

Amersham Corporation

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Burlington, Massachusetts 01803
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19 October 1990

Mr. Charles E. MacDonald, Chief
Transportation Branch
Division of Safeguards and
Transportation, NMSS
U.S. Nuclear Regulatory Commission
OWFN, 4E4
Washington, D.C. 20555

Dear Mr. MacDonald:

We request renewal of USNRC Certificate of Compliance Number USA/9007/B(U), which has an expiration date of 30 December 1990.

I have enclosed a revised Section 7 on operating procedures and a revised Section 8 on maintenance, which updates earlier information submitted in our consolidated application dated 16 September 1985.

I have updated the special form certificate information in Section 2, as some of the source assemblies listed in the consolidated application are obsolete and no longer manufactured. Section 7 lists the currently manufactured sources models.

As we are not currently manufacturing these devices, all other manufacturing and fabrication information remains as described in the consolidated application dated 16 September 1985.

I have enclosed the application fee of \$150.00 to cover this renewal request. If I can provide any additional information, please contact me.

Sincerely,

Cathleen M. Roughan
Cathleen M. Roughan
Radiation Safety Officer

CMR/bt

Enclosures

9010230302 901019
PDR ADOCK 07109007
C PDC

Amersham

Rec'd 10/23/90
w/ck. # 005443
\$150.00

NT01

2.8 Special Form

The Model AI 520 is designed to transport source capsules. These source capsules have been certified as special form radioactive material under IAEA Certificate of Competent Authority Number USA/0335/S. This certificate is presented in Section 2.10.

2.9 Fuel Rods

Not applicable.

2.10

Appendix

IAEA Certificate of Competent Authority USA/0335/S

Test Report: Model AI 520 Hold-down Arrangement

Report: Analysis of Model AI 520 Tie-down Arrangement

Letter to Mr. R. Rawl, U.S. Department of Transportation from Mr. M. P. Santoro, Automation Industries, Dated 4 December 1981, describing the results of the Model 520 Penetration Reduced Pressure and Compression Tests.

Automation Industries Test Report by Mr. M. P. Santoro, dated 24 July 1973, describing the results of the Model 520 Free Drop, Puncture and Thermal Tests.



US Department
of Transportation

Research and
Special Programs
Administration

401 Seventh Street, S.W.
Washington, D.C. 20590

**IAEA CERTIFICATE OF COMPETENT AUTHORITY
SPECIAL FORM RADIOACTIVE MATERIALS
CERTIFICATE NUMBER USA/0335/S, REVISION 2**

This certifies that the source described has been demonstrated to meet the regulatory requirements for special form radioactive material as prescribed in IAEA Regulations¹ and USA regulations² for the transport of radioactive materials.

1. Source Description - The sources described by this certificate are identified as the Amersham Model 875 Series source capsule assemblies, which are single-welded encapsulations constructed of Type 304 or 304L stainless steel. They measure either 21.5 mm (0.85") or 24 mm (0.95") in length and 6.4 mm (0.25") in diameter. Contents may be further contained in stainless steel or titanium inner secondary encapsulations with springs and spacers. The flex cables for these sources are either 3.8 mm (0.150") or 4.75 mm (0.187") in diameter. A drawing of Model 87510 is attached.
2. Radioactive Contents - This source consists of not more than 8.88 TBq (240 Ci) Iridium 192 as solid metal, 8.14 TBq (220 Ci) Cobalt 60 as solid metal, 7.4 TBq (200 Ci) Ytterbium 169 as Yb₂O₃, 1.11 TBq (30 Ci) Cesium 137 as CsCl₂ in a secondary stainless steel encapsulation, or 1.85 TBq (50 Ci) Thulium 170 as Tm₂O₃.
3. Expiration Date - This certificate expires December 31, 1994.

This certificate is issued in accordance with paragraph 803 of the IAEA Regulations and Section 173.476 of Title 49 of the Code of Federal Regulations, in response to the November 22, 1989 petition by Amersham Corporation, Burlington, MA, and in consideration of the associated information therein and on file in this Office.

Certified by:

for
Michael E. Wangler
Chief, Radioactive Materials Branch
Office of Hazardous Materials Transportation

DEC 29 1989

(DATE)

Revision 2 - Issued to accommodate minor change in capsule design and to extend the expiration date.

1 "Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, 1973 Revised Edition" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

2 Title 49, Code of Federal Regulations, Parts 100 - 199, USA.

SECTION 7: AI520 OPERATING PROCEDURES

NOTE: All the precautions used when making a radiographic exposure must be observed when loading or when unloading the package.

1. A calibrated and operable survey meter must be used at all times when loading or unloading this package.
2. Personnel dosimetry must be worn when loading or unloading the package.
3. For details on the operation and source changing procedures please refer to the instruction manual for the device which can be obtained from Amersham Corporation.

TECHNICAL SPECIFICATIONS

MODEL AI520 EXPOSURE DEVICE

USNRC Type B Certificate	=	USA/9007/B(U)
Isotope	=	Ir-192
Capacity	=	100 Curies (+20%)
Authorized source assembly	=	866, B-8-A, B-8-T
Gross Weight	=	40 lbs (18kg)
Shielding	=	Depleted Uranium 27 lbs (12.3 kg)

7.1

Procedure For Loading the Package

1. Assure that the package is not damaged except for superficial marks or dents.
2. Assure the source is authorized for use in this container and is secured in the locked position.
3. To properly secure the source, the lock should be depressed and the key removed.
4. Install the brass shipping plug over the source assembly and assure it is attached securely.
5. Install the shipping plug into the front port of the camera securely and apply a security seal with an identification mark through the shipping plug and the handle of the camera.
6. Assure all nameplates are clear and legible and contain the following information:
 - a. The words "Danger Radioactive Material" and the trefoil symbol.
 - b. The proper shipping name (ie. Radioactive Material Special Form, N.O.S., UN2974)
 - c. Package identification (ie. USA/9007/B(U), Type B(U))
 - d. The radioactive contents.
7. If the AI520 is to be packaged inside a crate or other outer packaging, the outer packaging must be strong enough to withstand the normal conditions of transport and must not reduce the safety of the package. The AI520 must be placed within the outer package with sufficient blocking to prevent shifting during transportation.

NOTE: When using a crate or other outer packaging to ship the AI520, steps 8-14 refer to the crate or outer packaging.

8. Survey the exterior surfaces of the package and assure that the maximum radiation level does not exceed 200 mrem/hr. Survey one meter from the exterior surfaces of the package and assure that the maximum radiation level does not exceed 10 mrem/hr. Determine the proper shipping labels to be applied to the package using the criteria of table 1.
9. Properly complete two shipping labels indicating the contents (iridium-192), the activity of the source in curies or millicuries and the transport index. The transport index is the dimensionless number (rounded up to the first decimal place) expressing the maximum radiation level (in mrem/hr) measured at one meter from the package surface.
10. Assure that any old shipping labels have been removed from the package. Apply two properly completed labels to two opposite sides of the package.
11. Mark the outside of the package with the proper shipping name and identification number (Radioactive Material, Special Form, n.o.s., UN 2974) if not already marked. Place the letters RQ next to the proper shipping name.
12. If the AI520 is inside a crate or other outer packaging, mark the outside package "INSIDE PACKAGE COMPLIES WITH PRESCRIBED SPECIFICATIONS" and list the appropriate DOT specification number or USNRC Type B number and the words "TYPE B".
13. Assure that the levels of removable radioactive contamination on the outside surface of the outer package do not exceed 0.001 microcurie per 100 square centimeters.
14. Properly complete the shipping papers, indicating:
 - a. Proper shipping name and identification number (i.e. Radioactive Material, Special Form, n.o.s., UN 2974).
 - b. The letters RQ must appear next to the proper shipping name when shipping more than 10 curies of Ir-192 or Co-60.

- c. Name of the radionuclide (i.e. iridium-192).
 - d. Activity of source in curies or millicuries.
 - e. Category of label applied (i.e. Radioactive Yellow II).
 - f. Transport Index.
 - g. USNRC identification number or DOT specification number (i.e. USA/9007/B(U)).
 - h. For export shipments, the IAEA identification number (i.e. USA/9007/B(U)).
 - i. Shipper's Certification:

"This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transport according to the applicable regulations of the Department of Transportation."
 - j. The shipping papers must indicate an emergency phone number. This phone number must have 24 hour coverage in case of an emergency concerning your shipment. The phone number must be clearly visible on the shipping paper.
 - k. For packages containing depleted uranium as shielding material, a notice must be enclosed in or on the package, included with the packing list or otherwise forwarded with the package. This notice must include the name of the consignor or consignee and the statement:

"This package conforms to the conditions and limitations specified in 49 CFR173.424 for excepted radioactive material, articles manufactured from depleted uranium UN 2909."
15. Place the package onto the vehicle using the handle of the camera.
16. Properly brace and secure the package against movement in the vehicle.

17. Assure that back of the vehicle is closed and secured so that it will not open during transport.

NOTE: 1. For air shipments, the following Shipper's certification may be used:

"I hereby certify that the contents of the consignment are fully and accurately described above by proper shipping name and are classified packaged, marked and labeled and are in proper condition for carriage by air according to applicable national governmental regulations."

2. For air shipments, the package must be labeled with a "CARGO AIRCRAFT ONLY" label and the shipping papers must state: THIS SHIPMENT IS WITHIN THE LIMITATIONS PRESCRIBED FOR CARGO AIRCRAFT ONLY".
3. For international shipments the activity must be given in Gigabecquerels on the DOT label and the shipping papers (curies X 37 = Gigabecquerels).

Procedure for Unloading the Package

NOTE: a. A radioactive material package must be accepted from the carrier at the time it is delivered.

b. If a radioactive material package is to be held at the carrier's terminal for pickup, arrangements must be made to receive notification from the carrier of the arrival of the package at the time of arrival. The package must be picked up expeditiously upon receipt of notification (within three hours if practicable).

1. Upon receipt of a package of radioactive material, survey the exterior surfaces of the package and assure that the maximum radiation level does not exceed 200 mrem/hr. Survey three feet from the exterior surfaces of the packages and assure that the maximum radiation level does not exceed 10 mrem/hr. If either of these limits are exceeded, notify the Radiation Safety Officer immediately. Record the maximum radiation levels measured at the package surface and at three feet from the package surface on the Receiving Report.
2. If the package contains radioactive material which is not in special form make a contamination wipe test of the exterior surface of the package. Wipe a representative surface of the package, covering an area of approximately 100 square centimeters, using a cloth patch and moderate pressure. Measure the activity of the patch using the contamination monitor and assure that the activity does not exceed 0.01 microcurie. If this limit is exceeded, notify the Radiation Safety Officer immediately. Record the results of this contamination wipe test on the Receiving Report.

NOTE: If any of these limits are exceeded, the Radiation Safety Officer shall immediately notify the USNRC and the final delivering carrier.

3. Inspect the package for any evidence of physical damage. Record the results of this inspection on the Receiving Report. Also record on the Receiving Report the source model number, source serial number, radionuclide, activity, transport package model number and package serial number. Forward a copy of the completed Receiving Report to the Radiation Safety Officer.
4. Assure that the package is locked, or place the package into an outer locked container. Place the package into the Radioactive Material Storage Room and lock the door to the room.
5. Keep a copy of the Operations Manual for the package on file to assure you have the proper opening instructions.
6. To properly open and use the package, as a radiographic source changer refer to the detailed instruction manual for this device.

Procedure for Preparation of an Empty Package for Transport

1. For shipment of an empty Model AI520 exposure device, first assure the camera does not contain an unauthorized source or cropped source by performing a physical verification using the following procedure.
 - a. Remove the shipping plug from the front of the camera and connect up the controls.
 - b. Crank the drive cable through the S-tube of the camera while observing the survey meter at the front of the camera.

NOTE: If radiation levels increase or an obstruction is felt, immediately discontinue the test and secure the device. Contact Amersham Corporation for further instructions.

- c. The drive cable should pass through the entire length of the S-tube and emerge from the front of the camera.
 - d. At the conclusion of the test, disconnect the controls insert both shipping plugs and attach an EMPTY tag.
2. If the shipping package is to be placed inside a crate or other outer packaging, the outer packaging must be strong enough to withstand the normal conditions of transport and must not reduce the safety of the package. The shipping package must be placed within the outer package with sufficient blocking to prevent shifting during transportation.

NOTE: When using a crate or other outer packaging to ship the AI520, steps 3-4 refer to the crate or outer packaging.

3. Assure that the levels of removable radioactive contamination on the outside surface of the outer package do not exceed 0.001 microcuries per 100 square centimeters.

4. Survey the package at the surface and at one meter from the surface to determine the proper shipping labels to be applied to package.
- a. If the surface radiation level does not exceed 0.5 mrem/hr and there is no measurable radiation level at one meter from the surface, no label is required. Mark the outside of the package with the proper shipping name and identification number (Radioactive Material, Articles Manufactured from depleted Uranium, UN 2909) and the statement:

"EXEMPT FROM SPECIFICATION PACKAGING SHIPPING PAPER AND CERTIFICATION, MARKING AND LABELING AND EXEMPT FROM THE REQUIREMENTS OF 49CFR part 175 PER CFR173.421-1 AND 49 CFR173.424".

NOTE: This does not exempt the shipment from the reporting requirements listed in 49 CFR parts 171-177 pertaining to the reporting of the contamination or other radiation incidents.




Additionally, a notice must be enclosed in or on the package, included with the packing list or otherwise forwarded with the package. The notice must include the name of the consignor or consignee and the statement:

"This package conforms to the conditions and limitations specified in 49CFR173.424 for Exempted Radioactive Material, Manufactured from Depleted Uranium, UN 2909".

- b. If the surface radiation level exceeds 0.5 mrem/hr, or if there is a measurable radiation level at one meter from the surface, use the criteria of table 1 in section 7.1 to determine the proper shipping labels to be applied to the package with the proper shipping name and identification number (Radioactive Material, LSA, n.o.s., UN 2912). If the container is packaged inside a crate or other outer packaging, mark the package with the statement "INSIDE PACKAGE COMPLIES WITH PRESCRIBED SPECIFICATIONS".

Properly complete the shipping papers, as listed in section 7.1. The isotope is U-238 and approximately 5 millicuries.

TABLE 1

	Maximum Radiation Level	
	at Surface	at One Meter
Radioactive White I 	0.5 mR/hr	None
Radioactive Yellow II 	50 mR/hr	1.0 mR/hr
Radioactive Yellow III 	200 mR/hr	10 mR/hr

SECTION 8: AI520 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8.1 Acceptance Tests

8.1.1 Visual Inspection

The package is visually inspected to assure:

1. It was constructed properly in accordance with drawing number AI52090.
2. The labels are inspected to assure they contain the required information as referenced in Section 7.

3. The safety wires are installed through the shipping plug.

4. The source assembly used in this device is visually inspected to assure proper closure of the weld, to maintain primary containment. It is also inspected for proper length to assure it locks in the required storage position.

8.1.2 Structural and Pressure Tests

The swage coupling between the source capsule and cable is subjected to a static tensile test with a load of 100 pounds. Failure of this test will prevent the source assembly from being used.

8.1.3 Leak Tests

The radioactive source capsule (the primary containment) is wipe tested for leakage of radioactive contamination. The source capsule is subjected to a vacuum bubble leak test. The capsule is then subjected to a second wipe test for leakage of radioactive contamination. The contamination must be less than 0.005 microcuries. Failure of any of these tests will prevent use of this source assembly. The package is wipe tested on the exterior surface prior to its first shipment in accordance with 10CFR71.87. (If this wipe test exceeds 0.001 microcuries/100 cm² it will not be shipped.)

8.1.4 Component Tests

The lock assembly of the package is tested to assure that securiprevent use of the package until the lock assembly is corrected and retested. The brass outlet plugs are installed and checked to assure they are attached securely to the device. Failure of the test will present use of the package until the failure is corrected and retested.

8.1.5 Tests for Shielding Integrity

The radiation levels at the surface of the package and at one meter from the surface are measured using a small detector survey instrument (e.g., AN/PDR-27). These radiation levels, when extrapolated to the rated capacity of the package must not exceed 200 milliroentgens per hour at the surface nor ten milliroentgens per hour one meter from the surface of the package. Failure of this test will prevent use of the package.

8.1.6 Thermal Acceptance Tests

Not applicable.

8.2 Maintenance Program

8.2.1 Structural and Pressure Tests

Not applicable.

8.2.2 Leak Tests

As described in section 8.1.3, the radioactive source assembly is leak tested at manufacture. Additionally, the source assembly is wipe tested for leakage of radioactive contamination every six months.

8.2.3 Subsystem Maintenance

The lockbox assembly is tested as described in section 8.1.4 prior to each use of the package. Additionally, the package is inspected for tightness of fasteners, proper seal wires, and general condition before each use.

8.2.4 Valves, Rupture Discs, and Gaskets

Not applicable.

8.2.5 Shielding

Prior to each use, a radiation survey of the package is made to assure that the radiation levels do not exceed 200 milliroentgens per hour at the surface nor 10 milliroentgens per hour at one meter from the surface.

8.2.6 Thermal

Not applicable.

8.2.7 Miscellaneous

Inspections and tests designed for secondary users of this package under the general license provisions of 10 CFR 71.12(b) are included in Appendix A of section 8.

APPENDIX A

Maintenance

It is required by 10CFR 34.28 that inspection and maintenance of the Model AI 520 control unit and the exposure device be performed at intervals not to exceed three months.

A: Control Unit and Source Guide Tubes

1. Disconnect the control unit from the exposure device.
2. Inspect the entire length of each control hose to assure that each section is free from cuts and damage.
3. Inspect the end fittings to assure that they are tightly connected. Check the threads on the fittings for damage.
4. To remove the drive cable, turn the hand crank of the control unit in the expose direction. The emergent cable should be cranked into a bucket or other container to keep it clean.
5. If the crank will no longer turn a stop spring has been put on the drive cable. This must be removed before the drive cable can be completely withdrawn from the crank.
6. Clean the drive cable with chlorothene and flush the control housing and the source guide tubes.
7. Thoroughly dry the drive cable, control housing, and the source guide tube. Any remaining solvent can cause permanent damage.
8. Check the source guide tubes for binding by holding them vertical and dropping a dummy source through them.
9. Wipe the source guide tubes and control housings with a cloth soaked in chlorothene and flex them to check for internal damage.
10. If the control housings or guide tubes are cut or flattened they should be repaired or replaced.
11. The guide tubes or control housings may be covered with tape where only the outer plastic is cut through.
12. Check for excessive wear on the connector.
13. Lightly grease the drive cable with Texaco Unitemp grease.

B: Exposure Device

1. Survey the entire circumference of the device to assure that the radiation levels do not exceed 200 milliroentgens per hour at the surface or 10 milliroentgens per hour at three feet from the surface.
2. To perform maintenance on the exposure device, the source assembly must be removed and placed in a source changer following the appropriate operating instructions for the source changer.
3. When the exposure device is empty, a tube wipe should be performed to check for contamination. To clean the 'S' tube run a cloth soaked in chlorothene through it several times. Dry the 'S' tube by running a dry cloth through the tube.
4. The lock assembly should be removed and cleaned in chlorothene. Inspect all parts for excessive wear or damage and replace if necessary. Lightly grease all moving parts at their contact surfaces with Texaco Unitemp grease.
5. Assure that the two female threaded fittings on the exposure device are free of any dirt or sludge buildup. These should be cleaned with chlorothene and then allowed to dry.
6. Assure that the brass plugs (dust covers) are free of any dirt or sludge buildup. These should also be cleaned with chlorothene and then allowed to dry.
7. Inspect the carrying handle for damage or excessive wear and replace if necessary. If the handle has become worn or started to tear it should be replaced.