



TEST REPORT FOR REACTION TO FIRE

Test Report No.: 801494-01/01

Issued: 29. 5. 2018

Notified Body No. 1014

Name of product: Electrical cable
Type of product: 2*1.5mm² Electrical cable Dca
Ratings: Dca-s1,d2,a1
Serial number: --
Manufacturer: ZHEJIANG TIANJIE INDUSTRIAL CORP
Linglong Economic Development Zone, Lin'an
Hangzhou China, People republic of China
Production site: Same as manufacturer
Ordering firm: ZHEJIANG TIANJIE INDUSTRIAL CORP
Linglong Economic Development Zone, Lin'an
Hangzhou China, People republic of China
Number of tested samples: 1
Samples submitted on: 14. 5. 2018
Location of testing: Elektrotechnický zkušební ústav, s. p.
Tests performed from 18. 5. 2018 through 28. 5. 2018
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, EN 60754-2:14

Compiled by: Jan Tůma



Approved by: František Nekola
Testing laboratory manager

No. of pages: 7

No. of annexes: 0

No. of annexes pages: 0

Test results stated in the test report apply only to the tested subject and unless specified otherwise in the test report, the tests were performed using the method and under the conditions determined in the test regulations, technical norm, instructions for use and information provided by the manufacturer on the tested subject and using accessories required by the manufacturer.
Without written consent of Elektrotechnický zkušební ústav, s. p. this report must not be reproduced in any other way than as a whole.
When referring to services of Elektrotechnický zkušební ústav, s. p. as an accredited laboratory, the customer specified in this report must use the following formulation: "Tested by test laboratory no. 1056, accredited by CAI".

Test type: **Classification 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: **2x1,5 mm² LSHF**Cable producer: **Zhejiang Tianjie Industrial Corp.**

date of test: 22.5.2018

Number of pieces calculation:

Main axis: 17,5 mm

Minor axis: 4,4 mm

Ratio: 1,64

$$N = \text{int} \left[\frac{300+m_c}{2m_c} \right]$$

Test pieces: 21 ks

Mounting type: separately

Space: 7,2 mm

required by: EN 13501-6 for class D_{ca}

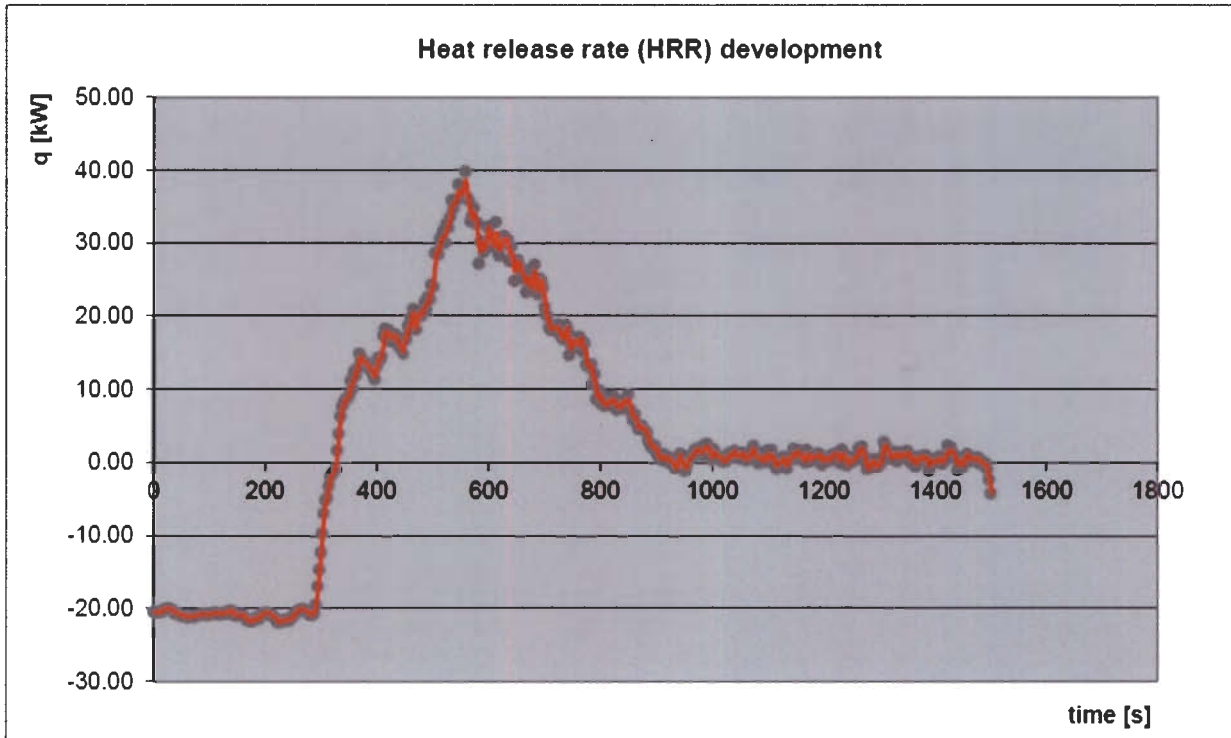
Test results:	FS =	>2 m	FS ≤	Not required
	HRR_{avg max} =	36,7 kW	Peak HRR ≤	400 kW
	SPR_{avg max} =	0,059 m ² /s	(s1) SPR ≤	0,5 m ² /s (additional classific.)
	THR =	11,2 MJ	THR_{1200 s} ≤	70 MJ
	TSP =	21,1 m ²	(s1) TSP_{1200 s} ≤	50 m ² (additional classific.)
	FIGRA =	182,2 W.s ⁻¹	FIGRA ≤	1300 W.s ⁻¹
	Burning particles :	Yes, it burns longer than 10 s	d2	(additional classific.)
	Flame spread H =	203 mm	H ≤	425 mm

Classification according to ČSN EN 13501-6:

D_{ca}-s1,d2

EN 50399:2011

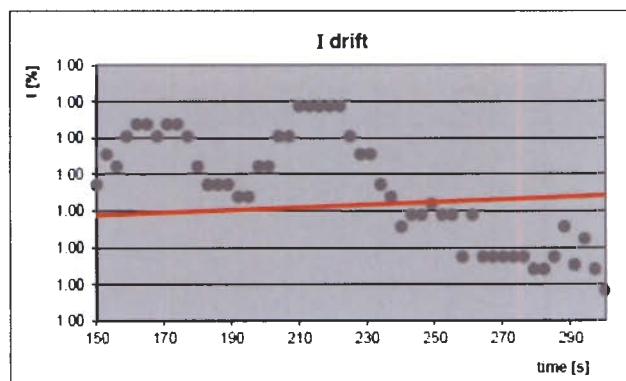
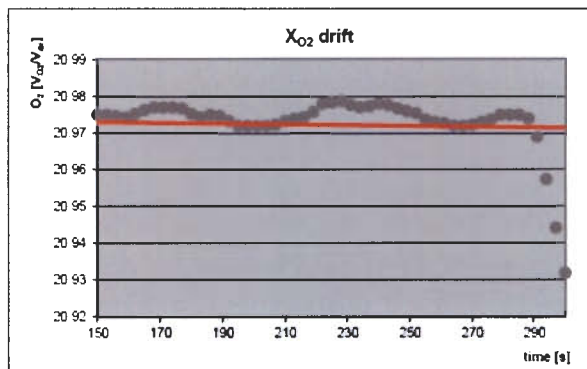
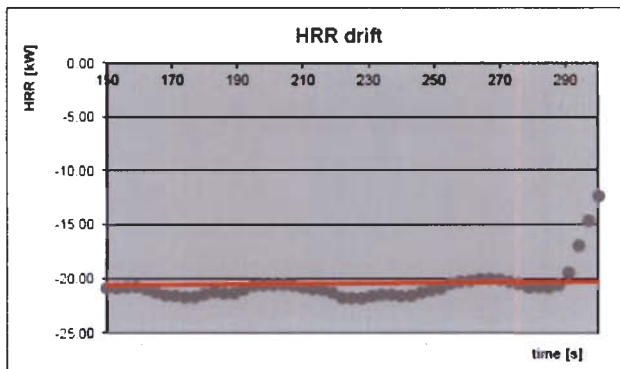
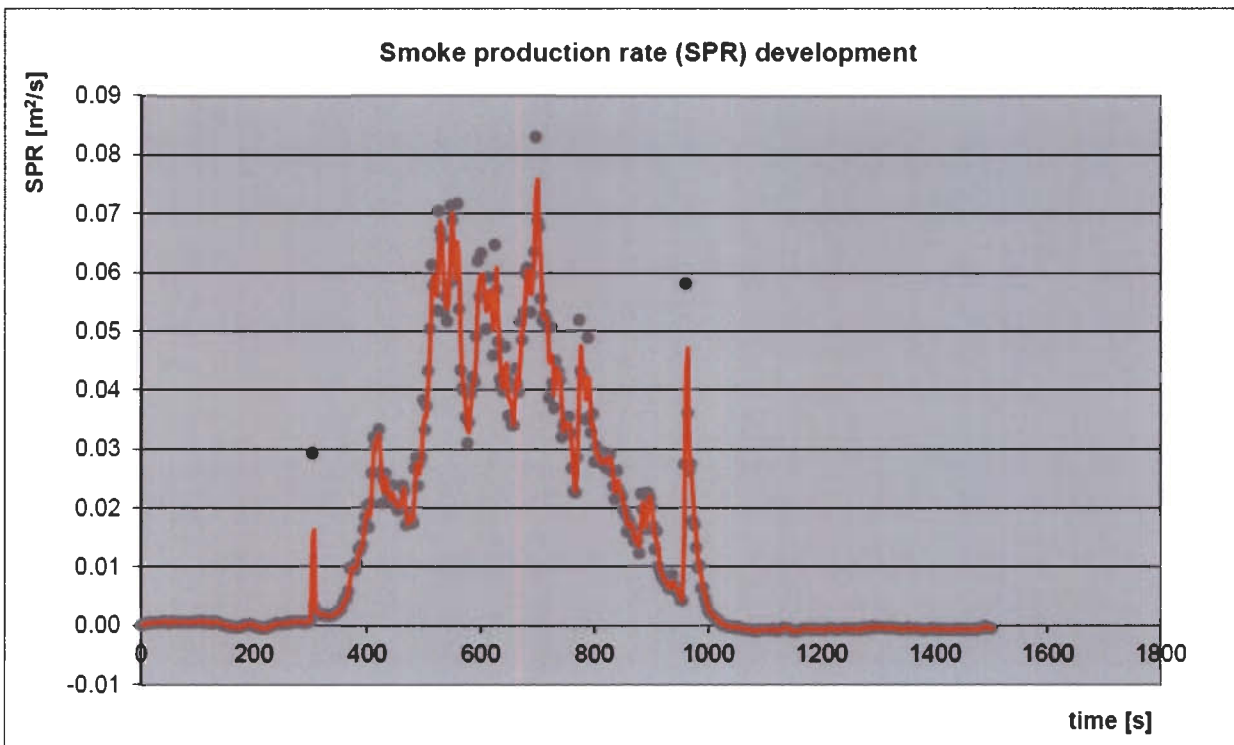
performance level: 20.5 kW



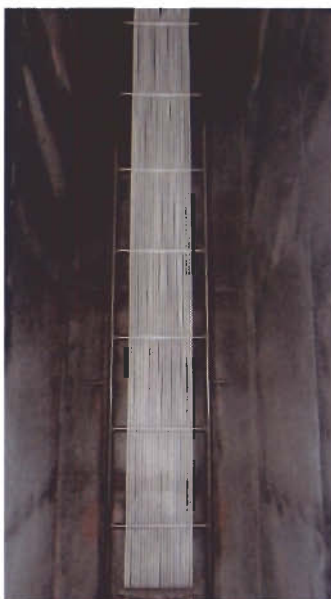
$HRR_{avg\ max} = 36.736\ kW$
 $THR_{1200} = 11.222\ MJ$
 $SPR_{avg\ max} = 0.059\ m^2/s$
 $TSP_{1200} = 21.114\ m^2$
 $FIGRA = 182.2\ W.s^{-1}$

$RH = 37.8\ \%$
 $p_{atm}^0 = 98650\ Pa$
 $\vartheta_{atm} = 23.6\ ^\circ C$
 $E_{C_3H_8} = 17200\ J/m^3$
 $E = 46.4\ KJ/g$

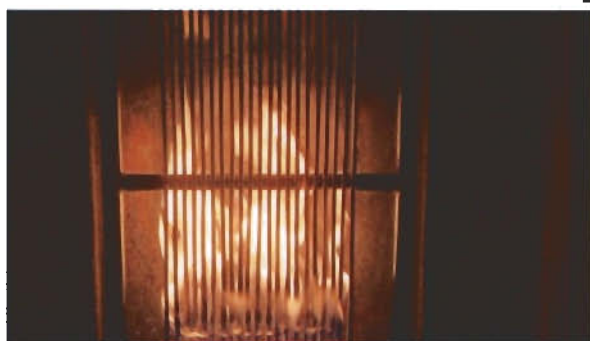
$E^i = 17200\ J/m^3$



EN 50399



Before test



1. min



5. min



10. min



15. min



19. min



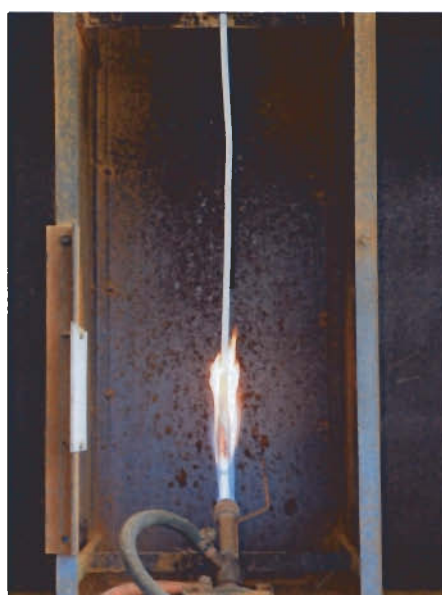
After test

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]		7,2 x 4,4
- flame application time		[s]	60	60
- not damage area from lower edge of the top support	min.	[mm]	50	266
- damage area from lower edge of the top support	max.	[mm]	540	469
- flame spread H	≤	[mm]	425	203
Test on complete cable according to EN 60754-2				
Tests on gases evolved during combustion EN 60754-2, article 8.3				additional classification: a1
- conductivity	max.	[μS/mm]	2,5	0,36
- pH	min.		4,3	5,28

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
--	Smoke index measurement chamber	ZPD 007
X	Mettler 100 cm	N 400013
X	Slide caliper	259
X	Table stopwatch	551705
X	Test under fire conditions	20 780
--	Water bath	51027
--	Digital gravity BP 610	550156
--	Combustion chamber	110239
--	pH meter	551983
--	Konduktometer	551983
--	Cooling equipment	95-5855
X	Mettler 100 cm	N 400013
X	Stopwatch	N700456
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