

# Technology Safety Data Sheet

## Niton XL-800 Series Multi-Element Spectrum Analyzer (Alloy Analyzer)

### Section 1: Technology Identity

<b>Technology Name(s):</b>		<b>Emergency Contact:</b>	
Niton XL-800 Series Multi-Element Spectrum Analyzer (Alloy Analyzer) DOE OST TMS # 2397		NITON Corporation: 800-875-1578 or 978-670-7460	
<b>Manufacturer's Name and Address:</b>		<b>Information Contact:</b>	
NITON Corporation 900 Middlesex Turnpike Building #8 Billerica, MA 01821 TEL: 800-875-1578 TEL: 978- 670-7460 FAX: 978-670-7430 EMAIL: xrf@niton.com		NITON Corporation Support 1130 Ten Rod Road Suite C-207 North Kingstown, RI 02852 USA TEL 800-875-1578 TEL: 978-670-7460 FAX: 978-670-7430 EMAIL: support@niton.com	
<b>Date Prepared:</b>	July 2002	<b>Date Revised:</b>	Not yet revised

### Section 2: Technology Pictures



Figure 1: A View of the Front of the NITON XL-800.



Figure 2: A Worker Determines the Alloy Used to Make This Bottle.



Figure 3: This Figure Shows the Plunger on the NITON XL-700 Model. The Plungers Look the Same for all NITON Models.

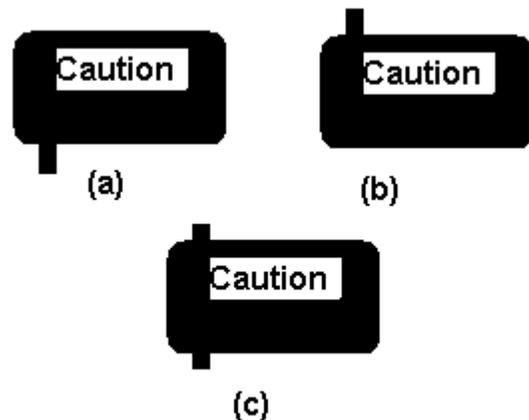


Figure 4: This Basic Diagram Shows the Plunger (a) Completely Closed, (b) Completely Open, and (c) Partially Open.

### Section 3: Technology Description

The XL-800 utilizes x-ray fluorescence (XRF) to identify and quantify elements in metal. The readings are compared to a built-in library to determine the alloy grade. The XL-800 weighs 2.5 pounds and has dimensions of 8.25 inches x 3 inches x 1.875 inches. It utilizes a rechargeable battery pack for ease of use. It can be used to determine the alloy content of solid parts, turnings, and powders in less than 30 seconds. The unit contains a Cadmium-109 ( $^{109}\text{Cd}$ ) radioisotope, which is used to determine elements such as titanium, chromium, iron, and lead. A safety switch must be depressed before the shutter will open. The shutter only opens when the window is against a surface. When the window is pressed against a surface, the plunger that sticks out of the bottom of the unit moves to the top of the unit, indicating that the window is open (see *Figure 3 in Section 2: Technology Pictures*). The window is made of beryllium, which helps to protect the worker from the radioisotope.

### Section 4: Safety Hazards

#### Hazard Category:

(Adapted from Appendix A to MIL-STD-882D, February 10, 2000, Department of Defense Standard Practice for System Safety.)

- 4 - Could result in death or permanent total disability
- 3 - Could result in permanent partial disability or injuries or occupational illness that may result in hospitalization of at least three persons
- 2 - Could result in injury or occupational illness resulting in one or more lost work days
- 1 - Could result in injury or illness not resulting in a lost work day
- N/A - Is not applicable to this technology and poses no appreciable risk

<b>A. Buried Utilities, Drums, and Tanks</b>	<b>Hazard Rating: N/A</b>
Buried utilities, drums, and tanks are not associated with this technology.	
<b>B. Chemical (Reactive, Corrosive, Pyrophoric, etc)</b>	<b>Hazard Rating: N/A</b>
No chemicals are used with this technology.	
<b>C. Confined Space</b>	<b>Hazard Rating: N/A</b>
This technology does not require entrance into a confined space. If it is used in a confined space, proper regulations should be followed.	
<b>D. Electrical</b>	<b>Hazard Rating: N/A</b>
No electrical hazards exist for this technology.	
<b>E. Explosives</b>	<b>Hazard Rating: N/A</b>
Explosives are not used with this technology.	
<b>F. Fire Protection</b>	<b>Hazard Rating: N/A</b>
No additional fire protection requirements are necessary.	
<b>G. Gas Cylinders</b>	<b>Hazard Rating: N/A</b>
Gas cylinders are not used with this technology.	
<b>H. Ladders/Platforms</b>	<b>Hazard Rating: N/A</b>
Neither ladders nor platforms are integral to the use of this technology.	
<b>I. Lockout/Tagout</b>	<b>Hazard Rating: N/A</b>
The manufacturer should perform all maintenance, consequently, lockout and tagout of this device is not necessary.	
<b>J. Mechanical Hazards</b>	<b>Hazard Rating: 2</b>
If the shutter should stick in the open position, the possibility for radiation exposure exists. Pushing the plunger into the proper position and placing the instrument in its shielded case will eliminate the hazard. Call NITON immediately to report the problem.	
<b>K. Moving Vehicles</b>	<b>Hazard Rating: N/A</b>
No moving vehicles are used with this technology.	

<b>L. Overhead Hazards</b>	<b>Hazard Rating: N/A</b>
No overhead hazards exist for this technology.	
<b>M. Pressure Hazards</b>	<b>Hazard Rating: N/A</b>
No pressure hazards exist for this technology.	
<b>N. Slips/Trips/Falls</b>	<b>Hazard Rating: N/A</b>
There is no potential for a slip, trip, or fall.	
<b>O. Suspended Loads</b>	<b>Hazard Rating: N/A</b>
This technology does not utilize suspended loads.	
<b>P. Trenching/Excavation</b>	<b>Hazard Rating: N/A</b>
No trenching or excavation is needed for this technology.	
<b>Section 5: Health Hazards</b>	
<b>A. Inhalation</b>	<b>Hazard Rating: 3</b>
Inhalation of the radiation source is possible if it is leaking. NITON suggests performing leak tests on the analyzer twice per year. The company provides kits and directions for performing the test.	
<b>B. Skin Absorption</b>	<b>Hazard Rating: 2</b>
If the radiation source leaks, there is a potential for skin absorption. Wearing protective clothing and placing the source into a sealed container will help prevent the problem.	
<b>C. Noise</b>	<b>Hazard Rating: N/A</b>
The NITON XL-800 does not produce noise.	
<b>D. Heat Stress/Cold Stress</b>	<b>Hazard Rating: N/A</b>
The NITON XL-800 does not produce heat. Heat or cold stress may occur if the unit is used outdoors or in an area with extreme heat or coldness. The use of personal protective equipment necessary in some radiological areas may add to the effects of heat stress.	
<b>E. Ergonomics</b>	<b>Hazard Rating: N/A</b>
The lightness, textured sides, and hand strap of this tool make it ergonomic.	

<b>F. Ionizing Radiation</b>	<b>Hazard Rating: 1</b>
<ul style="list-style-type: none"> <li>Localized radiation exposure may occur if a worker opens the shutter and touches the window or aims the NITON XL-800 at himself or another worker. If exposed to the maximum exposure rate by touching the window, reddening of the skin, known as radiation burn, is highly unlikely but possible. A worker would need an exposure greater than 30 roentgen (R), requiring an exposure of over 500 hours.</li> <li>There is a potential for ionizing radiation exposure if a person is exposed to a leaking source. Wearing protective clothing and placing the source in a sealed container will help alleviate the potential for exposure.</li> </ul>	
<b>G. Non-ionizing Radiation</b>	<b>Hazard Rating: N/A</b>
Non-ionizing radiation is not associated with this technology.	
<b>H. Biological Hazards</b>	<b>Hazard Rating: N/A</b>
No biological hazards exist for this technology.	
<b>I. Other</b>	<b>Hazard Rating: N/A</b>
None	
<b>Section 6: Phase Analysis</b>	
<b>A. Construction/Start-up</b>	
<ul style="list-style-type: none"> <li>A risk of ionizing radiation exposure exists when the shutter is opened and the source is exposed, even if the instrument is turned off.</li> <li>If a leak occurs during any phase of use, the risk for exposure exists. Proper training in hazardous materials clean up, use of protective clothing, and placing the leaking source in a sealed container will reduce the possibility of exposure.</li> </ul>	
<b>B. Operation</b>	
<ul style="list-style-type: none"> <li>If the safety plunger becomes stuck in the open position, the shutter will stay open. There is a risk of localized radiation exposure if the worker touches the window or points it at himself or another worker.</li> </ul>	
<b>C. Maintenance (Emergency and Routine)</b>	
<ul style="list-style-type: none"> <li>Periodic wipe tests will determine whether the radiation source is leaking. NITON suggests conducting leak tests twice a year using the wipe test method. The company provides the test kits and directions for its use.</li> <li>Only NITON should replace the radiation source in the XL-800.</li> </ul>	

## D. Shutdown (Emergency and Routine)

Should the plunger become stuck in the open position, place the instrument in its protective case so that the window is facing the shielding in the case. Be careful to point the instrument away from people in the area.

## E. Decontamination/Decommissioning

- Clean the instrument by wiping it to remove any contamination.
- Properly dispose of the instrument as a hazardous material.

# Section 7: Worker Protection Measures

## A. Exposure Monitoring

- Radiation dosimeters are site-specific needs. The low levels of radiation from the XL-800 do not require the use of a dosimeter.
- Wipe tests will determine radiation source leaks.

## B. Worker Training

- NITON provides radiation safety and general use courses.
- RAD Worker I
- General use training

## C. Medical Surveillance

- Use of the XL-800 does not require medical surveillance.

## D. Engineering Controls

- The NITON XL-800 comes with a case with a shield where the window fits. This will help eliminate exposure if the plunger should become stuck in the open position. Always store the NITON in its case when not in use to prevent accidental exposure.
- The plunger is an engineering control developed by NITON. It is used to determine whether the window is in the open or closed position without aiming the instrument at one's face.
- A shutter safety slide must be shifted to the proper position before the plunger will move and allow the shutter to open.
- The shutter opens when the plunger is placed against a surface. The shutter will not open unless the plunger is depressed.
- Two Mylar windows and the shutter protect the radiation source from emitting radiation while closed.

## E. Administrative Controls

- Always know the location of the radiation source and the direction of the source's x-rays. Never point the x-rays at yourself or others.
- Open the shutter only when performing a test.

## F. Personal Protective Equipment

No personal protective equipment is needed for general use unless the radiation source leaks. If the source leaks, wear anti-contamination gloves to clean up and store the source.

## Section 8: Emergency Preparedness

No additional emergency preparedness controls are needed in addition to the site's controls.

## Section 9: Comments, Lessons Learned, & Special Considerations

- The NITON XL-800 is a faster and safer method of determining alloys in metals. Samples can be analyzed on the spot, rather than waiting a week or more for laboratory results, leading to a reduced exposure time for workers in the contaminated area.
- Radiation sources must be returned to the manufacturer for disposal due to the radioactivity involved.
- To use this equipment in contaminated areas, place it in a plastic, sealed bag to prevent contamination of the instrument. This will eliminate the time needed for decontamination. Keep in mind that the window cannot be covered with plastic.
- If the plunger becomes stuck in the open position, push it closed, store the instrument in its case, and call NITON at 401-294-1234.

## This Technology Safety Data Sheet Was Prepared By:

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Copies of this Technology Safety Data Sheet and others developed by the Operating Engineers National Hazmat Program can be found on the internet at: [www.iuoeiettc.org](http://www.iuoeiettc.org).