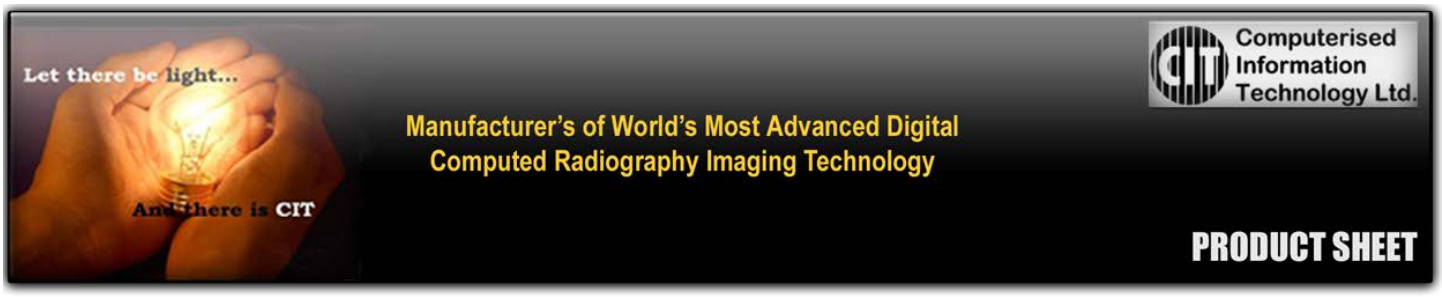
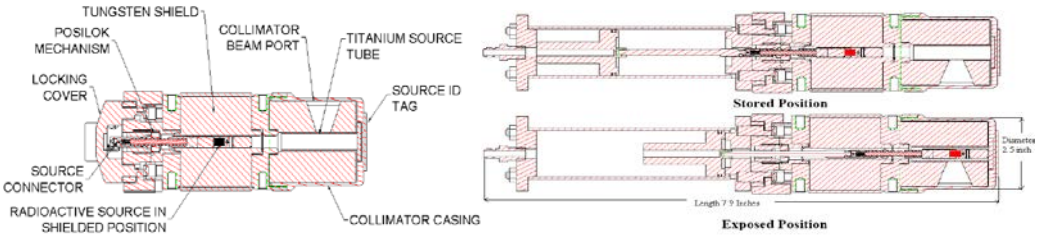


CIT/Se75–989 Radiation Isotope Device for Industrial Radiography

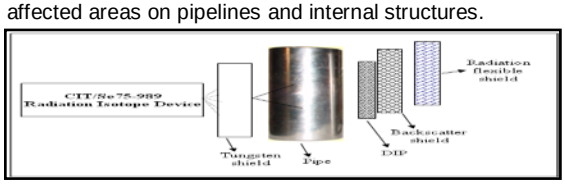
The emerging trend in industrial gamma NDT digital computed radiography is to use Se75 radiation source with a small focal spot of 1mm × 1mm to inspect small diameter pipe from 1" to 48" pipe welds within a 5 meter radiation controlled zone area or less with additional shielding. It replaces conventional gamma radiography with matched radiograph image quality and minimal exposure time. The radiation emerges in a cone, directing towards the region of interest reducing the background scatter. Radiation isotope container does not have a pigtail and radiation source never leaves the device (diagram below depicts the position). This also eliminates the beam collimator requirement. The in-built tungsten collimator beam port helps to align beam more in a specific direction.

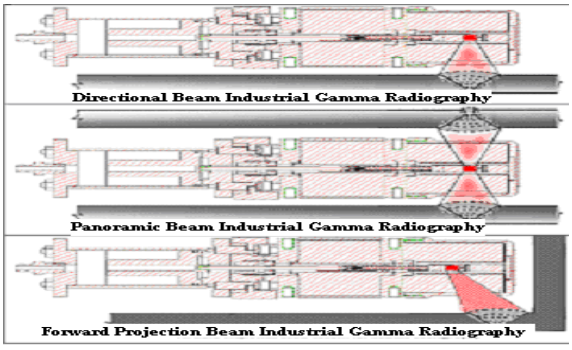


The CIT/Se75-989 radiation isotope device with controller unit helps the operators in automating various radiographic exposure operations. This includes automation of exposure time, radiation monitoring, air pneumatically operated radiation device, health and safety policies using safety warning alarm systems. The product is being designed to include greater fail safe features and enhance safety of operators.

The CIT/Se75-989 exposure device contained within the supplied transport case is designed and tested to comply with the requirements of Type A packaging in accordance with International Atomic Energy Agency Safety Standard Series No. TS-R- 1 and the applicable USA regulations contained in the USNRC 10 CFR71 and USDOT 49 CFR 173.

The device was designed using the applicable specifications of ISO 3999:2004(E) for a category X device. The device may be used to perform directional beam gamma radiography of welds and the adjacent heat affected areas on pipelines and internal structures.





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Radiation Isotope Container

Features

- Exposure time from 2 seconds onwards
- Class A Tungsten container that houses Se75 (Maximum capacity 20 Curies)
- Source
  - ✓ 1.0 mm × 1.0 mm → 5 Curies
  - ✓ 1.5 mm × 1.5 mm → 12 Curies
  - ✓ 2.0 mm × 1.0 mm → 20 Curies
- Half Life (128 days × 4 = 512 days)
- The device can be operated with:
  - ✓ Manual wind out controls.
  - ✓ Air pneumatic controls with automatic timers
  - ✓ Computer controlled for remote device operation

Benefits

- Utilising Digital CR benefits
- Reduced exposure time
- In-built health and safety measures
- Interfacable to computer link controlled
- Simplified operations

Technical Specifications

1. Products Inspected

- Materials inspected
  - Aluminium 200mm
  - Steel (70mm equivalent)
  - Ferrous/Non ferrous
- Product type
  - Pipes weld
  - Castings
  - Assembled items
  - With/without cladding

2. Meets the following standards

- System meets ISO 3999 for category X device
- International Atomic Energy Agency requirements No. TS-R-1 (1996), 'Regulations for the Safe Transport of Radioactive Materials'.(Owned by QSA global)
- International Air Transport Association, 'Dangerous Goods Regulations'.
- International Civil Aviation Organization, 'Technical Instructions for the Safe Transport of Dangerous Goods by Air'.
- International Maritime Organization, 'International Maritime Dangerous Goods Code'.
- U.S. Department of Transportation, Title 49 Code of Federal Regulations Parts 171 through 178.
- U.S. Nuclear Regulatory Commission, Title 10 Code of Federal Regulations Parts 20, 34 & 71.
- Canadian Nuclear Safety Commission, Nuclear Safety and Control Act, 'Packaging and Transport of Nuclear Substances Regulations'; 'Nuclear Substances and Radiation Devices Regulations'.
- Transport Canada, 'Transport of Dangerous Goods Regulations'.
- Transport in the Great Britain is governed by the Radioactive Material (Road Transport) Great Britain) Regulations.

3. Radiation Isotope Device

CIT/Se75-989 radiographic exposure device is designed for directional beam and panoramic beam industrial gamma radiography.

Length	7.5 inches (19.5cm) without storage cover and shipping container
Diameter	2.54 inches (6.5cm) without storage cover and shipping container
Mass	16 pounds (7.3 kg) maximum
Shielding	5.7 pounds (2.6 kg) of tungsten plus 3.8 to 5.4 pounds (1.7 to 2.5 kg) of lead or tungsten for the collimator

4. Exposure Device Authorised Contents

Isotope name	Selenium-75
Assembly Model Number	97941
Gamma Energy Range	66-401 keV
Approximate Half Life	120 days
Device/Source Steel Working Thickness	3-29 mm
Maximum Capacity	20 Ci. 740 GBq
Source Output	2.03 mSv/hr (0.203 R/hr) at 1 m per 37 GBq (1 Ci)

5. Radiation Isotope Device Controller Unit

On/Off Switch	Applies or removes the air supply to the control panel
Isotope Control Valve	Electrically operated valve with a spring-loaded return
Emergency Stop Button	Software controlled button that removes the air from the output of the control panel when actuated
Air Pressure	If the air pressure fails, an internal return spring pushes the isotope back into the container
Watchdog Timer Circuit	Indicates the loss of communication with the control system by resetting the control system and turning off the isotope container valve

6. Winding Apparatus

The device can be operated with:

- Manual wind out controls.
- Air pneumatic controls with automatic timers
- Computer controlled for remote device operation

Manual Control

Air Pneumatic Control

Computer Control

Air Pump

7. Source Termination

To terminate a radiographic exposure using the pneumatic actuator, the air supply is turned off and the pneumatic lines and actuator are exhausted. The return spring forces the sealed source assembly back into the fully shielded position regardless of the exposure device orientation. Conversely, if the air supply is interrupted during a radiographic exposure, the sealed source assembly is automatically forced back into a shielded position.

8. Collimator Beam Port

Lead or tungsten collimator beam port with aperture of 10°, 20°, 45° and forward projection angles for directional beam and panoramic beam gamma radiography are available on request.

For ordering/query, please contact CIT UK at info@cituk.com

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