

Test Method for Analyzing Extractables

This test method is used to analyze the soluble ionic extractable contaminants from cleanroom gloves.

1. Scope

- 1.1. The test method covers the average ionic contamination found on gloves designated for cleanroom applicability.
- 1.2. The average contaminant concentration will be reported in one of two ways:
 - 1.2.1. Micrograms of ionic contaminant per gram of glove weight (ug/g), also described as ppm.
 - 1.2.2. Micrograms of ionic contaminant per square centimeter of glove area (ug/cm²)
- 1.3. This test method does not cover contaminants that are insoluble in water, or organic macromolecules.
- 1.4. The safe and proper use of gloves is beyond the scope of this test method.
- 1.5. This test method does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this Test Method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

- 2.1. IEST-RP-CC005.2 Recommended Practice for Gloves and Finger Cots Used in Cleanrooms and Other Controlled Environments.
- 2.2. Work Instruction WI 10-05-26, Work Instruction for Performing Ion Chromatography Analysis of Gloves

3. Apparatus

- 3.1. Analytical Balance, capable of readability and repeatability to 0.1 mg
- 3.2. Ion Chromatograph
- 3.3. Extraction Containers, 1 liter capacity, HDPE with screw type lids
- 3.4. Stainless Steel Forceps, 10" length
- 3.5. 500 ml Volumetric Flask
- 3.6. High Purity Deionized Water System, capable of producing 18.0 MOhm quality water
- 3.7. Point of Use Filter, 0.1 micron size
- 3.8. Circular Die, 1.5 inch diameter, calibrated

4. Procedure

4.1. Test Preparation

- 4.1.1. Prior to extraction, all extraction containers will be cleaned using an ultrasonic bath no less than five times with high purity deionized water filtered to 0.1 microns at point of use.
- 4.1.2. All related equipment (forceps, volumetric flasks, etc.) must be rinsed with high purity de-ionized water prior to use.

4.2. Extraction

- 4.2.1. After opening the glove bag, use the stainless steel forceps to remove the three gloves that are uppermost in the stack.
- 4.2.2. Carefully discard the top two gloves, so that the remaining glove has only touched a glove on either top or bottom surface.
- 4.2.3. Place glove finger-first into the one liter extraction container and hold open by cuff using the rinsed forceps.
- 4.2.4. Empty into the inside of the glove approximately 300 ml high purity filtered deionized water.
- 4.2.5. Allow the glove to settle into the extraction container.
- 4.2.6. Pour remaining contents of the 500 ml high purity filtered deionized water over the glove within the extraction container.
- 4.2.7. Place the lid upon the container and seal tightly.
- 4.2.8. Gently swirl the container to ensure that all surfaces of the glove are wetted.
- 4.2.9. Allow the glove to extract in the deionized water for at least 10 minutes, but no longer than 11 minutes.

- 4.2.10. Remove the glove by the fingers, allowing most of the water trapped in the fingers to drain back in to the extraction container.
- 4.2.11. Dispose of the glove.
- 4.2.12. Repeat extraction two additional times to complete the set.
- 4.2.13. Prepare a sample blank, using all the steps in section 2, without placing the glove in the extraction container.

4.3. Measurement

- 4.3.1. Follow the guidelines for the Ion Chromatograph for analyzing aqueous solutions.

4.4. Glove weight and surface area

4.4.1. Glove weight

- 4.4.1.1. Pull three gloves from the production package and weigh to the nearest 0.1 mg.
- 4.4.1.2. Record.

4.4.2. Glove Surface Area

- 4.4.2.1. Perform the steps to obtain the glove weight.
- 4.4.2.2. Punch out a measured section of all three glove palms, using the calibrated circular 1.5-inch die.
- 4.4.2.3. Measure the six cut-out sections to the nearest 0.1 mg.
- 4.4.2.4. Record.

5. Calculations

- 5.1. Once the data output from the Chromatograph has been reviewed for errors, calculate the following:

$$5.1.1. \text{ Average glove weight: } = \frac{\text{TotalWeightof 3Gloves}}{3}$$

$$5.1.2. \text{ Average glove surface area: } = \frac{(\text{Weightof 3Gloves}) * 45.6sqcm}{\text{WeightOf 6Cutouts}}$$

$$5.1.3. \text{ ug/g (ppm) contamination: } = \frac{(\text{AnalyteConc.}) * (500ml)}{\text{GloveWeight}}$$

$$5.1.4. \text{ ug/cm}^2 \text{ contamination: } = \frac{(\text{AnalyteConc.}) * (500ml)}{\text{SurfaceArea}}$$

6. Reporting

- 6.1. The final report should include the Lot number, Batch number, Product description, Part number, and any other pertinent information about the sample, as well as the final calculated contaminant concentration in ug/g and ug/cm².