Envirosense Corporation

Project:	**M125**	**Address**	**1461 Atteberry Lane**
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CSL
CONTAMINATION
STUDIES
LABORATORIES INC.

Assembled Boards at Medical Manufacturer

Cleanliness Evaluation Program

	all values are ug/in2	Ion Chromatography		
ID	**Sample Description**	**Chloride**	**Bromide**	**WOA**
MI25-1	WSF Assembly #1a Cleaned Mfg (Tap Water Inline)	13.89	3.23	11.95
MI25-2	WSF Assembly #1b **Cleaned in Tsunami** (Dl Water + E816 @ 5% conc)	1.24	1.88	1.75
MI25-3	WSF Assembly #2a Cleaned Mfg (Tap Water Inline)	18.57	2.52	15.48
MI25-4	WSF Assembly #2b **Cleaned in Tsunami** (Dl Water + E816 @ 5% conc)	0.63	1.48	1.33
MI25-5	WSF Assembly #3a Cleaned Mfg (Tap Water Inline)	18.23	3.87	19.54
MI25-6	WSF Assembly #3b **Cleaned in Tsunami** (Dl Water + 3112B @ 8% conc)	3.29	3.04	4.31
MI25-7	WSF Assembly #4a Cleaned Mfg (Tap Water Inline)	17.94	3.76	22.35
MI25-8	WSF Assembly #4b **Cleaned in Tsunami** (Dl Water + 3112B @ 8% conc)	3.77	2.87	3.89
MI25-9	Bare uncompressed Umpire boards used in this evaluation	1.31	0.57	0

Ions Detectable	**Anions:** Chloride, Nitrate, Bromide, Phosphate, Methane Sulfonic Acid, Fluoride, Sulfate, Weak Organic Acid (WOA), Carbonate, Succinate, Glutarate, and Adipate

Experimental Goal

The goal of this investigation is to identify the cleanliness of assembled boards; process cleaned at a medical manufacturer with tap water only in an in-line cleaner. The water only process data is compared to batch cleaning with the Tsunami Class III bench top cleaning unit using a (E816 organic) and (#3112B inorganic) aqueous saponifying cleaning chemistries. All residues in this evaluation were characterized using Ion Chromatography per IPC-TM-650,

method 2.3.28.

Conclusions

1. The cleaning process at the manufacturer using tap water only in the in-line cleaner did a poor job of cleaning. The chloride levels were high on these boards as well as failing IPC SIR tests on the 80 pin TQFP pad to pad testing. The Tsunami Class III cleaned assemblies showed low levels of chloride and passed the SIR testing for the TQFP parts. EnviroGold 816 and the #3112B inorganic reduced the chloride and bromide levels to well below our excepted levels for good electrical performance.

2. This recommended level of chloride is below 5.0 ug/in2 for all three boards. The risk of electromigration or electrical problems is minimal at these levels.

Reported by: Terry L. Munson, President Date 5/30/00