



**Risk Assessment – Regulation 8 IRR17
Ashted Technology Ltd - November 2020**

Section 1		
(a)	Nature of the sources of ionising radiation to be used, or likely to be present, including accumulation of radon in the working environment	Current hand-held battery-operated xrf units (Niton XL2T) typically utilise a 45 kV/80 μ A x-ray beams for the analysis of trace materials by x-ray fluorescence. Effective energy of the x-ray beam is typically 15 keV.
(b)	Estimated radiation dose rates to which anyone can be exposed	<p>Supplier stated maximum dose rate of 1000 mSv hr⁻¹ at front aperture.</p> <p>Use within stand Unit is only used on site within an associated interlocked stand. The maximum contact dose rate with the stand using a 2.5 cm Al sample within the chamber was 10 μSv hr⁻¹ dropping to <1 μSv hr⁻¹ at 30 cm. Dose rate to the trigger finger was measured to be <0.2 μSv hr⁻¹. Assuming the operator uses the unit to make 3000 exposures over an annual period (at 10 seconds per exposure) this equates to 8.3 hours with annual whole body, extremity and eye doses of 8.3, 2 & 8.3 μSv respectively.</p> <p>Hand held mode (not currently used on site) Under correct usage of the unit in hand held mode, typical dose to operator whole body, fingers & eye are measured to be 1, 20 & 1 μSv hr⁻¹ respectively. Annual exposure if used in this mode for 8.3 hours is 8.3, 166 & 8.3 μSv for whole body, extremities and eye respectively.</p>

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(c)	Likelihood of contamination arising and being spread	Not applicable
(d)	Results of any previous personal dosimetry or area monitoring relevant to the proposed work	Initially dosimetry was used for a 3 month period with nothing being measured above the detection threshold of the ring TLDs (typically <0.2 mSv). Unit is only used with associated interlocked stand and thus whole body or extremity dosimetry is not utilised.
(e)	Advice from the manufacturer or supplier of equipment about its safe use and maintenance	Information from Niton/Thermo incorporated into procedures/local rules.
(f)	Engineering control measures and design features already in place or planned	Work area designated as a Supervised Area when unit is energised in the interlocked stand. Local Rules in place. RPS designated and appropriately trained – June 2018.
(g)	Planned systems of work;	Contained within Local Rules.
(h)	Estimated levels of airborne and surface contamination likely to be encountered	Not applicable.
(i)	Effectiveness and the suitability of personal protective equipment to be provided	No specific PPE. Unit only used in shielded interlocked enclosure Mini 900 E monitor used when unit is energised. Pre and Post hire checks carried out on interlocked enclosures & hand-held units.
(j)	Extent of unrestricted access to working areas where dose rates or contamination levels are likely to be significant	Working area designated as a Supervised Area - verbally maintained by the operator. Operators appropriately trained under the local rules or as RPSs.
(k)	Possible accident situations, their likelihood and potential severity	Fire (Likelihood Low, Severity High)

		<p>Dropped unit (or other damage) (Likelihood Low, Severity High)</p> <p>Entry of unauthorised person into Supervised Area (Likelihood Low, Severity Low)</p> <p>Failure of beam to terminate (Likelihood Low, Severity Medium)</p>
(l)	Consequences of possible failures of control measures - such as electrical interlocks, ventilation systems and warning devices - or systems of work	<p>Direct exposure of skin – typically 2.8 mSv – based on 1000 mSv hr⁻¹ at front aperture over a 10 second exposure.</p> <p>Failure of stand/enclosure interlock – interlock fails to safe.</p> <p>Failure of radiation monitor – Correct usage of unit, as outlined in local rules, will continue to minimise exposure.</p>
(m)	Steps to prevent identified accidents, situations, or limit their consequences.	<p>Fire – appropriate fire detection systems in place. Fire contingency contained within local rules.</p> <p>Dropped unit (or other damage) – unit handled with care. Unit contains shock detectors as a method of determining if they have been dropped.</p> <p>Entry of unauthorised personnel into Supervised Area – contingency contained within local rules.</p> <p>Failure of beam to terminate – contingency contained within local rules.</p>
Section 2		
(a)	What action is needed to ensure that the radiation exposure of all persons is kept as low as reasonably practicable.	<p>Appointment of appropriately trained RPSs.</p> <p>Work carried out according to local rules.</p> <p>Employer to arrange training of all operators (non-RPSs) in local rules.</p>

(b)	What steps are necessary to achieve this control of exposure by the use of engineering controls, design features, safety devices and warning devices and, in addition, by the development of systems of work	Unit only to be used in interlocked stand. Work carried out according to local rules.
(c)	Whether it is appropriate to provide personal protective equipment and if so what type would be adequate and suitable.	N/A for keeping exposures ALARP. Suitable monitoring when unit is energised.
(d)	Whether it is appropriate to establish any dose constraints for planning or design purposes, and if so what values should be used.	Not necessary based on assessed doses.
(e)	The need to alter the working conditions of any female employee who declares she is pregnant or is breastfeeding.	Dose assessment shows that potential exposure to the unborn child is significantly below the appropriate dose limit for a member of the public (based on 3000 exposures).
(f)	An appropriate investigation level to check that exposures are being restricted as far as reasonably practicable.	Contained within local rules.
(g)	What maintenance and testing schedules are required for the control measures selected.	Units to be tested pre & post hire Interlocks to be checked pre & post hire Local rules to be reviewed on annual basis. Monitoring equipment calibrated on an annual basis.

(h)	What contingency plans are necessary to address reasonably foreseeable accidents.	See local rules.
(i)	The training needs of classified and non-classified employees.	Customers are offered training in basic use of the unit by Ashtead Technology. RPSs to be trained to appropriate level – see HSE Guidance Employer to arrange training of operators in local rules.
(j)	The need to designate specific areas as controlled or supervised areas and to specify local rules.	Working area designated as a Radiation Supervised Area whenever unit is energised within the stand. Unit not used in hand-held mode so designation of a Controlled Area not required.
(k)	The actions needed to ensure restriction of access and other specific measures in controlled or supervised areas.	Keypad security access in operation throughout site. The unit is not used in hand-held mode on site so no Controlled Areas are designated. When used within the stand a Supervised Area is designated where the unit is used. There is no additional restriction of access to this Supervised Area when the unit is in operation. The unit is, however, continually supervised by an RPS when in use.
(l)	The need to designate certain employees as classified persons.	Based on this risk assessment, there is no need to designate staff as Classified.
(m)	The content of a suitable programme of dose assessment for employees designated as classified persons and for others who enter controlled areas.	No Classified employees & no Controlled Areas designated.
(n)	The responsibilities of managers for ensuring compliance with these Regulations	Responsibility of employer to ensure all findings of this risk assessment are complied with.
(o)	An appropriate programme of monitoring or auditing of arrangements to check that the requirements of these	Initially, auditing on an annual basis – or more frequently in the event of significant changes.

	Regulations are being met.	
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