

**HOMOLOGATION REPORT**  
**No. 910.24**

**Aerial Drop Optical fibre cable**  
**4FO**

**Specification:**  
**TC09381**

**SAP Code: 60114657**

*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 4FO type tests have been carried out in accordance with specification TC09381, international IEC specifications and internal R&D rules.

# Test report

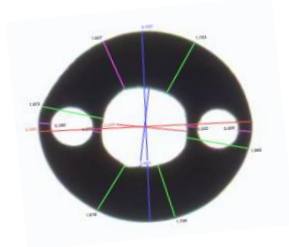
## Dimensional measurement

Type of cable:	FUDI FT K0D1E0 4(4G.657A1)		
Drum no.:	DWP0800 08516627		
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	1.73
Outer sheath Ø [mm]	6 ±0.2	6.27
Cable weight [Kg/Km]	30	27.7

Outer end		
	Dimension	[mm]
Sheath thickness	Min. 1.607	Max. 1.892
	<b>average</b>	<b>1.732</b>
Outer Ø	Min. 6.050	Max. 6.486
	<b>average</b>	<b>6.268</b>



Date:  
14/11/2024

Performed by:  
M. Pauna

Approved by:  
M. Jianu

# ATTENUATION MEASUREMENT REPORT

Product Code: <b>60114657</b>	Batch: <b>RD00021190</b>	Measurement Date: <b>12/11/2024 10:51</b>
Product Description: <b>FUDI FT KOD1E0 4(4G.657A1)-TC09381-en</b>	Drum Number: <b>DWP0800-08516627</b>	Instrument ID: <b>PRYRO-OTDR01</b>
Specification: <b>TC09381-en</b>	Cable Length: <b>3567</b>	Measuring Device: <b>PhotonKinetics 8000i</b>
Customer: <b>CAM 1</b>	Length ID: <b>TEST</b>	Fiber Length: <b>3579</b>

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

**Result:Pass**

**Wavelength (nm): 1310**

G.657A1 0.364;0.224;0.240;0.350	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.335
Natur   Orange	0.338
Natur   Green	0.337
Natur   Brown	0.337
<b>Maximum</b>	<b>0.338</b>
<b>Avgerage</b>	<b>0.337</b>
<b>Limit</b>	<b>0.364</b>

**Wavelength (nm): 1383**

G.657A1 0.364;0.224;0.240;0.350	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.296
Natur   Orange	0.280
Natur   Green	0.285
Natur   Brown	0.276
<b>Maximum</b>	<b>0.296</b>
<b>Avgerage</b>	<b>0.284</b>
<b>Limit</b>	<b>0.350</b>

**Wavelength (nm): 1550**

G.657A1 0.364;0.224;0.240;0.350	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.185
Natur   Orange	0.186
Natur   Green	0.186
Natur   Brown	0.186
<b>Maximum</b>	<b>0.186</b>
<b>Avgerage</b>	<b>0.186</b>
<b>Limit</b>	<b>0.224</b>

**Wavelength (nm): 1625**

G.657A1 0.364;0.224;0.240;0.350	
Tube   Fiber	Atten. dB/Km
Natur   Blue	0.198
Natur   Orange	0.198
Natur   Green	0.197
Natur   Brown	0.196
<b>Maximum</b>	<b>0.198</b>
<b>Avgerage</b>	<b>0.197</b>
<b>Limit</b>	<b>0.240</b>

Production Operator:  
Quality Inspector: CHITUCEA

Finish Goods Inspector  
Lungu Ionut

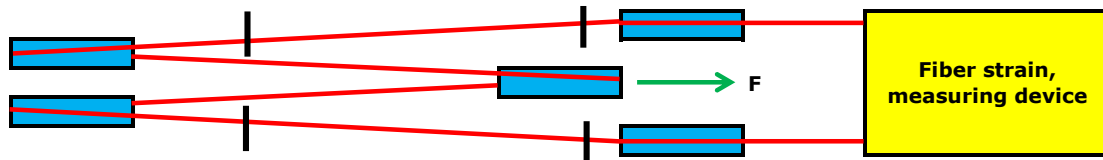


# Test report

## Tensile performance

Type of cable:	FUDI FT K0D1E0 4(4G.657A1)	Calibration due date:	Dec-24
Drum no.:	DWP0800 08516627	Calibration due date:	Apr-24
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-21 E1		
Length under test:	147 m		
Fibers under test:	4 by 4 different channels		
Instruments:	Load cell 5000 Kgf, ASA-RT-ATBCX120		
	Fiber strain CD500		

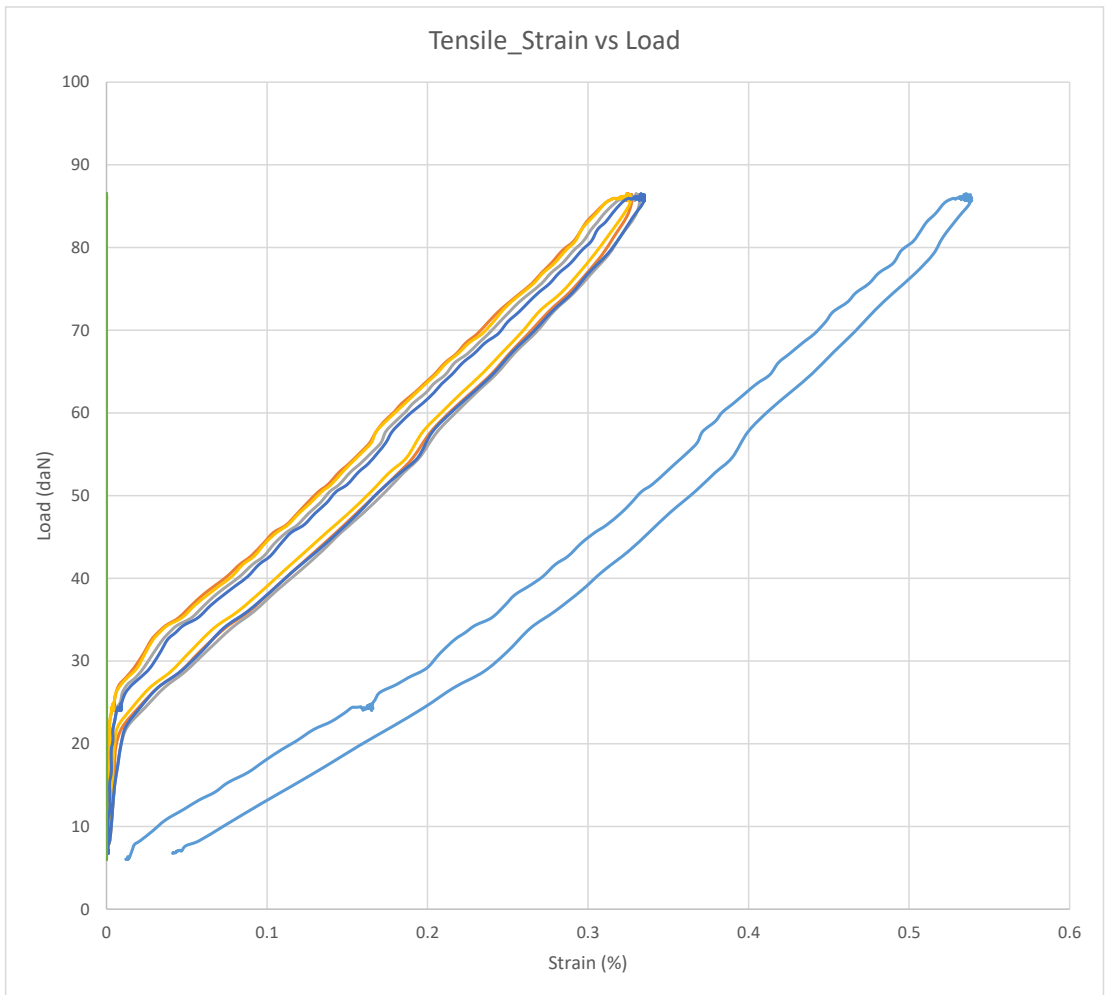
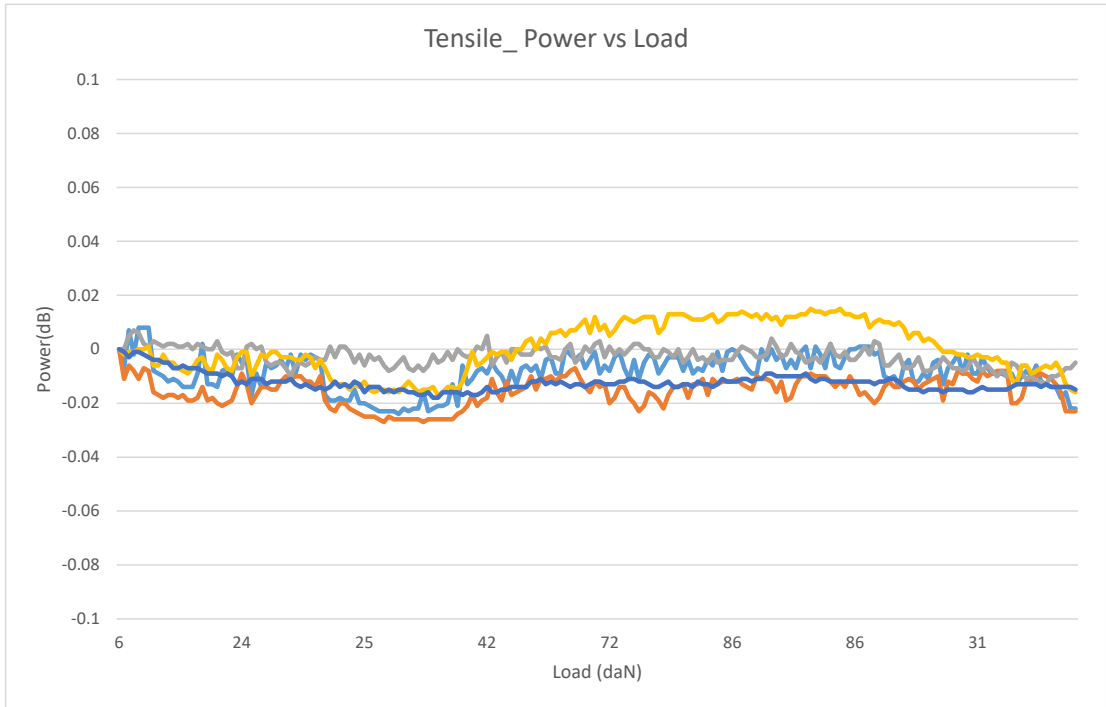
<b>PASS / FAIL CRITERIA:</b> 800N, 5 min, $\Delta l/l \leq 0.3\%$ , $\Delta\alpha \leq 0.5$ dB/km, reversible;
<b>RESULT:</b> @ 800N, max $\Delta l/l$ fibers = 0.335 %, max $\Delta l/l$ cable = 0.539 %, max $\Delta\alpha$ = 0.027 dB, reversible;
<b>CONCLUSION:</b> <b>PASS</b>



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



Set-up Picture



Date:  
14/11/2024

Performed by:  
A. Bostina

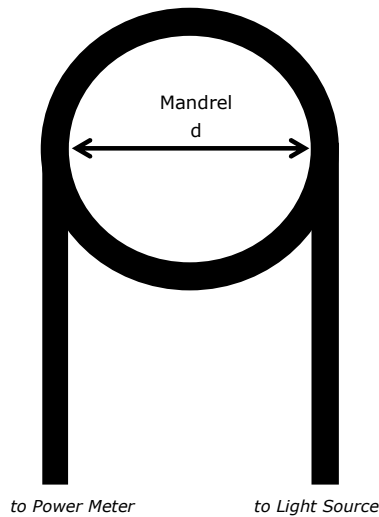
Approved by:  
M. Jianu

# Test report

## Cable bend

Type of cable:	FUDI FT K0D1E0 4(4G.657A1)		
Drum no.:	DWP0800 08516627		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-21 E11		
Length under test:	83 m		
Fibers spliced in loop:	4		
Instruments:	Laboratory bend test device	Calibration due date:	N/A
	Fiber strain CD500	Calibration due date:	Apr-24

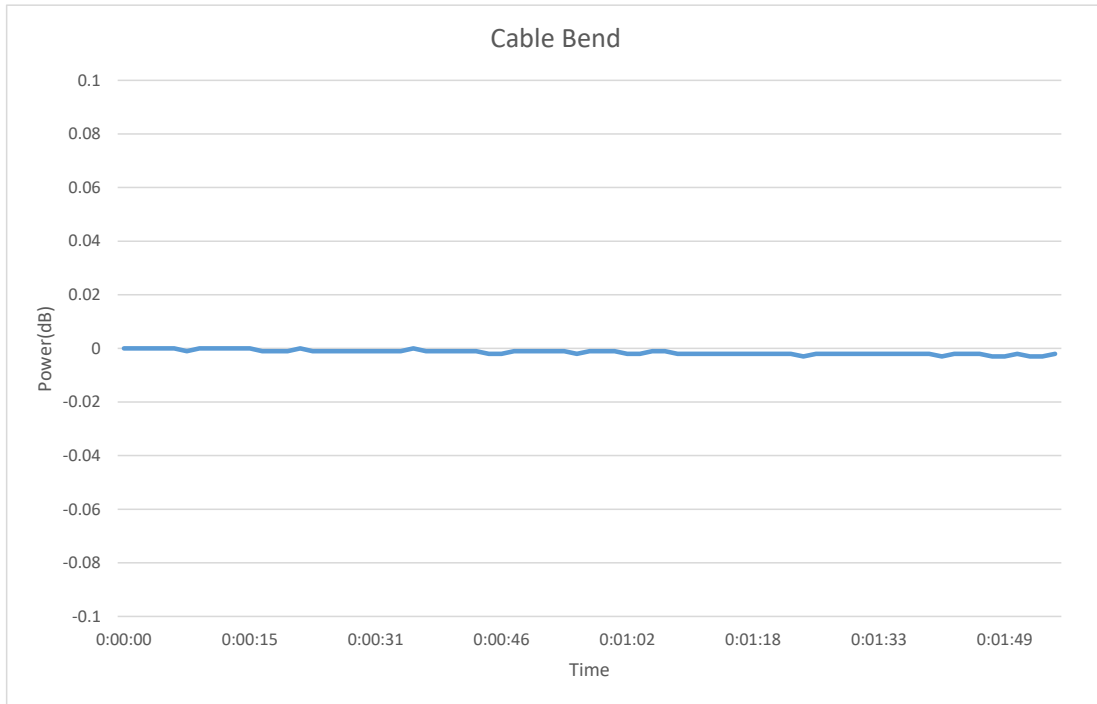
<b>PASS / FAIL CRITERIA:</b> R = 10 x OD, 4 turns, 3 cycles, $\Delta\alpha \leq 0.05$ dB, reversible;
<b>RESULT:</b> 3 cycles x 4 turns; mandrel $\varnothing 120$ mm; max $\Delta\alpha = 0.003$ dB, $\Delta\alpha$ reversible;
<b>CONCLUSION:</b> <b>PASS</b>



**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	0.003



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

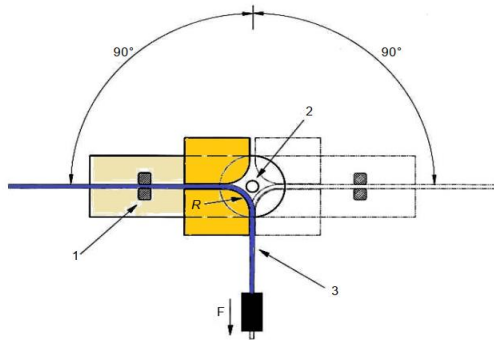


# Test report

## Repeated bending

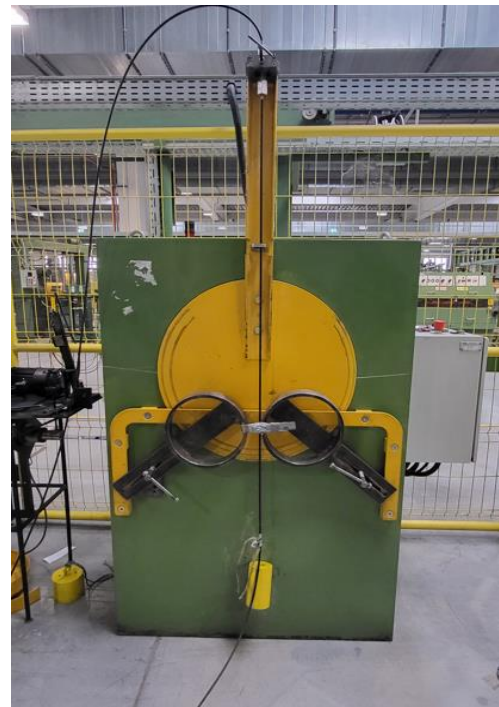
Type of cable:	FUDI FT K0D1E0 4(4G.657A1)	Calibration due date:	N/A
Drum no.:	DWP0800 08516627	Calibration due date:	Apr-24
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-2-E6		
Length under test:	83 m		
Fibers spliced in loop:	4		
Instruments:	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. $\Delta\alpha = 0.005$ dB, no damage;
<b>CONCLUSION:</b>
<b>PASS</b>

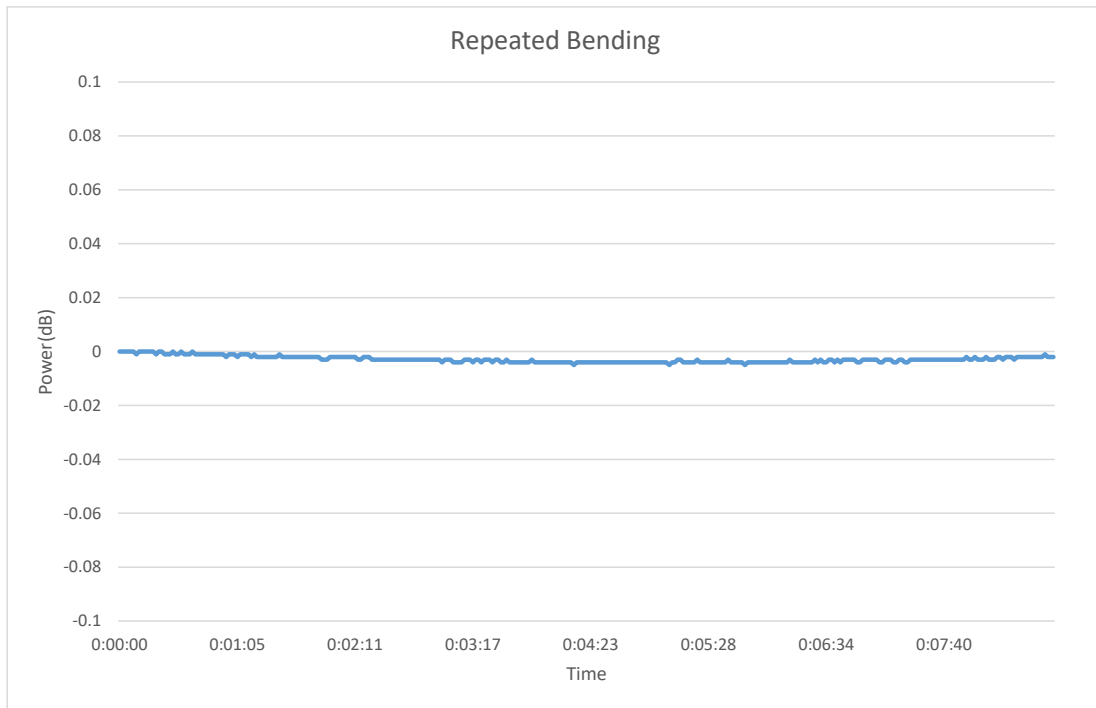


IEC

- 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	0.005



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

# Test report

## Crush test

Type of cable:	FUDI FT K0D1E0 4(4G.657A1)		
Drum no.:	DWP0800 08516627		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-21 E3		
Length under test:	83 m		
Fibers spliced in loop:	4		
Instruments:	Instron	Calibration due date:	Dec-24
	Fiber strain CD500	Calibration due date:	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 $\Delta\alpha = 0.011$ dB;		
<b>CONCLUSION:</b>	<b>PASS</b>		

Test results		
Crush test no.	Load [N]	Max. att. change during test /loop [dB]
1	1500	0.011
2	1500	0.009
3	1500	0.006

#Crush1

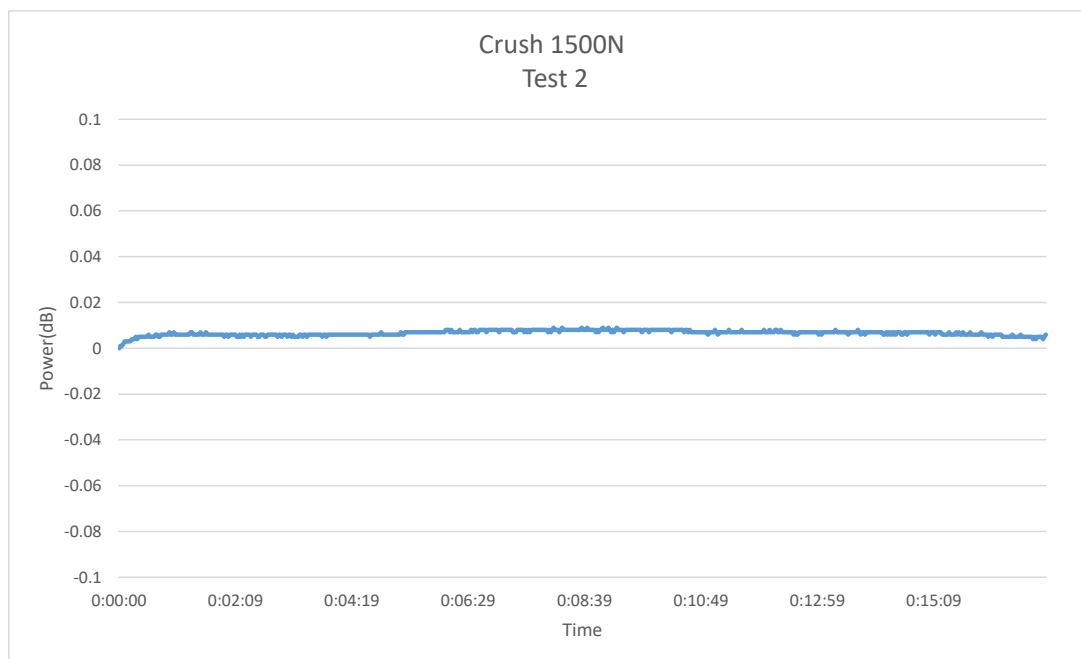
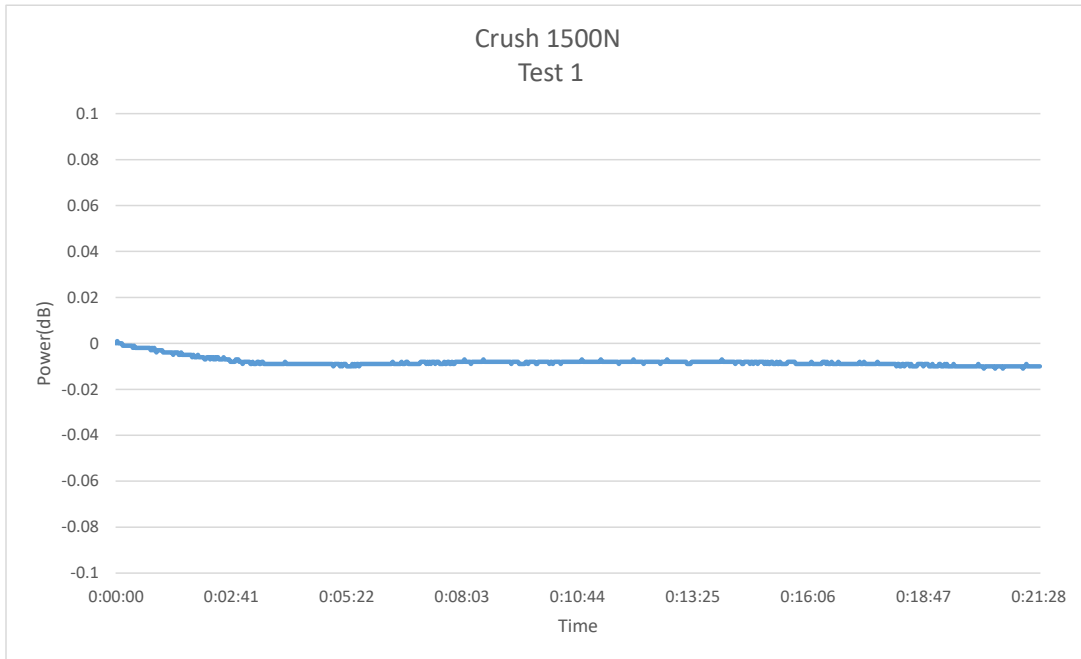


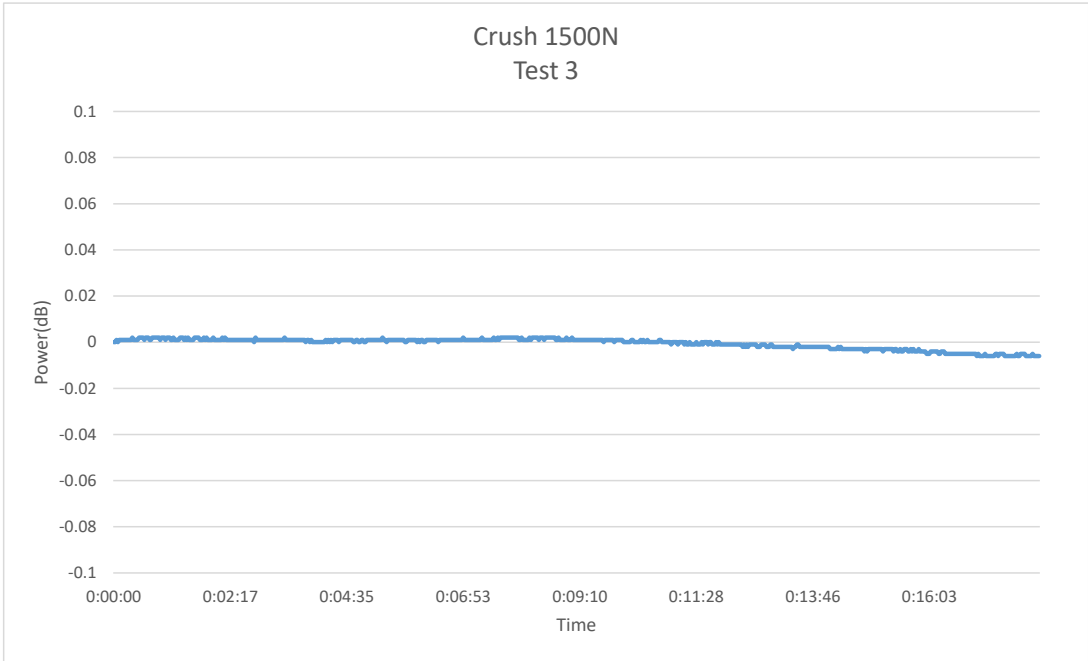
#Crush2



#Crush3







*Date:*  
14/11/2024

*Performed by:*  
C. Oanta

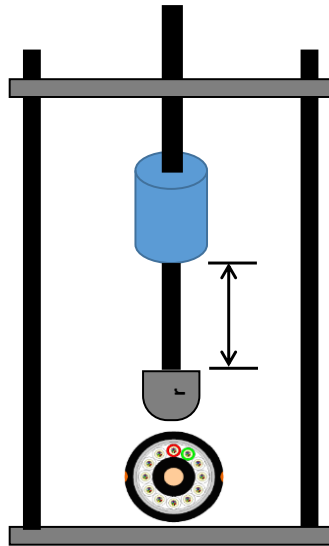
*Approved by:*  
M. Jianu

# Test report

## Impact test

Type of cable:	FUDI FT KOD1E0 4(4G.657A1)		
Drum no.:	DWP0800 08516627		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-21 E4		
Length under test:	83 m		
Fibers spliced in loop:	4		
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**

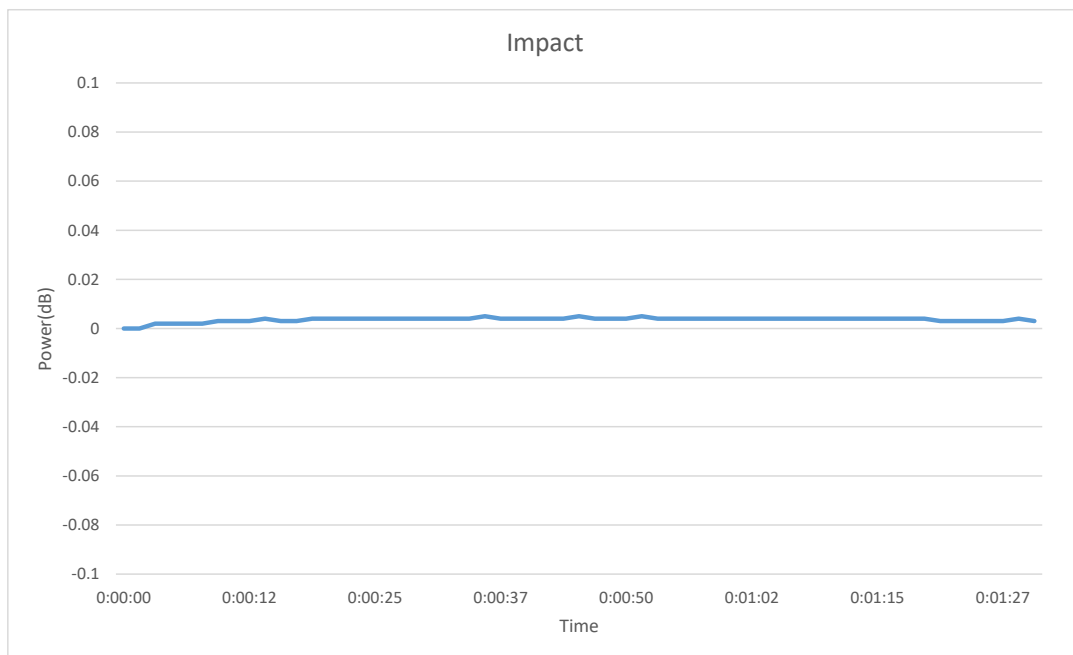
**#1**



**#2**



**#3**



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

# Test report

## Temperature cycling

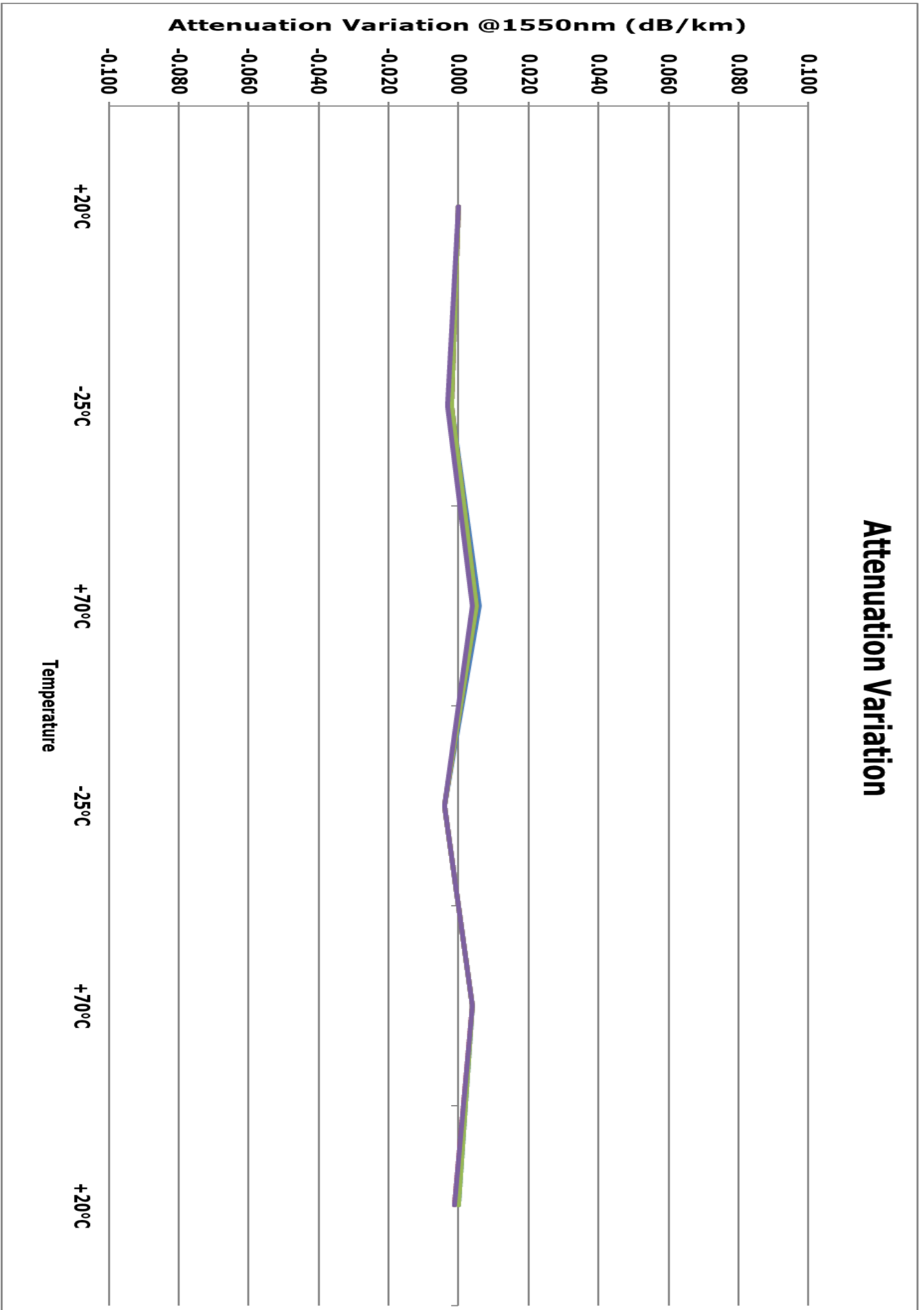
Type of cable:	FUDI FT K0D1E0 4(4G.657A1)		
Drum no.:	DWP0800-08516627		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-2 F1		
Length under test:	3567 m		
Looped fibers:	-		
Instruments:	Climatic chamber Angelantoni	Calibration due date	Dec-24
	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	0.006	0.001



# Attenuation Variation



Date:  
14/11/2024

Performed by:  
C. Mateita

Approved by:  
M. Jianu

# Test report

## Water penetration

Type of cable:	FUDI[FT KOD1E0 4(4G.657A1)		
Drum no.:	DWP0800 08516627		
Specification:	TC09381		
Laboratory:	Prysmian Group Cabluri si Sisteme, Slatina		
Test standard:	IEC 60794-1-2 F5B		
Length under test:	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 24 hours;
<b>CONCLUSION:</b>	<b>PASS</b>

Test Results	
Sample No.	Water pen. length [mm]
1	150
2	170
3	230

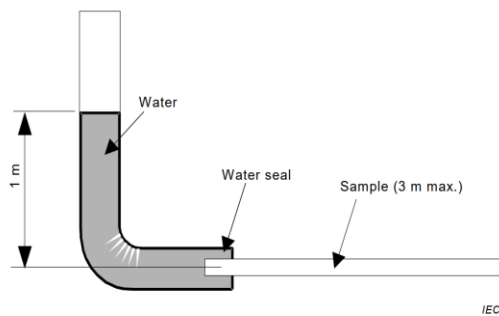
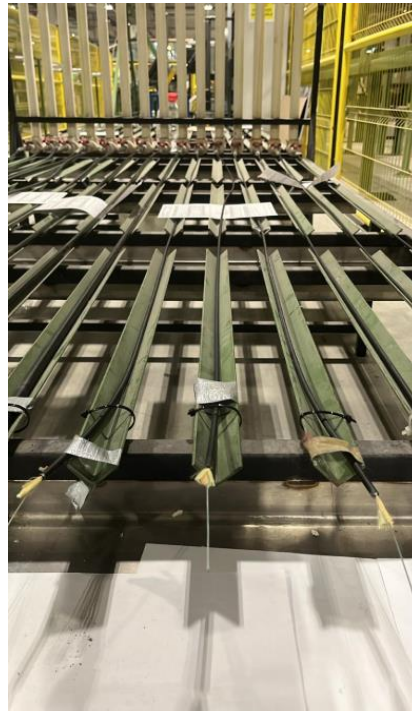


Figure 4 – Test arrangement for method F5B



Date:  
14/11/2024

Performed by:  
A. Bostina

Approved by:  
M. Jianu

# Test report

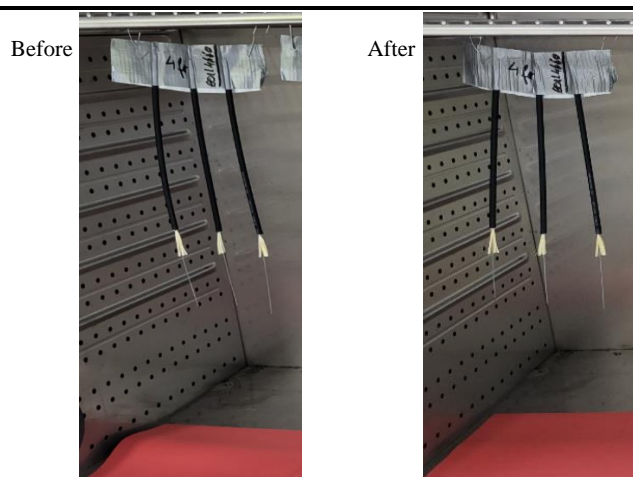
## Drip Test

Type of cable:	FUDI FT KOD1E0 4(4G.657A1)		
Drum no.:	DWP0800 08516627		
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>	
<b>PASS</b>	

### 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