

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SEALED SOURCE

NO.: MA-1059-S-867-S
(Supercedes NR-0628-S-109-S)

DATE: February 25, 2002

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SEALED SOURCE TYPE: Radiography Source Assembly

MODEL: 90003 Source Assembly

DISTRIBUTOR/MANUFACTURER: AEA Technology QSA Incorporated
40 North Avenue
Burlington, MA 01803

Formerly

Amersham Corporation (formerly Tech/Ops)
Radiation Products Division
40 North Avenue
Burlington, MA 01803

ISOTOPE:

MAXIMUM ACTIVITY

Iridium-192

240 Curies (8.88 TBq)

LEAK TEST FREQUENCY: 6 months

PRINCIPAL USE: (A) Industrial Radiography

CUSTOM SOURCE:

YES ____ NO X

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DESCRIPTION: This source assembly is no longer manufactured. The following description was active at the time of manufacture.

The radioactive Iridium-192 is contained in Amersham Model 90004 or 90005 source capsule. This source capsule is fabricated from either Type 304 or Type 304L stainless steel. The source capsule is seal welded by Amersham in accordance with Amersham standard source encapsulation procedure.

The source capsule is installed in the source capsule holder which is fabricated from either Type 303 or Type 304 stainless steel. The capsule holder is threaded together and pinned at assembly using a 3/32 inch (2.38 mm) diameter roll pin.

Attached to the front of the source capsule holder are two source shields fabricated from tungsten. Attached to the rear of the source capsule holder are three source shields fabricated from tungsten and the female source connector. These source shields and connector are joined by means of couplings fabricated from either Type 303 or Type 304 stainless steel and 3/32 inch (2.38 mm) diameter roll pins. This makes up the Model 90003 source assembly. See Attachment 1 for sealed source dimensions.

This source assembly meets 10 CFR Part 34 equipment requirements.

LABELING:

Each source assembly is engraved with a unique serial number, the isotope and manufacturer's logo. A source identification label is provided with each source assembly for attachment to the device.

The female connector of the source assembly, in accordance with 10 CFR 34.20(C)(4), is labeled with "DANGER-RADIOACTIVE".

DIAGRAM: See Attachment 1.

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CONDITIONS OF NORMAL USE:

This component will typically be used in environments associated with industrial radiography. These environs subject the component to extremely harsh environmental use conditions and accidental condition.

PROTOTYPE TESTING:

Prototypes of Model 90003 source assembly were tested by Amersham and classified as ANSI 77C43515. In addition, the source capsules passed special form tests as described in 10 CFR 71 and IAEA Safety Series No. 6, 1973.

EXTERNAL RADIATION LEVELS:

Amersham specifies that the source emits 0.48 R/hr/curie (1.3 mSv/hr/GBq) at 1 meter. Thus, the maximum calculated radiation levels for a 240 curie (8.88 TBq) source are:

Distance		Maximum Radiation Level	
(cm)	(inches)	(R/hr)	(Sv/hr)
5	1.97	46,080	460.08
30	11.81	1,280	12.80
100	39.37	115	1.15

QUALITY ASSURANCE AND CONTROL:

The source assembly is no longer manufactured.

The manufacturer stated that all source capsule and source assembly components were inspected on a 100 percent basis for conformance to design specifications in accordance with Amersham's NRC-approved Part 71 Quality Control Program. Failure of any of these tests or inspections would prevent distribution of the source assembly. A copy of Amersham's quality assurance and control program was on file with the Source Containment and Devices Branch.

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SEALED SOURCE TYPE: Radiography Source Assembly

LIMITATIONS AND/OR CONSIDERATION OF USE: The source assembly is no longer manufactured.

- The source assembly shall be distributed only to persons specifically licensed by the NRC or an Agreement State.
- This source should not be subjected to environmental or other factors which exceed the ANSI Classification 77C43515.
- The source assembly shall be leak tested at six month intervals using techniques capable of detecting 0.005 microcuries (185 Bq) of removable contamination.
- Leak tests using Vacuum Bubble Tests techniques shall not employ the use of water unless the inner capsule void space is greater than 30 mm³.
- Handling, storage, use, transfer, and disposal are to be determined by the licensing authority. In view of these sealed sources exhibit high surface dose rates when unshielded, these sealed sources should be handled only by experienced licensed personnel using adequate remote handling equipment and procedures.
- The Model 90003 source assembly can be used in conjunction with Model 900, and 920 exposure devices, and Model 850 source changer.
- This source assembly shall only be used in the devices listed above and/or devices or other uses in a registration certificate issued by the NRC or Agreement State.
- This registration certificate and the information contained within the references shall not be changed or transferred without the written consent of the Commonwealth of Massachusetts, Radiation Control Program.

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SAFETY ANALYSIS SUMMARY: The source assembly is no longer manufactured.

In 1994, based on review of the information contained in the references below, the NRC concluded that the Amersham Model 90003 source assembly is acceptable for specific licensing purposes. This source assembly is designed for use in either Amersham Model 900 or 920 radiography device and is intended for use only by qualified radiographers who are licensed by NRC or Agreement States. Prototype test data provided by Amersham confirmed that Model 90003 source assembly meets ANSI Classification 77C43515 requirements and that it also meets 10 CFR 71 requirements for special form classification. These tests confirm that when used in either the Model 900 or 920 radiography exposure device in accordance with Amersham's instructions they will properly contain the Iridium-192 under conditions of use and accidental conditions which might occur during uses specified in this certificate.

REFERENCES:

The following supporting documents for the Model 90003 source assembly are hereby incorporated by reference and are made part of this registry document.

- Tech/Ops letters dated August 11, 1980, October 28, 1980, February 1980, and March 6, 1980, with enclosures thereto.
- Amersham Corporation letters dated June 11, 1993, August 5, 1991, and letter received January 4, 1989, with enclosures thereto.
- AEA Technology letter dated April 13, 2000, with enclosures thereto.

ISSUING AGENCY:

Massachusetts Department of Public Health, Radiation Control Program

Date 2/25/02

Reviewer 
Tony Carpenito

Date 3/6/02

Concurrence 
Kenath Traegde

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Attachment 1 of 1

SEALED SOURCE TYPE: Radiography Source Assembly

Model 90003

