National Environment Agency
Safeguard • Nurture • Cherish

40 Scotts Road #13-00
Environment Building
Singapore 228231
www.nea.gov.sg

IR2 LICENCE ISSUED UNDER THE RADIATION PROTECTION ACT

This licence is effective as at the start date.

CUST. PROF. NO.: 9924

LICENCE NO	: IR2/2023/01616	ISSUE DATE	: 20 FEB 2023
START DATE	: 20 FEB 2023	ANNIVERSARY DATE	: 21 FEB

THE LICENCE IS ISSUED TO **ADMATERIALS TECHNOLOGIES PTE LTD (UEN: 200805959C)** TO KEEP OR POSSESS AN IONISING IRRADIATING APPARATUS AND / OR RADIOACTIVE MATERIAL FOR USE (OTHER THAN SALE)

PARTICULARS OF IONISING IRRADIATING APPARATUS AND / OR RADIOACTIVE MATERIAL AUTHORISED UNDER THIS LICENCE

Please see attached Annex A.

QUALIFIED PERSON(S) AND RADIATION SAFETY OFFICER(S)

Please see attached Annex B.

LICENCE CONDITIONS

Please see attached Annex C.

TAN KWEE CHAI
AUTHORISED OFFICER
NATIONAL ENVIRONMENT AGENCY

LICENCE NO : IR2/2023/01616

ANNEX A

PARTICULARS OF IRRADIATING APPARATUS NOT CONTAINING RADIOACTIVE MATERIAL

ITEM 1.1

TYPE	:	X-RAY
PURPOSE	:	PRODUCT/MATERIAL INSPECTION/TESTING/ANALYSIS
MAX VOLTAGE	:	60 kV
MAX CURRENT (mA)	:	80
MAKER	:	SHIMADZU CORPORATION
APPARATUS MODEL	:	XRD-6000
APPARATUS SERIAL NUMBER	:	Q30338000196
STORAGE LOCATION	:	ADMATERIALS TECHNOLOGIES PTE LTD 58 SUNGEI KADUT LOOP PROSPAQ INDUSTRIAL BUILDING SINGAPORE 729501

ITEM 1.2

TYPE	:	X-RAY
PURPOSE	:	INDUSTRIAL USE
MAX VOLTAGE	:	50 kV
MAX CURRENT (mA)	:	1
MAKER	:	SHIMADZU
APPARATUS MODEL	:	EDX 800HS
APPARATUS SERIAL NUMBER	:	Q22644700176
STORAGE LOCATION	:	ADMATERIALS LABORATORY INSTRUMENT ROOM 2 58 SUNGEI KADUT LOOP PROSPAQ INDUSTRIAL BUILDING SINGAPORE 729501

PARTICULARS OF IRRADIATING APPARATUS CONTAINING RADIOACTIVE MATERIAL

ITEM 2.1

TYPE	:	NUCLEAR MOISTURE/DENSITY GAUGE
MANUFACTURER	:	TROXLER ELECTRONIC LABORATORIES INC
APPARATUS MODEL	:	3440
APPARATUS SERIAL NUMBER	:	64140 / 77-10230; 37447 / 77-4629
STORAGE LOCATION	:	ADMATERIALS TECHNOLOGIES PTE LTD 58 SUNGEI KADUT LOOP PROSPAQ INDUSTRIAL BUILDING SINGAPORE 729501

DETAILS OF SOURCE

RADIONUCLIDE	:	Cs-137
FORM / NATURE OF SUBSTANCE	:	SEALED SOURCE (SOLID)
TOTAL MAX ACTIVITY	:	8 mCi
SOURCE QUANTITY	:	2

ITEM 2.2

TYPE	:	NUCLEAR MOISTURE/DENSITY GAUGE
MANUFACTURER	:	TROXLER ELECTRONIC LABORATORIES INC
APPARATUS MODEL	:	3440
APPARATUS SERIAL NUMBER	:	64140 / 78-6558; 37447 /78-2274
STORAGE LOCATION	:	ADMATERIALS TECHNOLOGIES PTE LTD 58 SUNGEI KADUT LOOP PROSPAQ INDUSTRIAL BUILDING SINGAPORE 729501

DETAILS OF SOURCE

RADIONUCLIDE	:	Am-241/Be-9
FORM / NATURE OF SUBSTANCE	:	SEALED SOURCE (SOLID)
TOTAL MAX ACTIVITY	:	40 mCi
SOURCE QUANTITY	:	2

PARTICULARS OF RADIOACTIVE MATERIAL

ITEM 3.1

TYPE	:	SEALED SOURCE
RADIONUCLIDE	:	Am-241/Be-9
TOTAL MAX ACTIVITY	:	40 mCi
MANUFACTURER	:	TROXLER ELECTRONIC LABORATORIES INC
SOURCE MODEL	:	TROXLER 3450
SOURCE QUANTITY	:	1
SOURCE SERIAL NUMBER	:	72835/78-11225
STORAGE LOCATION	:	ADMATERIALS TECHNOLOGIES PTE LTD 58 SUNGEI KADUT LOOP PROSPAQ INDUSTRIAL BUILDING SINGAPORE 729501

ITEM 3.2

TYPE	:	SEALED SOURCE
RADIONUCLIDE	:	Cs-137
TOTAL MAX ACTIVITY	:	8 mCi
MANUFACTURER	:	TROXLER ELECTRONIC LABORATORIES INC
SOURCE MODEL	:	TROXLER 3450
SOURCE QUANTITY	:	1
SOURCE SERIAL NUMBER	:	72835/77-15909
STORAGE LOCATION	:	ADMATERIALS TECHNOLOGIES PTE LTD 58 SUNGEI KADUT LOOP PROSPAQ INDUSTRIAL BUILDING SINGAPORE 729501

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ANNEX B

PARTICULARS OF QUALIFIED PERSON(S)

S/N	NAME OF QUALIFIED PERSON(S)	DESIGNATION
1	CHUO CHUNG HAI	MANAGER
2	MAY SOE MOE	Assistant Manager

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ANNEX C

LICENCE CONDITION(S)

1. For cancellation of this licence, documentary proof of the whereabouts of the apparatus or materials is required to be submitted.
2. Items authorised for storage only or exhibition only must not be energised or used.
3. In the event of any occurrence of a radiation accident or loss of radioactive material, licensee must make a preliminary oral report to the National Environment Agency via the Radiation Protection and Nuclear Science Group's emergency number at 9163 8842 within the timeframe required under the Radiation Protection (Ionising Radiation) Regulations.
4. The disposal of unwanted, defective or decayed radioactive sources is the responsibility of the licensee who must follow an approved method of disposal. Return to the manufacturer is considered an approved method of disposal.
5. Licensee must notify in writing of any intentions to modify or remove any security measures put in place to secure radioactive materials, and obtain written approval from the Radiation Protection and Nuclear Science Group before implementing any changes.
6. Licensee must ensure that authorised irradiating apparatus and radioactive materials are not used for irradiation of human beings or administered to human beings unless authorised to be used for medical, dental or research (involving human subjects) purposes.
7. Licensee must ensure that any individual handling any radioactive material authorised under the licence or operating any irradiating apparatus must be suitably trained to do so.
8. Radioactive materials must be stored or kept in such a manner as —
   (a) not to create outside the defined area where the radioactive materials are stored or kept at any location accessible to any individual other than a radiation worker a radiation level exceeding 0.5 µSv per hour; and
   (b) not to suffer any individual other than a radiation worker to receive a radiation dose in excess of 20 µSv in a period of any 7 consecutive days.
9. The vault or room wherein any radioactive material is stored, kept, used or handled and from which any radionuclide in gaseous, vapour or aerosol form is or may be emitted must be suitably ventilated in such a manner that the radionuclide does not constitute a radiation hazard.
10. When radioactive materials are stored temporarily, or when not being used are kept, in a workroom, laboratory or any other place where any individual is regularly or frequently present, these radioactive materials must be enclosed in adequate containers or otherwise shielded so that —
    (a) the average radiation level at 5 cm from the surface of each container or shield does not exceed 40 µSv per hour and the maximum radiation level does not exceed 200 µSv per hour; and
    (b) the average radiation level at one metre from the centre of each source does not exceed 4 µSv per hour and the maximum radiation level does not exceed 20 µSv per hour.
11. Where practicable, a walled enclosure or a cabinet must be set apart for the purpose of industrial radiography and the use of ionising radiations in the irradiation of materials for the purpose of inducing chemical, physical or biological changes, including the irradiation of materials for the purpose of sterilisation, disinfection or disinfestation or for the purpose of preserving food. Where a walled enclosure or cabinet is used, the following requirements must be met:
    (a) The walled enclosure or cabinet must be constructed such that no individual other than a radiation worker present in the area adjacent to the walled enclosure or cabinet receives a radiation dose in excess of 1.5 µSv in any one hour or 20 µSv in a period of any 7 consecutive days.

(b) The radiation level anywhere outside the walled enclosure or cabinet without restricted access while any irradiating apparatus is energised or any sealed source is exposed in the walled enclosure or cabinet must not exceed 10 µSv per hour.
(c) Effective devices must be provided and maintained to ensure that if any part of the walled enclosure or of the cabinet is opened, no irradiating apparatus therein can be energised and that if any part of the walled enclosure or of the cabinet is opened while any irradiating apparatus therein is energised the irradiating apparatus is automatically de-energised.
(d) In the case where no individual is authorised to have access to the walled enclosure or cabinet while a sealed source contained within is exposed and the exposure of the sealed source is electrically or pneumatically controlled, effective devices must be provided and maintained to ensure that no part of the enclosure or of the cabinet can be opened while the sealed source is exposed and that the sealed source cannot be exposed while any such door or part is open.
(e) Where the exposure of a sealed source used in the walled enclosure or cabinet is controlled manually, any door or part of the walled enclosure or of the cabinet that can be opened must be locked when left unattended.
(f) A radiation monitor must be readily available so that any individual entering the walled enclosure or cabinet can check the radiation dose rate if he or she is in any doubt whether the source is in the shielded position.
(g) The control panel for any irradiating apparatus within a walled enclosure or cabinet which is intended to produce ionising radiations must be situated outside the walled enclosure or cabinet.

12. Where it is necessary for industrial radiography and the use of ionising radiations in the irradiation of materials for the purpose of inducing chemical, physical or biological changes, including the irradiation of materials for the purpose of sterilisation, disinfection or disinfestation or for the purpose of preserving food to be carried out in a field site, a boundary of the field site must be set up and clearly defined by some appropriate means, such as ropes, rails, fences, walls of a building or notices, such that the radiation level outside the boundary does not exceed 25 µSv per hour. Additionally, the following requirements must be met:
(a) A boundary of the field site need not afford any control over access to the site, but such control must be effected by continuous and competent supervision of the site whenever a sealed source is exposed or an irradiating apparatus is energised within the site.
(b) The boundary of the field site must be adequately posted with clearly legible warning notices incorporating the words "DANGER—RADIATION" and the standard radiation hazard symbol specified in the Fourth Schedule of the Radiation Protection (Ionising Radiation) Regulations.
(c) Every sealed source and irradiating apparatus at a field site must be locked in the OFF condition whenever it is not in use and all necessary precautions must be taken to ensure that no unauthorised removal of a sealed source can occur.
(d) A radiation area monitor must be readily available and used at field sites to check that a source has returned to the OFF condition immediately on completion of each exposure and to check that any radiation level boundary requirements are met.
(e) Adequate warning to every individual in the vicinity and any individual who may be inside the walled enclosure, cabinet or boundary of a field site must be given by appropriate light or audible signals or both when (i) a sealed source is about to be exposed or when an irradiating apparatus is about to be energised; and (ii) while a sealed source is exposed or an irradiating apparatus is energised; and the signals given for the purposes of (i) must be distinguishable from those given for the purposes of (ii).

13. Where an irradiating apparatus is used for medical, dental, veterinary or other human imaging purposes, the radiation level in any area accessible to any individual outside the controlled area must not exceed 10 µSv per hour while the irradiating apparatus is being operated at its maximum rated current for the maximum rated voltage and at its normal operation positions.

14. Where sealed sources are used in thickness gauges, density gauges, package monitors, level gauges, static eliminators, analysers or other analytical, inspection or gauging equipment, the following requirements must be met:
(a) The sealed source must be provided with an adequate and efficient cover plate, shutter or shield which (i) must be capable of being easily, securely and quickly placed or moved so as to attenuate the useful beam as far as is reasonably practicable, and (ii) must be used whenever practicable to attenuate the useful beam and

whenever reasonably practicable must be arranged to operate automatically, and a means must be provided to indicate clearly whether or not the said cover plate, shutter or shield is in the closed position.

(b) The housing of each sealed source must be legibly engraved, stamped or otherwise permanently marked to give a warning that it contains radioactive material.

(c) Adequate shielding must be provided for the sealed source or other measures taken to ensure that:

i. the radiation level outside the defined area where the radioactive materials are stored or kept at any location accessible to any individual other than a radiation worker does not exceed 0.5 µSv per hour, and

ii. no individual other than a radiation worker may receive a radiation dose in excess of 20 µSv in a period of any 7 consecutive days.

15. Where apparatus designed to produce ionising radiations are used in thickness gauges, density gauges, package monitors, level gauges, analysers or other analytical, inspection or gauging equipment, the following requirements must be met:

(a) Adequate warning to every individual in the vicinity must be given by appropriate light or audible signals or by both, arranged to operate automatically (i) when a machine or apparatus is about to be energised; (ii) while a machine or apparatus is energised; (iii) when any shutter used for the purpose of attenuating the useful beam is about to be opened; and (iv) while any shutter used for the purpose of attenuating the useful beam is open, and the signals given for the purposes of (i) to (iv) must be distinguishable from each other.

(b) Effective arrangements must be provided, maintained and used to prevent insertion of any part of the body into a useful beam.

16. For use of X-ray analytical apparatus, the following requirements must be met:

(a) Effective arrangements must be provided, maintained and used to prevent insertion of any part of the body into a useful beam.

(b) Where an X-ray diffraction camera or slit collimating system is in use, the useful beam passing between the X-ray tube aperture and the camera or collimating system must be completely enclosed so as to provide adequate shielding.

(c) Adequate warning to every individual in the vicinity must be given by appropriate light or audible signals or both while the apparatus is energised, and the warning signals must be arranged to operate automatically.