

FIBER RACEWAY SYSTEMS

Test Report and Specifications





\sim		1.1		
C	or	ite	n	tS

1.	Intro	duction	2
	1.1.	About Samm Teknoloji	2
	1.2.	Purpose and Scope	2
2.	Gene	eral Information	3
	2.1.	Product Description	3
	2.2.	Test Criteria	3
	2.2.1	1. Perform within Samm Teknoloji	3
	2.2.2	2. 3 rd Party	4
3.	Test	s Details and Results	6
	3.1.	Appearance and Physical Evaluation Test	6
	3.2.	Resistance to Stress Cracking Test	6
	3.2.1	Criteria of Resistance to Stress Cracking Test	6
	3.2.2	2. Method of Resistance to Stress Cracking Test	6
	3.2.3	3. Result of Resistance to Stress Cracking Test	6
	3.3.	Impact Test	7
	3.3.1	I. Criteria of Impact Test	7
	3.3.2	2. Method of Impact Test	7
	3.3.3	3. Result of Impacts Test	7
	3.4.	RoHS Test for Plastic Parts	8
	3.4.1	I. Criteria of RoHS Test for Plastic Parts	8
	3.4.2	2. Method of RoHS Test for Plastic Parts	8
	3.4.3	3. Result of RoHS Test for Plastic Parts	8
	3.5.	Halogen Content Test	9
	3.5.1	I. Criteria of Halogen Content Test	9
	3.5.2	2. Method of Halogen Content Test	9
	3.5.3	3. Result of Halogen Content Test	9
	3.6.	Flame Resistance Classifications UL94 Test	10
	3.6.1	Criteria of Flame Resistance Classifications UL94 Test	10
	3.6.2	2. Method of Flame Resistance Classifications UL94 Test	10
	3.6.3	3. Result of Flame Resistance Classifications UL94 Test	10
	3.7.	Temperature Cycling Test	11
	3.7.1	Criteria of Temperature Cycling Test	11
	3.7.2	2. Method of Temperature Cycling Test	11
	3.7.3	3. Result of Temperature Cycling Test	11
	3.8.	Neutral Salt Spray Test for Coated Metal Accessories	12
	3.8.1	Criteria of Neutral Salt Spray Test	12
	3.8.2	2. Method of Neutral Salt Spray Test	12
	3.8.3	3. Result of Neutral Salt Spray Test	12
	3.9.	RoHS Test for Metal Parts	13
	3.9.1	I. Criteria of RoHS Test for Metal Parts	13
	3.9.2	2. Method of RoHS Test for Metal Parts	13
	3.9.3	3. Result of RoHS Test for Metal Parts	13



1. Introduction

1.1. About Samm Teknoloji

SAMM Teknoloji is a firm specialized in telecommunication, IT, constructions and industrial products. Concurrently, SAMM also operates as an import, export and executive subcontractor for many domestic and foreign companies specialized in the same fields of business. Mainly, we distribute active and passive telecommunications equipment; corrosion prevention and protection systems used Oil and Energy sectors; and all electric heat tracing and heat maintenance related product, and we do executive subcontracting services for all these products.

SAMM functions as a bridge, connecting end users with suppliers handling trading, technical and engineering chores, all by the persistent workflow of its allocated employees in order to, most importantly, earn the customers' satisfaction. Furthermore, our trained and certified staff provides construction and assembly for all the products we distribute.

In businesses requiring companies' collaboration, SAMM conducts project management or exercise leadership in undertaking import, export and contracting. By the work of our trained technical and administrative staff SAMM takes the initiative and responsibility in finishing logistic and engineering ventures, including construction, contracting and turnkey projects.

As well as our technical staff, our banking, financial and logistic staff are extensively trained and experienced with all the necessary means and equipment to ensure concluding all our projects professionally on schedule.

1.2. Purpose and Scope

This document is prepared to show quality of Samm Teknoloji Raceway Systems. For plastic parts of Raceway System, as Samm Teknoloji, we perform RoHS Test, Halogen Content Test, Appearance and Physical Test, Resistance to Stress Cracking Test, Impact Test, Temperature Cycling and Flame Resistance Classification UL94 Test. Moreover, for metal parts of Raceway System, we perform Neutral Salt Spray Test and RoHS Test. All of these tests aim to high quality raceway production.



2. General Information

2.1. Product Description

Samm fiber optic raceway system is a fully enclosed ducting system that segregates, routes, and protects fiber optic cables and jumpers from building entry point to fiber termination and distribution equipment. With the raceway system, fiber is easily traced and accessed through its convenient fully wrap-around, lay-in design. Straight channels and curved fittings are specifically designed to prevent fibers from violating a 50mm minimum bend Radius requirement and they protect fibers from snagging, crimping, and stress. The system's modular design and extensive mounting kit selection enable the Project engineer to meet cable capacity requirements and future expansion needs using existing superstructure, cable racking and/or equipment racking. The flexibility and simplicity of the Samm raceway system ensures cost-effective installations for new or existing cable routes in Central Offices, CEVs, Head-ends, Remote Offices, Data Centers, and Wiring Closets.

2.2. Test Criteria

Quality is one of the most important things for Samm Teknoloji. There are several tests for quality and control for fiber raceway systems. As Samm Teknoloji, we perform some test in our own laboratories. However, we cannot perform some test; consequently, we are performed the tests by contracted test companies.

2.2.1. Perform within Samm Teknoloji

2.2.1.1. Appearance and Physical Evaluation Test

Test Method Followed: IEC 61300-3-1

Requirements: No defects which will adversely affect product performance

Method: Samples shall be inspected for flaws, defects, cracks or impurities visible to the naked eye.

2.2.1.2. Resistance to Stress Cracking Test Method Followed: IEC 61300-2-34

Requirements: No cracking

Test Temperature: (+23±3) °C

Media: Isopropyl Alcohol and White Spirit

Method: Swabbing

Duration: 15 minutes

2.2.1.3. Impact Test

Test Method Followed: ASTM D2444

Requirements: No cracking, deformation or permanent deformation

Test Temperature: (+23±3) °C

Impact Tool: Steel ball (1000±10) gram

Drop Height: 2 meters

Points of Impacts: Ends and center



2.2.1.4. Temperature Cycling Test

Test Method Followed: IEC 60068-2-14 Requirements: No cracking, deformation or permanent deformation Test Temperature Range: (-20/+60) °C and (-30/+60) °C Temperature Ramp: 1 °C/min Dwell Time: 30 minutes Nuer of Cycles: 3 cycles

2.2.2.3rd Party

2.2.2.1. RoHS Test for Plastic

Test Method Followed: IEC 62321			
Requirements: Cadmium Content: <100 ppm			
	Chromium VI Content:	<1000 ppm	
	Lead Content:	<1000 ppm	
	Mercury Content:	<1000ppm	
	Flame Retardants:	<1000ppm	

2.2.2.2. RoHS Test for Metal

Test Method Followed: IEC 62321

Requirements:	Cadmium Content:	<100 ppm
	Chromium VI Content:	<0.10 µg/cm ³ – Negative
		≥0.10 µg/cm ³ and ≤ 0.13 µg/cm ³ – Inconclusive
		>0.13 µg/cm ³ – Positive
	Lead Content:	<1000 ppm
	Mercury Content:	<1000ppm
	Flame Retardants:	<1000ppm

2.2.2.3. Neutral Salt Spray Test for Coated Metal Accessories Test Method Followed: TS EN ISO 9227, ASTM B117

Requirements: No signs of corrosion shall be visible after a test duration

Test Duration: 72 hours

pH: 6,5-7.2

Temperature of the Test Chamber: (35±2) °C



2.2.2.4. Halogen Content Test Test Method Followed: DIN EN 14582 by Ion Chromatography Requirements: 50 ppm Detection Limit Testing Item: Fluorine (F) Content Chlorine (CL) Content Bromine (Br) Content Iodine (I) Content

2.2.2.5. Flame Resistance Classifications UL94 Test Test Method Followed: UL94

Requirement: V-0 Classification

Test Temperature: (23±3) °C



3. Tests Details and Results

3.1. Appearance and Physical Evaluation Test

The Appearance and Physical Evaluation Test is performed the problems that may appear with naked eye. Samm Teknoloji has Quality Directives for each product to high quality production. Besides. the Appearance and Physical Evaluation Test applied to each product.

3.2. Resistance to Stress Cracking Test

The Resistance to Stress Cracking Test is performed the chemical resistance. Both isopropyl alcohol (C_3H_8O) and white spirit (C_2H_6O) are flammable liquid chemicals.



Figure 1: White Spirit



Figure 2: Isopropyl Alcohol

3.2.1. Criteria of Resistance to Stress Cracking Test

- Requirements: No cracking or deformation
- Test Temperature: (+23±3) °C
- Media: Isopropyl Alcohol and White Spirit.
- Method: Swabbing.
- Duration: 15 minutes.

3.2.2. Method of Resistance to Stress Cracking Test

- Test Method Followed: IEC 61300-2-34
- Test materials are isopropyl alcohol and white spirit.
- Examine the test item.
- To swab isopropyl alcohol and white spirit fifteen minutes each one.
- Dry the test item.
- Examine the test item again.

3.2.3.Result of Resistance to Stress Cracking Test

- No crack.
- No deformation.
- No permanent deformation.





3.3. Impact Test

The Impact Test is performed to observe impact resistance of the fiber raceway. The steel ball, that is 1 kg, is dropped from the height of 2 meters to the top and center of the fiber raceway. The steel ball accelerates as it falls free from a height of 2 meters. After that, observation is carried out.

3.3.1.Criteria of Impact Test

- Requirements: No cracking, deformation or permanent deformation
- Test Temperature: (+23±3) °C
- Impact Tool: Steel ball (1000±10) gram
- Drop Height: 2 meters
- Points of Impacts: Ends and center

3.3.2. Method of Impact Test

- Test Method Followed: ASTM D2444
- 1.8-meter lengths of straight ducting, with cover uppermost, shall be placed on a smooth, flat, horizontal surface.
- A steel ball weighing 1 kg shall be suspended at a height of 2 meters above the test point.
- The weight shall be allowed to fall under the influence of gravity.
- The test shall be repeated for each location, as shown in the sketch above, and repeated after turning the sample through 180°.
- After completion of the test, samples shall be inspected for damage with the naked eye.



Figure 3: Impact Test

3.3.3.Result of Impacts Test

- No crack
- No deformation
- No permanent deformation





3.4. RoHS Test for Plastic Parts

•

All new products should be monitored for the amount of restricted hazardous substances including Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr+6), polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

3.4.1.Criteria of RoHS Test for Plastic Parts

Cadmium Content:	<100 ppm
Chromium VI Content:	<1000 ppm
Lead Content:	<1000 ppm
Mercury Content:	<1000ppm
PBB Content:	<1000ppm
PBDE Content:	<1000ppm
Phthalates Content:	<1000ppm
	Cadmium Content: Chromium VI Content: Lead Content: Mercury Content: PBB Content: PBDE Content: Phthalates Content:

3.4.2. Method of RoHS Test for Plastic Parts

Test Method Followed: IEC 62321

3.4.3.Result of RoHS Test for Plastic Parts

Component	Concentration
Cadmium (Cd) Content	N.D.
Chromium VI (Cr+6) Content	N.D.
Lead (Pb) Content	N.D.
Mercury (Hg) Content	N.D.
PBB Content	N.D.
PBDE Content	N.D.
Phthalates	N.D.

N.D.: not detected

- Issued by Intertek / Report No: TURT190067884
- Third party analysis reports are available upon request through our sales representative.





3.5. Halogen Content Test

The Halogen Content Test is determined. to amount of Halogen. In the fires, materials that are easily flamed and emit toxic gases into the environment lead to great losses. Combustion is a chemical reaction. As a result of this reaction, the carbon-containing halogens present in the structure of the burning materials and transform into flammable and toxic gases that will affect human health and transmit the flame and cause the fire to grow.

3.5.1. Criteria of Halogen Content Test

- Testing Item: Fluorine (F) Content Chlorine (CL) Content Bromine (Br) Content Iodine (I) Content
- Requirements: Halogen Free

Component	Concentration		
Clorine (Cl)	<900 ppm		
Bromine (Br)	<900 ppm		
Total concentration of Br+Cl	<1500 ppm		
Table 1 IEC 61240 2 21 IECA ESO1 and IEC 4101 Standards			

Table 1-IEC 61249-2-21, JPCA-ES01 and IPC 4101 Standards

3.5.2. Method of Halogen Content Test

• Test Method Followed: DIN EN 14582 by Ion Chromatography

3.5.3.Result of Halogen Content Test

Component	Concentration
Florine (F)	186 mg/kg
Clorine (Cl)	N.D.
Bromine (Br)	818 mg/kg
lodine (I)	N.D.
NID : seat detended	

N.D.: not detected

- According to IEC 61249-2-21, JPCA-ES01 and IPC 4101, SAMM Fiber Raceways are Halogen Free.
- Issued by SGS / Report No: TR1513023
- Third party analysis reports are available upon request through our sales representative.





3.6. Flame Resistance Classifications UL94 Test

UL94 test is the basic means of specifying how easily a material or finished product will fire or burn when placed near a fire or heat. The UL94 test comprises a different test protocol and method for measuring certain sensitivities of a material, in fact, to an ignition source, combustion curve, and combustion rate when fired. These and other features are evaluated to determine if a given material or finished product can be safely used as intended, without contributing to the risk of fire.

3.6.1. Criteria of Flame Resistance Classifications UL94 Test

- Requirement: V-0 Classification
- Test Temperature: (+23±3) °C

3.6.2. Method of Flame Resistance Classifications UL94 Test

Test Method Followed: UL94

3.6.3.Result of Flame Resistance Classifications UL94 Test

REQUIREMENTS	V-0
After flame time for each individual specimen t1 or t2	≤10s
Total after flame time for any condition set (t1 plus t2 for the 5 specimens)	≤50s
After flame plus afterglow time for each individual specimen after the second flame application (t2+t3)	≤30s
After flame or afterglow of any specimen up to the holding clamp	No
Cotton indicator ignited by flaming particles or drops	No
CONCLUSION	PASS

- Issued by Intertek / Report No: TURT190067883
- Third party analysis reports are available upon request through our sales representative.





3.7. Temperature Cycling Test

The Temperature Cycling Test is performed to observe temperature resistance of the fiber raceway.

3.7.1. Criteria of Temperature Cycling Test

- Requirements: No cracking, deformation or permanent deformation
- Test Temperature Range: (-20/+60) °C and (-30/+60) °C
- Temperature Ramp: 1 °C/min
- Dwell Time: 30 minutes
- Nuer of Cycles: (-20/+60) °C 3 cycles and (-30/+60) °C 3 cycles

3.7.2. Method of Temperature Cycling Test

- Test Method Followed: IEC 60068-2-14
- Set the climatic test cabinet for conditions temperature
- Examine the test item
- Put the test item to climatic cabinet
- Examine the test item again



3.7.3.Result of Temperature Cycling Test

- No crack
- No deformation
- No permanent deformation





3.8. Neutral Salt Spray Test for Coated Metal Accessories

The Neutral Salt Spray Test is performed corrosion resistance for coated metal tools. Corrosion is a big risk for metal parts because affect the life of metal parts. Also, there are risks for environment.

3.8.1. Criteria of Neutral Salt Spray Test

- Requirements: No signs of corrosion shall be visible after a test duration
- Test Duration: 72 hours
- pH: 6,5-7.2
- Temperature of the Test Chamber: (35±2) °C

3.8.2. Method of Neutral Salt Spray Test

Test Method Followed: TS EN ISO 9227, ASTM B117

3.8.3.Result of Neutral Salt Spray Test

Resistance to Correct Test Method:	osion ISO 9227:2017			
Test Conditions:		<u>Testing time: 72</u> <u>Test concentration</u> Evaluate with ISO 102	<u>h</u> : <u>5%</u> 89:2010	
<u>(A1)</u>	Protective Rating (RP)	Appearance Rating (RA)	Type of coating deterioration	Requirement by the Client
Matellie Hannes Dest	4	4	x-A	No Doguiromont
Metallic Hanger Part	2	2	x-F	No Requirement

<u>Ratings</u> (Rp or Ra)	Area of defect A (%)	Type of coating deterioration	
<u>10</u>	No defects	<u>A</u>	Staining and/or color change due to deterioration of the coating.
9	<u>0< A < 0.1</u>	в	Dulling with little or no visible corrosion of coating.
8	<u>0.1 < A< 0.25</u>	<u>C</u>	Corrosion products from anodic coatings.
<u>7</u>	<u>0.25 <a 0.5<="" <="" u=""></u>	D	Corrosion products from cathodic coatings.
<u>6</u>	<u>0.5 <a 1<="" <="" u=""></u>	E	Surface pitting.
<u>5</u>	<u>1 <a< 2.5<="" u=""></a<></u>	E	Flaking, peeling, spalling.
<u>4</u>	<u>2.5 <a 5<="" <="" u=""></u>	G	<u>Blistering.</u>
3	<u>5 <a< 10<="" u=""></a<></u>	Η	Cracking.
2	<u>10 <a 25<="" <="" u=""></u>	<u> </u>	Crazing.
1	<u>25 <a 50<="" <="" u=""></u>	J	Crow's feet or star-shaped defects.
0	<u>50 < A</u>		

- Issued by SGS / Report No: TR1513019
- Third party analysis reports are available upon request through our sales representative.



3.9. RoHS Test for Metal Parts

•

All new products should be monitored for the amount of restricted hazardous substances including Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr+6), polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

3.9.1. Criteria of RoHS Test for Metal Parts

Requirements: Cadmium Content:

Chromium VI Content: <

<100 ppm <0.10 µg/cm3 – Negative ≥0.10 µg/cm3 and ≤ 0.13 µg/cm3 – Inconclusive >0.13 µg/cm3 – Positive <1000 ppm <1000ppm

Lead Content: Mercury Content:

3.9.2. Method of RoHS Test for Metal Parts

Test Method Followed: IEC 62321

3.9.3.Result of RoHS Test for Metal Parts

Concentration
N.D.
N.D.
N.D.
N.D.

N.D.: not detected

- Issued by Intertek / Report No: TURT190067885
- Third party analysis reports are available upon request through our sales representative.

