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## Analysis of flow sensors according SEMI F 40 / F 57

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### 1. Subject / Sample description

Chemically precleaned flowsensors should be analysed according SEMI F40/F57.

Tab.1: Sample name and sample parameters

| Sample description   | Sample number | Surface area [cm <sup>2</sup> ] | Test Method   |
|--|---------------|---------------------------------|---|
| 100 – 30308 Levil Flow Sensor<br>LFS-20-Z, 0-20 lpm, Z-Shape | 0910 066 – 1  | 84                              | Leachable TOC<br>Leachable Inorganics<br>Leachable Anions |
| 100 – 30312 Levil Flow Sensor<br>LFS-80-Z, 0-80 lpm, Z-Shape | 0910 066 – 2  | 202                             | Leachable TOC<br>Leachable Inorganics<br>Leachable Anions |

## 2. Preparation

The preparation was carried out in class 1 cleanbenches, located in class 1000 cleanrooms, in accordance to SEMI F40/F57. The flowsensor tubes were filled with ATU ultrapure water and closed with precleaned caps. All metal, reactive silica and anion impurity levels in the used UPW were measured below 100 ppt (parts per trillion). The conductivity was 18,2 megohm-cm, and the TOC level was at 2 ppb. The used nitric acid (HNO<sub>3</sub>) had ULSI quality.

Tab.2: preparation parameters

| Test Method          | Container-material | Soaking solution | Soaking parameters |
|----------------------|--------------------|------------------|--------------------|
| Leachable TOC        | PFA                | UPW              | 7 days at 85°C     |
| Leachable Anions     | PFA                | UPW              | 7 days at 85°C     |
| Leachable Inorganics | PFA                | UPW              | 7 days at 85°C     |

For the method-blank determination, two containers of test fluid are handled in the same manner.

## 3. Analysis

### 3.1 Leachable TOC

The analysis is done with thinfilm UV-oxidation, using NIST reference and traceable standards for calibration.

### 3.2 Leachable Anions

The analysis is done with preconcentration ion chromatography [PC-IC / Dionex], using NIST reference and traceable standards for calibration.

### 3.3 Leachable Inorganics

The analysis is done with inductively coupled plasma-mass spectrometry [ICP-MS Agilent 7500 cs], using an external calibration with NIST reference and traceable standards. All blank-, standard- and sample solutions were in the same matrix .

#### 4. Analysis results

| ATU sample # |                               | 0910 066-1  | 0910 066-2                                       |      |        |
|--------------|-------------------------------|---|--|------|--------|
| Parameter    |                               | 100-30308<br>LeviFlowSensor<br>LFS-20-Z, 0-20 lpm | 100-30312<br>LeviFlowSensor<br>LFS-80-Z 0-80 lpm | DL   | Spec.  |
| Aluminium    | Al                            | 1,2   | 0,24   | 0,1  | 10     |
| Barium       | Ba                            | 1,1   | 0,87   | 0,1  | 15     |
| Boron        | B                             | 0,65  | <  | 0,5  | 10     |
| Calcium      | Ca                            | 8,6   | 4,6  | 0,3  | 30     |
| Chrome       | Cr                            | <   | <  | 0,05 | 1      |
| Copper       | Cu                            | 0,73  | <  | 0,1  | 15     |
| Iron         | Fe                            | 0,44  | 0,22   | 0,1  | 5      |
| Lead         | Pb                            | 0,19  | 0,62   | 0,05 | 1      |
| Lithium      | Li                            | <   | <  | 0,1  | 2      |
| Magnesium    | Mg                            | 0,25  | 0,13   | 0,1  | 5      |
| Mangane      | Mn                            | 0,52  | <  | 0,1  | 5      |
| Nickel       | Ni                            | 0,34  | 0,29   | 0,05 | 1      |
| Pottasium    | K                             | 1,6   | 0,87   | 0,1  | 15     |
| Sodium       | Na                            | 4,3   | 1,1  | 0,1  | 15     |
| Strontium    | Sr                            | 0,04  | 0,02   | 0,01 | 0,5    |
| Zinc         | Zn                            | 2,9   | 1,9  | 0,1  | 10     |
| Fluoride     | F <sup>-</sup>                | <   | <  | 100  | 60 000 |
| Chloride     | Cl <sup>-</sup>               | 51  | 66   | 10   | 3 000  |
| Bromide      | Br <sup>-</sup>               | <   | <  | 10   | 100    |
| Nitrate      | NO <sub>3</sub> <sup>-</sup>  | <   | <  | 10   | 100    |
| Nitrit       | NO <sub>2</sub> <sup>-</sup>  | 18  | <  | 10   | 100    |
| Phosphate    | PO <sub>4</sub> <sup>3-</sup> | <   | <  | 20   | 300    |
| Sulfate      | SO <sub>4</sub> <sup>2-</sup> | <   | <  | 20   | 300    |
| TOC          |                               | 160   | 206  | 100  | 60 000 |

The results written in red are off Spec. RL = reproted limit

With best regards



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The present results refer exclusively to the samples examined here.  
The copy of the examination report and/or the passing on to third parties is on permit only by our express approval