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OPTICAL CABLE

A-D(ZN-2P)2Y-xxE-2,5kN

ОКП(c2,5)T-xx

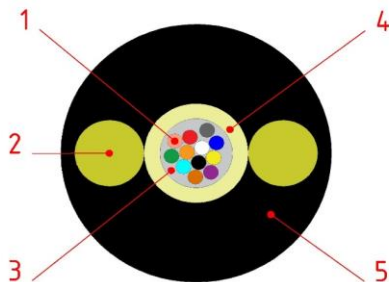
ID: A25TxD

17.10.2024

Cable Design

Application

Properties



Aerial



UV resistant



All-dielectric

1. Optical fiber	Single-mode Rec. ITU-T G.652.D
2. Peripheral strength member	FRP rod
3. Filler	Thixotropic filling compound (gel)
4. Loose Tube	Polybutylene terephthalate (PBT)
5. Outer jacket	Polyethylene (HDPE), black, UV-resistance

Technical data

A25T2D

A25T3D

A25T5D

A25T7D

A25TAD

A25TED

Optical fiber/Manufacturer		Single-mode Rec. ITU-T G.652.D / Corning ®						
Cladding Diameter		(±0,7), μm	125					
Coating Diameter		(±5), μm	242					
Attenuation		(λ= 1310 nm), dB/km	≤ 0,32					
		(λ= 1550 nm), dB/km	≤ 0,22					
Number of optical fibers			2	4	8	12	16	24
Central tube diameter		(±0,2), mm	1,8		2,5		3,0	
Cable diameter		(±0,4), mm	6,5		7,2		8,0	
Cable weight		(±5%), kg/km	38,1	38,2	45,8	45,9	55,4	55,6
Max. Tension		Installation , kN	2,5					
		Operational, kN	1,2					
Crush resistance, N/10 cm			3000					
Cable modulus of elasticity, N/mm²			7360		6238		5181	
Effective cable area, mm²			32,1		38,2		46,5	
Thermal expansion coefficient, °C ⁻¹			1,06E-05		1,17E-05		1,31E-05	
Delivery Lengths		(±100) , m	2000 / 4000 *					
Temperature range		Operation, °C	-40 ... +70					
		Installation, °C	-10 ... +50					
		Storage, °C	-40 ... +70					
Min. bending radius			20xOD					

* - other lengths available upon agreement

Identification

Optical fibers*	
Central Loose Tube**	1 NAT
Cable marking	The cable is marked in yellow every 1 meter of length by inkjet printing where: yyyy - year; xx - the number of optical fibers in the cable; ZZZZ - sequential length mark.

.*

**

Recommendations

Recommended tension clamps	Spiral anchor for long runs											
Cable ID	A25T2D; A25T3D				A25T5D; A25T7D				A25TAD, A25TED			
Mounting sag of the cable , % *	≥1,25				≥1,5				≥1,5			
Temperature, °C	-5	-5	-5	+20	-5	-5	-5	+20	-5	-5	-5	+20
Ice, mm	15	10	10	0	15	10	10	0	15	10	10	0
Wind, km/h	0	65	0	100	0	65	0	100	0	65	0	100
Span (max), m *	105	130	160	285	110	135	165	290	95	120	145	245

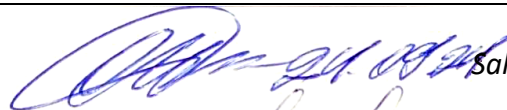
* - presented data are indicative, calculated for areas with medium climatic conditions. The exact calculation for a specific cable area must be determined by the design.

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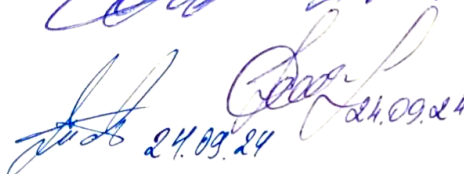
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IC 38510082

TYPE TEST REPORT	№ 2-2024
TEST OBJECT:	Fiber optic cable for aerial installation on power transmission towers, facades of structures and buildings.
TYPE:	A-D(ZN-2P)2Y-4E-2.5KN (OKП(c2,5)T-04)
PRODUCT SPECIFICATION CODE:	ID – A25T3D
NORMATIVE DOCUMENT	TY 27.3 -38510082-001:2016 Product specification - A25T3D
RANGE OF TESTS PERFORMED:	Verification of: 1. Tensile strength 2. Impact resistance 3. Repeated bending 4. Torsional resistance 5. Crush resistance 6. Resistance of cable marking to abrasion 7. Resistance of the cable sheath to abrasion 8. Water penetration 9. Measuring the attenuation
PERIOD OF TESTS	10.09.2024 to 20.09.2024
TEST METHOD STANDARD:	IEC 60794-1-21:2015 Optical fiber cables - Part 1-21: Generic specification - Basic optical cable test procedures - Mechanical test methods IEC 60793-1-40 : 2001 Part 1 Measurement methods and test procedures
TEST RESULT	The tests have been passed.

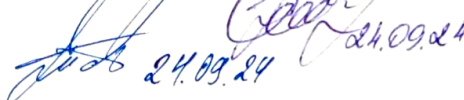
Chief Technologist of UTEX UKRAINE LLC

 Sakazly O.

Senior Technologist

 Khomytskiy M.

Research and development technologist

 Luchkin O.

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IC 38510082

1. Tensile strength

Test method standard:	IEC 60794-1-21:2015 (method E1)
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Dynamometer SF-918 Installation for measuring the tensile force of the optical fiber
Sample length	50 m
Measured optical fibers	5 of each optical fibers in unit - looped

1.1. Requirements:

T_s - The maximum allowable short-term tensile load	2.5 kN
T_L - Maximum allowable working (long-term) tensile load	1.2 kN

For T_L - elongation of the optical fiber ≤ 20% proof-test elongation. No change in attenuation*¹.

For T_s - elongation of the optical fiber ≤ 60% proof-test elongation and attenuation change ≤ 0,05 dB/km.

Cable is considered to have passed the test in the absence of changes in attenuation*¹ (dB) at T_{install max}.

*¹ ± 0,05 dB according to paragraph 4.9.2 of IEC 60794-1-20

1.2. Test result:

Applied load, kN	Change in attenuation, dB (1550 nm)*	Tensile force of the optical fiber, N
T _L 1.0	—	0,2
T _s 1,5	+0,03 (no change in attenuation* ¹)	0,4
T _{install} 2.5	+0,04 (no change in attenuation* ¹)	0,7

*10 minutes after reaching the value

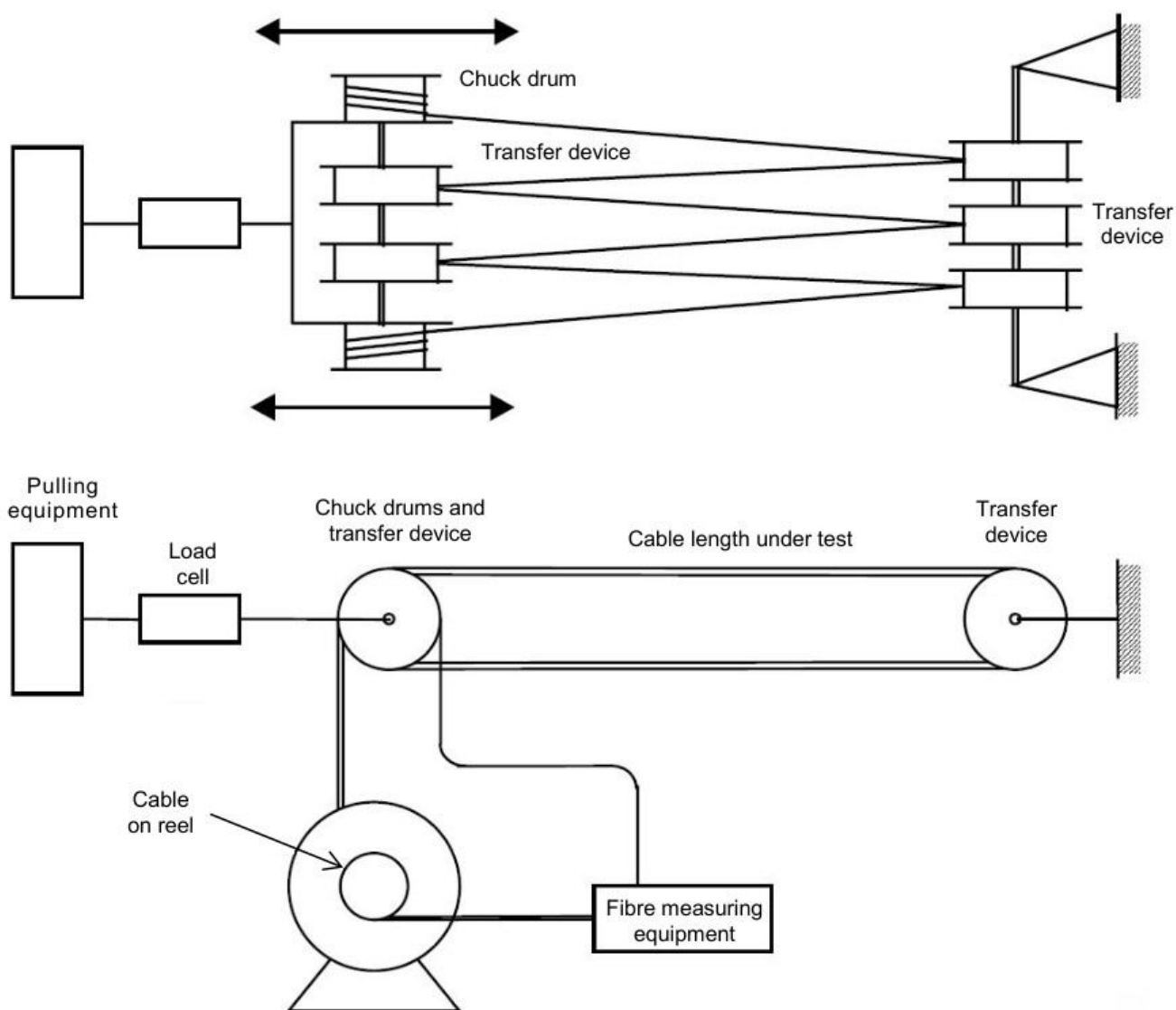
T_s - The maximum allowable short-term tensile load

T_L - Maximum allowable working (long-term) tensile load

T_{install max} - tensile load exceeding permissible value

1.3 Conclusion:

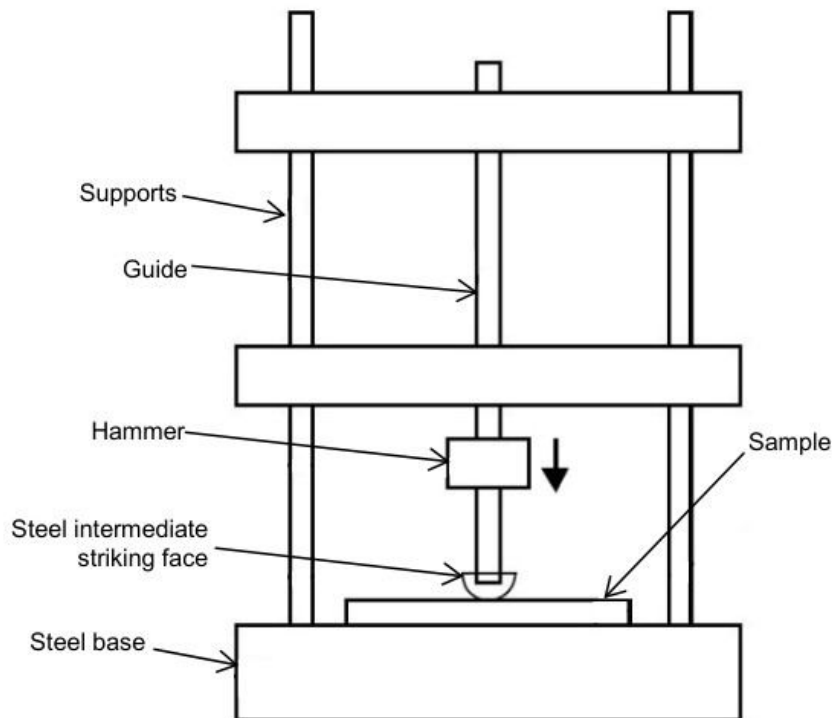
The cable meets the stated specifications. *TEST object has passed the type test. Verified.*



2. Impact resistance

Test method standard:	IEC 60794-1-21: 2015 Method E4: Impact
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Impact apparatus
Percussion Element	Hammer with radiused edges (radius = 10 mm) Hammer diameter = 20±1 mm
Impact energy	3 J
Impacts number	3
Distance between impact points, mm	≤ 500

Apparatus:



2.1. Requirements for Declared product characteristics

No visible damage to the coating. Permitted attenuation change for 1550 nm wavelength less than 0,1 dB.

2.2. Test result:

No visible damage to the sheath and other cable components after test. No attenuation change.

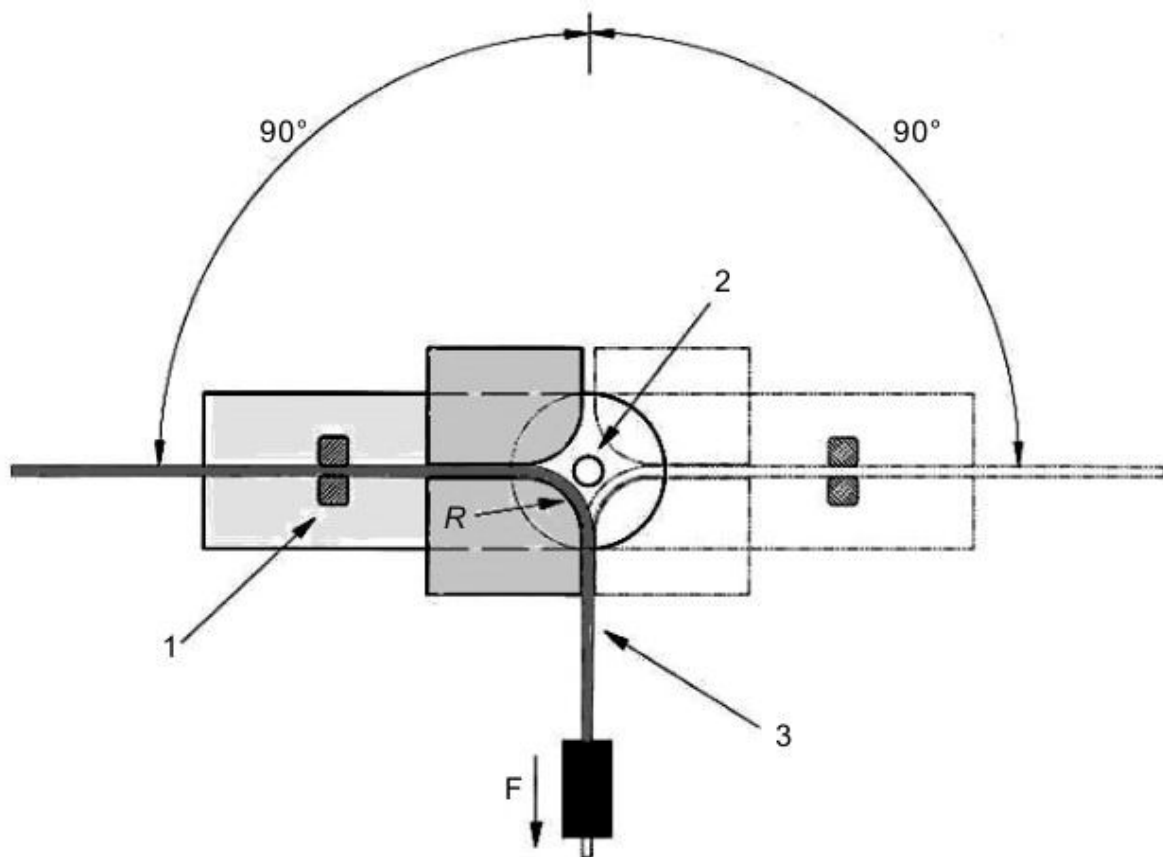
2.3. Conclusion:

TEST object has passed the type test Verified.

3. Repeated bending

Test method standard:	IEC 60794-1-21: 2015 Method E6: Repeated bending
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Number of cycles	25
Tensile load	40 N
Bending radius R, mm	130 (20 x cable diameter)
Bending rate, sec	2

Apparatus:



3.1 Requirements for Declared product characteristics

No visible damage to the sheath and other cable components after test.

3.2. Test result:

No visible damage to the sheath and other cable components after test.

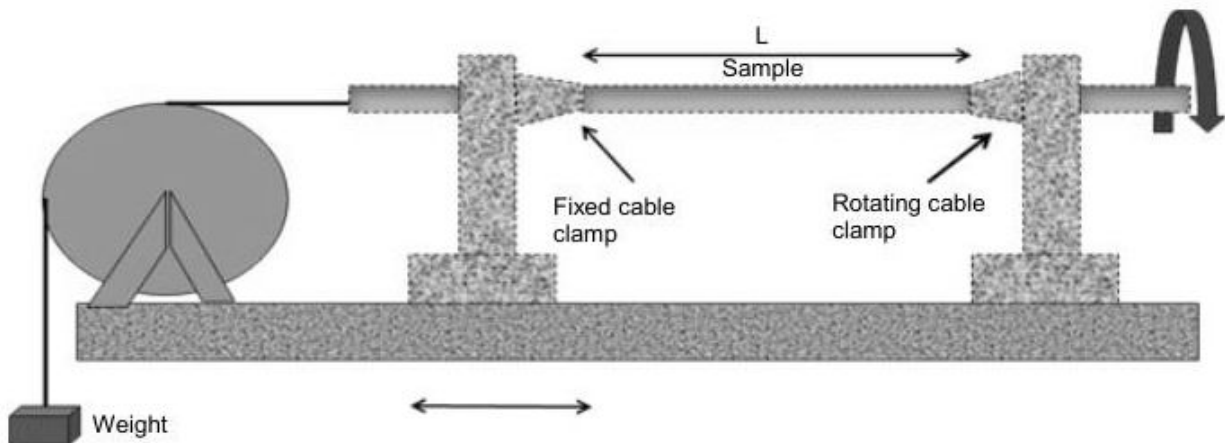
3.3. Conclusion:

TEST object has passed the type test. Verified.

4. Torsional resistance

Test method standard:	IEC 60794-1-21: 2015 Method E7: Torsion
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Cable twisting device
Number of cycles	10
Distance between fixed and rotating	2 m
Tension force:	70 N
Twist:	$\pm 180^\circ$

Apparatus:



4.1. Requirements for Declared product characteristics

No visible damage to the coating. No damage to the optical fiber. Allowable change in attenuation for wavelength 1550 nm less than 0,1 dB.

4.2. Test result:

No visible damage to the coating. No damage to the optical fiber. No attenuation change.

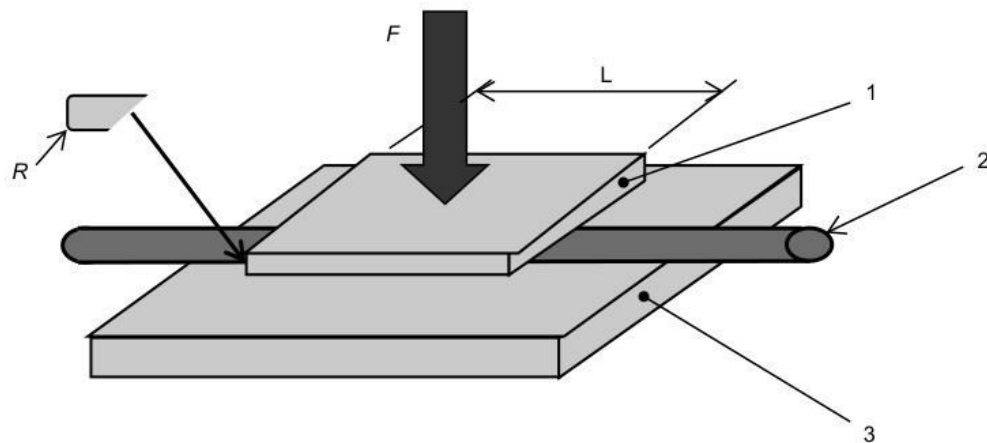
4.3. Conclusion:

TEST object has passed the type test. Verified.

5. Crush resistance

Test method standard:	IEC 60794-1-21: 2015 Method E3A: Crush
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Cable twisting device
Crushing force:	1,5 kN
Crushing time:	10 min
Length of the crushing element:	50 mm
Number of crush pints:	3
Distance between crush points:	500 mm

Apparatus:



Key

- R radius of edge of movable plate, 5 mm
- F force on movable place, as defined in relevant specification
- L length of plate
- 1 movable plate
- 2 cable under test

5.1. Requirements for Declared product characteristics

Allowable change in attenuation for 1550 nm wavelength less than 0,1 dB, no damage to any cable element.

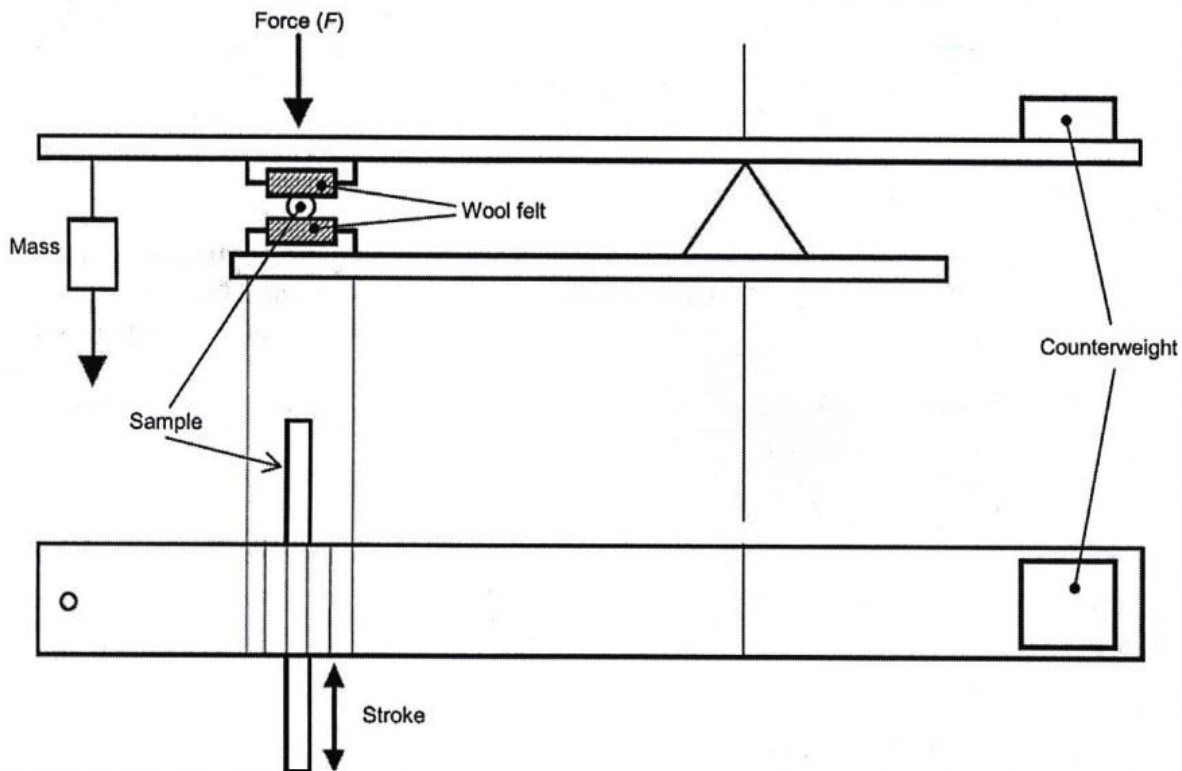
5.2. Test result:

No visible damage to the coating. No damage to the optical fiber. No attenuation change

5.3. Conclusion:

TEST object has passed the type test. Verified.

6. Resistance of cable marking to abrasion

Test method standard:	IEC 60794-1-21: 2015 Method E2B: Abrasion resistance (marking)
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Sample length:	1 m
Press force:	4 N
Number of cycles	50
Apparatus:	

6.1 Requirements for Declared product characteristics

After the test, the inscription should be legible along its entire length. For laser marking - test not applicable.

6.2 Test result:

The inscription is legible

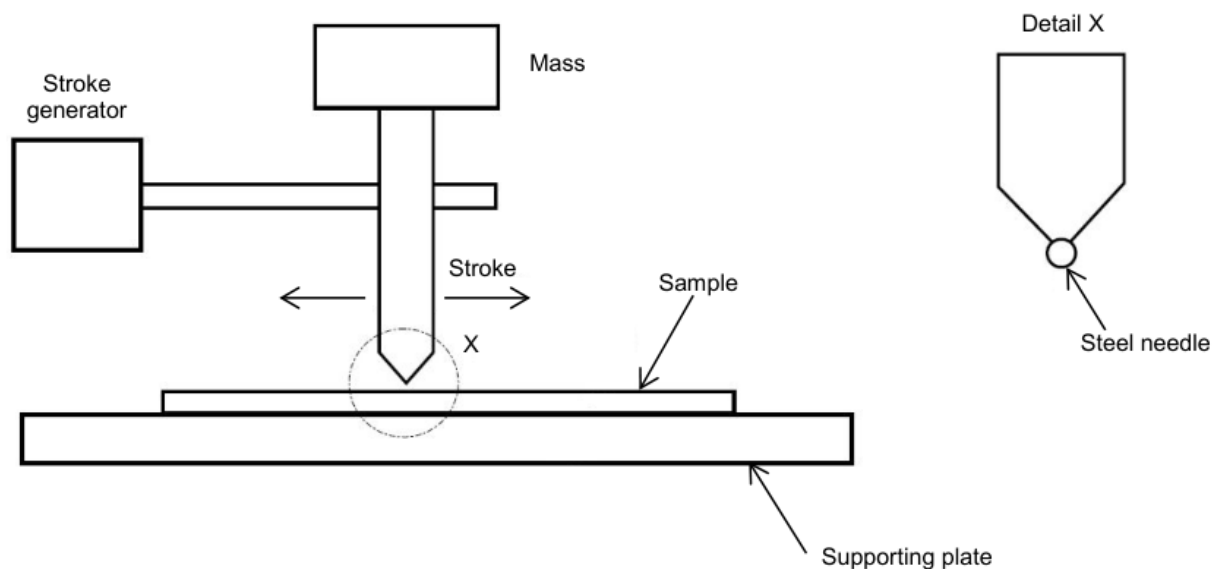
6.3 Conclusion:

TEST object has passed the type test. Verified.

7. Resistance of the cable sheath to abrasion

Test method standard:	IEC 60794-1-21: 2015 Method E2A Abrasion resistance of optical fibre cable sheaths
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Sample length:	1 m
Press force:	4 N
Number of cycles	500 (4 points - 90° turn)
Diameter of a steel needle	1 mm

Apparatus:



7.1 Requirements for Declared product characteristics

There shall be no perforation of the sheath after performing the number of cycles.
The integrity of the coating shall be preserved. (acc. ZN-OPL-005-02 / 17 requirements).

7.2. Test result:

There is no perforation of the sheath.
The integrity of the coating is preserved. (acc. ZN-OPL-005-02 / 17 requirements).

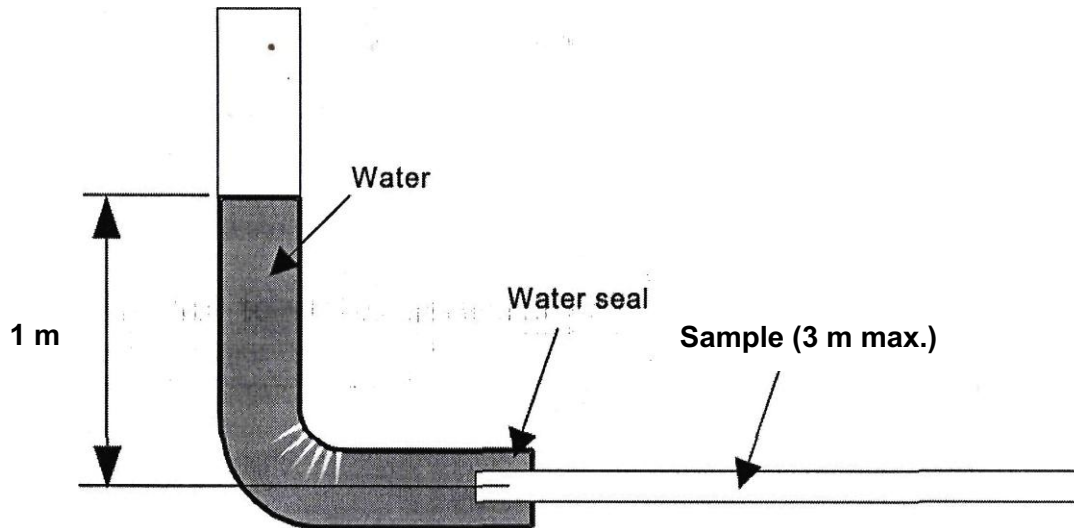
7.3. Conclusion:

TEST object has passed the type test. Verified.

8. Water penetration

Test method standard:	IEC 60794-1-22: 2012
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Sample length:	3 m
Water column height:	1 m
Test duration:	24 hours

Apparatus:



8.1. Requirements for Declared product characteristics

No leakage at the far end of the sample after completion of the test.

8.2. Test result:

No leakage at the far end of the sample after completion of the test
(Length of water penetration into the cable – 1000 mm)

8.3. Conclusion:

TEST object has passed the type test. Verified.

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9. Measuring the attenuation

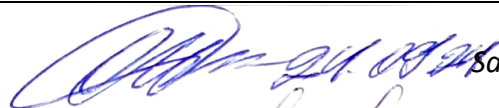
Test method standard:	IEC 60793-1-40
Atmospheric test conditions:	20°C
Test equipment:	Measuring station INNO A870
Sample length:	3000 m
Attenuation at a wavelength of 1310 nm	$\leq 0,36$ dB/km
Attenuation at a wavelength of 1550 nm	$\leq 0,19$ dB/km

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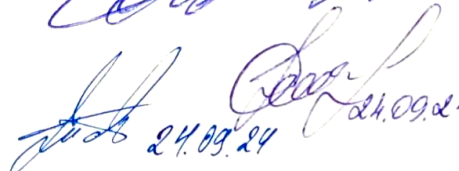
Ukraine, Chernigiv, 14034
70, Rokossovskogo str., of. 214
IC 38510082

TYPE TEST REPORT	№ 3-2024	
TEST OBJECT:	Fiber optic cable for aerial installation on power transmission towers, facades of structures and buildings.	
TYPE:	A-D(ZN-2P)2Y-8(12)E-2.5KN (OKП(c2,5)T-08(12))	
PRODUCT SPECIFICATION CODE:	ID – A25T5D, A25T7D	
NORMATIVE DOCUMENT	TY 27.3 -38510082-001:2016 Product specification - A25T5D, A25T7D	
RANGE OF TESTS PERFORMED:	Verification of: 1. Tensile strength 2. Impact resistance 3. Repeated bending 4. Torsional resistance 5. Crush resistance 6. Resistance of cable marking to abrasion 7. Resistance of the cable sheath to abrasion 8. Water penetration 9. Measuring the attenuation	
PERIOD OF TESTS	12.09.2024 to 23.09.2024	
TEST METHOD STANDARD:	IEC 60794-1-21:2015 Optical fiber cables - Part 1-21: Generic specification - Basic optical cable test procedures - Mechanical test methods IEC 60793-1-40 : 2001 Part 1 Measurement methods and test procedures	
TEST RESULT	The tests have been passed.	

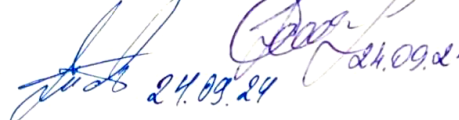
Chief Technologist of UTEX UKRAINE LLC

 Sakazly O.

Senior Technologist

 Khomytskiy M.

Research and development technologist

 Luchkin O.



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1. Tensile strength

Test method standard:	IEC 60794-1-21:2015 (method E1)
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Dynamometer SF-918 Installation for measuring the tensile force of the optical fiber
Sample length	50 m
Measured optical fibers	5 of each optical fibers in unit - looped

1.1. Requirements:

T_s - The maximum allowable short-term tensile load	2.5 kN
T_L - Maximum allowable working (long-term) tensile load	1.2 kN

For T_L - elongation of the optical fiber ≤ 20% proof-test elongation. No change in attenuation*¹.

For T_s - elongation of the optical fiber ≤ 60% proof-test elongation and attenuation change ≤ 0,05 dB/km.

Cable is considered to have passed the test in the absence of changes in attenuation*¹ (dB) at T_{install max}.

*¹ ± 0,05 dB according to paragraph 4.9.2 of IEC 60794-1-20

1.2. Test result:

Applied load, kN	Change in attenuation, dB (1550 nm)*	Tensile force of the optical fiber, N
T _L 1.0	—	0,25
T _S 1,5	+0,03 (no change in attenuation* ¹)	0,45
T _{install} 2.5	+0,04 (no change in attenuation* ¹)	0,7

*10 minutes after reaching the value

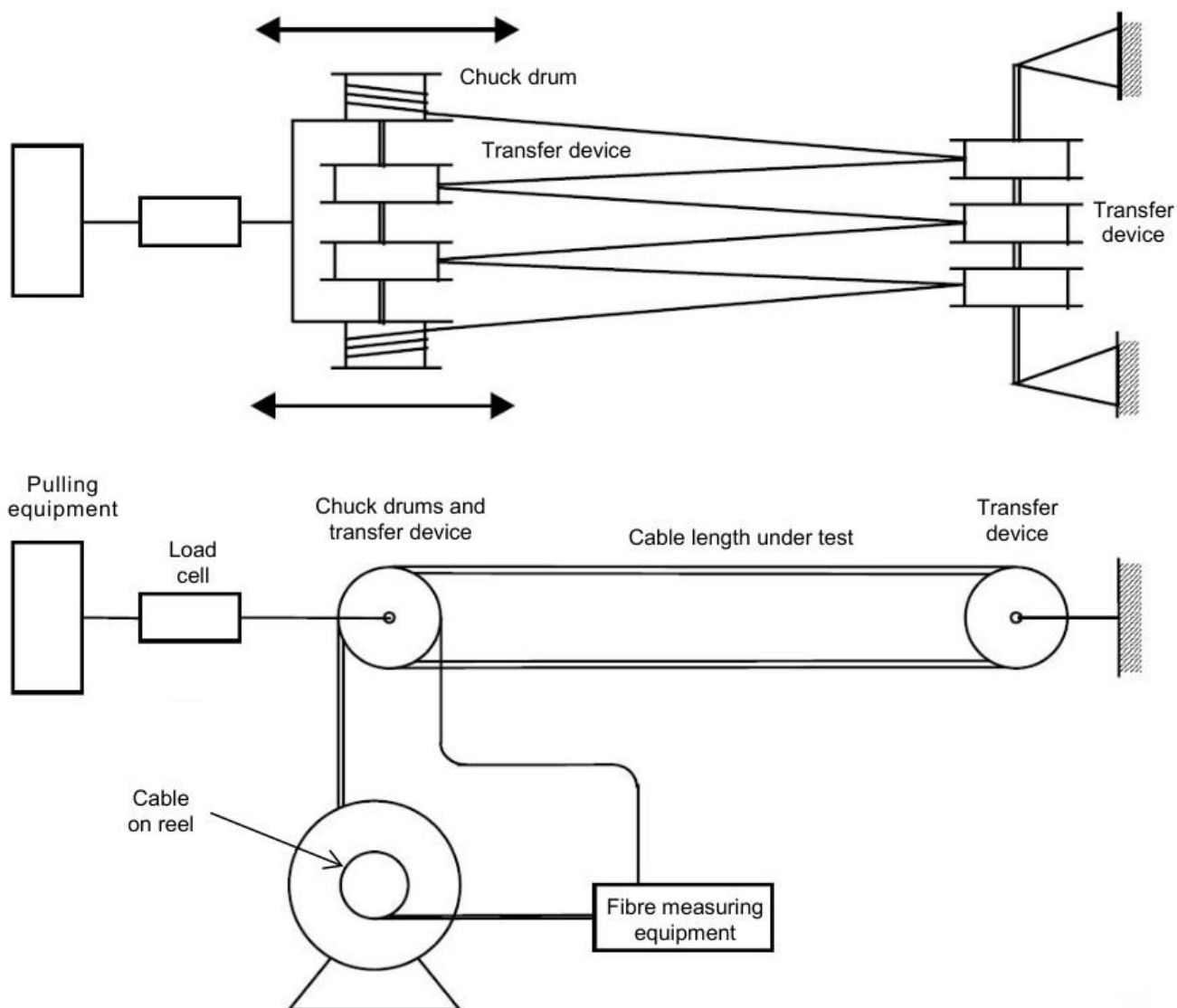
T_S - The maximum allowable short-term tensile load

T_L - Maximum allowable working (long-term) tensile load

T_{install max} - tensile load exceeding permissible value

1.3 Conclusion:

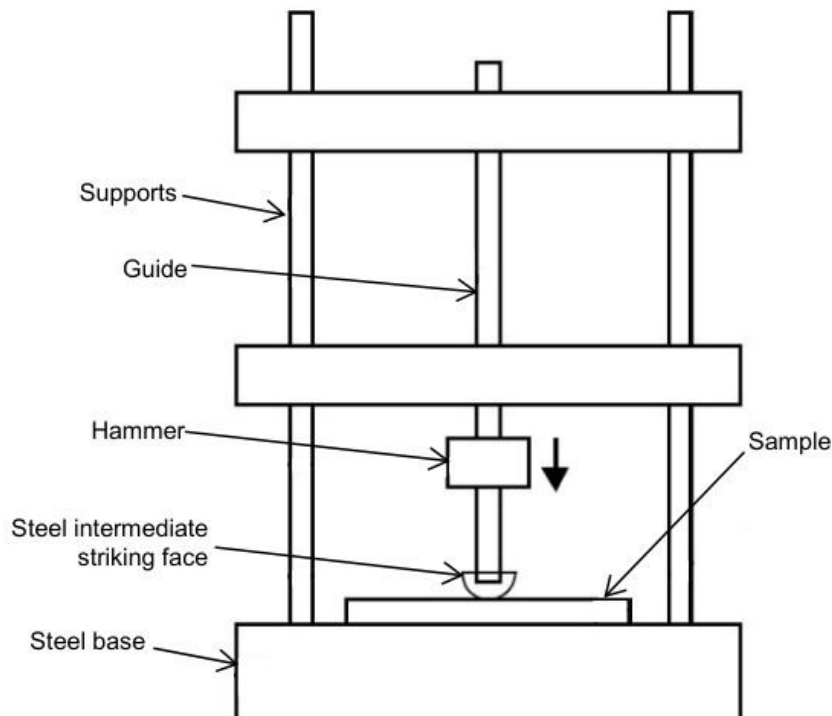
The cable meets the stated specifications. *TEST object has passed the type test. Verified.*



2. Impact resistance

Test method standard:	IEC 60794-1-21: 2015 Method E4: Impact
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Impact apparatus
Percussion Element	Hammer with radiused edges (radius = 10 mm) Hammer diameter = 20 ± 1 mm
Impact energy	3 J
Impacts number	3
Distance between impact points, mm	≤ 500

Apparatus:



2.1. Requirements for Declared product characteristics

No visible damage to the coating. Permitted attenuation change for 1550 nm wavelength less than 0,1 dB.

2.2. Test result:

No visible damage to the sheath and other cable components after test. No attenuation change.

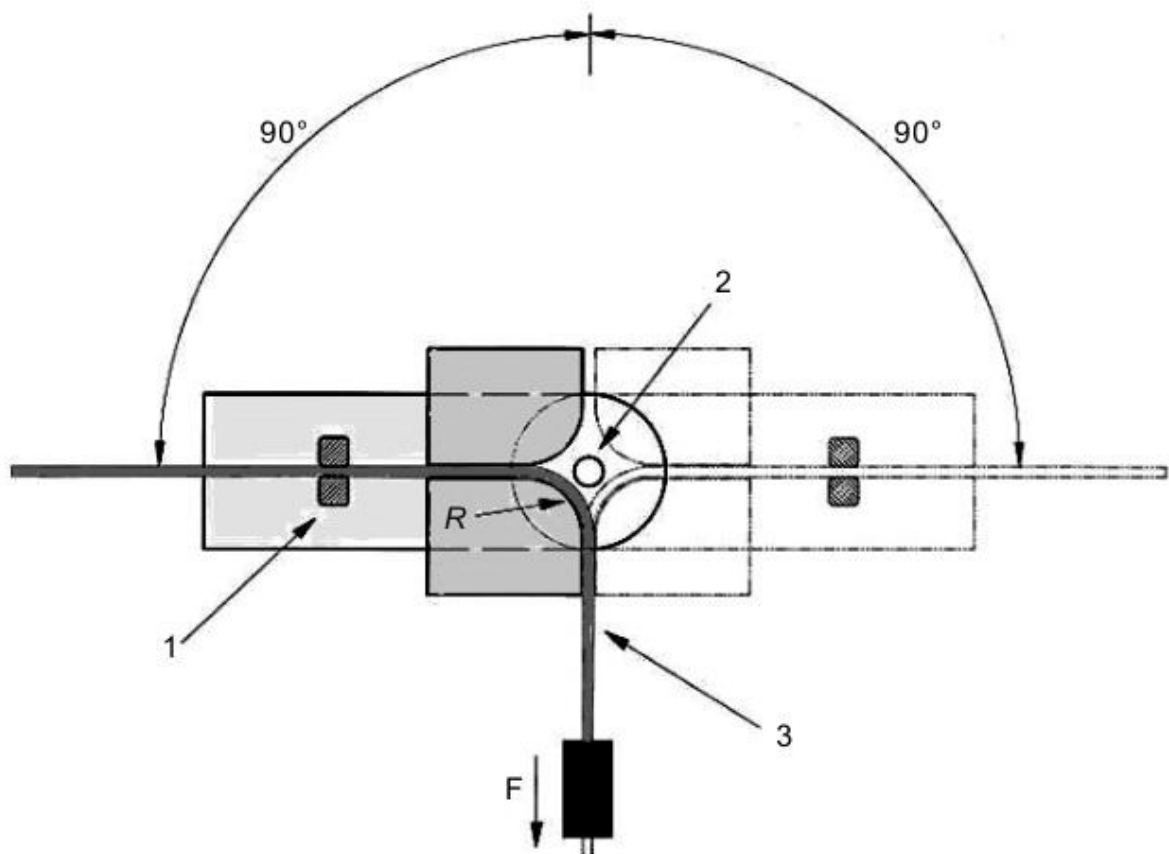
2.3. Conclusion:

TEST object has passed the type test Verified.

3. Repeated bending

Test method standard:	IEC 60794-1-21: 2015 Method E6: Repeated bending
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Number of cycles	25
Tensile load	40 N
Bending radius R, mm	140 (20 x cable diameter)
Bending rate, sec	2

Apparatus:



3.1 Requirements for Declared product characteristics

No visible damage to the sheath and other cable components after test.

3.2. Test result:

No visible damage to the sheath and other cable components after test.

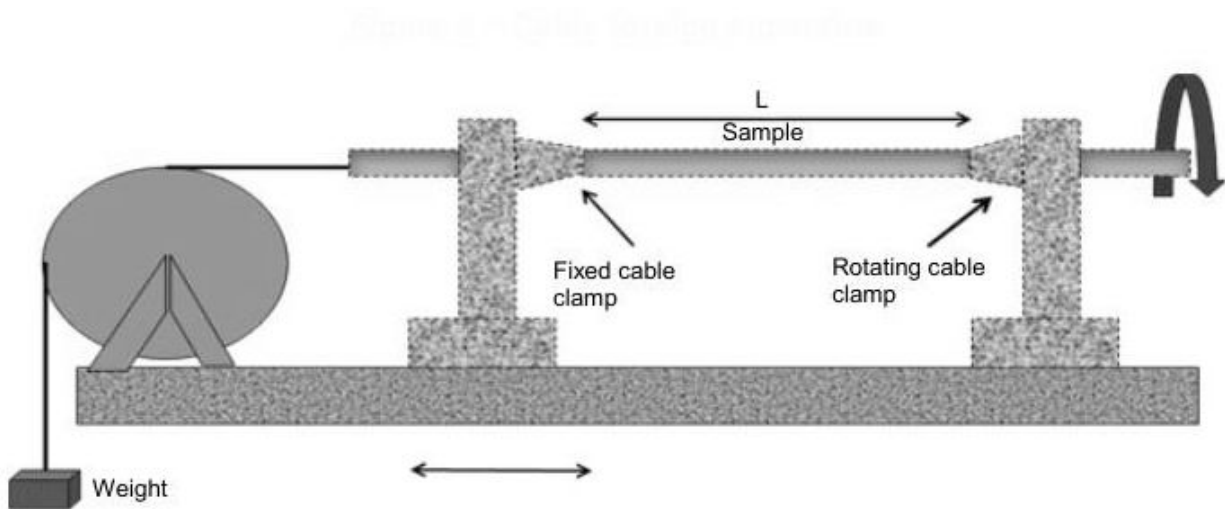
3.3. Conclusion:

TEST object has passed the type test. Verified.

4. Torsional resistance

Test method standard:	IEC 60794-1-21: 2015 Method E7: Torsion
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Cable twisting device
Number of cycles	10
Distance between fixed and rotating	2 m
Tension force:	70 N
Twist:	$\pm 180^\circ$

Apparatus:



4.1. Requirements for Declared product characteristics

No visible damage to the coating. No damage to the optical fiber. Allowable change in attenuation for wavelength 1550 nm less than 0,1 dB.

4.2. Test result:

No visible damage to the coating. No damage to the optical fiber. No attenuation change.

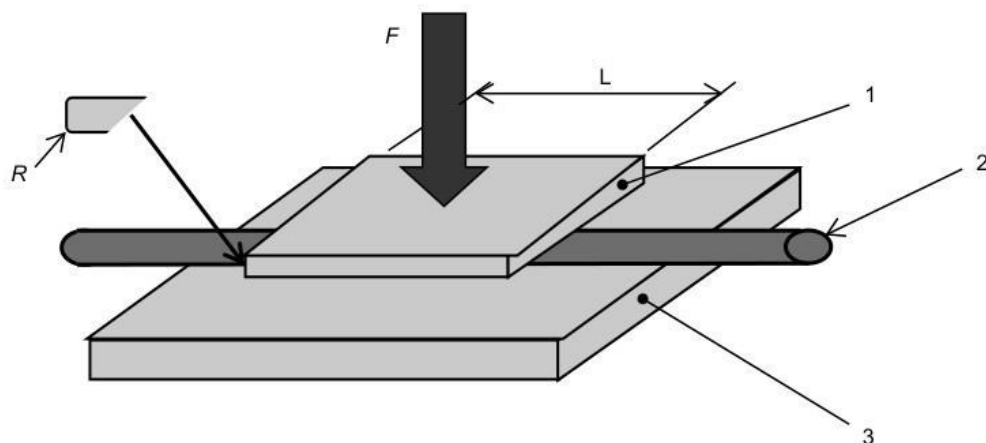
4.3. Conclusion:

TEST object has passed the type test. Verified.

5. Crush resistance

Test method standard:	IEC 60794-1-21: 2015 Method E3A: Crush
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Test equipment:	Measuring station INNO A870 Cable twisting device
Crushing force:	1,5 kN
Crushing time:	10 min
Length of the crushing element:	50 mm
Number of crush pints:	3
Distance between crush points:	500 mm

Apparatus:



Key

- R radius of edge of movable plate, 5 mm
- F force on movable place, as defined in relevant specification
- L length of plate
- 1 movable plate
- 2 cable under test

5.1. Requirements for Declared product characteristics

Allowable change in attenuation for 1550 nm wavelength less than 0,1 dB, no damage to any cable element.

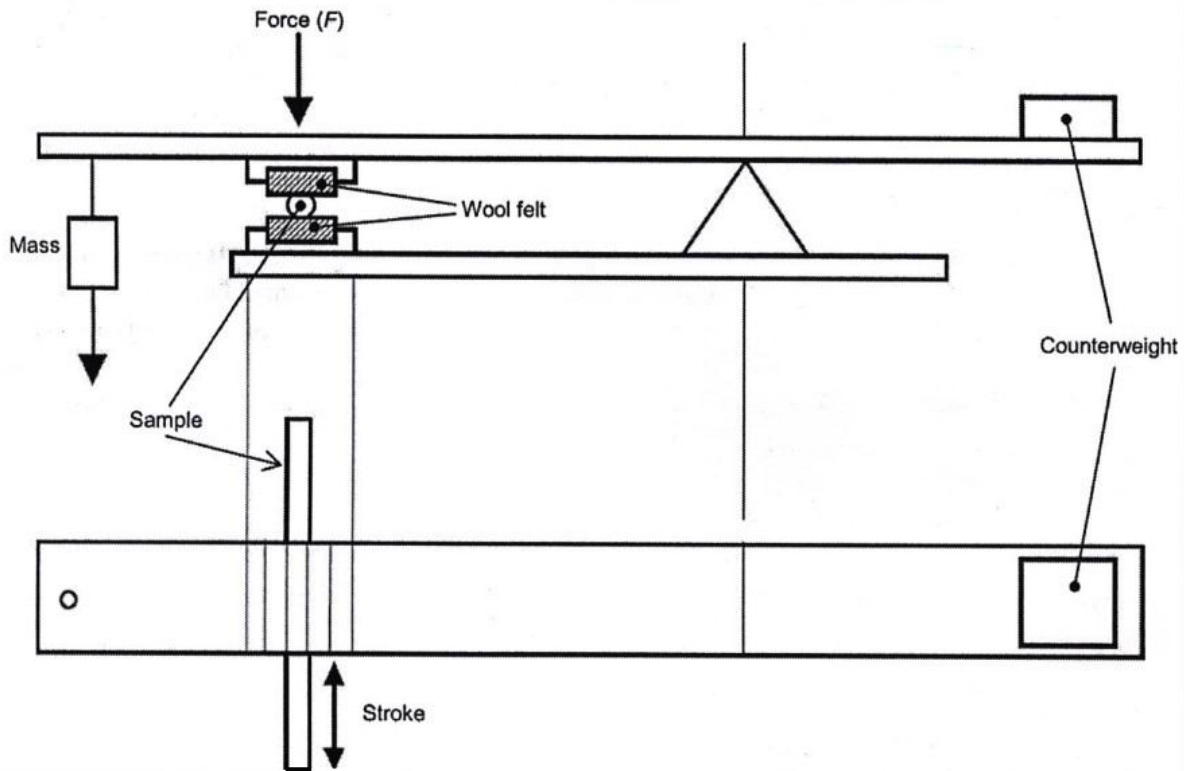
5.2. Test result:

No visible damage to the coating. No damage to the optical fiber. No attenuation change

5.3. Conclusion:

TEST object has passed the type test. Verified.

6. Resistance of cable marking to abrasion

Test method standard:	IEC 60794-1-21: 2015 Method E2B: Abrasion resistance (marking)
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Sample length:	1 m
Press force:	4 N
Number of cycles	50
Apparatus:	

6.1 Requirements for Declared product characteristics

After the test, the inscription should be legible along its entire length. For laser marking - test not applicable.

6.2 Test result:

The inscription is legible

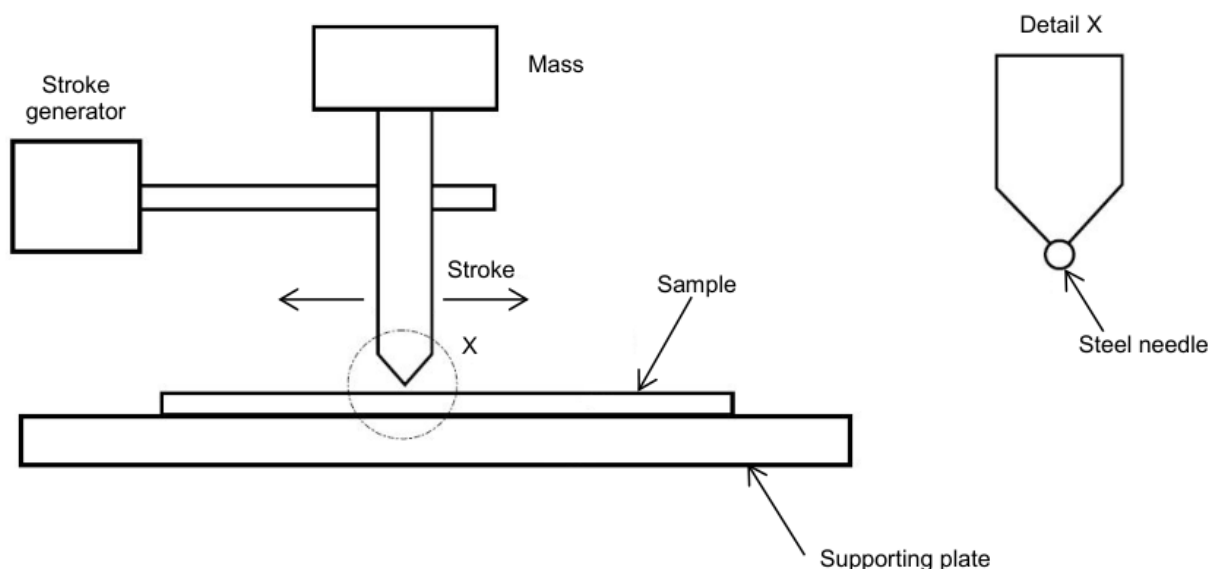
6.3 Conclusion:

TEST object has passed the type test. Verified.

7. Resistance of the cable sheath to abrasion

Test method standard:	IEC 60794-1-21: 2015 Method E2A Abrasion resistance of optical fibre cable sheaths
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Sample length:	1 m
Press force:	4 N
Number of cycles	500 (4 points - 90° turn)
Diameter of a steel needle	1 mm

Apparatus:



7.1 Requirements for Declared product characteristics

There shall be no perforation of the sheath after performing the number of cycles.
The integrity of the coating shall be preserved. (acc. ZN-OPL-005-02 / 17 requirements).

7.2. Test result:

There is no perforation of the sheath.
The integrity of the coating is preserved. (acc. ZN-OPL-005-02 / 17 requirements).

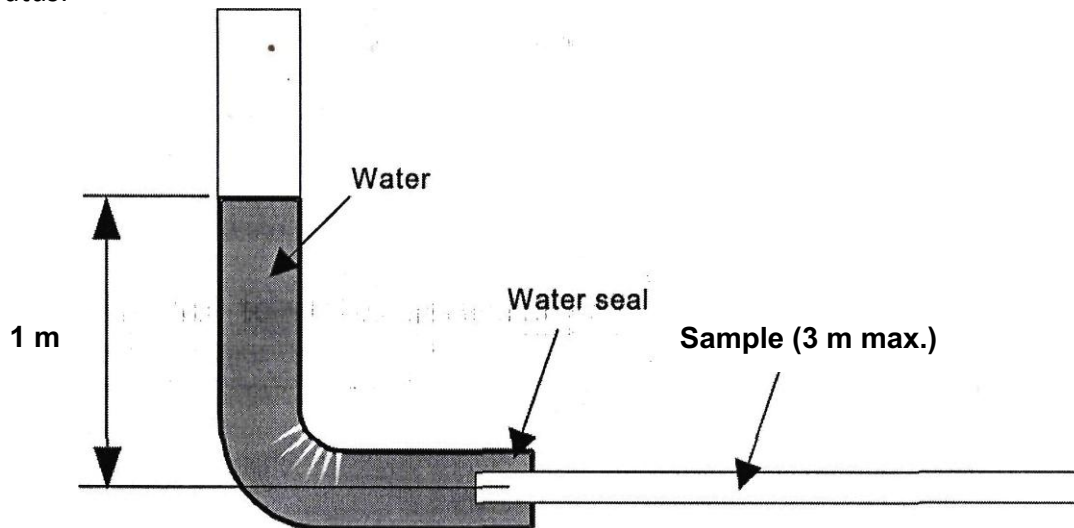
7.3. Conclusion:

TEST object has passed the type test. Verified.

8. Water penetration

Test method standard:	IEC 60794-1-22: 2012
Atmospheric test conditions:	in accordance with paragraph 4.4 IEC 60794-1-20
Sample length:	3 m
Water column height:	1 m
Test duration:	24 hours

Apparatus:



8.1. Requirements for Declared product characteristics

No leakage at the far end of the sample after completion of the test.

8.2. Test result:

No leakage at the far end of the sample after completion of the test
(Length of water penetration into the cable – 1000 mm)

8.3. Conclusion:

TEST object has passed the type test. Verified.

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9. Measuring the attenuation

Test method standard:	IEC 60793-1-40
Atmospheric test conditions:	20°C
Test equipment:	Measuring station INNO A870
Sample length:	3000 m
Attenuation at a wavelength of 1310 nm	$\leq 0,36$ dB/km
Attenuation at a wavelength of 1550 nm	$\leq 0,19$ dB/km