,270	0,344	0,102	0,123	233	10,01
1x95	0,195	0,249	0,099	0,118	285	13,59
1x120	0,154	0,196	0,096	0,116	333	17,16
1x150	0,126	0,161	0,094	0,113	386	21,45
1x185	0,100	0,128	0,093	0,112	444	26,46
1x240	0,0762	0,0972	0,090	0,108	528	34,32
1x300	0,0607	0,0775	0,089	0,107	612	42,9
2x1,5/4	12,2	15,6	0,112	0,135	23	0,21
2x2,5/4	7,56	9,64	0,104	0,124	31	0,36
2x4/4	4,70	5,99	0,096	0,116	43	0,57
2x6/6	3,11	3,96	0,091	0,109	55	0,86
2x10/10	1,84	2,35	0,085	0,102	75	1,43
2x16/16	1,16	1,48	0,081	0,097	100	2,29
2x25/16	0,734	0,936	0,080	0,096	130	3,58
2x35/16	0,529	0,675	0,078	0,093	161	5,01
2x50/25	0,391	0,499	0,077	0,093	196	7,15
3x1,5/4	12,2	15,6	0,112	0,135	20	0,21
3x2,5/4	7,56	9,64	0,104	0,124	58	0,36
3x4/6	4,70	5,99	0,096	0,116	37	0,57
3x6/6	3,11	3,96	0,091	0,109	47	0,86
3x10/10	1,84	2,35	0,085	0,102	65	1,43
3x16/16	1,16	1,48	0,081	0,097	87	2,29
3x25/16	0,734	0,936	0,080	0,096	110	3,58
3x35/16	0,529	0,675	0,078	0,093	137	5,01
3x50/25	0,391	0,499	0,077	0,093	167	7,15
3x70/35	0,270	0,344	0,075	0,09	214	10,01
3x95/50	0,195	0,249	0,074	0,089	259	13,59
3x120/60	0,154	0,196	0,073	0,087	301	17,16
3x150/75	0,126	0,161	0,073	0,087	347	21,45
3x185/95	0,100	0,128	0,073	0,087	397	26,46
3x240/120	0,0762	0,0972	0,072	0,087	468	34,32

BFOU P5/P12 0,6/1kV

Standard NEK TS 606:2009

Electrical parameters cont.:

Type/braid [n x mm^2]	Resistance at 20°C, max. [Ohm/km]	Resistance at 90°C, max. [Ohm/km]	Reactance at 50 Hz, [Ohm/km]	Reactance at 60 Hz, [Ohm/km]	Current rating IEC 60092-352 Table B.4, Ampere	Short circuit rating 1 second, Ampere
4x1,5/4	12,2	15,6	0,112	0,135	20	0,21
4x2,5/4	7,56	9,64	0,104	0,124	28	0,36
4x4/6	4,70	5,99	0,096	0,116	37	0,57
4x6/6	3,11	3,96	0,091	0,109	47	0,86
4x10/10	1,84	2,35	0,085	0,102	65	1,43
4x16/16	1,16	1,48	0,081	0,097	87	2,29
4x25/16	0,734	0,936	0,080	0,096	110	3,58
4x35/16	0,529	0,675	0,078	0,093	137	5,01
4x50/25	0,391	0,499	0,077	0,093	167	7,15
4x70/35	0,270	0,344	0,075	0,090	214	10,01
4x95/50	0,195	0,249	0,074	0,089	259	13,59
4x120/60	0,154	0,196	0,073	0,087	301	17,16
5x1,5/6	12,2	15,6	0,112	0,135	12	0,21
7x1,5/6	12,2	15,6	0,112	0,135	11	0,21
12x1,5/10	12,2	15,6	0,112	0,135	9	0,21
19x1,5/10	12,2	15,6	0,112	0,135	8	0,21
27x1,5/10	12,2	15,6	0,112	0,135	7	0,21
37x1,5/16	12,2	15,6	0,112	0,135	6	0,21
5x2,5/6	7,56	9,64	0,104	0,124	17	0,36
7x2,5/6	7,56	9,64	0,104	0,124	15	0,36
12x2,5/10	7,56	9,64	0,104	0,124	13	0,36
19x2,5/10	7,56	9,64	0,104	0,124	11	0,36
27x2,5/16	7,56	9,64	0,104	0,124	10	0,36
37x2,5/16	7,56	9,64	0,104	0,124	9	0,36

BFOU P5/P12 0,6/1kV

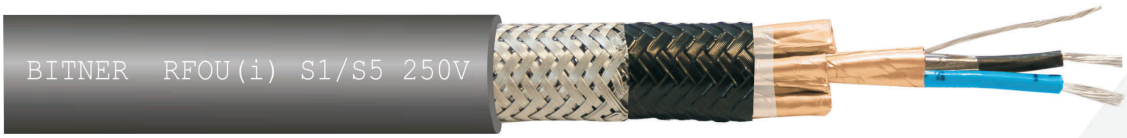
Standard NEK TS 606:2009

Construction:

n x mm²/braid	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Nominal overall diameter [mm]	Weight [kg/km]	Min. bending radius
1x10	4,0	1,0	9,0	12,7	310	77
1x16	5,1	1,0	10,2	13,9	390	84
1x25	6,5	1,2	12,0	16,3	585	98
1x35	7,4	1,2	12,9	17,2	690	104
1x50	8,7	1,4	14,5	19,0	890	114
1x70	10,3	1,4	16,1	20,6	1110	124
1x95	12,2	1,6	18,4	23,1	1440	139
1x120	13,8	1,6	20,0	25,0	1735	150
1x150	15,1	1,8	21,8	27,0	2060	162
1x185	17,0	2,0	24,2	29,4	2545	177
1x240	19,6	2,2	27,2	32,6	3170	196
1x300	21,9	2,4	29,7	35,3	3910	212
2x1,5/4	1,6	1,0	10,5	14,2	310	86
2x2,5/4	2,1	1,0	11,2	15,1	360	91
2x4/4	2,6	1,0	12,3	16,6	470	100
2x6/6	3,2	1,0	13,4	17,9	555	108
2x10/10	4,0	1,0	15,4	19,9	705	120
2x16/16	5,1	1,0	17,8	22,5	985	135
2x25/16	6,5	1,2	21,4	26,4	1360	159
2x35/16	7,4	1,2	24,4	28,4	1620	171
2x50/25	8,7	1,4	26,4	32,4	2290	195
3x1,5/4	1,6	1,0	11,1	14,8	345	89
3x2,5/4	2,0	1,0	11,9	16,2	445	98
3x4/6	2,6	1,0	13,1	17,4	530	105
3x6/6	3,2	1,0	14,2	18,7	635	113
3x10/10	4,0	1,0	16,4	21,1	830	127
3x16/16	5,1	1,0	18,9	23,7	1160	143
3x25/16	6,5	1,2	22,9	28,1	1640	169
3x35/16	7,4	1,2	24,8	30,2	1980	182
3x50/25	8,7	1,4	28,3	34,3	2750	206
3x70/35	10,3	1,4	32,2	39,0	3675	234
3x95/50	12,2	1,6	37,1	44,7	4955	269
3x120/60	13,8	1,6	40,4	48,3	6035	290
3x150/75	15,1	1,8	44,9	53,2	7355	320
3x185/95	17,0	2,0	51,7	59,5	9025	357
3x240/120	19,6	2,2	56,5	66,5	11590	399
4x1,5/4	1,6	1,0	12,1	16,4	400	99
4x2,5/4	2,0	1,0	13,0	17,3	505	104
4x4/6	2,6	1,0	14,3	18,8	620	113
4x6/6	3,2	1,0	15,6	20,1	750	121
4x10/10	4,0	1,0	18,0	22,7	985	137
4x16/16	5,1	1,0	20,9	25,9	1400	156
4x25/16	6,5	1,2	25,3	30,7	1995	185
4x35/16	7,4	1,2	27,5	33,1	2440	199
4x50/25	8,7	1,4	31,8	38,2	3430	230
4x70/35	10,3	1,4	35,7	42,7	4600	257
4x95/50	12,2	1,6	41,6	49,4	6135	297
4x120/60	13,8	1,6	45,4	53,6	7515	322
5x1,5/6	1,6	1,0	13,2	17,7	510	107
7x1,5/6	1,6	1,0	14,4	18,9	590	114
12x1,5/10	1,6	1,0	18,9	23,9	880	144
19x1,5/10	1,6	1,0	22,2	27,4	1185	165
27x1,5/10	1,6	1,0	26,8	32,3	1575	194
37x1,5/16	1,6	1,0	30,5	36,3	2015	218
5x2,5/6	2,0	1,0	14,3	18,8	595	113
7x2,5/6	2,0	1,0	15,6	20,1	700	121
12x2,5/10	2,0	1,0	20,5	25,5	1045	153
19x2,5/10	2,0	1,0	24,2	29,6	1445	178
27x2,5/16	2,0	1,0	29,6	35,4	1970	213
37x2,5/16	2,0	1,0	33,2	39,8	2610	239

RFOU(i) S1/S5 250V

Standard NEK TS 606:2009



RoHS 2011/65/EU

Technical data:

Operating temperature: 90°C
Operating voltage: 250V
Min. bending radius during installation: 6xD
Min. bending radius for fixed installation: 6xD
Max. tensile load during installation: 50 N /mm²
Min. installation temperature: -20°C

Standards applied:

IEC 60092-376 - Design
IEC 60228 class 2 - Conductor
IEC 60092-351 - Insulation
IEC 60092-359 - Sheath
IEC 60332-1 - Flame Retardant
IEC 60332-3-22 - Flame Retardant
IEC 60754-1,2 - Halogen-Free
IEC 61034-1,2 - Low Smoke
IEC 61892-4 - Electrical installations

Construction:

Conductor: Stranded/flexible tinned Cu (class 2 as per IEC60228)
Insulation: EPR Rubber (HEPR)
Pairs/Triples are screened by copper backed mylar tape with tinned copper drain wire /polyester tape
Inner sheath: Halogen-free thermoset compound
Tape over inner sheath: Polyester tape
Armour: Tinned copper wire braiding
Tape over armour: Polyester tape
Outer sheath: SHF2 MUD
Sheath marking: Bitner RFOU(i) 250V S1/S5 pr/tr/qd x size year metre mark
Outer sheath colour: Grey or blue
Flame retardant: IEC 60332-1 / IEC 60332-3-22 Cat. A
Halogen-free: IEC 60754-1/2
Maximum conductor temperature: 90°C
Operating temperature, flexible: -20/90°C
Operating temperature, fixed: -40/90°C

Application:

Fixed installation for instrumentation, communication, control and alarm systems in both EX and safe areas. Meets the MUD resistant requirements in NEK TS 606:2009.

Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x0,75	1,15	0,6	8,1	1,3	12,0	228	48
2x2x0,75	1,15	0,6	11,9	1,4	16,0	408	64
4x2x0,75	1,15	0,6	13,8	1,5	18,0	551	72
7x2x0,75	1,15	0,6	16,5	1,6	21,5	689	86
8x2x0,75	1,15	0,6	17,5	1,7	22,8	765	91
12x2x0,75	1,15	0,6	20,9	1,9	26,6	1035	107
16x2x0,75	1,15	0,6	24,1	2,0	30,3	1370	121
19x2x0,75	1,15	0,6	26,0	2,1	32,3	1550	129
24x2x0,75	1,15	0,6	28,8	2,2	35,4	1850	141
32x2x0,75	1,15	0,6	32,7	2,4	40,3	2420	161
1x3x0,75	1,15	0,6	8,5	1,3	12,3	248	49
2x3x0,75	1,15	0,6	13,0	1,5	17,2	477	69
4x3x0,75	1,15	0,6	15,1	1,6	20,2	684	81
7x3x0,75	1,15	0,6	18,8	1,7	24,2	854	97
8x3x0,75	1,15	0,6	20,1	1,8	25,7	954	103
12x3x0,75	1,15	0,6	23,6	2,0	29,8	1320	119
16x3x0,75	1,15	0,6	27,2	2,1	33,6	1710	134
19x3x0,75	1,15	0,6	29,4	2,2	36,0	1935	144
24x3x0,75	1,15	0,6	32,6	2,4	40,1	2430	161
32x3x0,75	1,15	0,6	37,5	2,6	45,5	3130	182
1x2x1	1,3	0,6	8,9	1,3	12,7	258	51
2x2x1	1,3	0,6	13,2	1,5	17,5	484	70
4x2x1	1,3	0,6	15,4	1,5	20,0	658	80
7x2x1	1,3	0,6	18,5	1,7	23,6	808	94
8x2x1	1,3	0,6	19,7	1,8	25,2	902	101
12x2x1	1,3	0,6	23,5	1,9	29,3	1210	117
16x2x1	1,3	0,6	27,1	2,0	33,3	1610	133
19x2x1	1,3	0,6	29,3	2,1	35,7	1820	143
24x2x1	1,3	0,6	32,5	2,4	39,5	2220	158
32x2x1	1,3	0,6	37,4	2,5	45,2	2940	181
1x3x1	1,3	0,6	9,4	1,3	13,2	281	53
2x3x1	1,3	0,6	14,5	1,5	18,7	557	75
4x3x1	1,3	0,6	16,9	1,6	22,0	799	88
7x3x1	1,3	0,6	21,1	1,8	26,7	1010	107
8x3x1	1,3	0,6	22,7	1,9	28,4	1125	114
12x3x1	1,3	0,6	27,0	2,0	33,2	1590	133
16x3x1	1,3	0,6	30,7	2,2	37,4	2025	149
19x3x1	1,3	0,6	33,2	2,4	40,2	2320	161
24x3x1	1,3	0,6	37,3	2,5	45,0	2950	180
32x3x1	1,3	0,6	42,5	2,7	50,6	3710	203

RFOU(i) S1/S5 250V

Standard NEK TS 606:2009

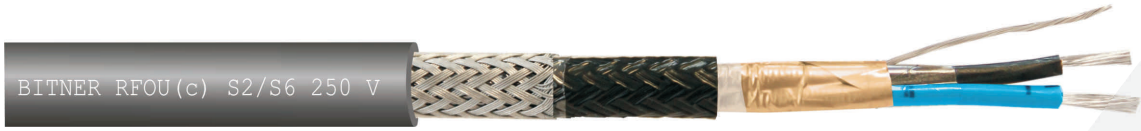
Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x1,5	1,55	0,7	9,2	1,3	13,0	277	52
2x2x1,5	1,55	0,7	13,8	1,5	18,0	525	72
4x2x1,5	1,55	0,7	16,0	1,6	21,1	759	85
7x2x1,5	1,55	0,7	19,3	1,7	24,6	900	98
8x2x1,5	1,55	0,7	20,6	1,9	26,3	1020	105
12x2x1,5	1,55	0,7	25,0	2,0	31,2	1460	125
16x2x1,5	1,55	0,7	28,4	2,2	35,0	1850	140
19x2x1,5	1,55	0,7	30,6	2,2	37,3	2070	149
24x2x1,5	1,55	0,7	34,4	2,5	41,7	2590	167
32x2x1,5	1,55	0,7	39,2	2,6	47,1	3350	189
1x3x1,5	1,55	0,7	9,7	1,3	13,5	306	54
2x3x1,5	1,55	0,7	15,1	1,5	20,0	648	80
4x3x1,5	1,55	0,7	17,6	1,6	22,7	895	91
7x3x1,5	1,55	0,7	22,1	1,8	27,7	1150	111
8x3x1,5	1,55	0,7	23,7	1,9	29,7	1320	119
12x3x1,5	1,55	0,7	28,3	2,2	34,9	1870	139
16x3x1,5	1,55	0,7	32,2	2,3	39,0	2350	156
19x3x1,5	1,55	0,7	34,7	2,4	41,8	2680	167
24x3x1,5	1,55	0,7	39,1	2,7	47,2	3460	189
32x3x1,5	1,55	0,7	44,5	2,8	52,9	4340	211

Note: Electrical parameters see page 21

RFOU(c) S2/S6 250 V

Standard NEK TS 606:2009



RoHS 2011/65/EU

Technical data:

Operating temperature: 90°C
Operating voltage: 250V
Min. bending radius during installation: 6xD
Min. bending radius for fixed installation: 6xD
Max. tensile load during installation: 50 N /mm²
Min. installation temperature: -20°C

Standards applied:

IEC 60092-376 - Design
IEC 60228 class 2 - Conductor
IEC 60092-351 - Insulation
IEC 60092-359 - Sheath
IEC 60332-1 - Flame Retardant
IEC 60332-3-22 - Flame Retardant
IEC 60754-1,2 - Halogen-Free
IEC 61034-1,2 - Low Smoke
IEC 61892-4 - Electrical installations

Construction:

Conductor: Stranded/flexible tinned Cu (class 2 as per IEC60228)
Insulation: EPR Rubber (HEPR)
Pairs/Triples are laid up collectively and screened by copper backed mylar tape with tinned copper drain wire/polyester tape
Inner sheath: Halogen-free thermoset compound
Tape over inner sheath: Polyester tape
Armour: Tinned copper wire braiding
Tape over armour: Polyester tape
Outer sheath: SHF2 MUD
Sheath marking: Bitner RFOU(c) 250V S2/S6 pr/tr/qd x size year metre mark
Outer sheath colour: Grey or blue
Flame retardant: IEC 60332-1 / IEC 60332-3-22 Cat. A
Halogen-free: IEC 60754-1/2
Maximum conductor temperature: 90°C
Operating temperature, flexible: -20/90°C
Operating temperature, fixed: -40/90°C

Application:

Fixed installation for instrumentation, communication, control and alarm systems in both EX and safe areas. Meets the MUD resistant requirements in NEK TS 606:2009.

Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x0,75	1,15	0,6	8,1	1,3	12	228	48
2x2x0,75	1,15	0,6	11,8	1,4	15,8	391	63
4x2x0,75	1,15	0,6	13,6	1,5	17,8	505	71
7x2x0,75	1,15	0,6	16,2	1,6	21,2	608	85
8x2x0,75	1,15	0,6	17,2	1,7	22,5	671	90
12x2x0,75	1,15	0,6	20,4	1,9	26,2	886	105
16x2x0,75	1,15	0,6	23,5	2	29,7	1180	119
19x2x0,75	1,15	0,6	25,3	2,1	31,7	1310	127
24x2x0,75	1,15	0,6	28,1	2,2	34,7	1570	139
32x2x0,75	1,15	0,6	31,9	2,4	39,4	2030	158
1x3x0,75	1,15	0,6	8,5	1,3	12,3	248	49
2x3x0,75	1,15	0,6	12,9	1,5	17,1	457	68
4x3x0,75	1,15	0,6	14,9	1,6	19,9	630	80
7x3x0,75	1,15	0,6	18,5	1,7	23,6	766	94
8x3x0,75	1,15	0,6	19,7	1,8	25,3	852	101
12x3x0,75	1,15	0,6	23,1	2	29,3	1160	117
16x3x0,75	1,15	0,6	26,6	2,1	33	1490	132
19x3x0,75	1,15	0,6	28,7	2,2	35,2	1680	141
24x3x0,75	1,15	0,6	31,9	2,4	39,4	2120	158
32x3x0,75	1,15	0,6	36,6	2,6	44,6	2700	178
1x2x1	1,3	0,6	8,9	1,3	12,7	258	51
2x2x1	1,3	0,6	13,1	1,5	17,3	466	69
4x2x1	1,3	0,6	15,2	1,5	19,8	609	79
7x2x1	1,3	0,6	18,1	1,7	23,3	722	93
8x2x1	1,3	0,6	19,3	1,8	24,9	801	99
12x2x1	1,3	0,6	23,1	1,9	28,8	1050	115
16x2x1	1,3	0,6	26,5	2	32,7	1400	131
19x2x1	1,3	0,6	28,6	2,1	35	1560	140
24x2x1	1,3	0,6	31,8	2,4	38,9	1920	155
32x2x1	1,3	0,6	36,6	2,5	44,4	2510	177
1x3x1	1,3	0,6	9,4	1,3	13,2	281	53
2x3x1	1,3	0,6	14,3	1,5	18,6	538	74
4x3x1	1,3	0,6	16,7	1,6	21,7	749	87
7x3x1	1,3	0,6	20,8	1,8	26,3	922	105
8x3x1	1,3	0,6	22,3	1,9	28	1025	112
12x3x1	1,3	0,6	26,5	2	32,7	1440	131
16x3x1	1,3	0,6	30,1	2,2	36,7	1810	147
19x3x1	1,3	0,6	32,5	2,4	39,5	2050	158
24x3x1	1,3	0,6	36,6	2,5	44,3	2630	177
32x3x1	1,3	0,6	41,6	2,7	49,8	3290	199

RFOU(c) S2/S6 250 V

Standard NEK TS 606:2009

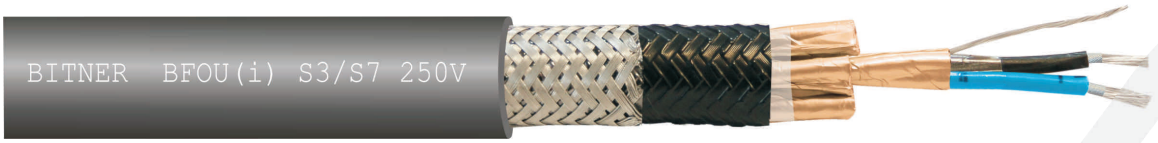
Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x1,5	1,55	0,7	9,2	1,3	13	277	52
2x2x1,5	1,55	0,7	13,6	1,5	17,9	507	72
4x2x1,5	1,55	0,7	15,8	1,6	20,9	709	84
7x2x1,5	1,55	0,7	19	1,7	24,3	814	97
8x2x1,5	1,55	0,7	20,2	1,9	26	917	104
12x2x1,5	1,55	0,7	24,5	2	30,7	1300	123
16x2x1,5	1,55	0,7	27,8	2,2	34,4	1630	138
19x2x1,5	1,55	0,7	30	2,2	36,6	1810	147
24x2x1,5	1,55	0,7	33,8	2,5	41	2280	164
32x2x1,5	1,55	0,7	38,4	2,6	46,3	2920	185
1x3x1,5	1,55	0,7	9,7	1,3	13,5	306	54
2x3x1,5	1,55	0,7	15	1,5	19,8	624	79
4x3x1,5	1,55	0,7	17,4	1,6	22,5	838	90
7x3x1,5	1,55	0,7	21,8	1,8	27,3	1060	109
8x3x1,5	1,55	0,7	23,3	1,9	29,3	1210	117
12x3x1,5	1,55	0,7	27,8	2,2	34,4	1700	137
16x3x1,5	1,55	0,7	31,5	2,3	38,4	2200	153
19x3x1,5	1,55	0,7	34,1	2,4	41,2	2430	165
24x3x1,5	1,55	0,7	38,3	2,7	46,5	3130	186
32x3x1,5	1,55	0,7	43,6	2,8	52	3880	208

Note: Electrical parameters see page 21

BFOU(i) S3/S7 250V

Standard NEK TS 606:2009



RoHS 2011/65/EU

Technical data:

Operating temperature: 90°C
Operating voltage: 250V
Min. bending radius during installation: 6xD
Min. bending radius for fixed installation: 6xD
Max. tensile load during installation: 50 N /mm²
Min. installation temperature: -20°C

Standards applied:

IEC 60092-376 - Design
IEC 60228 class 2 - Conductor
IEC 60092-351 - Insulation
IEC 60092-359 - Sheath
IEC 60332-1 - Flame Retardant
IEC 60332-3-22 - Flame Retardant
IEC 60331-1, -2, -21 - Fire Resistant
IEC 60754-1,2 - Halogen-Free
IEC 61034-1,2 - Low Smoke
IEC 61892-4 - Electrical installations

Construction:

Conductor: Stranded/flexible tinned Cu (class 2 as per IEC60228)
Insulation: Mica Glass Tape / EPR Rubber (HEPR)
Pairs/Triples are screened by copper backed mylar tape with tinned copper drain wire/polyester tape
Inner sheath: Halogen-free thermoset compound
Tape over inner sheath: Polyester tape
Armour: Tinned copper wire braiding
Tape over armour: Polyester tape
Outer sheath: SHF2 MUD
Sheath marking: Bitner BFOU(i) 250V S3/S7 pr/tr/qd x size year metre mark
Outer sheath colour: Grey or blue
Insulation integrity: In accordance with IEC 60331
Flame retardant: IEC 60332-1 / IEC 60332-3-22 Cat. A
Halogen-free: IEC 60754-1/2
Maximum conductor temperature: 90°C
Operating temperature, flexible: -20/90°C
Operating temperature, fixed: -40/90°C

Application:

Fixed installation for instrumentation, communication, control and alarm systems in both EX and safe areas, emergency and critical systems with increased fire safety requirements. Meets the MUD resistant requirements in NEK TS 606:2009.

Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x0,75	1,15	0,6	9,1	1,3	13	259	52
2x2x0,75	1,15	0,6	13,7	1,4	17,7	479	71
4x2x0,75	1,15	0,6	15,9	1,5	20,5	655	82
7x2x0,75	1,15	0,6	19,1	1,6	24,2	773	97
8x2x0,75	1,15	0,6	20,3	1,7	25,7	860	103
12x2x0,75	1,15	0,6	24,3	1,9	30,1	1165	120
16x2x0,75	1,15	0,6	28,1	2,0	34,3	1550	137
19x2x0,75	1,15	0,6	30,3	2,1	36,7	1740	147
24x2x0,75	1,15	0,6	33,6	2,2	40,3	2075	161
32x2x0,75	1,15	0,6	38,3	2,4	45,9	2720	184
1x3x0,75	1,15	0,6	9,6	1,3	13,5	281	54
2x3x0,75	1,15	0,6	15,0	1,5	19,6	574	78
4x3x0,75	1,15	0,6	17,4	1,6	22,5	795	90
7x3x0,75	1,15	0,6	21,9	1,7	27,2	963	109
8x3x0,75	1,15	0,6	23,5	1,8	29	1075	116
12x3x0,75	1,15	0,6	27,6	2,0	33,8	1490	135
16x3x0,75	1,15	0,6	31,8	2,1	38,2	1930	153
19x3x0,75	1,15	0,6	34,4	2,2	41	2180	164
24x3x0,75	1,15	0,6	38,2	2,4	45,8	2750	183
32x3x0,75	1,15	0,6	44,0	2,6	52	3520	208
1x2x1	1,3	0,6	11,0	1,3	13,7	291	55
2x2x1	1,3	0,6	16,1	1,5	19,6	573	78
4x2x1	1,3	0,6	18,6	1,5	22,1	756	88
7x2x1	1,3	0,6	22,4	1,7	26,4	898	106
8x2x1	1,3	0,6	23,8	1,8	28	1000	112
12x2x1	1,3	0,6	28,3	1,9	32,7	1340	131
16x2x1	1,3	0,6	32,7	2,0	37,3	1800	149
19x2x1	1,3	0,6	35,2	2,1	40	2000	160
24x2x1	1,3	0,6	39,0	2,4	44,4	2460	178
32x2x1	1,3	0,6	45,2	2,5	50,8	3250	203
1x3x1	1,3	0,6	11,5	1,3	14,3	315	57
2x3x1	1,3	0,6	17,5	1,5	21,1	659	84
4x3x1	1,3	0,6	20,6	1,6	24,4	918	97
7x3x1	1,3	0,6	25,6	1,8	29,8	1120	119
8x3x1	1,3	0,6	27,3	1,9	31,7	1255	127
12x3x1	1,3	0,6	32,6	2,0	37,2	1770	149
16x3x1	1,3	0,6	36,9	2,2	41,9	2260	168
19x3x1	1,3	0,6	39,8	2,4	45,2	2570	181
24x3x1	1,3	0,6	45,1	2,5	50,7	3280	203
32x3x1	1,3	0,6	51,1	2,7	57,1	4120	229

BFOU(i) S3/S7 250V

Standard NEK TS 606:2009

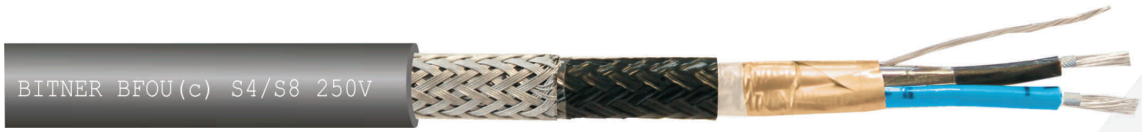
Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x1,5	1,55	0,7	10,2	1,3	14,1	310	56
2x2x1,5	1,55	0,7	15,5	1,5	20,2	616	81
4x2x1,5	1,55	0,7	18,1	1,6	23,1	861	92
7x2x1,5	1,55	0,7	21,9	1,7	27,2	987	109
8x2x1,5	1,55	0,7	23,4	1,9	29,1	1120	116
12x2x1,5	1,55	0,7	28,4	2,0	34,6	1600	139
16x2x1,5	1,55	0,7	32,3	2,2	39	2030	156
19x2x1,5	1,55	0,7	35,0	2,2	41,6	2260	166
24x2x1,5	1,55	0,7	39,3	2,5	46,5	2830	186
32x2x1,5	1,55	0,7	44,8	2,6	52,8	3660	211
1x3x1,5	1,55	0,7	10,8	1,3	14,6	341	59
2x3x1,5	1,55	0,7	17,1	1,5	21,9	742	88
4x3x1,5	1,55	0,7	20,0	1,6	25,1	1015	100
7x3x1,5	1,55	0,7	25,2	1,8	30,7	1270	123
8x3x1,5	1,55	0,7	27,0	1,9	33	1450	132
12x3x1,5	1,55	0,7	32,3	2,2	38,9	2050	156
16x3x1,5	1,55	0,7	36,7	2,3	43,6	2590	174
19x3x1,5	1,55	0,7	39,7	2,4	46,8	2940	187
24x3x1,5	1,55	0,7	44,7	2,7	52,8	3790	211
32x3x1,5	1,55	0,7	51,0	2,8	59,4	4750	237

Note: Electrical parameters see page 21

BFOU(c) S4/S8 250V

Standard NEK TS 606:2009



RoHS 2011/65/EU

Technical data:

Operating temperature: 90°C
Operating voltage: 250V
Min. bending radius during installation: 6xD
Min. bending radius for fixed installation: 6xD
Max. tensile load during installation: 50 N /mm²
Min. installation temperature: -20°C

Standards applied:

IEC 60092-376 - Design
IEC 60228 class 2 - Conductor
IEC 60092-351 - Insulation
IEC 60092-359 - Sheath
IEC 60332-1 - Flame Retardant
IEC 60332-3-22 - Flame Retardant
IEC 60331-1, -2, -21 - Fire Resistant
IEC 60754-1,2 - Halogen-Free
IEC 61034-1,2 - Low Smoke
IEC 61892-4- Electrical installations

Construction:

Conductor: Stranded/flexible tinned Cu (class 2 as per IEC60228)
Insulation: Mica Glass Tape / EPR Rubber (HEPR)
Pairs/Triples are laid up collectively and screened by copper backed mylar tape with tinned copper drain wire/polyester tape
Inner sheath: Halogen-free thermoset compound
Tape over inner sheath: Polyester tape
Armour: Tinned copper wire braiding
Tape over armour: Polyester tape
Outer sheath: SHF2 MUD
Sheath marking: Bitner BFOU(c) 250V S4/S8 pr/tr/qd x size year metre mark
Outer sheath colour: Grey or blue
Insulation integrity: In accordance with IEC 60331
Flame retardant: IEC 60332-1 / IEC 60332-3-22 Cat. A
Halogen-free: IEC 60754-1/2
Maximum conductor temperature: 90°C
Operating temperature, flexible: -20/90°C
Operating temperature, fixed: -40/90°C

Application:

Fixed installation for instrumentation, communication, control and alarm systems in both EX and safe areas, emergency and critical systems with increased fire safety requirements. Meets the MUD resistant requirements in NEK TS 606:2009.

Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x0,75	1,15	0,6	9,1	1,3	13,0	259	52
2x2x0,75	1,15	0,6	13,5	1,4	17,5	463	70
4x2x0,75	1,15	0,6	15,7	1,5	20,3	611	81
7x2x0,75	1,15	0,6	18,8	1,6	23,9	695	96
8x2x0,75	1,15	0,6	20,0	1,7	25,3	768	101
12x2x0,75	1,15	0,6	23,9	1,9	29,6	1020	118
16x2x0,75	1,15	0,6	27,5	2,0	33,7	1350	135
19x2x0,75	1,15	0,6	29,6	2,1	36,1	1500	144
24x2x0,75	1,15	0,6	33,0	2,2	39,6	1790	158
32x2x0,75	1,15	0,6	37,5	2,4	45,1	2325	180
1x3x0,75	1,15	0,6	9,6	1,3	13,5	281	54
2x3x0,75	1,15	0,6	14,8	1,5	19,0	542	76
4x3x0,75	1,15	0,6	17,2	1,6	22,3	744	89
7x3x0,75	1,15	0,6	21,5	1,7	26,9	879	107
8x3x0,75	1,15	0,6	23,1	1,8	28,6	979	114
12x3x0,75	1,15	0,6	27,0	2,0	33,2	1337	133
16x3x0,75	1,15	0,6	31,2	2,1	37,6	1716	150
19x3x0,75	1,15	0,6	33,7	2,2	40,4	1940	162
24x3x0,75	1,15	0,6	37,5	2,4	45,0	2432	180
32x3x0,75	1,15	0,6	43,1	2,6	51,1	3100	204
1x2x1	1,3	0,6	9,9	1,3	13,7	291	55
2x2x1	1,3	0,6	14,8	1,5	19,1	542	76
4x2x1	1,3	0,6	17,3	1,5	21,9	706	88
7x2x1	1,3	0,6	20,7	1,7	26,1	814	104
8x2x1	1,3	0,6	22,1	1,8	27,7	900	111
12x2x1	1,3	0,6	26,5	1,9	32,2	1185	129
16x2x1	1,3	0,6	30,5	2,0	36,8	1574	147
19x2x1	1,3	0,6	33,0	2,1	39,4	1748	158
24x2x1	1,3	0,6	36,7	2,4	43,7	2145	175
32x2x1	1,3	0,6	42,2	2,5	50,0	2827	200
1x3x1	1,3	0,6	10,5	1,3	14,3	315	57
2x3x1	1,3	0,6	16,3	1,5	20,9	641	84
4x3x1	1,3	0,6	19,0	1,6	24,1	867	97
7x3x1	1,3	0,6	23,9	1,8	29,4	1039	118
8x3x1	1,3	0,6	25,6	1,9	31,3	1159	125
12x3x1	1,3	0,6	30,5	2,0	36,7	1615	147
16x3x1	1,3	0,6	34,8	2,2	41,4	2064	166
19x3x1	1,3	0,6	37,6	2,4	44,6	2336	178
24x3x1	1,3	0,6	42,2	2,5	49,9	2967	200
32x3x1	1,3	0,6	48,1	2,7	56,2	3688	225

BFOU(c) S4/S8 250V

Standard NEK TS 606:2009

Construction:

Type [nx2xmm]	Conductor diameter [mm]	Insulation thickness [mm]	Nominal inner sheath diameter [mm]	Outer sheath thickness [mm]	Nominal outer diameter [mm]	Nominal cable weight [kg/km]	Min. bending radius
1x2x1,5	1,55	0,7	10,2	1,3	14,1	310	56
2x2x1,5	1,55	0,7	15,4	1,5	20,0	599	80
4x2x1,5	1,55	0,7	17,9	1,6	22,9	810	91
7x2x1,5	1,55	0,7	21,6	1,7	26,9	904	108
8x2x1,5	1,55	0,7	23,0	1,9	28,8	1018	115
12x2x1,5	1,55	0,7	28,0	2,0	34,2	1440	137
16x2x1,5	1,55	0,7	31,8	2,2	38,4	1815	154
19x2x1,5	1,55	0,7	34,4	2,2	41,0	2027	164
24x2x1,5	1,55	0,7	38,6	2,5	45,9	2525	183
32x2x1,5	1,55	0,7	44,0	2,6	51,9	3231	208
1x3x1,5	1,55	0,7	10,8	1,3	14,6	341	59
2x3x1,5	1,55	0,7	16,9	1,5	21,8	722	87
4x3x1,5	1,55	0,7	19,7	1,6	24,9	960	99
7x3x1,5	1,55	0,7	24,8	1,8	30,4	1173	121
8x3x1,5	1,55	0,7	26,6	1,9	32,6	1345	131
12x3x1,5	1,55	0,7	31,7	2,2	38,4	1875	154
16x3x1,5	1,55	0,7	36,2	2,3	43,0	2379	172
19x3x1,5	1,55	0,7	39,1	2,4	46,2	2678	185
24x3x1,5	1,55	0,7	43,9	2,7	52,1	3443	208
32x3x1,5	1,55	0,7	50,1	2,8	58,5	4285	234

Note: Electrical parameters see page 21

Standards & Tests

Cables are manufactured in accordance to the following:

NEK TS 606:2009
Norwegian Elektro Technical Standard – Cables for offshore installations halogen-free and/or mud resistant Technical Specification

IEC 61892-4
Mobile and fixed offshore units – Electrical installations - Part 4: Cables

IEC 60092-350
General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications

IEC 60092-351
Insulating materials for shipboard offshore units, power, control, instrumentation, telecommunication and data cables

IEC 60092-352
Electrical installations in ships – Choice and installation of cables for low - voltage power systems

IEC 60092-353
Single and multicore non-radial field power cables with extruded solid insulation for rated voltages 1 kV and 3 kV
Single - and three-core power cables with extruded solid insulation for rated voltages 6 kV (Um = 7.2 kV) up to 30 kV (Um = 36 kV)

IEC 60092-359
Sheathing materials for shipboard power and telecommunication cables

IEC 60092-376
Cables for control and instrumentation circuits 150/250V (300V)

IEC 60228
Conductors of insulated cables

IEC 60331-11
Tests for electric cables under fire conditions – circuit integrity – apparatus -fire alone at a flame temperature of at least 750°C

IEC 60331-21
Tests for electric cables under fire conditions – circuit integrity – procedures and requirements - cables of rated voltage up to and including 0.6/1.0 kV

IEC 60331-1/2
Tests for electric cables under fire conditions – Test for method for fire with shock at temperature of at least 830° C for cables rated up to and including 0,6/1kV

IEC 60332-1
Tests on electric cables under fire conditions – part 1: test on a single vertical insulated wire or cable

IEC 60332-3-22 - A
Tests on electric cables under fire conditions – part 3-22: test for vertical flame spread of vertically mounted bunched wires or cables - category A

IEC 60754-1
Test on gases evolved during combustion of electric cables – determination of the amount of halogen acid gas

IEC 60811 Common test methods for insulating and sheathing materials of electric cables

IEC 61034 series
Measurement of smoke density of electric cables burning under defined conditions

IEC 60446
Basic and safety principles for manmachine interface, marking and identification of conductors by colours or alphanumerics

Core colours for cables according to NEK 606

0,6/1 kV power and control cables

According to NEK standards

1 core: white (grey)
2 cores: white (grey) - black
3 cores: white (grey) - black - red
4 cores: white (grey) - black - red - blue
Above 4 cores: black numbers on white base
Earthing core: green/yellow

150/250 V instrumentation cables

Pair: black - light blue
Triple: black - light blue - brown
Other colours on request
Pairs/Triples are numbered with numbers printed directly on the insulated conductors (1-1, 2-2, …) or by numbered tape

MV cables

1 core: none (natural colour of the compound)
3 cores: none (natural colour of the compound)

Electrical Parameters

Type	Twisting & Core size	Approx. Capacitance (nF/km)	Approx. Inductance (mH/km)	Max. conductor Resistance at 20°C (Ohm/km)	L/R (µH/Ohm)
RFOU(c), BFOU(c)	Pair 0,75mm^2	90	0,67	26,3	20
	Triple 0,75mm^2	90	0,67	26,3	20
	Pair 1,0mm^2	100	0,65	19,3	25
	Triple 1,0mm^2	100	0,65	19,3	25
	Pair 1,5mm^2	110	0,63	12,9	35
	Triple 1,5mm^2	110	0,63	12,9	35
RFOU(i), BFOU(i)	Pair 0,75mm^2	90	0,67	26,3	20
	Triple 0,75mm^2	90	0,67	26,3	20
	Pair 1,0mm^2	100	0,65	19,3	25
	Triple 1,0mm^2	100	0,65	19,3	25
	Pair 1,5mm^2	110	0,63	12,9	35
	Triple 1,5mm^2	110	0,63	12,9	35

Table of Abbreviations

Material Components	1st Letter Insulation	2nd Letter Innersheath	3rd Letter Armour	4th Letter Outersheath	5th Letter Screen
Mica - HEPR (Fire resistant)	B				
Ethylene propylene rubber (HEPR)	R				
Halogen-free compound (EVA)		U			
Bedding or taping (hal. free)		F			
Tinned copper wire braid			O		
Halogen free compound SHF2 MUD				U	
Individual screen					(I)
Collective screen					(C)

Notepad

DNV GL TYPE APPROVAL CERTIFICATES

RFOU P1/P8 - Certificate E14233

BFOU P5/P12 - Certificate E14234

RFOU(i) S1/S5 & RFOU(c) S2/S6 - Certificate E 14235

BFOU(i) S3/S7 & BFOU(c) S4/S8 - Certificate E 14236

DNV·GL

Certificate No:
E-14233
File No:
827.10
Job Id:
262.1-016420-1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
RFOU P1/P8,

Issued to
Zaklady Kablowe Bitner Celina Bitner
Kraków, Poland

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-353 (2011-08)
IEC 60332-3-22 (2009-02)
IEC 60754-2 (2011-11)
IEC 61034-1/2 Ed. 3.1 (2013-06)
NEK TS 606 (2009-05)

Application :

Shipboard and offshore cables intended for fixed installation, for control, lighting and power. Flame retardant Cat. A, halogen free, low smoke and mud resistant.

Type	Voltage class (kV)	Temp. class (°C)
RFOU P1/P8	0,6/1	90

This Certificate is valid until **2019-06-30**.
Issued at **Høvik** on **2015-05-19**

DNV GL local station: **Katowice**

Approval Engineer: **Ludovico Gullifa**

for **DNV GL**
Digitally Signed By: Laumann, Marit
Location: DNV GL Høvik, Norway
Signing Date: 2015-05-22

Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Certificate No: **E-14233**
File No: **827.10**
Job Id: **262.1-016420-1**

Product description

Cable Type: RFOU P1/P8 0,6/1 kV

Construction:
Conductors: Tinned, stranded copper class 2
Core insulation: HEPR
Inner covering: HF compound + polyester tape
Braid armour: Tinned copper wire braid
Outer sheath: SHF2 MUD
Nomenclature No. cores x cross-section/PE braid

No	Number of cores x conductor cross-section
	mm2
1	1x10
2	1x16
3	1x25
4	1x35
5	1x50
6	1x70
7	1x95
8	1x120
9	1x150
10	1x185
11	1x240
12	1x300
13	2x1,5/4
14	2x2,5/4
15	2x4/4
16	2x6/6
17	2x10/10
18	2x16/16
19	2x25/16
20	2x35/18

No	Number of cores x conductor cross-section
	mm2
21	2x50/25
22	3x1,5/4
23	3x2,5/4
24	3x4/6
25	3x6/6
26	3x10/10
27	3x16/16
28	3x25/16
29	3x35/18
30	3x50/25
31	3x70/35
32	3x95/50
33	3x120/60
34	3x150/75
35	3x185/95
36	3x240/120
37	4x1,5/4
38	4x2,5/4
39	4x4/6
40	4x6/6

No	Number of cores x conductor cross-section
	mm2
41	4x10/10
42	4x16/16
43	4x25/16
44	4x35/18
45	4x50/25
46	4x70/35
47	4x95/50
48	4x120/60
49	5x1,5/6
50	5x2,5/6
51	7x1,5/6
52	7x2,5/6
53	12x1,5/10
54	12x2,5/10
55	19x1,5/10
56	19x2,5/10
57	27x1,5/10
58	27x2,5/16
59	37x1,5/16
60	37x2,5/16

Application/Limitation

This cable intended for fixed installation, flame (IEC 60332) retardant and mud (NEK TS 606) resistant. Operating temperature, fixed : -40°C to 90°C. Min installation temperature : -20°C.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Test Report No. TR-nr 15 ZBK 04b dated 2014.10.14
Test Report No. 00475B-1-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00475B-2-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00475B-3-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00475B-4-2014 Section ZKB 04c dated 2014.11.07
Datasheet NEK 606_Bitner 2015

Certificate No: **E-14233**
File No: **827.10**
Job Id: **262.1-016420-1**

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-353	2011-08	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1:Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
IEC 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Oil based mud: Carbo Sea 70°C 56d and EDC 95/11 70°C 56d

Marking of product

Bitner - RFOU P1/P8, No.cores x size/braid, voltage, Year, Metre Mark, - IEC 60332-3-22 Cat. A

Periodical assessment

The scope of the Periodical assessmentis to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE

DNV·GL

Certificate No:
E-14234
File No:
827.10
Job Id:
262.1-016420-1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
BFOU P5/P12,

Issued to
Zaklady Kablowe Bitner Celina Bitner
Kraków, Poland

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-353 (2011-08)
IEC 60331-21 (1999-04)
IEC 60332-3-22 (2009-02)
IEC 60754-2 (2011-11)
IEC 61034-1/2 Ed. 3.1 (2013-06)
NEK TS 606 (2009-05)

Application :

Shipboard and offshore cables intended for fixed installation, for control, lighting and power. Fire resistant. Flame retardant Cat. A, halogen free, low smoke and mud resistant.

Type	Voltage class (kV)	Temp. class (°C)
BFOU P5/P12	0,6/1	90

This Certificate is valid until **2019-06-30**.
Issued at **Høvik** on **2015-05-19**

DNV GL local station: **Katowice**

Approval Engineer: **Ludovico Gullifa**

for **DNV GL**
Digitally Signed By: Laumann, Marit
Location: DNV GL Høvik, Norway
Signing Date: 2015-05-22

Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Certificate No: **E-14234**
File No: **827.10**
Job Id: **262.1-016420-1**

Product description

Cable Type: BFOU P5/P12 0,6/1 kV

Construction:
Conductors: Tinned, stranded copper class 2
Core insulation: Mica glass tape + HEPR
Inner covering: HF compound + polyester tape
Braid armour: Tinned copper wire braid + polyester tape
Outer sheath: SHF2 MUD
Nomenclature No. cores x cross-section/PE braid

No	Number of cores x conductor cross-section
	mm2
1	1x10
2	1x16
3	1x25
4	1x35
5	1x50
6	1x70
7	1x95
8	1x120
9	1x150
10	1x185
11	1x240
12	1x300
13	2x1,5/4
14	2x2,5/4
15	2x4/4
16	2x6/6
17	2x10/10
18	2x16/16
19	2x25/16
20	2x35/18

No	Number of cores x conductor cross-section
	mm2
21	2x50/25
22	3x1,5/4
23	3x2,5/4
24	3x4/6
25	3x6/6
26	3x10/10
27	3x16/16
28	3x25/16
29	3x35/18
30	3x50/25
31	3x70/35
32	3x95/50
33	3x120/60
34	3x150/75
35	3x185/95
36	3x240/120
37	4x1,5/4
38	4x2,5/4
39	4x4/6
40	4x6/6

No	Number of cores x conductor cross-section
	mm2
41	4x10/10
42	4x16/16
43	4x25/16
44	4x35/18
45	4x50/25
46	4x70/35
47	4x95/50
48	4x120/60
49	5x1,5/6
50	5x2,5/6
51	7x1,5/6
52	7x2,5/6
53	12x1,5/10
54	12x2,5/10
55	19x1,5/10
56	19x2,5/10
57	27x1,5/16
58	27x2,5/16
59	37x1,5/16
60	37x2,5/16

Application/Limitation

This cable intended for fixed installation, fire (IEC 60331) and mud (NEK TS 606) resistant. Operating temperature, fixed : -40°C to 90°C. Min installation temperature : -20°C.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Test Report No. TR-nr 15 ZBK 04b dated 2014.10.14
Test Report No. 00475B-1-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00475B-2-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00475B-3-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00475B-4-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 341777 Section ZKB 04d dated 2014.11.04
Datasheet NEK 606_Bitner 2015

Certificate No: **E-14234**
File No: **827.10**
Job Id: **262.1-016420-1**

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-353	2011-08	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1:Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
IEC 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV	Minimum 120 min + 15 min cooling down time
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Oil based mud: Carbo Sea 70°C 56d and EDC 95/11 70°C 56d

Marking of product

Bitner – BFOU P5/P12, Voltage, No. cores x size/Braid, Year, Metre mark, IEC 60332-3-22 Cat. A
IEC 60331-21

Periodical assessment

The scope of the Periodical assessmentis to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE

DNV·GL

Certificate No:
E-14235
File No:
827.20
Job Id:
262.1-016420-1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
RFOU(i) S1/S5 & RFOU(c) S2/S6,

Issued to
Zaklady Kablowe Bitner Celina Bitner
Kraków, Poland

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-376 (2003-05)
IEC 60332-3-22 (2009-02)
IEC 60754-2 (2011-11)
IEC 61034-1/2 Ed. 3.1 (2013-06)
NEK TS 606 (2009-05)

Application :

Shipboard and offshore cables intended for fixed installation, for control, instrumentation and telecommunication. Flame retardant Cat. A, halogen free, low smoke and mud resistant.

Type	Voltage class (V)	Temp. class (°C)
RFOU(i) S1/S5 & RFOU(c) S2/S6	250	90

This Certificate is valid until **2019-06-30**.
Issued at **Høvik** on **2015-05-19**

DNV GL local station: **Katowice**

Approval Engineer: **Ludovico Gullifa**

for **DNV GL**

Digitally Signed By: Laumann, Marit
Location: DNV GL Høvik, Norway
Signing Date: 2015-05-22

Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Certificate No: **E-14235**
File No: **827.20**
Job Id: **262.1-016420-1**

Product description

Cable Type: RFOU(i) S1/S5 & RFOU(c) S2/S6 250V

Construction:

Conductors:	Tinned, stranded copper class 2
Core insulation:	HEPR
I.& C. screen:	Copper backed mylar tape
Drain wire	Tinned copper covered by pet foil tape
Inner covering:	HF compound + polyester tape
Braid armour:	Tinned copper wire braid + polyester tape
Outer sheath:	SHF2 MUD
Nomenclature	No. of cabling elements x No. cores x cross-section

No	No. elements x No. of cores x conductor cross-section
	mm2
1	1x2x0,75
2	2x2x0,75
3	4x2x0,75
4	7x2x0,75
5	8x2x0,75
6	12x2x0,75
7	16x2x0,75
8	19x2x0,75
9	24x2x0,75
10	32x2x0,75
11	1x3x0,75
12	2x3x0,75
13	4x3x0,75
14	7x3x0,75
15	8x3x0,75
16	12x3x0,75
17	16x3x0,75
18	19x3x0,75
19	24x3x0,75
20	32x3x0,75

No	No. elements x No. of cores x conductor cross-section
	mm2
21	1x2x1
22	2x2x1
23	4x2x1
24	7x2x1
25	8x2x1
26	12x2x1
27	16x2x1
28	19x2x1
29	24x2x1
30	32x2x1
31	1x3x1
32	2x3x1
33	4x3x1
34	7x3x1
35	8x3x1
36	12x3x1
37	16x3x1
38	19x3x1
39	24x3x1
40	32x3x1

No	No. elements x No. of cores x conductor cross-section
	mm2
41	1x2x1,5
42	2x2x1,5
43	4x2x1,5
44	7x2x1,5
45	8x2x1,5
46	12x2x1,5
47	16x2x1,5
48	19x2x1,5
49	24x2x1,5
50	32x2x1,5
51	1x3x1,5
52	2x3x1,5
53	4x3x1,5
54	7x3x1,5
55	8x3x1,5
56	12x3x1,5
57	16x3x1,5
58	19x3x1,5
59	24x3x1,5
60	32x3x1,5

Application/Limitation

This cable intended for fixed installation, flame (IEC 60332) retardant and mud (NEK TS 606) resistant. Operating temperature, fixed : -40°C to 90°C. Min installation temperature : -20°C.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Test Report No. TR-nr 16 ZBK 04b dated 2014.12.16
Test Report No. 00428B-1-2014 Section ZKB 04c dated 2014.10.29
Test Report No. 00428B-2-2014 Section ZKB 04c dated 2014.11.03
Test Report No. 00428B-3-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00428B-4-2014 Section ZKB 04c dated 2014.11.07
Datasheet NEK 606_Bitner 2015

Certificate No: **E-14235**
File No: **827.20**
Job Id: **262.1-016420-1**

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1:Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
IEC 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Oil based mud: Carbo Sea 70°C 56d and EDC 95/11 70°C 56d

Marking of product

Bitner – RFOU(i) S1/S5 & RFOU(c) S2/S6**,** Voltage, No. of cabling elements x No. cores x size, Year, Metre mark, IEC 60332-3-22 Cat. A.

Periodical assessment

The scope of the Periodical assessmentis to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE

DNV·GL

Certificate No:
E-14236
File No:
827.20
Job Id:
262.1-016420-1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
BFOU(i) S3/S7 & BFOU(c) S4/S8,

Issued to
Zaklady Kablowe Bitner Celina Bitner
Kraków, Poland

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-376 (2003-05)
IEC 60331-21 (1999-04)
IEC 60332-3-22 (2009-02)
IEC 60754-2 (2011-11)
IEC 61034-1/2 Ed. 3.1 (2013-06)
NEK TS 606 (2009-05)

Application :

Shipboard and offshore cables intended for fixed installation, for control, instrumentation and telecommunication. Fire resistant. Flame retardant Cat. A, halogen free, low smoke and mud resistant.

Type	Voltage class (V)	Temp. class (°C)
BFOU(i) S3/S7 & BFOU(c) S4/S8	**250**	**90**

This Certificate is valid until **2019-06-30**.
Issued at **Høvik** on **2015-05-19**

DNV GL local station: **Katowice**

Approval Engineer: **Ludovico Gullifa**

for **DNV GL**

Digitally Signed By: Laumann, Marit
Location: DNV GL Høvik, Norway
Signing Date: 2015-05-22

Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

Cable Type: BFOU(i) S3/S7 & BFOU(c) S4/S8 250V

Construction:	
Conductors:	Tinned, stranded copper class 2
Core insulation:	Mica glass tape + HEPR
I.& C. screen:	Copper backed mylar tape
Drain wire	Tinned copper covered by pet foil tape
Inner covering:	HF compound + polyester tape
Braid armour:	Tinned copper wire braid + polyester tape
Outer sheath:	SHF2 MUD
Nomenclature	No. of cabling elements x No. cores x cross-section

No	No. elements x No. of cores x conductor cross-section
	mm2
1	1x2x0,75
2	2x2x0,75
3	4x2x0,75
4	7x2x0,75
5	8x2x0,75
6	12x2x0,75
7	16x2x0,75
8	19x2x0,75
9	24x2x0,75
10	32x2x0,75
11	1x3x0,75
12	2x3x0,75
13	4x3x0,75
14	7x3x0,75
15	8x3x0,75
16	12x3x0,75
17	16x3x0,75
18	19x3x0,75
19	24x3x0,75
20	32x3x0,75

No	No. elements x No. of cores x conductor cross-section
	mm2
21	1x2x1
22	2x2x1
23	4x2x1
24	7x2x1
25	8x2x1
26	12x2x1
27	16x2x1
28	19x2x1
29	24x2x1
30	32x2x1
31	1x3x1
32	2x3x1
33	4x3x1
34	7x3x1
35	8x3x1
36	12x3x1
37	16x3x1
38	19x3x1
39	24x3x1
40	32x3x1

No	No. elements x No. of cores x conductor cross-section
	mm2
41	1x2x1,5
42	2x2x1,5
43	4x2x1,5
44	7x2x1,5
45	8x2x1,5
46	12x2x1,5
47	16x2x1,5
48	19x2x1,5
49	24x2x1,5
50	32x2x1,5
51	1x3x1,5
52	2x3x1,5
53	4x3x1,5
54	7x3x1,5
55	8x3x1,5
56	12x3x1,5
57	16x3x1,5
58	19x3x1,5
59	24x3x1,5
60	32x3x1,5

Application/Limitation

This cable intended for fixed installation, fire (IEC 60331) and mud (NEK TS 606) resistant. Operating temperature, fixed : -40°C to 90°C. Min installation temperature : -20°C.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

Certificate No: **E-14236**
File No: **827.20**
Job Id: **262.1-016420-1**

Type Approval documentation

Test Report No. TR-nr 16 ZBK 04b dated 2014.12.16
Test Report No. 00428B-1-2014 Section ZKB 04c dated 2014.10.29
Test Report No. 00428B-2-2014 Section ZKB 04c dated 2014.11.03
Test Report No. 00428B-3-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 00428B-4-2014 Section ZKB 04c dated 2014.11.07
Test Report No. 341778 Section ZKB 04d dated 2014.11.04
Datasheet NEK 606_Bitner 2015

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1:Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
IEC 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV	Minimum 120 min + 15 min cooling down time
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Oil based mud: Carbo Sea 70°C 56d and EDC 95/11 70°C 56d

Marking of product

Bitner – BFOU(i) S3/S7 or BFOU(c) S4/S8, Voltage, No. of cabling elements x No. cores x size, Year, Metre mark, IEC 60332-3-22 Cat. A, IEC 60331-21.

Periodical assessment

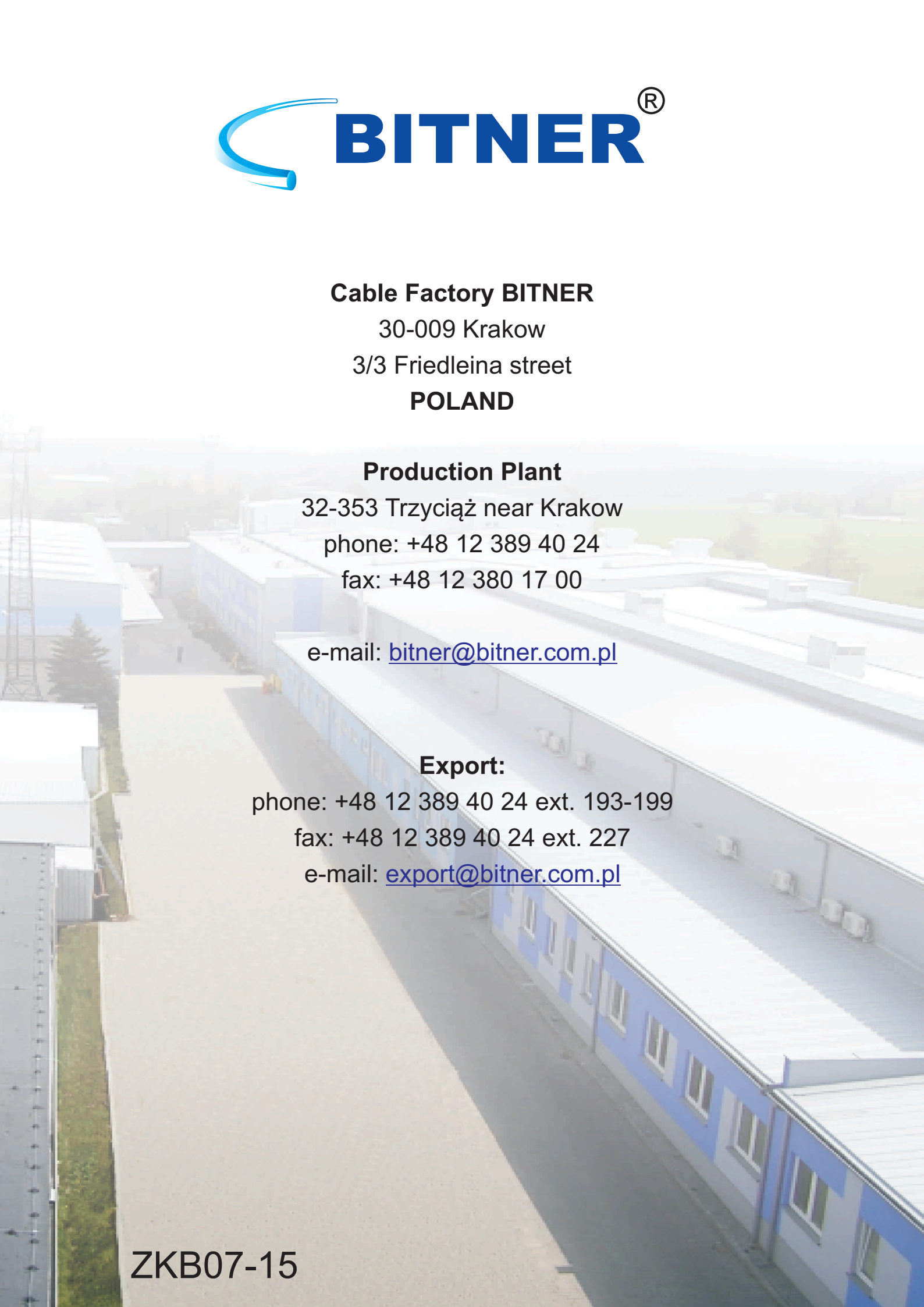
The scope of the periodical assessmentis to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE



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