

**HOMOLOGATION REPORT  
No. 909.24**

**Aerial Drop Optical fibre cable  
12FO**

**Specification:  
TC09381**

**SAP Code: 60114660**

*November, 2024*

Slatina, R&D

**AUTHOR:**  
Catalin Mateita  
R&D Technician

**APPROVED BY:**  
Florin Chirita  
R&D Manager

## Qualification tests list

<b>Content</b>	<b>Standards (if applicable)</b>	<b>Result</b>
Dimensional Measurement	SR EN 60811-1-100	Comply
Tensile Performance Test	IEC 60794-1-2 E1	Comply
Impact Test	IEC 60794-1-2 E4	Comply
Cable Bend Test	IEC 60794-1-2 E11	Comply
Repeated Bending	IEC 60794-1-2-E6	Comply
Crush Test	IEC 60794-1-2 E3	Comply
Temperature Cycling Test	IEC 60794-1-2 F1	Comply
Water Penetration Test	IEC 60794-1-2-F5B	Comply
Drip Test	IEC 60794-1-22-E14	Comply

The above mentioned Aerial drop optical fibre cable 12FO type tests have been carried out in accordance with specification TC09381, international IEC specifications and internal R&D rules.

# Test report

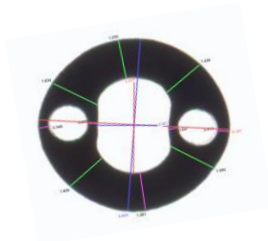
## Dimensional measurement

Type of cable:	FUDI FT K0D1E0 12(12G657A1)		
Drum no.:	DWP0900 09540759		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	SR EN 60811-1-100		
Instruments:	Caliper Mitutoyo	Calibration due date	Apr-24
	Cabscan 4.2	Calibration due date	May-24

<p><b>PASS / FAIL CRITERIA:</b> The measurements shall be compliant with cable's specification.</p>
<p><b>RESULT:</b> The following table summarizes the results.</p>
<p><b>CONCLUSION:</b> <span style="color: green; font-weight: bold;">PASS</span></p>

Parameter	Cable documentation	Measurement
# of tubes	1	1
Outer sheath tickness [mm]	1.7	1.435
Outer sheath Ø [mm]	6.0	6.17
Cable weight [Kg/Km]	30	27.5

Outer end		
	Dimension	[mm]
Sheath thickness	Min. 1.261	Max. 1.634
	<b>average</b>	<b>1.435</b>
Outer Ø	Min. 6.391	Max. 5.953
	<b>average</b>	<b>6.172</b>



Date:  
14/11/2024

Performed by:  
M. Pauna

Approved by:  
M. Jianu

# ATTENUATION MEASUREMENT REPORT

Product Code: <b>60114660</b>	Batch: <b>RD00021191</b>	Measurement Date: <b>12/11/2024 11:00</b>
Product Description: <b>FUDI FT K0D1E0 12(12G657A1)-TC09381-en</b>	Drum Number: <b>DWP0900-09540759</b>	Instrument ID: <b>PRYRO-OTDR01</b>
Specification: <b>TC09381-en</b>	Cable Length: <b>2103</b>	Measuring Device: <b>PhotonKinetics 8000i</b>
Customer: <b>CAM 1</b>	Length ID: <b>TEST</b>	Fiber Length: <b>2108</b>

**All OTDR traces have been checked as linear and with regular behavior.**

**Result:Pass**

**Wavelength (nm): 1310**

<b>G.657A1 0.36;0.22;0.24;0.35</b>	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.333
Natur   Orange	0.335
Natur   Green	0.332
Natur   Brown	0.333
Natur   Grey	0.333
Natur   White	0.332
Natur   Red	0.335
Natur   Black	0.331
Natur   Yellow	0.334
Natur   Violet	0.337
Natur   Pink	0.337
Natur   Turquoise	0.331
<b>Maximum</b>	<b>0.337</b>
<b>Average</b>	<b>0.334</b>
<b>Limit</b>	<b>0.360</b>

**Wavelength (nm): 1383**

<b>G.657A1 0.36;0.22;0.24;0.35</b>	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.309
Natur   Orange	0.284
Natur   Green	0.276
Natur   Brown	0.293
Natur   Grey	0.275
Natur   White	0.291
Natur   Red	0.272
Natur   Black	0.278
Natur   Yellow	0.293
Natur   Violet	0.286
Natur   Pink	0.281
Natur   Turquoise	0.263
<b>Maximum</b>	<b>0.309</b>
<b>Average</b>	<b>0.283</b>
<b>Limit</b>	<b>0.350</b>

**Wavelength (nm): 1500**

<b>G.657A1 0.36;0.22;0.24;0.35</b>	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.185
Natur   Orange	0.185
Natur   Green	0.183
Natur   Brown	0.183
Natur   Grey	0.184
Natur   White	0.186
Natur   Red	0.182

**Wavelength (nm): 1550**

<b>G.657A1 0.36;0.22;0.24;0.35</b>	
Tube   Fiber	Atten. dB/Km
Natur   Black	0.184
Natur   Yellow	0.184
Natur   Violet	0.184
Natur   Pink	0.186
Natur   Turquoise	0.185
<b>Maximum</b>	<b>0.186</b>
<b>Average</b>	<b>0.184</b>
<b>Limit</b>	<b>0.220</b>

**Wavelength (nm): 1625**

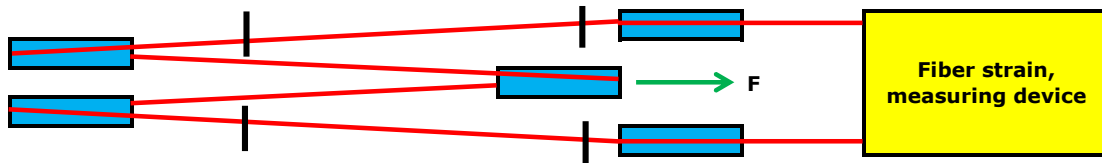
<b>G.657A1 0.36;0.22;0.24;0.35</b>	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.195
Natur   Orange	0.195
Natur   Green	0.195
Natur   Brown	0.196
Natur   Grey	0.196
Natur   White	0.197
Natur   Red	0.193
Natur   Black	0.195
Natur   Yellow	0.197
Natur   Violet	0.192
Natur   Pink	0.199
Natur   Turquoise	0.195
<b>Maximum</b>	<b>0.199</b>
<b>Average</b>	<b>0.195</b>
<b>Limit</b>	<b>0.240</b>

# Test report

## Tensile performance

Type of cable:	FUDI FT K0D1E0 12(12G657A1)	
Drum no.:	DWP0900 09540759	
Specification:	TC09381	
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina	
Test standard:	IEC 60794-1-21 E1	
Length under test:	147 m	
Fibers under test:	8 by 8 different channels	
Instruments:	Load cell 5000 Kgf, ASA-RT-ATBCX120	Calibration due date: Dec-24
	Fiber strain CD500	Calibration due date: Apr-24

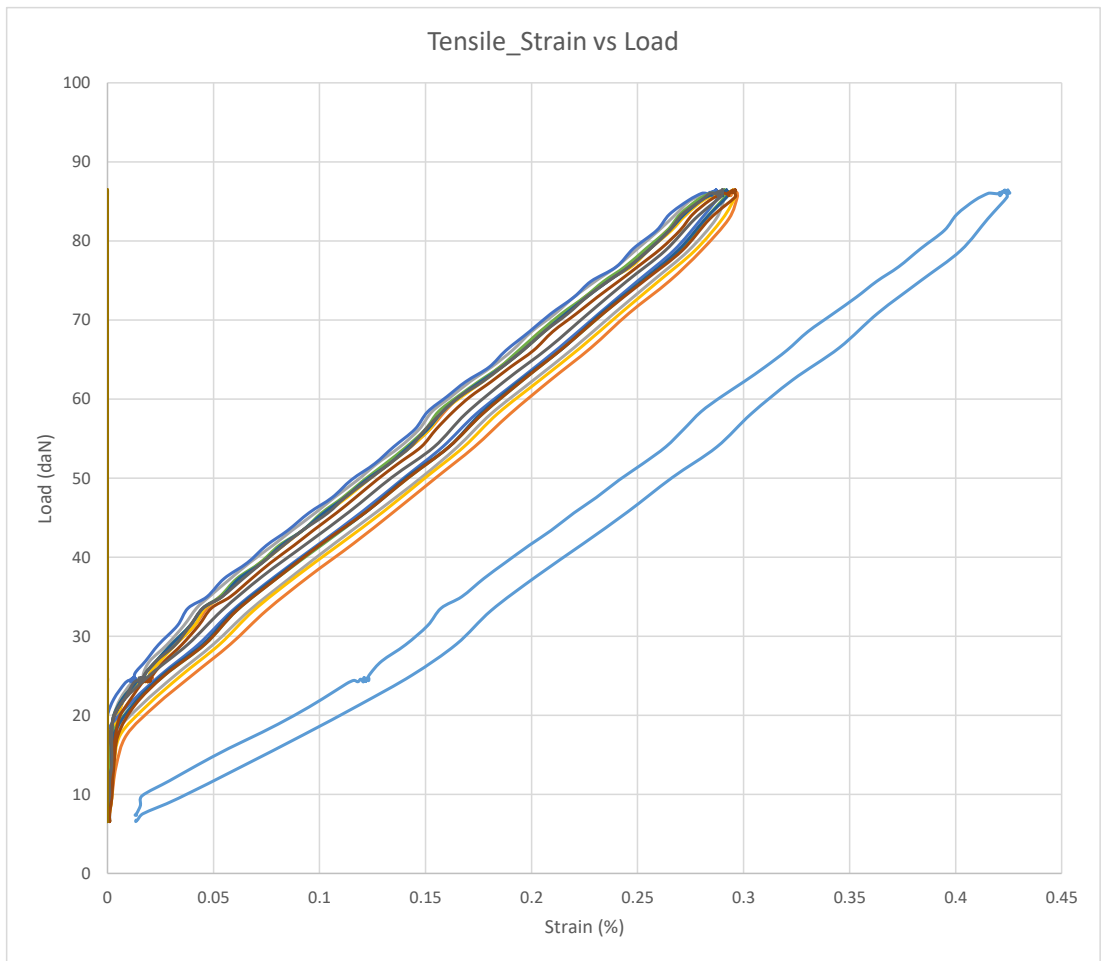
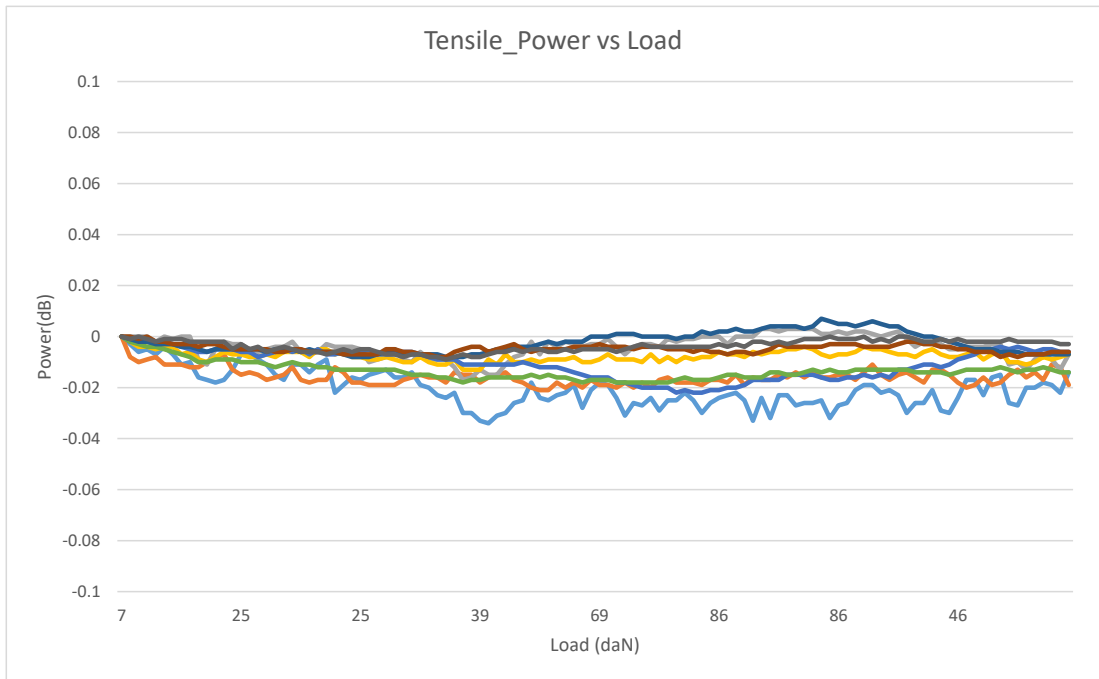
<b>PASS / FAIL CRITERIA:</b> 800 N, 5 min, $\Delta l/l \leq 0.3 \%$ , $\Delta\alpha \leq 0.5$ dB/km, reversible;
<b>RESULT:</b> @ 800N, max $\Delta l/l$ fibers = 0.297 %, max $\Delta l/l$ cable = 0.426 %, max $\Delta\alpha$ = 0.034 dB, reversible.
<b>CONCLUSION:</b> <span style="color: green; font-weight: bold;">PASS</span>



- Legend**
- Tensile Strength machine pulleys
  - Cable under test
  - Cable elongation marks
  - Load direction



Set-up Picture



Date:  
14/11/2024

Performed by:  
A. Bostina

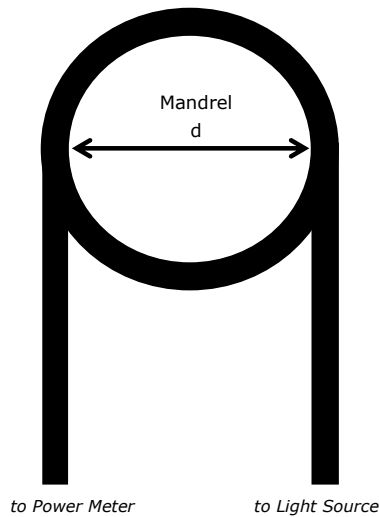
Approved by:  
M.Jianu

# Test report

## Cable bend

Type of cable:	FUDI FT K0D1E0 12(12G657A1)		
Drum no.:	DWP0900 09540759		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-21 E11		
Length under test:	69 m		
Fibers spliced in loop:	12		
Instruments:	Laboratory bend test device	Calibration due date:	N/A
	Fiber strain CD500	Calibration due date:	Apr-24

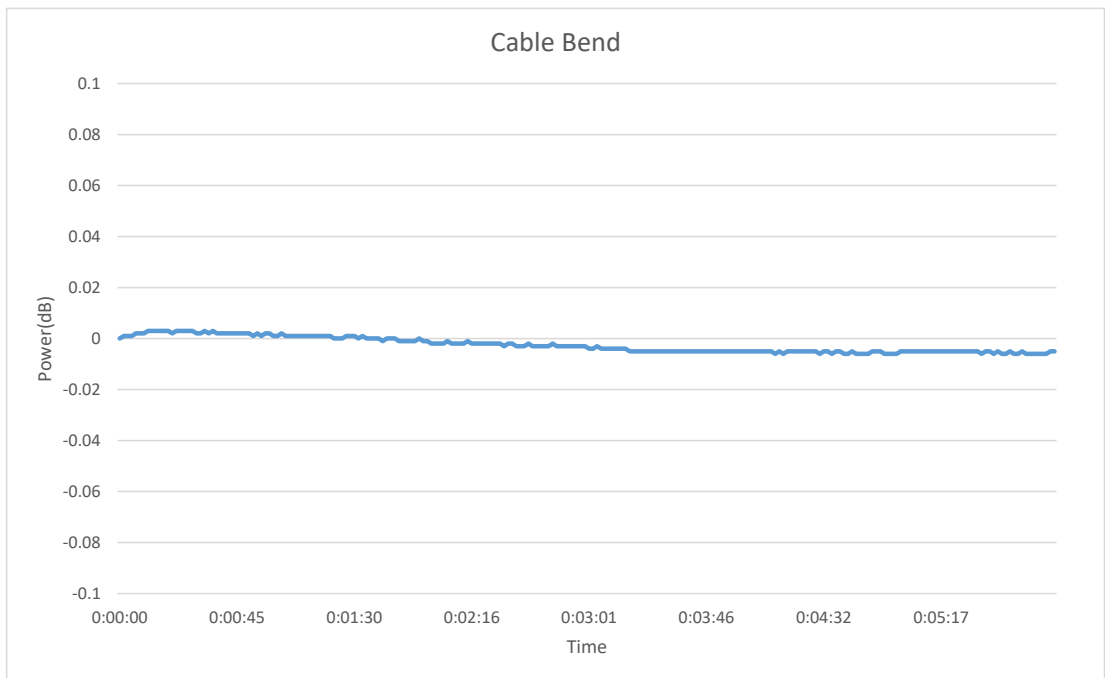
<b>PASS / FAIL CRITERIA:</b> R = 10 x OD, 4 turns, 3 cycles, $\Delta\alpha \leq 0.05$ dB, reversible;
<b>RESULT:</b> 3 cycles x 4 turns; mandrel $\varnothing 120$ mm; max $\Delta\alpha = 0.006$ dB, $\Delta\alpha$ reversible;
<b>CONCLUSION:</b> <b>PASS</b>



**Schematic representation of test**



Test results		
Cable bend test no. / No. of cycles	Mandrel Ø (mm)	Max. att. change during test/loop [dB]
1 / 3	120	0.006



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

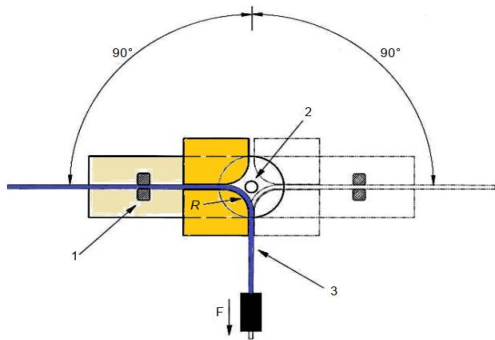


# Test report

## Repeated bending

Type of cable:	FUDI FT K0D1E0 12(12G657A1)	Calibration due date:	N/A
Drum no.:	DWP0900 09540759	Calibration due date:	Apr-24
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-2-E6		
Length under test:	69 m		
Fibers spliced in loop:	12		
Instruments:	Laboratory repeated bending test device		
	Fiber strain CD500		

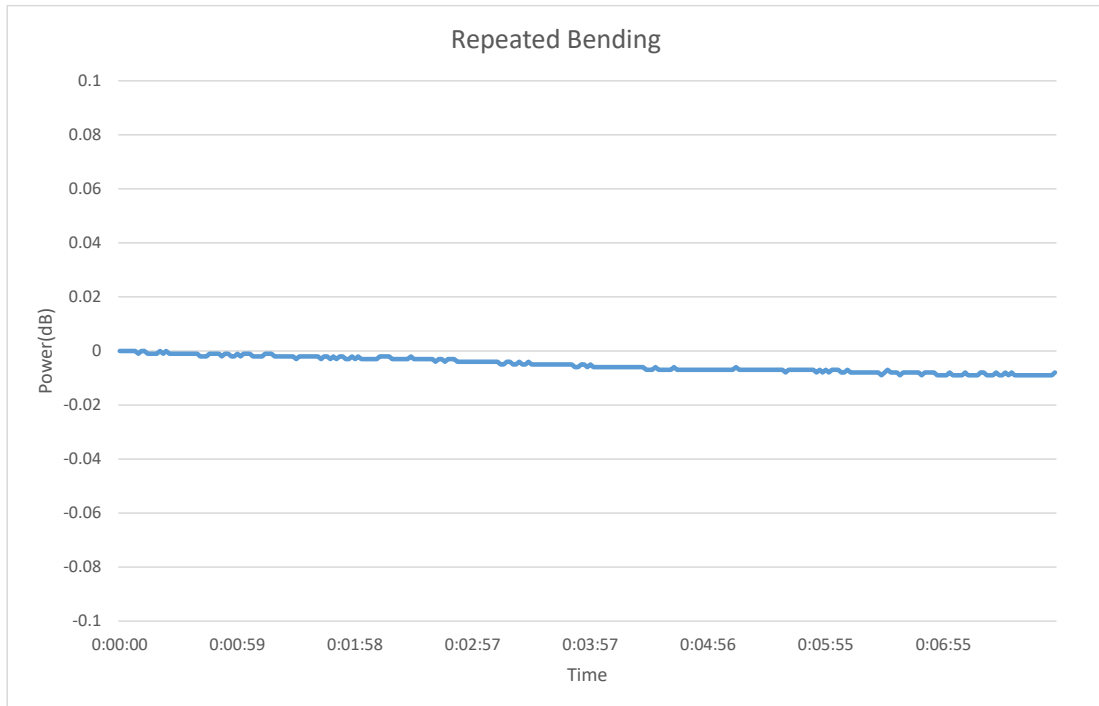
<b>PASS / FAIL CRITERIA:</b> 50 cycles; $R = 20 \times OD$ , $\Delta\alpha \leq 0.05$ dB, reversible;
<b>RESULT:</b> 50 cycles, mandrel $\varnothing 240$ mm, Max. $\Delta\alpha = 0.009$ dB, no damage;
<b>CONCLUSION:</b> <b>PASS</b>



- 1. Clamp
- 2. Axis of rotation
- 3. Sample
- $R$  bending radius
- $F$  load



Test results		
Test no.	No. of cycles	Max. att. change during test/loop [dB]
1	50	0.009



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

# Test report

## Crush test

Type of cable:	FUDI FT K0D1E0 12(12G657A1)		
Drum no.:	DWP0900 09540759		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-21 E3		
Length under test:	69 m		
Fibers spliced in loop:	12		
Instruments:	Instron Fiber strain CD500	Calibration due date:	Dec-24 Apr-24

<b>PASS / FAIL CRITERIA:</b> 1500 N / 100 mm, 10 min, $\Delta\alpha \leq 0.1$ dB, reversible, no damage;
<b>RESULT:</b> 1500 N / 100 mm, 10 min, max $\Delta\alpha = 0.010$ dB.
<b>CONCLUSION:</b> <span style="color: green; font-weight: bold;">PASS</span>

Test results		
Crush test no.	Load [N]	Max. att. change during test /loop [dB]
1	1500	0.010
2	1500	0.007
3	1500	0.005

#Crush1

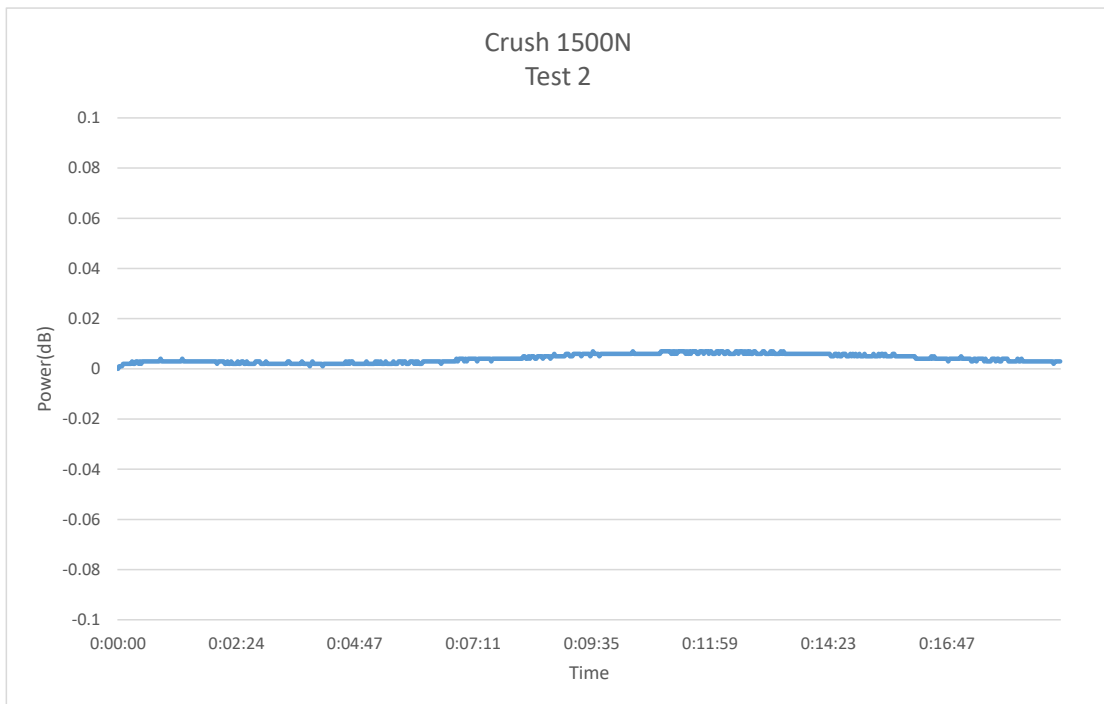
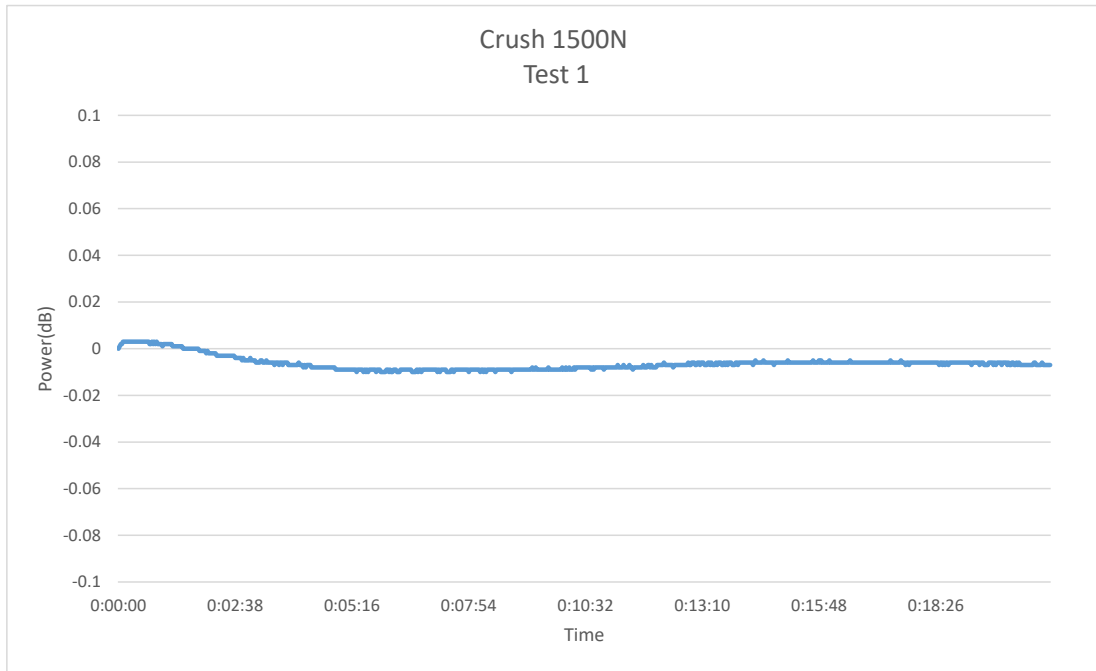


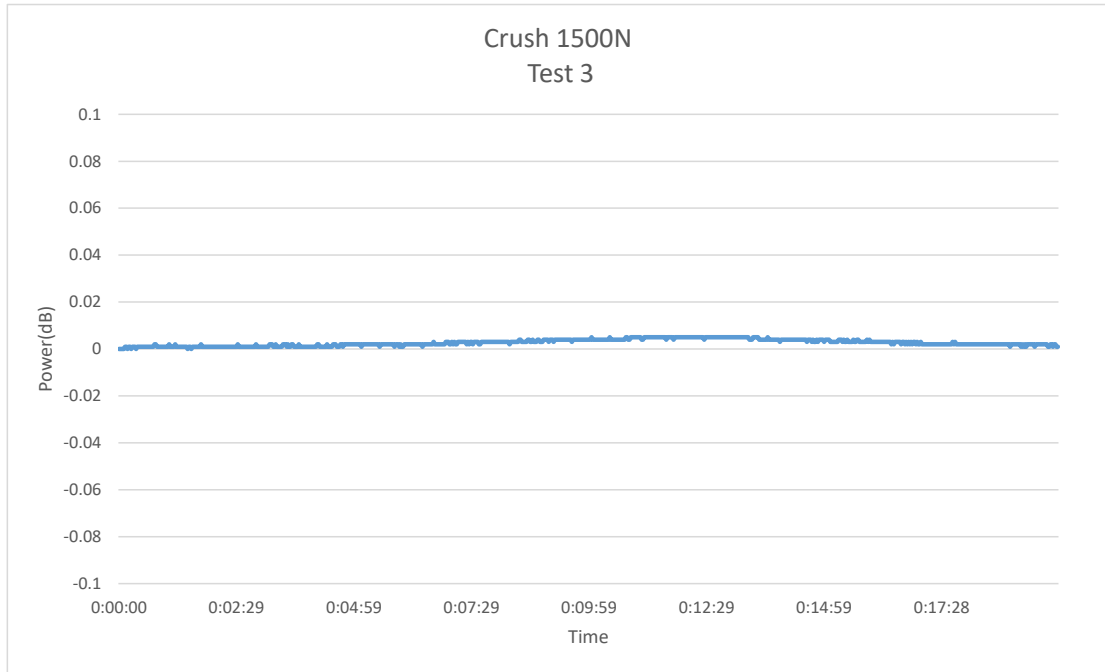
#Crush2



#Crush3







*Date:*  
14/11/2024

*Performed by:*  
C. Oanta

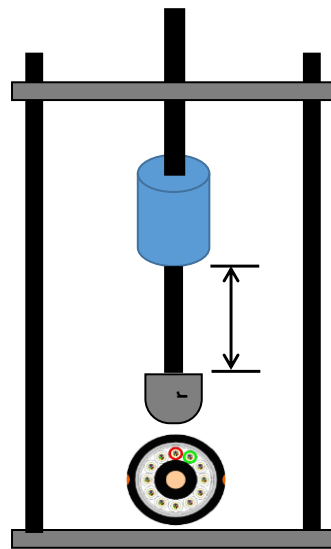
*Approved by:*  
M. Jianu

# Test report

## Impact test

Type of cable:	FUDI FT K0D1E0 12(12G657A1)		
Drum no.:	DWP0900 09540759		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-21 E4		
Length under test:	69 m		
Fibers spliced in loop:	12		
Instruments:	Laboratory Impact test device	Calibration due date:	NA
	Fiber strain CD500	Calibration due date:	Apr-24

<b>PASS / FAIL CRITERIA:</b> 10 J, 3 impacts , R = 300 mm; reversible, no damage;
<b>RESULT:</b> 10 J, 3 impacts, R = 300 mm, Max. $\Delta\alpha = 0.005$ dB, no damage;
<b>CONCLUSION:</b> <b>PASS</b>



Schematic representation of test

Test results		
Impact test no. / No. of impacts	Impact Energy(J)	Max. att. change during test/loop [dB]
1/ 3	10	0.005

**Cable After Test**

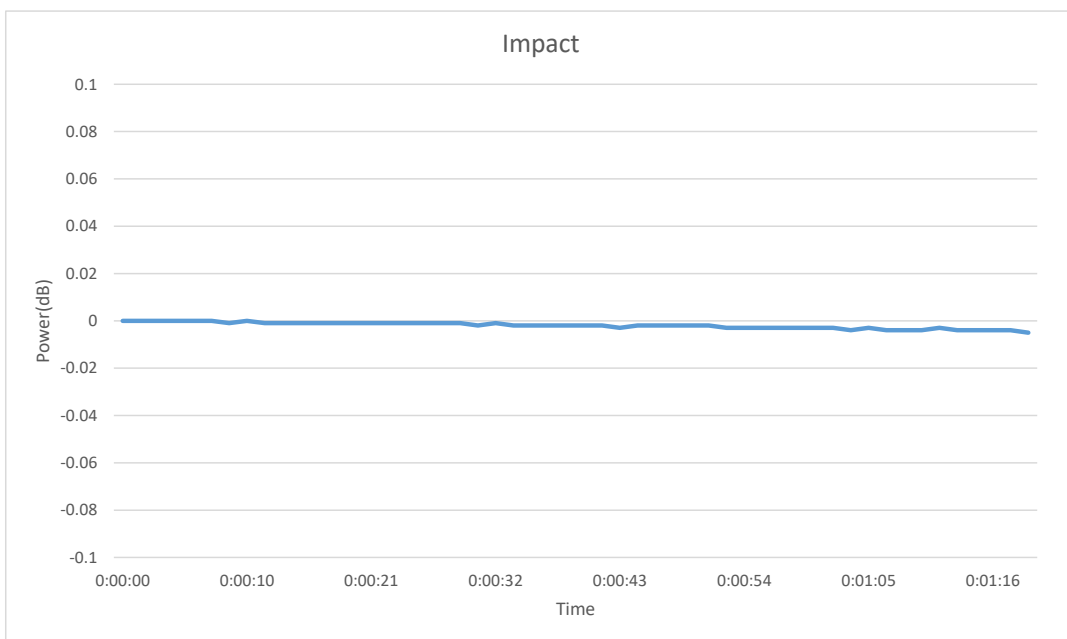
#1



#2



#3



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

# Test report

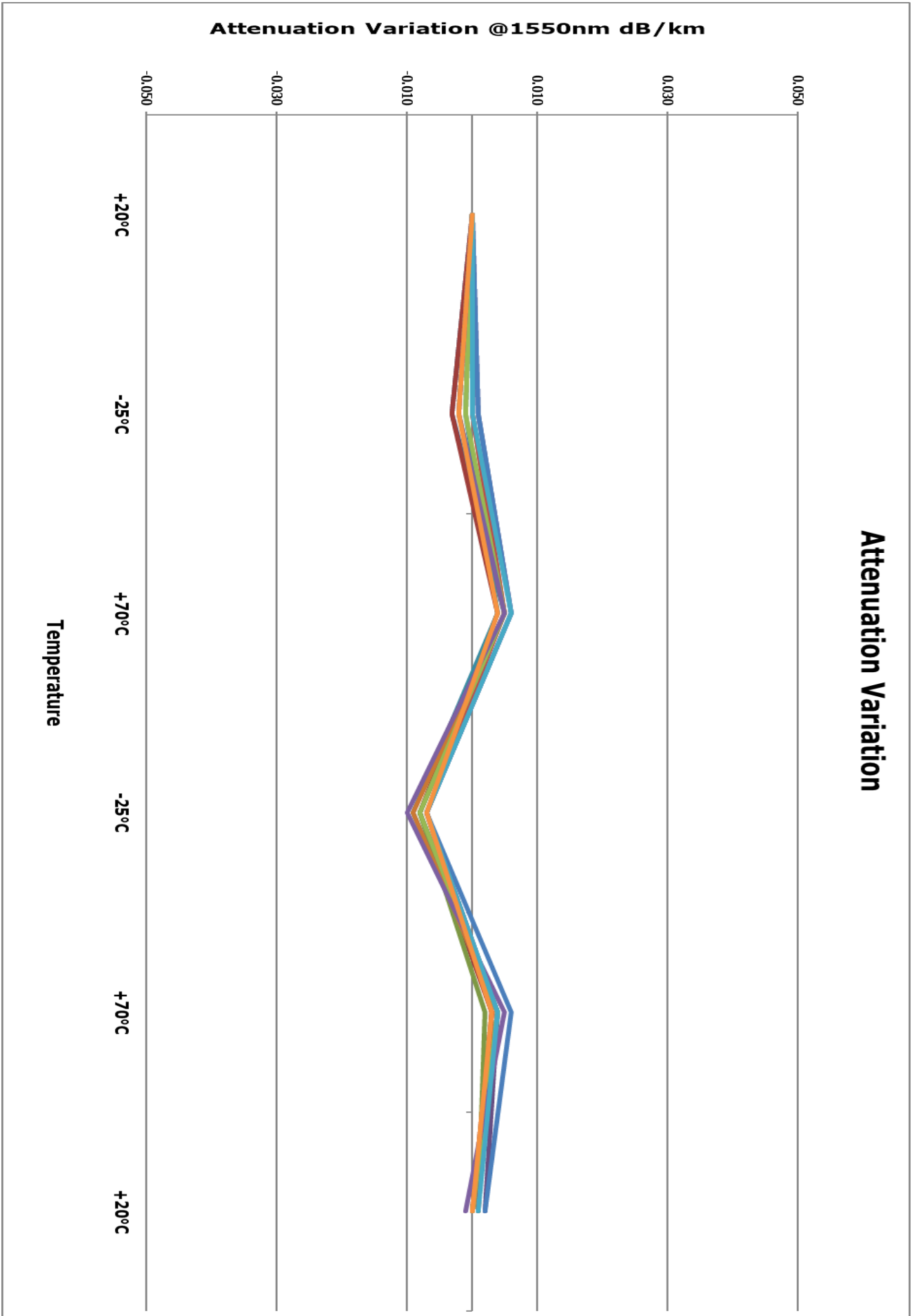
## Temperature cycling

Type of cable:	FUDI FT K0D1E0 12(12G657A1)		
Drum no.:	DWP0900-09540759		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-2 F1		
Length under test:	2103 m		
Looped fibers:	-		
Instruments:	Climatic chamber Angelantoni	Calibration due date	Dec-24
	OTDR PK8000	Calibration due date	Nov-24

<b>PASS / FAIL CRITERIA:</b>  <p style="text-align: center;">-25°C /+70°C ; @1550nm, <math>\Delta\alpha \leq 0.1</math> dB/km;</p>
<b>RESULT:</b>  <p style="text-align: center;">See table below</p>
<b>CONCLUSION:</b> <p style="text-align: center; color: green; font-weight: bold;">PASS</p>

Test Results		
Wavelength	Maximum attenuation variation -25°C / +70°C	Average reversibility
	dB/km	dB/km
@1550nm	0.010	0.001





Date:  
14/11/2024

Performed by:  
C. Mateita

Approved by:  
M. Jianu

# Test report

## Water penetration

Type of cable:	FUDI[FT K0D1E0 12(12G657A1)		
Drum no.:	DWP0900 09540759		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-2 F5B		
Length under test:	3 x 3 m		
Looped fibers:	-		
Instruments:	Water penetration test device	Last Calibration:	-

<b>PASS / FAIL CRITERIA:</b>	3 m sample, 1 m water column, no water penetration in 24 hours;		
<b>RESULT:</b>	No leakage was observed through cable core after 24h00		
<b>CONCLUSION:</b>	<b>PASS</b>		

Test Results	
Sample No.	Water pen. length [mm]
1	220
2	290
3	310

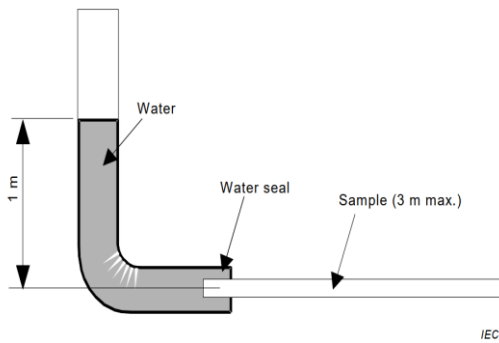


Figure 4 – Test arrangement for method F5B



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

# Test report

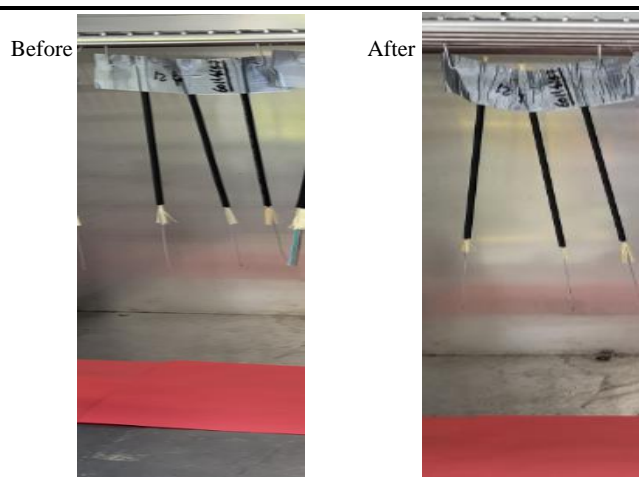
## Drip Test

Type of cable:	FUDI FT KOD1E0 12(12G657A1)		
Drum no.:	DWP0900 09540759		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-2 E14		
Length under test:	3 x 0.3 m		
Looped fibers:	-		
Instruments:	Binder Climatic Chamber	Last Calibration:	Aug-23

<b>PASS / FAIL CRITERIA:</b> L = 300 mm, specimen in vertical position, T = 75°C, t = 24h;
<b>RESULT:</b> No drop visible on wrapping paper after 24h00
<b>CONCLUSION:</b> <span style="color: green; font-weight: bold;">PASS</span>

### Test parameters

<b>Test Temperature</b>	<b>75°C</b>	Start at(date/hour)	<b>12.11.2024/12:30</b>
<b>Time of Test</b>	<b>24h00</b>		
<b>Number of samples</b>	<b>3</b>	Stop at(date/hour)	<b>13.11.2024/12:30</b>
<b>Maximum flow quantity</b>	<b>max. 0.050 g</b>		
<b>Prysmian Requirements</b>	<b>no drip // no drop visible on wrapping paper</b>		
<b>Equipement</b>			
<ul style="list-style-type: none"> <li>- Binder climatic chamber</li> <li>- Analytical balance(accuracy = 0.0001 g)</li> <li>- Non hygroscopic containers</li> </ul>			



Result summary				
		Requirement	Result	Pass /Fail
Maximum flow quantity	Sample 1	no drip	no drip	Pass
	Sample 2			Pass
	Sample 3			Pass

Date:  
12/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu