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January 26, 2021

ESD/LPD Trade/263

Mr. Doron Levit - CEO LPD Trade

RE: Measurement Results of antistatic Hand Tools Produced by FBK

Reference:
1) LPD Trade/FBK Catalog of Antistatic tools
2) ESD TR53-01-06: Compliance Verification of ESD protective Equipment and Materials, ESD Association (USA)
3) ASTM D-257-78: electrical resistance measurement methods of insulating materials
4) CENELEC/TR 50404-2003: Electrostatics - Code of practice for the avoidance of hazards due to static electricity
5) IEC 60079-32-2/Ed1: Explosive atmospheres – Part 32-2: Electrostatics hazards – Tests

1. Background

Tested Material

I got several black polypropylene hand tools for lab characterization. The tools are manufacturer by FBK. ID appearing in the table of measurement results are the tools' catalog number provided by LPD Trade. According to CENELEC/TR 50404-2003 ESD standard (Ref 4) acceptable antistatic tools would have resistivity (measured from tool handle to its end making a contact with HAZMATs) less than 1.0 X $10^8\Omega$, as is presented in the following table:

Sub clause	Type of installation	Maximum resistance to earth, ohms
10.3.4	Items fabricated from non-conductive or dissipative materials	10^6 to 10^8

2. Measurement Details

- Measurement methods are per Ref.2 and Ref. 3
- Measurement voltage: 100V
- Instrument: Resistance Meter, Prostate, Model PRS-812; Upper measurement range $10^{14}\Omega$
- Calibration due date: 28 September. 2015
- Tool electrical resistivity was measured from end to end (handle to tool's end making a contact with ESD sensitive material/component)

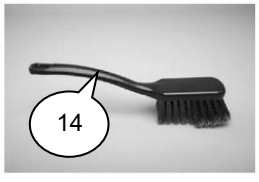
3. Measurement Results

All measurements were conducted at 24˚C and RH 39%

K=1000; M=10^6; G=10^9

No.	Cat. #	Tool Description	end-to-end Resistivity kΩ	Pass/ Fail
1	C25155	Brum (just brush)	32	Pass
2	C29903	Brum stick	1.9	Pass
3	C15105	Small hand scoop	15	Pass
4	C15107	Large hand scoop	4.1	Pass
5	C80301	Dust Pan	11	Pass
6	C80101	Bucket	14	Pass
7	C80111	Bucket Cover	10	Pass
8	C54134	Round Hand Scrub Brush	28	Pass
9	C82900	Scrapper (Spatula) 100*240mm	11	Pass
10	C82904	Scrapper (Spatula) 250*75mm	2.5	Pass
11	C15109	Scrapper 110*250mm	Not available	Pass
12	C15060	Nail Brush	160	Pass
13	C10232	Long Utility Brush, 55*410mm	3.3	Pass
14	C10201	Small Utility Brush, 47*270mm	13	Pass
15	C50153	Machin Brush 20*275mm	41	Pass
16	C10252	Bannister Brush 35*340mm	4.9	Pass
17	C81916	Hand scrapper half round	9.1	Pass
18	C81911	Hand scrapper - rectangular	6.4	Pass

4. Product Depiction

C10548 **CHURN BRUSH** 275 X 70 MM, POLYPROPYLENE		**C50153** **MACHINE BRUSH** 275 X 20 MM, POLYPROPYLENE	
C10252 **BANNISTER BRUSH** 340 X 35 MM, POLYPROPYLENE		**C27131** **TUBE CLEANING BRUSH** Ø 70 MM FOR HANDLE, POLYPROPYLENE	
C10232 **LONG UTILITY BRUSH** 410 X 55 MM, POLYPROPYLENE		**C27133** **TUBE CLEANING BRUSH** Ø 90 MM FOR HANDLE, POLYPROPYLENE	
C10201 **SMALL UTILITY BRUSH** 270 X 47 MM, POLYPROPYLENE		**C54134** **ROUND HAND SCRUB BRUSH** Ø 125 MM, POLYPROPYLENE	

C15060 **NAIL BRUSH** 110 X 45 MM POLYPROPYLENE	
C15064 **HAND SCRUB BRUSH** 210 X 70 MM POLYPROPYLENE	
C27154 **TANK BRUSH** 200 X 120 MM POLYPROPYLENE	
C57156 **TUBE CLEANER** Ø63 X 400 MM POLYPROPYLENE	

5. Conclusions

All tested hand tools were found to have very good static dissipative characteristics. They are good quality tools and need only GMP approval for pharmaceutical materials. For other processing industries such as food, hi-tech, chemicals, and petro-chemicals these hand tools are the **best tools approved by our lab, so far, for ESD control.**

Best Regards,

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