ezú elektrotechnický zkušební ústav

Elektrotechnický zkušební ústav, s. p.
Pod lisem 129/2
171 02 Praha 8 - Troja

TEST REPORT FOR REACTION TO FIRE

Test Report No.: 911203-01/04 Issued: 6. 6. 2019

Notified Body No. 1014

Name of product:	**Optical cable**
Type of product:	**J/A-DQ(BN)H(SR)H FSC180 - Z281**
Ratings:	**$B2_{ca}$-s1,d0**
Serial number:	--
Manufacturer:	**KABELOVNA Děčín Podmokly, s.r.o.** Ústecká 840/33, 405 33 Děčín, Czech Republic
Production site:	same as manufacturer
Ordering firm:	**KABELOVNA Děčín Podmokly, s.r.o.** Ústecká 840/33, 405 33 Děčín, Czech Republic
Number of tested samples:	7
Samples submitted on:	23. 5. 2019
Location of testing:	Elektrotechnický zkušební ústav, s. p.
Tests performed	**from** 5. 6. 2019 **through** 6. 6. 2019
Other data:	-
Tested according to:	EN 50399:11+A1:16, EN 60332-1-1:04+A1:16, EN 60332-1-2:04+A1:16+A11:17

Compiled by: Jan Tůma

elektrotechnický zkušební ústav ezú -5- zkušební laboratoř

Approved by: Martin Kříž
Testing laboratory manager

No. of pages: 7 No. of annexes: 0 No. of annexes pages: 0

Test type: **Classificiation of electric cables according to reaction to fire**

Standart: EN 13501-6

EN 50399:2011

Measurement of the heat release and smoke production

EN 60332-1-2

Test of vertical flame spread on a single cable

Cable type: **J/A-DQ(BN)H(SR)H FSC180 - Z281**

Cable producer: KDP s.r.o.

date of test: 5.6.2019

Number of pieces calculation:

Cable diametr: 12,7 mm

$$N = int\left[\frac{300 + d_c}{2 \times d_c}\right]$$

Test pieces: 12 ks

Mounting type: separately

Space: 12,7 mm

				required by: EN 13501-6 for class $B2_{ca}$		
Test results:	**FS =**	0,72	m	FS ≤	1,5 m	
	$HRR_{avg\ max}$ =	20,9	kW	Peak HRR ≤	30 kW	
	$SPR_{avg\ max}$ =	0,059	m^2/s	(s1) SPR ≤	0,25 m^2/s	(additional classific.)
	THR =	14,1	MJ	$THR_{1200\ s}$ ≤	15 MJ	
	TSP =	26,4	m^2	(s1) $TSP_{1200\ s}$ ≤	50 m^2	(additional classific.)
	FIGRA =	49,2	$W.s^{-1}$	FIGRA ≤	150 $W.s^{-1}$	
	Burning particles :	No		d0		(additional classific.)
	Flame spread H =	67	mm	H ≤	425 mm	

Classification according to ČSN EN 13501-6: **$B2_{ca}$-s1,d0**

Test type: **Classificiation of electric cables according to reaction to fire**

Standart: EN 13501-6

EN 50399:2011

Measurement of the heat release and smoke production

EN 60332-1-2

Test of vertical flame spread on a single cable

Cable type: **Z281**

Cable producer: KDP s.r.o.

date of test: 5.6.2019

Number of pieces calculation:

Cable diametr: 12,7 mm

$$N = int\left[\frac{300 + d_c}{2 \times d_c}\right]$$

Test pieces: 12 ks

Mounting type: separately

Space: 12,7 mm

				required by: EN 13501-6 for class $B2_{ca}$		
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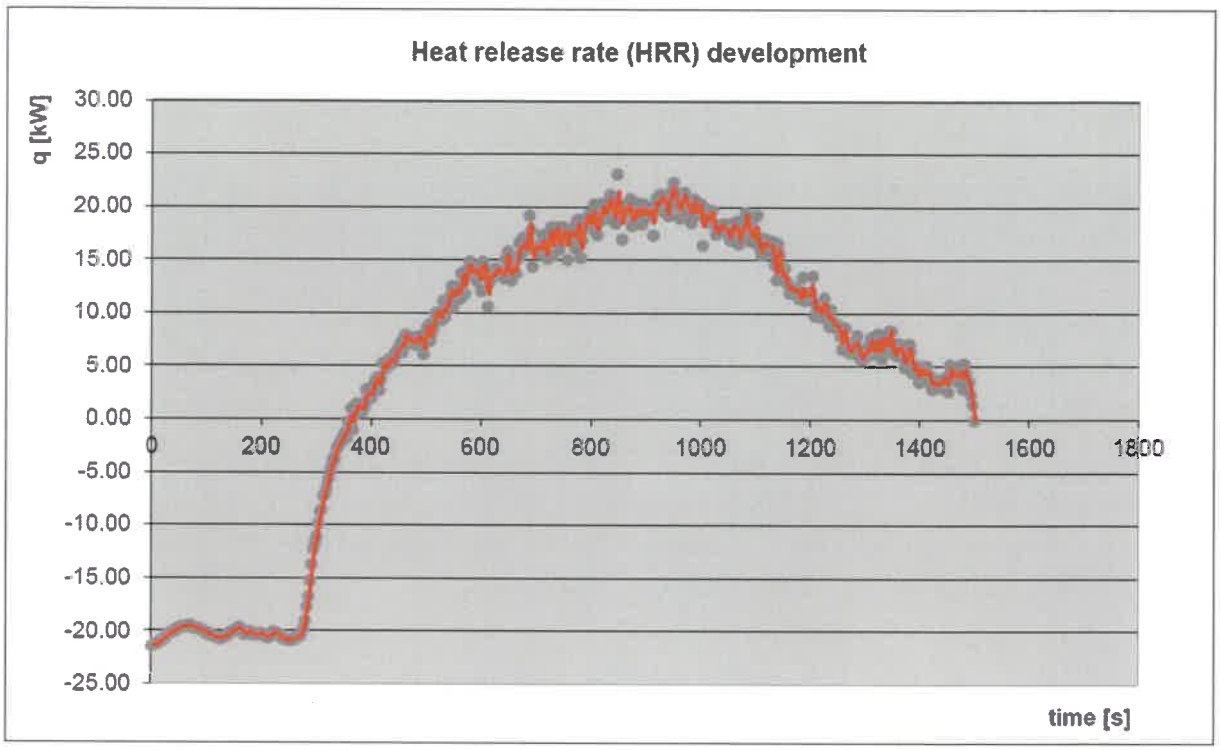
	Flame spread H =	67	mm	H ≤	425 mm	

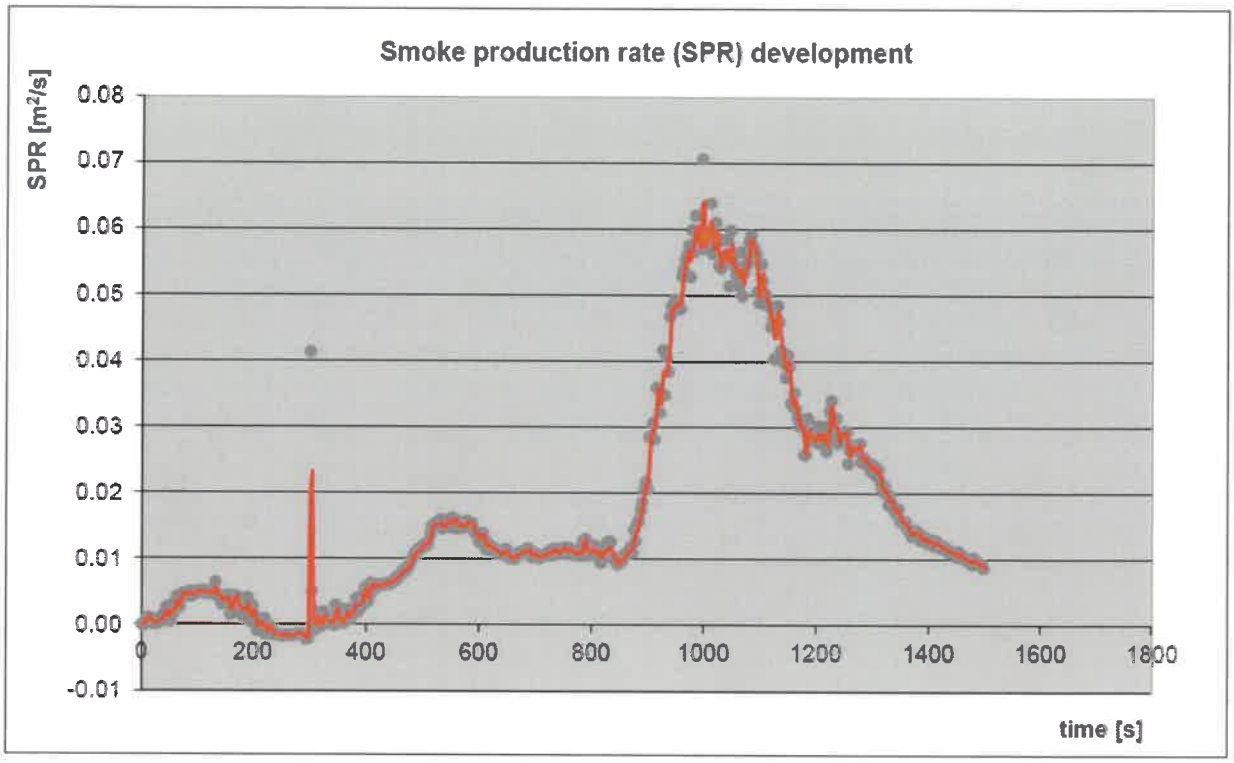
Classification according to ČSN EN 13501-6: **$B2_{ca}$-s1,d0**

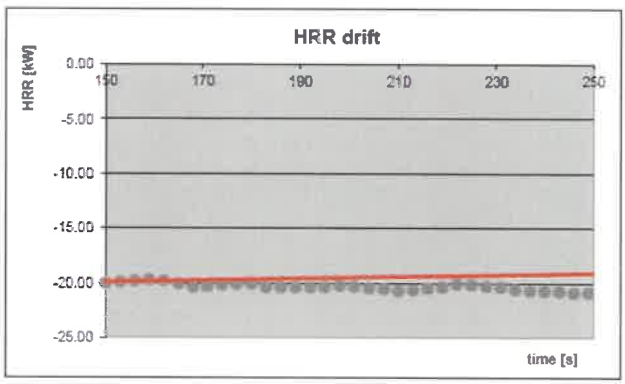
EN 50399:2011

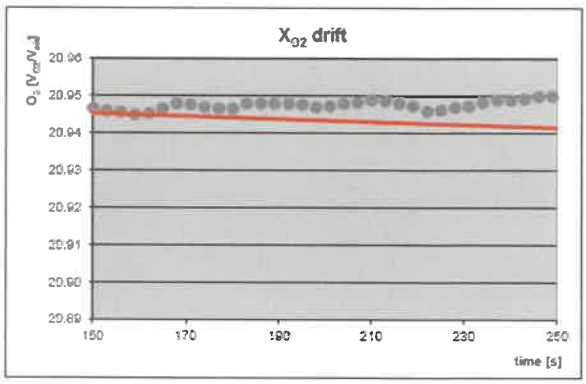
performance level: 20.5 kW

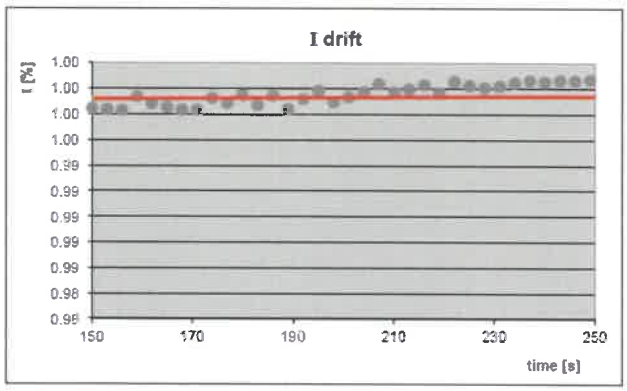


$HRR_{avg\ max}$ =	20.877	kW	RH =	43.3	%
THR_{1200} =	14.094	MJ	p^0_{atm} =	98250	Pa
$SPR_{avg\ max}$ =	0.059	m^2/s	ϑ_{atm} =	25.3	°C
TSP_{1200} =	26.383	m^2	E_{C3H8} =	17200	J/m^3
FIGRA =	49.198	$W.s^{-1}$		46.4	KJ/g


Smoke production rate (SPR) development
SPR [m²/s]
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
0
200
400
600
800
1000
1200
1400
1600
1800
time [s]


HRR drift
HRR [kW]
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
150
170
190
210
230
250
time [s]


X02 drift
20.96
20.95
20.94
20.93
20.92
20.91
20.90
20.89
150
170
190
210
230
250
time [s]

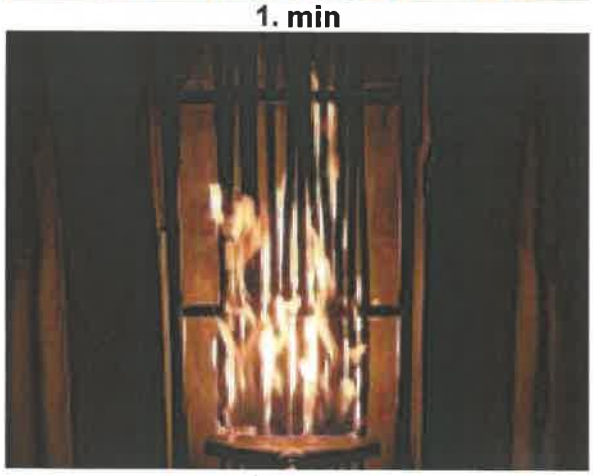

I drift
I [%]
1.00
1.00
1.00
1.00
0.99
0.99
0.99
0.99
0.99
0.98
0.98
150
170
190
210
230
250
time [s]

EN 50399

Before test

1. min

5. min



10. min

15. min

19. min

After test

Test	Prescribed			Observed
Test on complete cable according to EN 60332-1-2				
Test for vertical flame propagation EN 60332-1-2, article 5 EN 60332-1-2, article 6				
- outer diameter		[mm]		12,7
- flame application time		[s]	60	60
- not damage area from lower edge of the top support	min.	[mm]	50	399
- damage area from lower edge of the top support	max.	[mm]	540	466
- flame spread H	≤	[mm]	425	67

EN 60332-1-2

Before test

Course of the tests

After test

Measuring and testing equipment

Used	Type	Key number
--	Digital gravity Sartorius	88-4921/1
--	Teraohmmeter	00-6250
--	Resistomat 2304	00-6251 + 00-6249
--	Profilprojector KSM	00-6323
--	Thermometer	93-5494
--	Thermostat Heraeus UT 6120	110058
--	Thermostat Heraeus UT 6120	110060
--	Cooling chamber ProfiTest	110135
X	Metter 100 cm	N 400013
X	Slide caliper	259
X	Table stopwatch	551705
X	Test under fire conditions	20 780
--	Smoke index measurement chamber	ZPD 007
--	Slide caliper	190
--	Water bath	51027
--	Digital gravity BP 610	550156
--	Combustion chamber	110239
--	pH meter	551983
--	Konduktometer	551983
--	Cooling equipment	95-5855
X	diferencial barometer Testo 521	20 780
X	multimeter Fluke 189	110018
X	multimeter Fluke 189	SOD 024
X	digital termometer Testo T645	EOD 015
X	termometer Testo 177-T4	EOD 016
X	gas analyzer SICK-MAIHAK S710	TKD 012
X	digital anemometer T425	TKD 020
--	Stopwatch	SOD 025
X	diferencial barometer Testo 521	SOD 022
X	Mass Flowmeter aer - Brooks	SOD 020
X	Mass Flowmeter propan - Brooks	SOD 021

If an uncertainty of measurement is given, the expanded a measurement uncertainty is the product of the standard measurement uncertainty and coverage factor k = 2, which corresponds to a coverage probability of approximately 95% in a normal distribution.

Laboratory conditions during the test were in accordance with specifications of the standards listed on the first page of this test report.

Compiled by: Jan Tůma