



**Test Report**

No. 4167117-CH11

Date: July 7, 2017

Page 1 of 11

Samtech Inc.  
520 Park East Blvd.  
New Albany, IN 47151  
United States

The following sample(s) was/were submitted and identified by/on behalf of the client as:

**Multi-Conductor Cable with Black TPU Jacket, PTFE Wrap, and PVC Dielectric Insulated Copper Conductors**  
**Model/Part #: SBWC**

Sample Received Date: **6/27/2017**

Testing Period: **6/27/2017-7/6/2017**

Test Requested : Please refer to the test results.

Test Method & Results : Please refer to next page(s).

Result Summary :

Test Requested	Comment
1. RoHS Directive 2011/65/EU Annex II [amended by Directive (EU) 015/863]	PASS
2. European Regulation (EC) No. 1907/2006 (REACH) Annex XVII and its amendments – Phthalate content	PASS
3. Total Phosphorous Content as requested by client	See test results
4. Halogen content (Cl, Br, F, I) of the submitted sample(s) with reference to BS EN 14582:2016	See test results

Signed for and on behalf of SGS North America, Inc.

Prepared By:

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**1. RoHS Directive 2011/65/EU Annex II** [amended by Directive (EU) 2015/863]

Test Item(s):	Unit	Test Method	Results		MDL	Limit
			1	2		
Cadmium(Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cd and Pb by ICP-OES and /or ICP-MS)	ND	ND	2	100
Lead (Pb)	mg/kg		ND	6.18	2	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Hg by ICP-OES and/ or ICP-MS)	ND	ND	2	1000
Hexavalent Chromium (CrVI)	mg/kg	With reference to IEC 62321:2008 (Determination of CrVI by UV-VIS)	ND*	ND*	2	1000
<b>Sum of PBBs</b>	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB and PBDE by GC-MS)	ND	ND	-	1000
Monobromobiphenyl	mg/kg		ND	ND	5	-
Dibromobiphenyl	mg/kg		ND	ND	5	-
Tribromobiphenyl	mg/kg		ND	ND	5	-
Tetrabromobiphenyl	mg/kg		ND	ND	5	-
Hexabromobiphenyl	mg/kg		ND	ND	5	-
Pentabromobiphenyl	mg/kg		ND	ND	5	-
Heptabromobiphenyl	mg/kg		ND	ND	5	-
Octabromobiphenyl	mg/kg		ND	ND	5	-
Nonabromobiphenyl	mg/kg		ND	ND	5	-
Decabromobiphenyl	mg/kg		ND	ND	5	-
<b>Sum of PBDEs</b>	mg/kg		ND	ND	-	1000
Monobromodiphenyl ether	mg/kg		ND	ND	5	-
Dibromodiphenyl ether	mg/kg		ND	ND	5	-
Tribromodiphenyl ether	mg/kg		ND	ND	5	-
Tetrabromodiphenyl ether	mg/kg		ND	ND	5	-
Pentabromodiphenyl ether	mg/kg		ND	ND	5	-
Hexabromodiphenyl ether	mg/kg		ND	ND	5	-
Heptabromodiphenyl ether	mg/kg		ND	ND	5	-
Octabromodiphenyl ether	mg/kg		ND	ND	5	-
Nonabromodiphenyl ether	mg/kg	ND	ND	5	-	
Decabromodiphenyl ether	mg/kg	ND	ND	5	-	
Bis (2-ethylhexyl) phthalate (DEHP)	mg/kg	IEC 6232-8:2017 (Determination of DEHP, BBP, DBP and DIBP by GC-MS)	ND	248	50	1000
Butyl benzyl phthalate (BBP)	mg/kg		ND	ND	50	1000
Dibutyl phthalate (DBP)	mg/kg		ND	ND	50	1000
Diisobutyl phthalate (DIBP)	mg/kg		ND	ND	50	1000
Conclusion	/	/	PASS	PASS	/	/

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Test Item(s):	Unit	Test Method	Results	MDL	Limit
			3		
Cadmium(Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cd and Pb by ICP-OES and /or ICP-MS)	ND	2	100
Lead (Pb)	mg/kg		ND	2	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Hg by ICP-OES and/ or ICP-MS)	ND	2	1000
Hexavalent Chromium (CrVI)	mg/kg	With reference to IEC 62321:2008 (Determination of CrVI by UV-VIS)	ND*	2	1000
<b>Sum of PBBs</b>	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB and PBDE by GC-MS)	ND	-	1000
Monobromobiphenyl	mg/kg		ND	5	-
Dibromobiphenyl	mg/kg		ND	5	-
Tribromobiphenyl	mg/kg		ND	5	-
Tetrabromobiphenyl	mg/kg		ND	5	-
Hexabromobiphenyl	mg/kg		ND	5	-
Pentabromobiphenyl	mg/kg		ND	5	-
Heptabromobiphenyl	mg/kg		ND	5	-
Octabromobiphenyl	mg/kg		ND	5	-
Nonabromobiphenyl	mg/kg		ND	5	-
Decabromobiphenyl	mg/kg		ND	5	-
<b>Sum of PBDEs</b>	mg/kg		ND	-	1000
Monobromodiphenyl ether	mg/kg		ND	5	-
Dibromodiphenyl ether	mg/kg		ND	5	-
Tribromodiphenyl ether	mg/kg		ND	5	-
Tetrabromodiphenyl ether	mg/kg		ND	5	-
Pentabromodiphenyl ether	mg/kg		ND	5	-
Hexabromodiphenyl ether	mg/kg		ND	5	-
Heptabromodiphenyl ether	mg/kg		ND	5	-
Octabromodiphenyl ether	mg/kg		ND	5	-
Nonabromodiphenyl ether	mg/kg	ND	5	-	
Decabromodiphenyl ether	mg/kg	ND	5	-	
Conclusion	/	/	PASS	/	/

**Sample Description:**

1. TPU Insulation Jacket
2. Large Orange Conductor PVC Dielectric Insulation
3. Inner PTFE Wrap

**Note:**

- (a) mg/kg = ppm ; 0.1wt% = 1000ppm
- (b) ND= not detected
- (c) MDL = Method Detection Limit
- (d) - = not regulated

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- (e) \* = Total Chromium analysis by ICP-MS and/or ICP-OES was not detected in submitted sample. Therefore, Hexavalent Chromium determination using UV-Visible Spectroscopy was not performed.

[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)

Test Item(s):	Unit	Test Method	Results	MDL	Limit
			1		
Cadmium(Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cd and Pb by ICP-OES and /or ICP-MS)	ND	2	100
Lead (Pb)	mg/kg		3.67	2	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Hg by ICP-OES and/ or ICP-MS)	ND	2	1000
Hexavalent Chromium (CrVI) #	µg/cm <sup>2</sup>	With reference to IEC 62321-7-1:2015 (Determination of CrVI by UV-VIS)	ND	0.10	-
Conclusion	/	/	PASS	/	/

Sample Description:

1. Copper Conductor with Tin Plating

Note :

- (a) mg/kg = ppm ; 0.1wt% = 1000ppm
- (b) ND= not detected
- (c) MDL = Method Detection Limit
- (d) # =
  - a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI
  - b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating.
  - c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination.
  - d. For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing represent status of the sample at the time of testing.
- (e) - = not regulated
- (f) \* = Total Chromium analysis by ICP-MS and/or ICP-OES was not detected in submitted sample. Therefore, Hexavalent Chromium determination using UV-Visible Spectroscopy was not performed.

IEC 62321 series is equivalent to EN 62321 series

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**2. European Regulation (EC) No. 1907/2006 (REACH) Annex XVII and its amendments – Phthalate content**

Method : With reference to CPSC-CH-C1001-09.3. Analysis was performed by Gas Chromatography / Mass Spectrometry.

Test Item	Result (%)		Detection Limit (%)	Permissible Limit (%)
	1	2		
Dibutyl Phthalate (DBP)	ND	ND	0.015	--
Benzylbutyl Phthalate (BBP)	ND	ND	0.015	--
Bis-(2-ethylhexyl) Phthalate (DEHP)	ND	0.0198	0.015	--
DBP + BBP + DEHP	<0.05	0.0198	--	0.1
Diisononyl Phthalate (DINP)	ND	ND	0.015	--
Di-n-octyl Phthalate (DNOP)	ND	ND	0.015	--
Diisodecyl Phthalate (DIDP)	ND	ND	0.015	--
DINP + DNOP + DIDP	<0.05	<0.05	--	0.1
<b>Comment</b>	PASS	PASS	--	--

**Sample Description :**

1. TPU Insulation Jacket
2. Large Orange Conductor PVC Dielectric Insulation

Note : 1. % = percentage by weight  
 2. ND = Not Detected  
 3. < = less than

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**3. Total Phosphorous Content as requested by client**

Method: EPA 3050B/EPA 3052 followed by analysis using Inductively Coupled Argon Plasma Spectrometry.

Test Item	Result (mg/kg)		Detection Limit (mg/kg)
	1	2	
Phosphorous (P)	18200	43.2	10

Sample Description:

1. TPU Insulation Jacket
2. Large Orange Conductor PVC Dielectric Insulation

Note :

1. ND = Not Detected = denoted less than reporting limit
2. 1 mg/kg = 1 ppm

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**4. Halogen content (Cl, Br, F, I) of the submitted sample(s) with reference to BS EN 14582:2016**

With reference to **BS EN 14582:2016** "Characterization of waste – Halogen and sulfur content – Oxygen Combustion in closed systems and determination methods". Analysis was performed by Ion Chromatography.

Test Items	Unit	Method Detection Limit	1
Halogen – <b>Chlorine</b> (Cl) CAS # 007782-50-5	mg/kg	50	<b>69.9</b>
Halogen – <b>Bromine</b> (Br) CAS # 007726-95-6	mg/kg	50	<b>ND</b>
Halogen – <b>Fluorine</b> (F) CAS # 007782-41-4	mg/kg	50	<b>ND</b>
Halogen – <b>Iodine</b> (I) CAS # 007553-56-2	mg/kg	50	<b>ND</b>

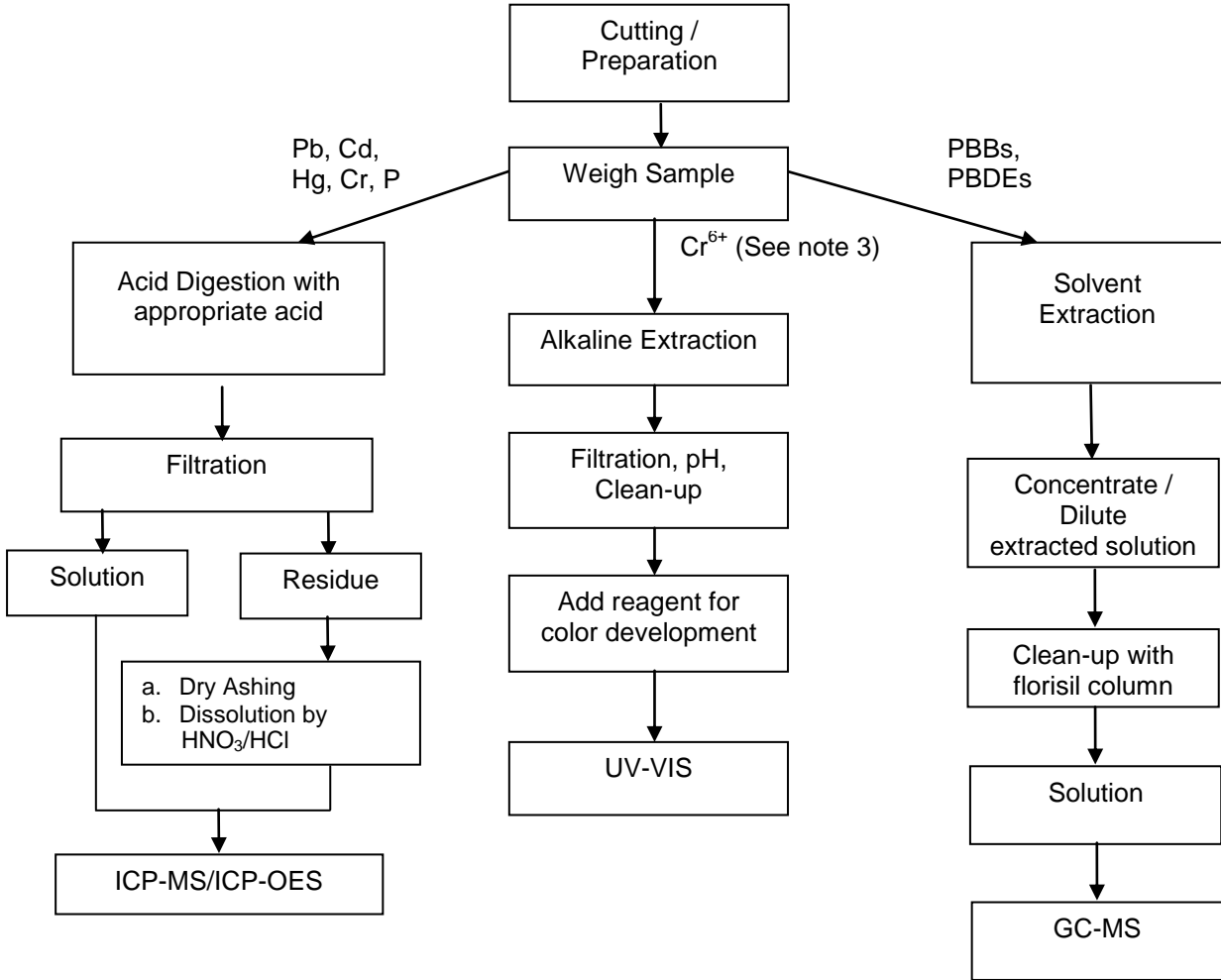
**Sample Description:**

1. TPU Insulation Jacket

Note: 1. mg/kg = ppm  
2. ND = Not Detected, reported when the reading is less than the detection limit value.

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**Flowchart for ROHS Testing:**

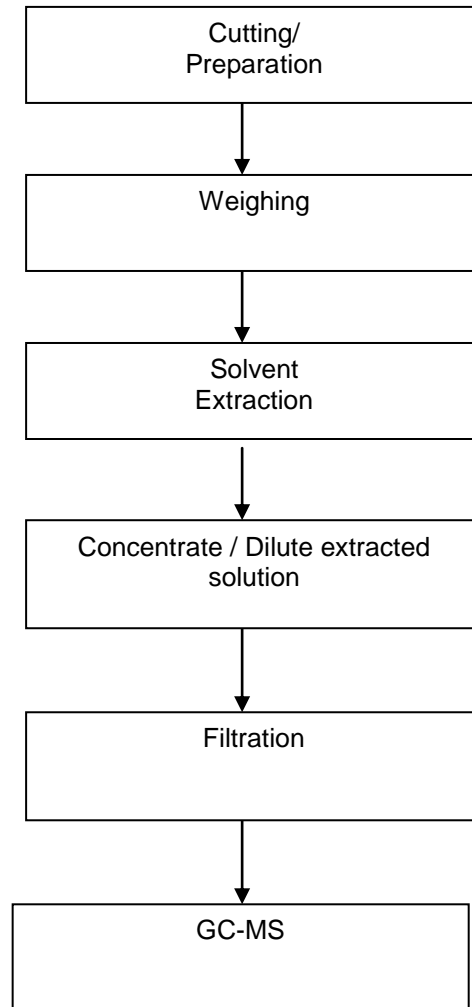


- Note :
1. For Cr(VI), spot test is adopted for metal sample.
  2. The Cd, Pb, Hg, P contents test on polymeric samples were dissolved totally by pre-conditioning method according to above flow chart.
  3. Cr<sup>6+</sup> is performed only when total Cr is detected

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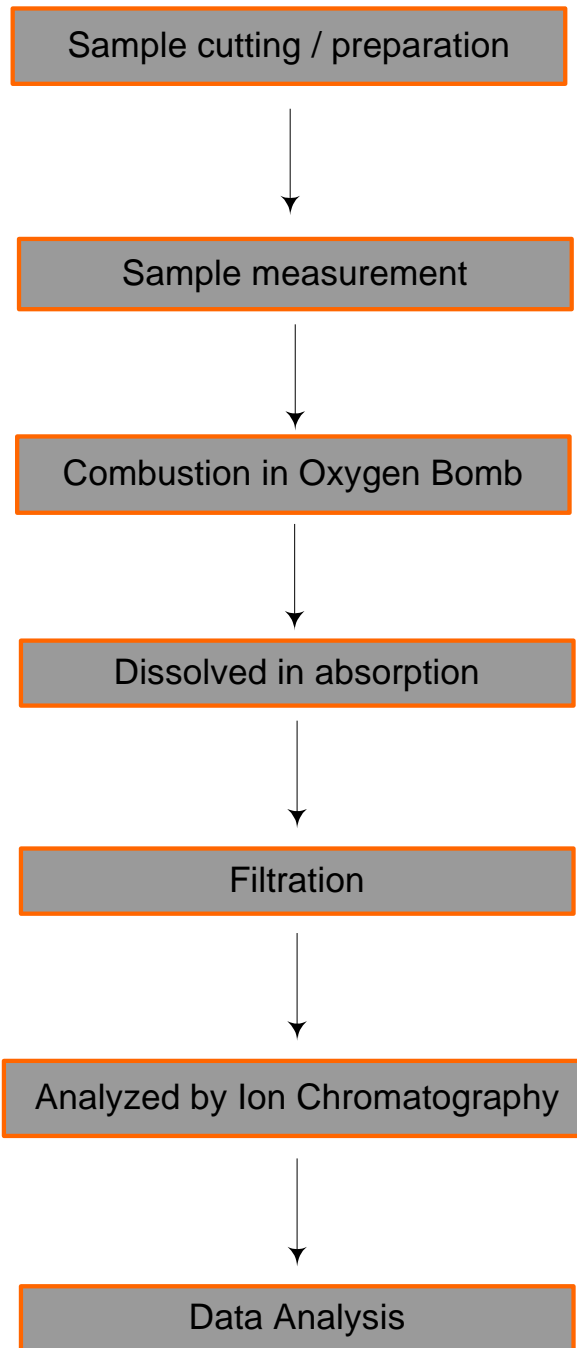


**Flowchart for Phthalates**



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Halogen Testing Flow Chart



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**Sample Photo:**



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