



Certificate

for Radiation Device

Certificate Number R-061-3025-4-2037	Date of Issue November 25, 2021	Date of Expiry January 31, 2037
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The radiation device identified below is certified by the Canadian Nuclear Safety Commission pursuant to paragraph 21(1)(h) of the *Nuclear Safety and Control Act* and section 12 of the *Nuclear Substances and Radiation Devices Regulations*.

Manufacturer: QSA Global, Inc.

Make and Model: AEA Technology/QSA Global 959M

Prev. Mfr. Name: AEA Technology

Device Type: EXPOSURE DEVICE, PNEUMATIC

Description: The model 959M is a steel encased, depleted uranium shielded portable pneumatic radiographic exposure device conforming to ISO 3999:2004(E) Category X. The air operated actuator piston rod moves the source from the shielded position to a collimated exposure position within the device. In the event of loss of air pressure, the source is returned to the shielded position by a spring. The dimensions of the device are approximately 11.4 cm in diameter by 29.2 cm long and the mass is approximately 18.6 kg. The device is transported in a Type A carrying case containing foam cushioning. The associated equipment is carried in a separate case.

Refer to Summary Evaluation for additional information (CNSC Document Number 6676140). Reference CNSC Application Number 61769.

The radiation device may contain any of the following nuclear substances in a quantity not exceeding the corresponding quantity indicated:

Nuclear Substance	Maximum Quantity
Depleted Uranium (used as shielding)	11 kg
Iridium 192	555 GBq
Selenium 75	3 TBq

Designated Officer pursuant to paragraph 37(2)(a) of the *Nuclear Safety and Control Act*





Summary Evaluation

For certificate number R-061-3025-4-2037

1. Identification of Radiation Device

Manufacturer: QSA Global, Inc.
Prev. Manufacturer: AEA Technology
Model(s): Model 959M
Type: Exposure Device, Pneumatic

2. Description

The model 959M is a steel encased, depleted uranium shielded portable pneumatic radiographic exposure device conforming to ISO 3999:2004(E) Category X where the source does not move outside the device during use. The device does not have a visual source position indicator to verify the source has returned to the fully shielded position. Instead, direct radiation survey measurement is required for determining whether the source is in the secured or unsecured position within the device. The source is exposed pneumatically by the control unit which is designed to pressurize the actuating mechanism of the device through the use of a hand pump or an auxiliary air supply. The control unit hose allows the operator to stand at least 3 m to 4.5 m away from the device during source exposure and retraction. In the event of loss of air pressure, the source is returned to the shielded position by a spring.

The dimensions of the radiation device are approximately 11.4 cm in diameter by 29.2 cm long and the mass is approximately 18.6 kg. The device is transported in a Type A carrying case containing foam cushioning. The associated equipment is carried in a separate case.

An illustration of the newer version of exposure device is shown in item 14, figure 1 and the photograph of the older version is shown in figure 2 below.

3. Intended Use

The portable 959M exposure device is designed to perform small controlled area radiography involving difficult joint geometries but can also be used in fixed installations.

4. Authorized Nuclear Substances

The radiation device is authorized to contain the following sealed source models with the maximum activity as shown in the table below.

Nuclear Substance	Radiation Device Maximum Activity	Source Model	Source Manufacturer	Special Form Radioactive Material Certificate
Ir-192	555 GBq	875 Series inner	QSA Global Inc.	USA/0392/S-96
Se-75	3 TBq	X540/1	QSA Global Inc.	USA/0502/S-96
Depleted Uranium	11 kg	N/A	N/A	N/A

5. Maximum Expected Radiation Dose

Se-75 Activity (GBq)	Orientation	Dose rate ($\mu\text{Sv/h}$)					
		@ Surface (5.5 cm from source to device surface)		@ 30 cm		@ 100 cm	
		Close	Open	Close	Open	Close	Open
2997	Top	60	20.0	4.0	1.0	<2	1.0
2997	Right	690	620.0	10.0	10.0	2.0	1.0
2997	Front	690	98 Sv	10.0	1.37 Sv	2.0	146.2 mSv
2997	Left	690	500.0	10.0	9.0	2.0	1.0
2997	Rear	690	500.0	10.0	9.0	2.0	3.0
2997	Bottom	60	5 Sv	3.0	114.0	0.0	11.0

Ir-192 Activity (GBq)	Orientation	Dose rate ($\mu\text{Sv/h}$)					
		@ Surface (5.5 cm from source to device surface)		@ 30 cm		@ 100 cm	
		Close	Open	Close	Open	Close	Open
555	Top	310.0	25.0	20.0	17.0	3.0	13.0
555	Right	1580.0	1810.0	26.0	0.0	4.0	0.0
555	Front	1580.0	41.7 Sv	26.0	58.0 mSv	4.0	61.96 mSv
555	Left	1580.0	1810.0	26.0	0.0	4.0	0.0
555	Rear	1580.0	1810.0	26.0	1.0	4.0	1.0
555	Bottom	240.0	4780.0	6.0	5.0	2.0	5.0

6. Conditions of Use and Storage

The radiation device is designed to operate or be stored in the temperature range of $-40\text{ }^{\circ}\text{C}$ to $149\text{ }^{\circ}\text{C}$. The humidity is not expected to affect the radiation device. This device is not designed for use under water.

7. Leak Tests

Periodic leak testing is to be conducted in accordance with section 3.6 of the QSA Global document MAN-033, "Operation and Maintenance Manual" and in accordance with section 18 of the CNSC *Nuclear Substances and Radiation Devices Regulations*.

8. Emergency and Accident Response

Emergency and accident response are to be dealt with in accordance with section 2.9 and section 6.1 of the QSA Global document MAN-033, "Operation and Maintenance Manual" and in accordance with the CNSC *Nuclear Substances and Radiation Devices Regulations*.

9. Quality Assurance

The design, testing and manufacture of the radiation device is made in accordance with the QSA Global Quality Assurance program that meets the requirements of ISO 9001:2015.

10. Inspection, Maintenance and Servicing

The radiation device is to be inspected and maintained in accordance section 3.0 of the QSA Global document MAN-033, "Operation and Maintenance Manual" and in accordance with the *Nuclear Substances and Radiation Devices Regulations*.

11. Packaging and Transport

The radiation device when transported in the Model 959A transport package meets the requirements of a Type A transportation package in accordance with the *Packaging and Transport of Nuclear Substances Regulations, 2015*. Transport of the source housing is to be in accordance with section 4.0 of the QSA Global

document MAN-033, "Operation and Maintenance Manual" and in accordance with the CNSC *Packaging and Transport of Nuclear Substances Regulations 2015*.

12. Authorized Configurations and Accessories

The following accessories are authorized for use with this radiation device:

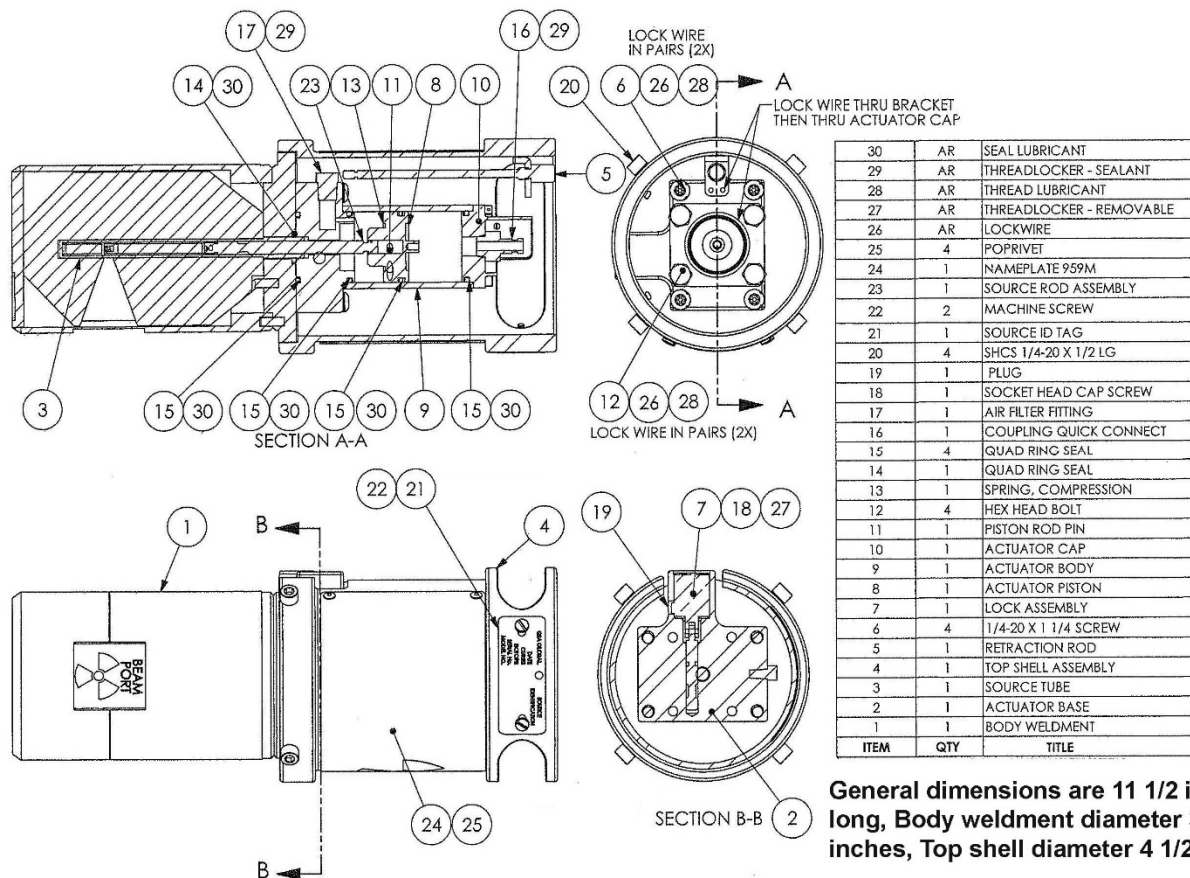
- Pipe fixture kit, model number 95999
- Pressure Control Unit, model number 86550
- Pressure Control Unit, model number JB193-000

13. Reference Documents

No.	Description	Date yyyy-mm-dd	CNSC Reference No.
1	Application for the Model 959 Exposure Device	2021-02-17	6497921
2	QSA Global document MAN-033, "SENTINEL 959M SCAR: Operation & Maintenance Manual"	April 2020	6620673

14. Illustration of the Radiation Device

Model 959M Scar Projector



*Older versions of the 959M may incorporate a welded Top Shell Assembly and the Top Shell Assembly may include mounting plates on the Top Shell Body

Figure 1: Newer version of Model 959M Exposure Device



Figure 2: Older version of Model 959M Exposure Device