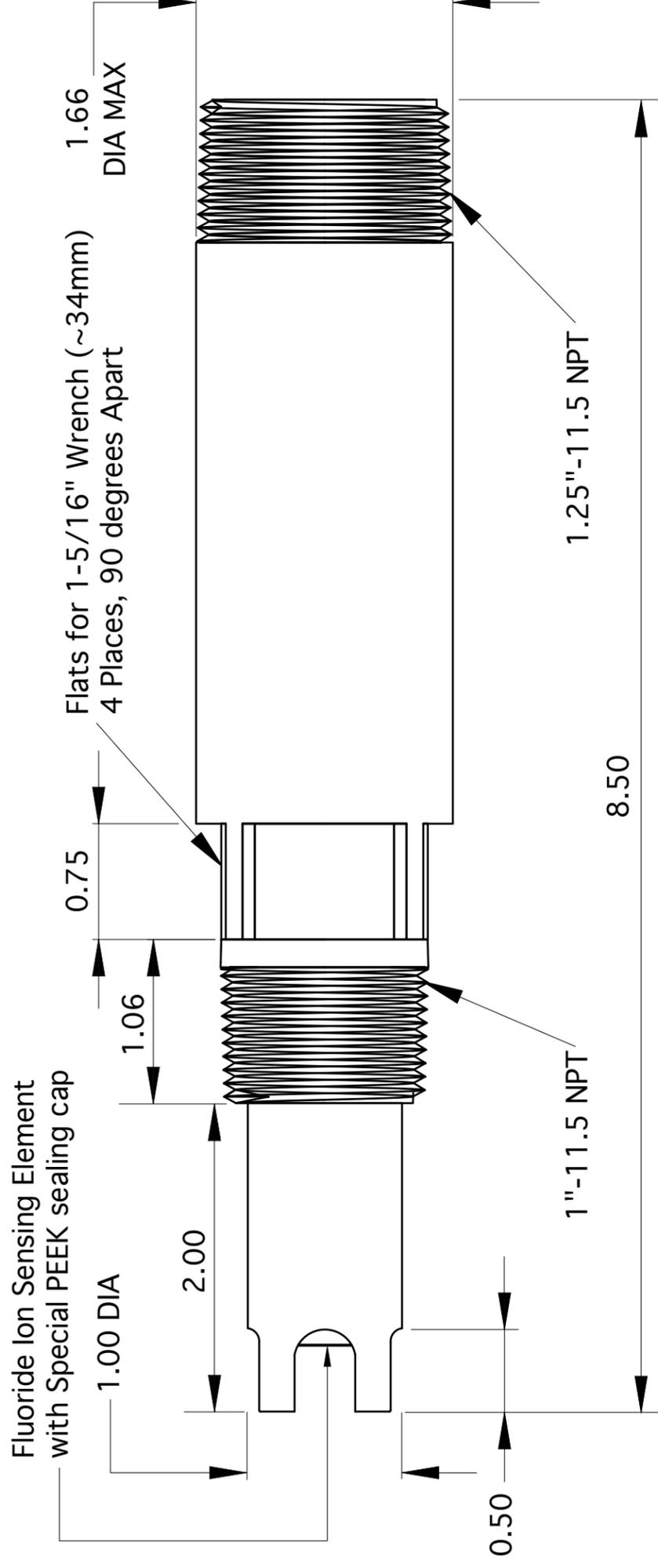




# IOTRON™ SENSORS

## INTEGRATED INDUSTRIAL ION SELECTIVE SENSOR SPECIFICATIONS

<u>Sensor Part Number &amp; Short Description:</u>	<b>AB 6100 – Fluoride (F)</b> Industrial Ion Selective (ISE) Immersion & Submersible Sensor using 1.25" MNPT rear threads for Immersion or Submersible Installations
<u>Configuration Type:</u>	<i>1"-1.25" MNPT Integrated ISE Sensor; Interface with 1.25" FNPT threads on rear of sensor with tube for immersion or with waterproofing seal for submersible installations</i>
<u>General Sensor Specifications:</u>	
Operating Temperature Range:	+5 to +70 °C Continuous
Operating Pressure Range:	1 to 20 psig (6.9 to 138 kPa)
Sensor Body Material:	RADEL® R-5000 NT (Poly-Phenyl-Sulfone, PPSU)
Junction Support Matrix Material:	High-Density Polyethylene (HDPE)
External Dimensions:	See Drawing F-1-ISE
<u>Ion Sensor Specifications:</u>	
Linear Measurement Range:	0.019 to 19,000 ppm ( $1 \times 10^{-6}$ to 1.0 Molar)
Lowest Limit of Detection	0.001 ppm ( $5 \times 10^{-8}$ Molar)
Interfering Ion(s):	$\text{OH}^-$ when pH is above 12.0
Suitable pH range:	0.0 to 12.0 *
<i>Cases where pH Compensation is necessary to compute total ammonia species</i>	* Note: When pH is below 5.5 then the sum of the measured unbound fluoride ions and dissolved hydrogen fluoride (HF) gas form must be computed as a function of realtime continuous measured pH parameter to ensure proper field calibration & measurement.
Measuring Element:	Fluoride ion sensitive crystal with PEEK sealing cap
ISE Sensing Element Dimensions:	0.315" (8mm) diameter for active fluoride ion sensing region, 0.625" (15.9 mm) overall diameter including PEEK sealing cap
Initial Impedance:	< 50 MΩ @ 25 °C
<u>Reference System Specifications:</u>	
Type:	Double Junction Standard (Triple Junction Optional, Alpha Prefix "TJ")
Reference Half Cell:	Ag/AgCl, Saturated KCl
Primary Junction:	Porous Ceramic, Sat. KCl in crosslinked polymer, Interfaced to Secondary Junction
Secondary Junction:	Solid-State Non-Porous Cross-Linked Polymer embedded in HDPE Support Matrix holds excess KCl assuring saturation at all temps for stability & long sensor life
<u>Supported Order Options with Alpha Prefix Order Code Designation:</u>	3-Wire TC for Sensors without Preamplifiers ("M"), Two each Protective Tines ("GRO"), No Protective Tines ("NG"), Shielded Braid Reinforced Blue Preamplifier Cable ("BL")
<b><i>Inquire to factory for specials</i></b>	
<u>Example Recommended Applications:</u>	Measurement of fluoride ion activity for etching solutions at low pH and/or elevated temperatures. Typical applications include acid fluoride etching of metals such as aluminum for beverage cans or titanium for aerospace parts. Acid etching processes are also commonly used for silicon wafer fabrication in the for semiconductor industries.  Hydrofluoric (HF) wastewater treatment (WWTP) systems where strong acid cleaning is required to remove calcium fluoride ( $\text{CaF}_2$ ), fluorosilicate or any other similar fouling build-up from sensor in such remediation and environmental abatement applications.
<u>Storage and Shelf Life:</u>	One (1) year from date of dispatch from factory when stored at indoor ambient room temperature with proper orientation & protector cap.
<u>Available Configurations &amp; Options:</u>	
Integrated Components:	- Pt1000 Temperature Compensation Element - Analog Conventional Preamplifier (Optional for noisy areas and/or long cable runs)
Analog Sensors without integral preamplifier:	Terminated with Tinned Lead Wires (-TL)
Analog Sensors with integral preamplifier:	Terminated with Tinned Lead Wires (-TL) or Quick Disconnect NEMA 6P Snap (-Q7M)



A

A

B

B

**NOTES**

1. All dimensions are in inches with tolerances as detailed below
2. Sensor body material of construction is RADEL for special AB 6100 fluoride ion selective ISE sensor
3. Support matrix for solid-state cross-linked conductive polymer reference is HDPE material of construction
4. Drawing shown in the standard with protective tines configuration (4 places, 90 degrees apart).  
The 2 protective tines only "GRO" configuration (2 places, 180 degrees apart) is optional.
5. In the alternate without tines configuration ("NG") the sensor body is exactly 8.0 inches in length.
7. AB 6100 is the ONLY model suitable for use in acid process media and to endure strong acid cleaning
8. Note suitable for inline use. Only designed and supported for immersion or submersible style installations.
9. Available in configurations with & without preamplifier  
Terminations are tinned leads or Q7M Snap Connector
10. Do not use any sensor beyond the factory defined maximum temperature or pressure rating.



Advanced Sensor Technologies U.S.A.  
Website: <http://www.astisensor.com>

TITLE <b>1"-1.25" MNPT Inline / Immersion / Submersible</b>			
SIZE <b>B</b>	PROJECT <b>Use in Acid Acid Clean</b>	DRAWING NO. <b>F-1-ISE Ion Selective Sensor</b>	REV <b>/</b>
SCALE Not to Scale	MODEL AB 6100 Fluoride ISE	SHEET 1	OF 1

TOLERANCES		DRAWN BY TADP
1 Place: ± .1	3 Places: ± .005	CHECKED BY TADP
2 Places: ± .01	4 Places: ± .0005	APPROVED BY MJP
Angular: ± 0.25°		

# *Advanced Sensor Technologies, Inc.*

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## **Cleaning and Maintenance of the Special**

### **AB 6100 Fluoride Ion Selective (ISE) Type Sensors**

*Cleaning is generally only recommended if the tracking of the installed fluoride ISE sensor as compared to the periodic grab sample determinations diverges over the course of time. This might mean that some build-up has accumulated making it less responsive to the changes in fluoride ion activity. The frequency of cleaning will depend on the nature of the process water and the extent of build up observed of on the probe tip. If the inline trending as compared to the periodic grab samples does not improve after following the cleaning procedure this may mean that the sensor is nearing the end of service life or else has been exposed to some conditions beyond its capability. Recall that the sensor DOES NOT have to be removed for the standard (grab) offset calibration.*

#### **SPECIAL NOTE & PRECAUTION:**

**The use of acid in the cleaning procedure is ONLY supported for the special AB 6100 type fluoride ISE sensors. The use of this acid cleaning regimen on any other sensor may render it completely inoperable.**

#### **CLEANING:**

1. Thoroughly rinse the sensor tip with deionized (DI) water. If DI water is not available you can use distilled water instead. Gently blot the sensor tip dry with a soft tissue.
2. **If necessary, use 5% to 15% hydrochloric (HCl) acid to clean the fouling. Some common compounds that can tend to build-up for some wastewater treatment applications that are made more soluble in acid conditions include calcium fluoride (CaF<sub>2</sub>) and fluorosilicates (various forms) amongst others.**
3. The fluoride sensor tip can be cleaned with isopropyl alcohol to remove any type of organic contaminants. No other solvents or reagents should be used without contacting ASTI to ensure that it is suitable.
4. Scrape the entire reference area clean with a sharp blade. This reference is a solid-state conductive polymer and cannot be damaged with ordinary scraping of the surface with a clean sharp blade. Please take care not to gouge into the reference itself and especially **DO NOT SCRATCH THE SENSING MEMBRANE.**
5. Once the reference junction has been cleaned rinse it thoroughly with DI water. The sensor can then be installed back into service. Sufficient time should be allowed for the sensor to equilibrate with the process solution after such a cleaning regimen before performing a subsequent standard (grab) calibration.
6. Any calibration fluoride standard solution can serve as conditioning solution for extended storage. Do not allow sensor to be exposed to air for prolonged periods of time (this will cause the reference junction to become dehydrated). Always store sensor in solution when not in service in process. The cap should be filled and sealed onto sensor tip securely sealed with TEFLON tape.

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## Miscellaneous Notes

- The decimal place can be moved in any screen of the analyzer by placing the cursor over the decimal place and using the up and down arrows to move the decimal point to any position.
- Do not to allow air bubbles to get trapped near the fluoride ion selective sensing crystal. The presence of even small air bubbles will cause erroneous readings and/or drift. See special notes below for resolution if you believe this issue is occurring for your sensor.
- The fluoride sensor is comprised of a high-impedance organic membrane system. Care should be taken not to move or touch the cable once a value is being stabilized. Touching the sensor cable can induce noise in the signal that may result in erroneous measurement values and/or calibrations.
- Please see the specification and hook-up schematics found in the AB 6100 fluoride sensor shipping box.

## Resolution for potential issue of air bubble on the AB 6100 fluoride sensor tip

### *Background:*

There is a sealing washer cap on the AB 6100 style fluoride ion selective sensors. This allows for the long service life of these fluoride ISE sensor even with acid service in process and acid cleaning to remove potential fouling contaminants such as  $\text{CaF}_2$  or various forms of fluorosilicates. The (unavoidable) trade-off is that the AB 6100 sensors are somewhat prone to getting an air bubble entrenched in this recessed area near the washer. If such an air bubble occurs the readings will be completely erratic. The three main solutions to this issue are:

1. Shakedown the sensor well in air. This usually liberates any internal air bubble entrenched as well as liberating any entrenched air bubbles that from on the outside of the sensor tip as well.
2. Shake the sensor in solution (calibration or process) at a 45-degree angle. This ensures that once immersed the bubble is liberated from the recessed cap show it have formed.
3. When installing into service make sure that the submersed sensor is installed at a 45-degree angle such that even if a bubble should form after it is placed into service it will not tend to persist.
4. Care should be taken to select an installation point that is the least prone for the formation of air bubbles form the process solution. Note that the AB 6100 type sensors can ONLY be installed as submersibles.

In the vast majority of cases following the procedures outlined above will resolve any air bubble induce anomaly to the fluoride ppm readings. If after following this procedure you still receive erratic readings please contact the factory for further assistance.