



## STATCLEAN TECHNOLOGY (S) PTE. LTD.

30 Kaki Bukit Road 3, # 03-12/13/14, Empire Technocentre, Singapore 417819.

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### ESD Spiral Coil

#### BENEFITS

- Permanent Static Dissipative
- Insensitive to environment
- Special design for Cleanroom application

#### APPLICATIONS

- To wrap cable or wire inside Cleanroom
- To coil pen inside Cleanroom
- Other



#### SPECIFICATION

<b>Decay time at end of tube</b>	0.8 to 1.3 seconds
<b>Decay time at centre of tube</b>	0.5 to 1.2 seconds
<b>Float voltage observed</b>	0V to 3V
<b>Peel off voltage observed</b>	0V to 3V
<b>Surface Resistivity</b>	$8 * 10$ to the power of 8

#### PROCEDURES

**OUTGASSING** – Three samples of Spiral Coil were used and placed in an outgassing vessel at 85 Degree C. It was then flushed continually for three hours at 50ml/min with grade 5 nitrogen. A carbotrap ‘B’ / carbotrap ‘C’ tube were then used to trap the outgassing constituents after which analyzing using GC/MS with ATD.

**FTIR / SILICONE OIL / HYDROCARBONS** – The presence of silicone oil and hydrocarbons were extracted in solvent soluble residue from one piece of 15.5 “ of ESD Bluish Spiral Coil. Both the inner and outer surfaces, a total of 121cm square, were rinsed with 10ml of hexane and isopropanol by mixing a portion of 1 : 1 (v/v) of the solvent solution. A clean 30ml glass beaker was used to collect the rinsate. The solvent solution was evaporated to dryness. Thereafter, FTIR / HATR was used to analyze for the presence of silicone oil and hydrocarbons on any residue rinsed from the sample.

**IONIC CONTAMINATION** – A ESD Bluish Spiral Coil sample were divided into three sections to test for ionic contamination. Three pre-clean glass beaker containing 10ml of de-ionized water was given one section of the spiral coil sample each and then capped off to prevent evaporation. The glass beakers were then placed in an 80 Degree C oven. The water extract was then analyzed using ion chromatography. A hand measured apparent surface area of 10.2cm square was used to calculate the results.



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### RESULTS:

**OUTGASSING** – Below are the data obtained from using the following chemical

COMPOUND IDENTIFICATION	Section 1 sample	Section 2 Sample	Section 3 Sample	Average
BHT	12 ug/g	12 ug/g	13 ug/g	12 ug/g
KETONES	28 ug/g	28 ug/g	21 ug/g	26 ug/g
SILOXANE	1 ug/g	0 ug/g	0 ug/g	1 ug/g
HYDROCARBON, OTHERS	19 ug/g	15 ug/g	14 ug/g	16 ug/g
TOTAL	60 ug/g	55 ug/g	48 ug/g	54 ug/g

### FTIR / SILICONE OIL / HYDROCARBONS

– Below shown was obtain from the analyzed results on one section of the Spiral Coil.

	Section 1 Sample	Limits
SILICONE OIL	10	As per customer's specification
HYDROCARBONS	160	As per customer's specification

**Note:** Results for both the silicone oil and hydrocarbons are in nanograms/cm square surface area.

**IONIC CONTAMINATION** – The results tested as follows

SAMPLE	Section 1 Sample (ug/cm square)	Section 2 Sample	Section 3 Sample	Average	Limits
AMMONIUM	0.015	0.014	0.020	0.016	As per customer's specification
BROMIDE	0.008	0.008	0.004	0.007	
CALCIUM	0.019	0.020	0.022	0.020	
CHLORIDE	0.008	0.010	0.014	0.010	
FLUORIDE	0.032	0.029	0.031	0.030	
MAGNESIUM	0.001	0.001	0.001	0.001	
NITRATE	0.003	0.004	0.004	0.003	
NITRITE	0.000	0.000	0.000	0.000	
PHOSPHATE	0.086	0.069	0.071	0.075	
POTASSIUM	0.010	0.012	0.011	0.011	
SODIUM	0.155	0.150	0.147	0.150	
SULFATE	0.000	0.005	0.000	0.001	
TOTAL SUM OF ANIONS	0.337	0.322	0.325	0.324	



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### ROHS FOR SPIRAL COIL

On analysis, the following result were obtain:-

Test Parameter	Digestion/ Extraction Method	Analysis Method	Result, ppm (w/w)
Mercury (Hg)	AC/RoHS/0010 Ver1.1/05 Wet Acid Digestion (Microwave)	CVAAS	ND
Lead (Pb)	AC/RoHS/0007 Ver1.0/05 Dry Ashing	ICP-AES	ND
Cadmium (Cd)	AC/RoHS/0007 Ver1.1/05 Wet Acid Digestion (Microwave)	ICP-AES	ND
Hexavalent Chromium (Cr 6+)	Ac/RoHS/0011 Ver1.0/05 EPA 3060A / 7196A (Modified)		ND
Polybrominated Biphenyls (PBB)	AC/RoHS/0012 Ver1.1/05 (Microwave)	GC-MS	ND
Polybrominated Diphenyl Ethers (PBDEs)	AC/RoHS/0012 Ver1.1/05 (Microwave)	GC-MS	ND

#### Remarks:

1) Sample was prepared as in AC/ROHS/0006 Ver1.0/05 and all the methods listed above are reference to the IEC 111/24/CD/Ed.1- Procedure for determination of levels of regulated Substances in Electrotechnical Products.

2) CVAAS = Cold Vapor Atomic Absorption Spectrometry  
ICP – AES = Inductively- Coupled Plasma – Atomic Emission Spectrometry  
GC-MS = Gas Chromatography – Mass Spectrometry

3) The Method detection limits (MDL) for Lead, Cadmium, Polybrominated Biphenyls and Polybrominated Diphenyl Ethers = 1 ppm each

4) The Method detection limits (MDL) for Hexavalent Chromium = 2ppm

5) The Method detection limits (MDL) for Mercury = 0.5ppm

6) “ND” = Not detected (Less than or equal to 5ppm)