

# LIGO-T040023-00-D

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**P020**

**To:** Helena Armandula

**2/6/2004**

**From:** Mark S. Anderson, Gary Plett

**Subject:** **LIGO: Teflon AF Fluoride Analysis**

## **Purpose**

A solution for casting Teflon AF (Grade 601S1-100-18) and its Fluorinert (FC-75) solvent were submitted for fluoride analysis.

## **Method**

The fluoride analysis was by Ion chromatography (IC). IC separates ions in a sample solution by injecting into an eluant buffer stream (a dilute aqueous carbonate bicarbonate solution) that is pumped through an anion exchange column. The separated ions are measured by a conductivity detector system. Prior to detection, the eluent passes through a suppressor ion exchange membrane that enhances analyte sensitivity by neutralizing the eluant while leaving the analytes in charged form, thus greatly increasing the detection sensitivity and allowing separation and analysis at low analyte concentrations. The system used in this test was a Dionex GP40/CD20 system with an AS4a-SC anion column. The buffer was aqueous 0.1 M NaCO<sub>3</sub> and 0.1M NaHCO<sub>3</sub>.

The solutions were handled in a clean flow bench and care was taken for clean sampling. The samples were extracted with water. The water effectively extracts the ionic fluoride out of the hydrophobic liquid samples. For the Teflon AF solution, the sample was first dissolved in hexane (5 grams in 10 mils of hexane) in order to avoid an emulsification with the water that occurs on direct extraction. The Fluorinert solvent was directly extracted with water. This is accomplished by vigorous shaking with a 1:1 sample mixture to water. The water solution is then analyzed using IC. Appropriate blanks were run to assure water, solvents and hardware does not impart unwanted ionic background.

## **Results**

The Teflon AF solution has 0.67 parts per million extractable fluoride. The Fluorinert solvent has 0.025 parts per million extractable fluoride.