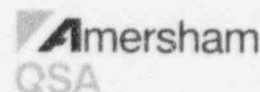


**SENTINEL**

February 7, 1997

Mr. Cass R. Chappell, Section Leader  
Cask Certification Section  
Storage and Transport Systems Branch  
Division of Industrial and Medical Nuclear Safety  
NMSS  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

Amersham Corporation  
40 North Avenue  
Burlington, MA 01803  
tel (617) 272-2000  
tel (800) 225-1383  
fax (617) 273-2216



RE: Docket Number 71-9137

Dear Mr. Chappell:

In response to your letter dated 19 August 1996 and in conjunction with our renewal of Certificate of Compliance number 9137 please find enclosed the following information.

1. Please find attached drawings and current revision level (revision B)
2. The drawings have been revised to reflect the requested information.
3. The drawings have been revised to reflect the requested information.
4. The operating procedures have been revised for clarity. As this information also appears in several other Type B package submissions, we had originally written this section to keep the information as generic as possible, ie not referencing specific model numbers so that this section could be used for different Type B packages. The revised section is now specific to the model 820.
5. Section 8 has been revised to reflect the marking information.
6. Section 8 has been revised to reflect the statement.
7. A page with the current revision levels is included.

I trust this contains the information necessary to complete your review. Please contact me if you need any additional information. Thank you for your assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Cathleen Roughan'.

Cathleen Roughan  
Regulatory Affairs Manager

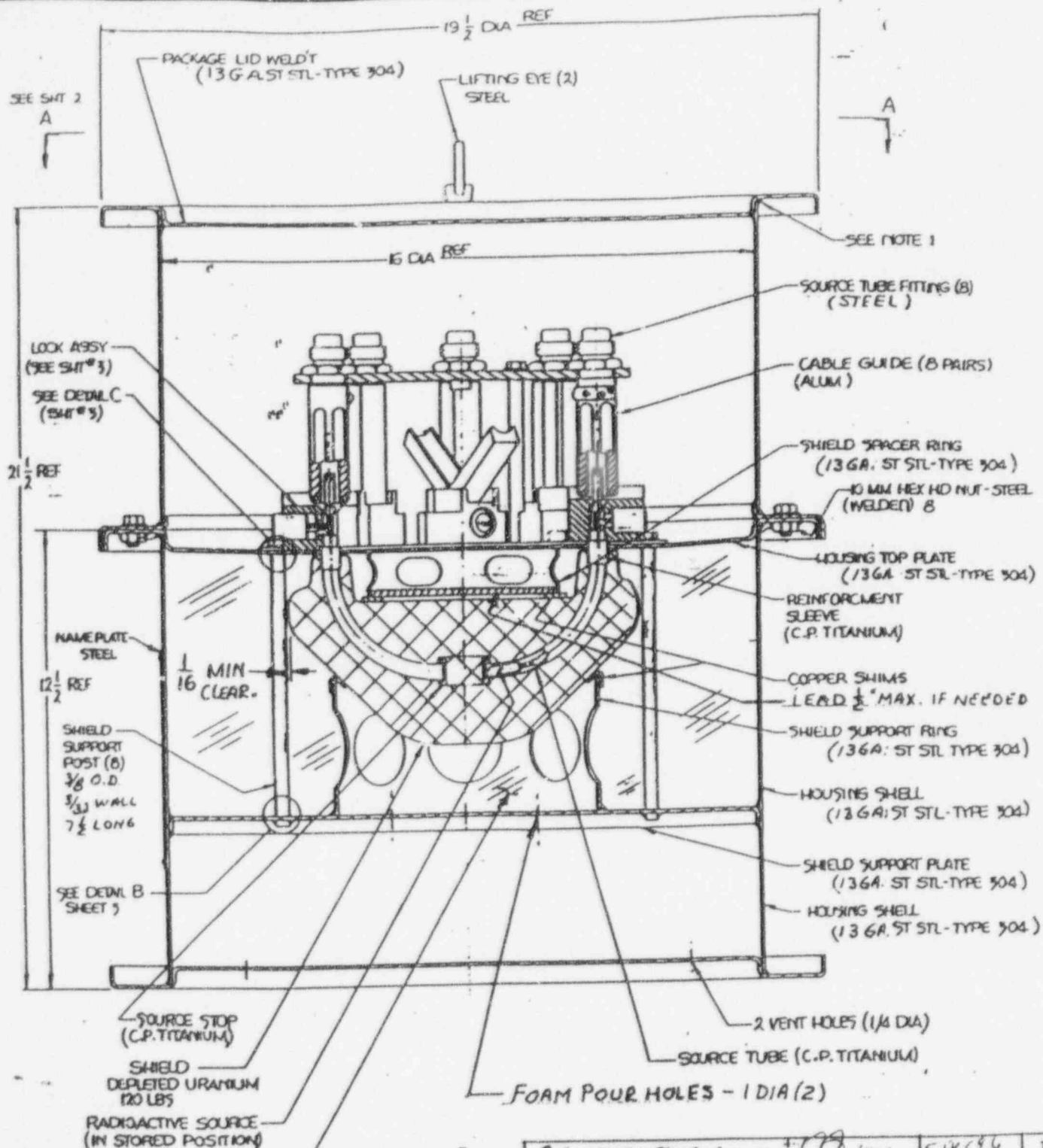
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REVISION LEVELS  
FEBRUARY 1997

PAGE NUMBER	REVISION LEVELS	DATE
1-1	1	April 96
1-2	0	July 95
2-1	1	April 96
2-2 through 2-3	0	July 95
2-4 through 2-6	1	April 96
3-1 through 6-1	0	July 95
7-1 through 8-3	2	Feb 97

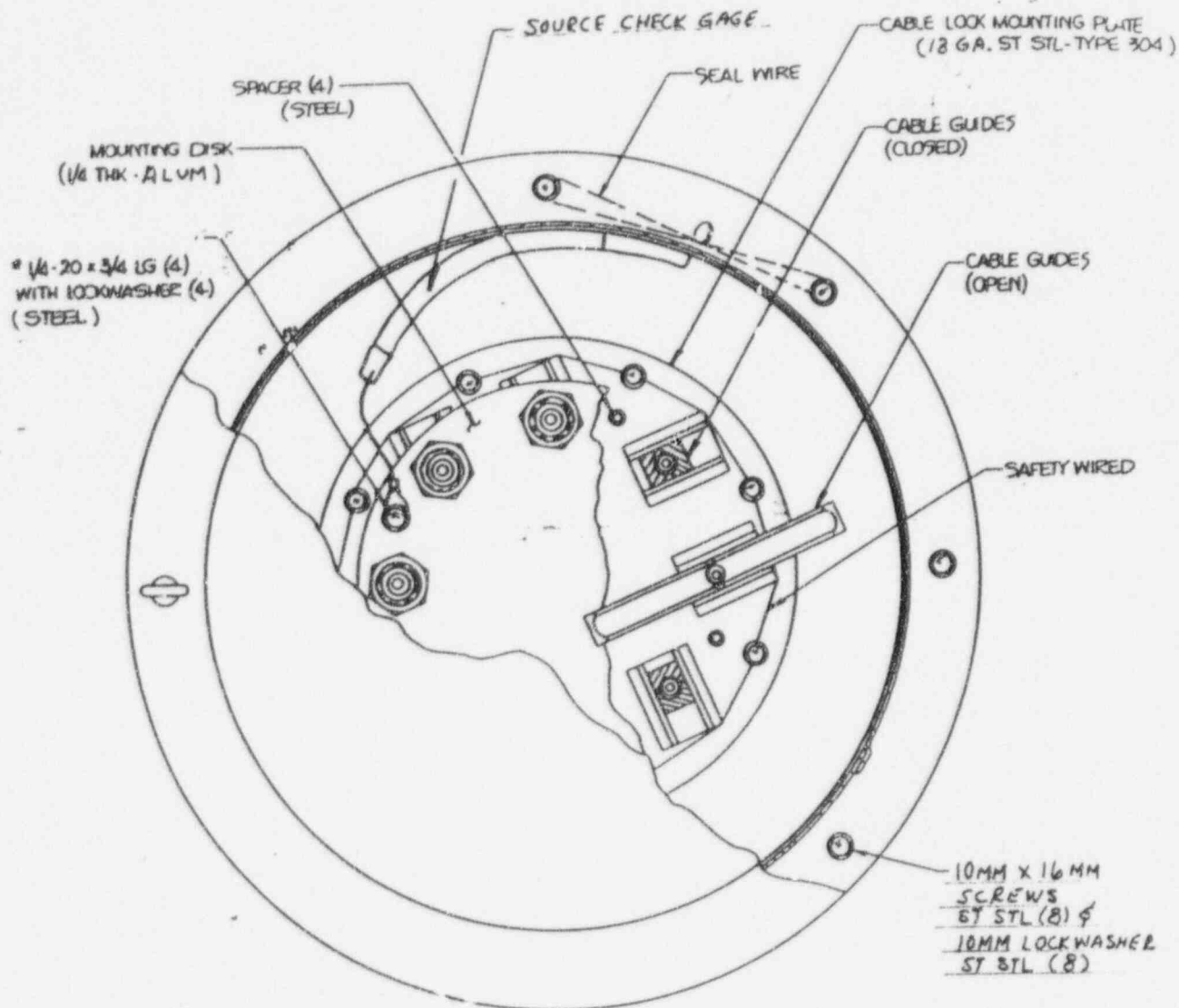


RIGID POLYURETHANE FOAM  
20 LBS/FT<sup>3</sup> MIN. DENSITY

#### NOTE:

1. ALL SPECIFIED WELDS  
PER ASME B & PV CODE, SEC. IX (AFTER JUN. 1993)
2. TOTAL WT - APPROX. 240 LB (109 Kg)
3. UNLESS OTHERWISE NOTED  
ALL DIM. ARE REFERENCE

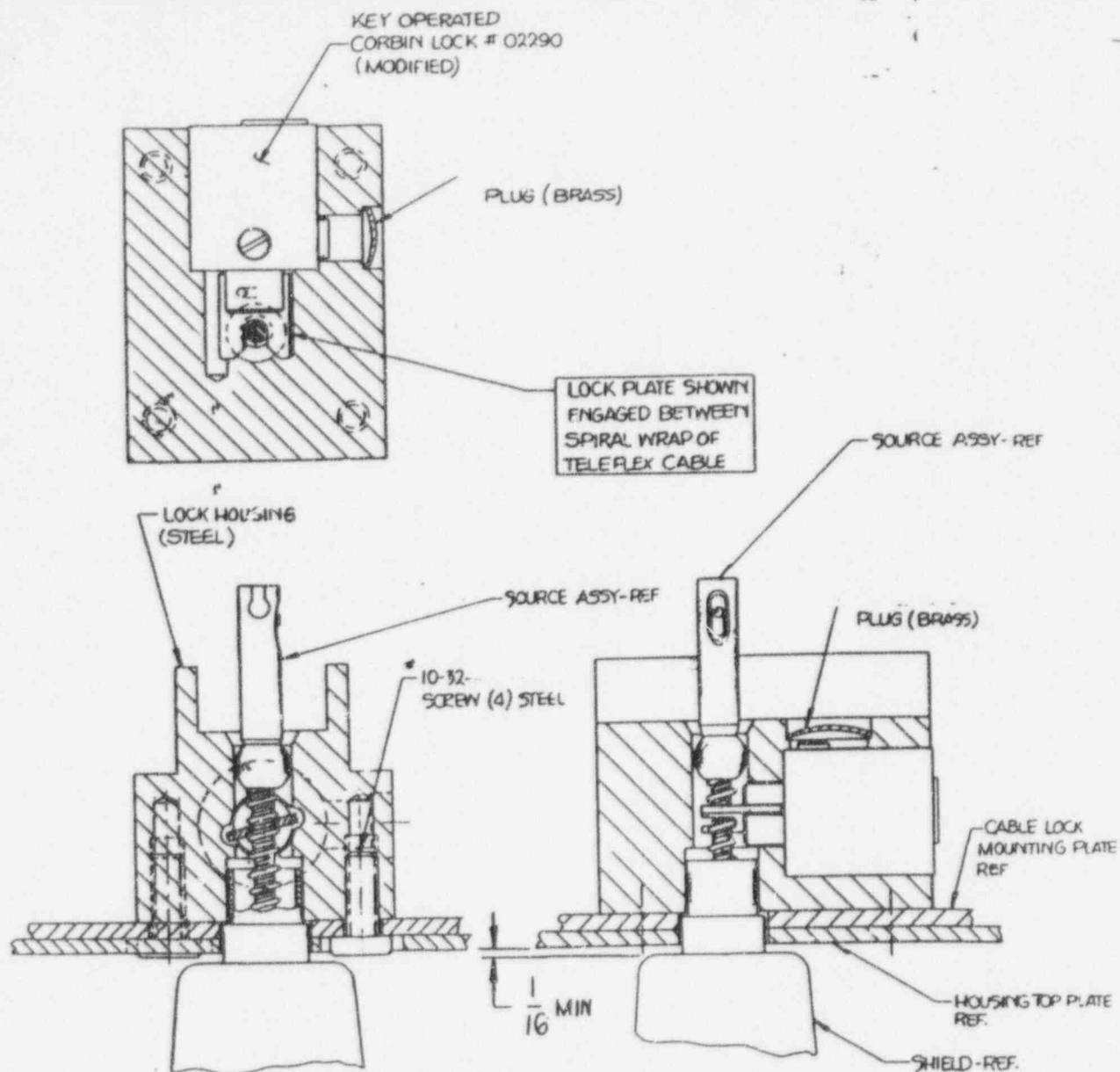
REVISED: REV A CH FILE	1/19/95	5/19/95	B
INITIAL RELEASE	G.P. L.B.	20 Jul 95	A
DESCRIPTION	APPROVALS	DATE	LTR
REVISIONS			
<b>SENTINEL</b> DESCRIPTIVE <b>Amersham Corporation</b> DRAWING 40 NORTH AVE. BURLINGTON, MA 01803			
TITLE MODEL 820 SOURCE CHANGER			
SIZE	DWG. NO. R	82090	REV
A	SCALE: NONE	SHEET 1 OF 4	B



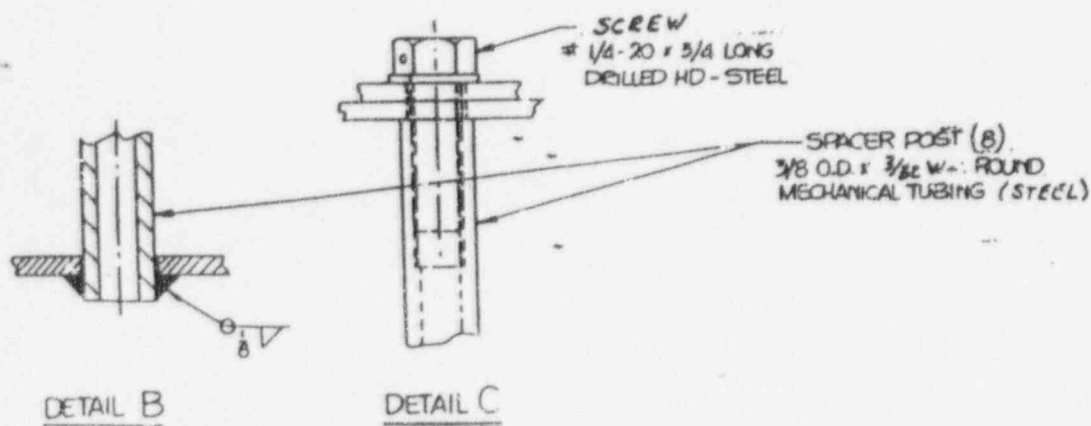
VIEW A-A  
(ROTATED 90° CCW)

UNLESS OTHERWISE NOTED  
ALL DIMENSIONS ARE REFERENCE

SIZE A	DWG. NO. R 82090		REV B
	SCALE: NONE	SHEET 2 OF 4	

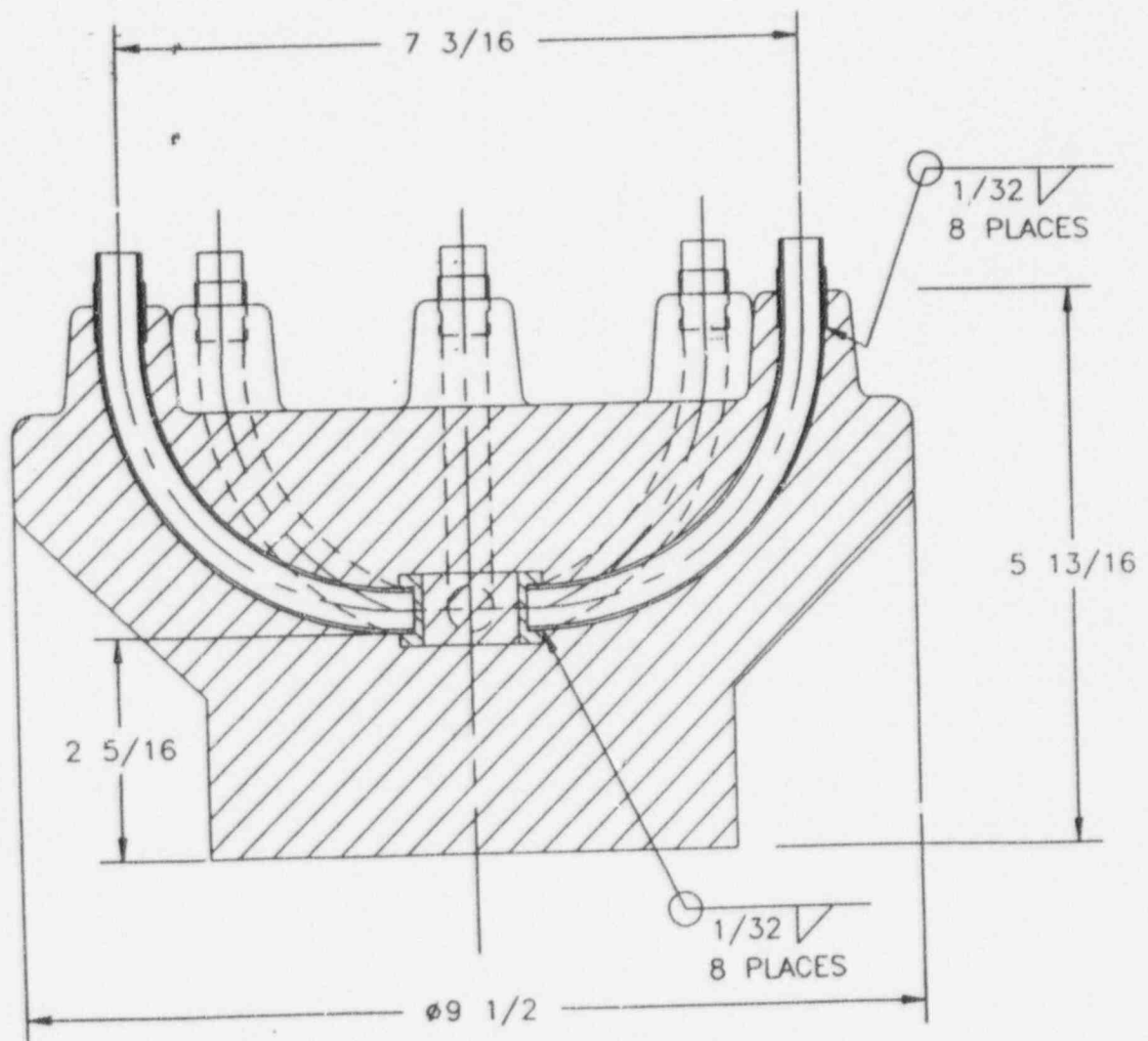


CABLE LOCK DETAIL  
TYP 8 PLACES



UNLESS OTHERWISE NOTED  
 ALL DIMENSIONS ARE REFERENCE

SIZE A	DWG. NO. R 82090	REV B
SCALE: NONE	SHEET 3 OF 4	



WEIGHT: 125 LBS  
OR AS REQ. TO PASS RADIATION PROFILE

UNLESS OTHERWISE NOTED  
ALL DIMENSIONS ARE REFERENCE

SIZE	DWG. NO. R	82090	REV
A	SCALE: NONE	SHEET 4 OF 4	B

## 7. Operating Procedure

### 7.1 Procedure for Loading the Package

1. Ensure that the source is locked into place in its storage position. The source assembly must be fully inserted into the source tube and the lock plate engaged between the spiral wrap of the teleflex cable. Actuate the lock with its key. Repeat this process for each source assembly to be installed. Place the hat on the 820 and secure with the eight bolts. Attach a tamper proof security seal with an identification mark to two of the drilled bolt heads.
2. Assure all the conditions of the Certificate of Compliance are met and the model 820 has all the required markings.
3. If the 820 is to be packaged in a crate or other outer packaging, the outer packaging must be strong enough to withstand the normal conditions of transport. These requirements are outlined in 10 CFR 71. The 820 should be put in the outer package with sufficient blocking to prevent shifting during transportation.
4. Perform a radioactive contamination wipe test of the 820. This consists of rubbing filter paper or other absorbent material, using heavy finger pressure, over an area of 46.5 in.<sup>2</sup> (300 cm<sup>2</sup>) of the package surface. The activity on the filter paper should not exceed 0.001 uCi of removable contamination. Also perform a contamination wipe on the outer package if used.
5. Survey the 820 with a survey meter at the surface and at a distance of 40 inches (1m) from the surface to determine the proper radioactive shipping labels to be applied to the package as required by 49 CFR 172.403. If radiation levels above 200 mR/hr at the surface or 10 mR/hr at 40 inches (1m) from the surface are measured, the 820 must not be shipped. Also survey the outer package if used.
6. Return the 820 to Amersham Corporation according to proper procedures for transporting radioactive material as established in 49 CFR 171-178.

NOTE: The U.S. Department of Transportation, in 49 CFR 173.22 © requires each shipper of Type B quantities of radioactive material to provide prior notification to the consignee of the dates of shipment and expected arrival.

### 7.2 Procedure for Unloading the Package

The consignee of a package of radioactive material must make arrangements to receive the package when it is delivered. If the package is to be picked up at the carrier's terminal, 10 CFR 20.205 requires that this be done expeditiously upon notification of its arrival.

Upon receipt, survey the package with a survey meter as soon as possible, preferably at the time of pickup and no more than three hours after it was received during normal working hours. Radiation levels should not exceed 200 milliroentgen per hour at the surface of the exposure device, nor 10 milliroentgens per hour at a distance of 40 inches (1m) from the surface. Actual radiation levels should be recorded on the receiving report. If the radiation levels exceed these limits, the package should be secured in a Restricted Area, and the appropriate personnel notified in accordance with 10 CFR 20.

All components should be inspected for physical damage.

The radioisotope, activity, model number, and serial number of the source and the package model number



and serial number should be recorded.

Opening and operation of the 820 will be performed in accordance with the operation manual supplied with the 820 in accordance with 10 CFR 71.89.

### 7.3 Preparation of an Empty Package for Transport

1. For shipment of an empty source changer first assure the changer does not contain an unauthorized source or cropped source by performing a physical verification using the following procedure.

NOTE: Use only the gauge provided with the source changer. Do not use any other tool or a gauge for another device. If you do not have the proper gauge to perform the test, contact Amersham Corporation before conducting the test.

- a. Insert the proper gauge in the empty tube(s) of the source changer. Read the gauge at the top of the outlet fitting.
- b. The gauge should bottom out in the empty source tube and indicate a safe condition (the redline should be flush with the top of the source tube). Verify that each empty tube indicates a safe condition and proceed to step 2.
- c. If the gauge indicates an unsafe condition (the red line is above the source tube) there may be an obstruction in the tube. Remove the gauge slowly while observing the survey meter. If the radiation levels increase as the gauge is being removed keep the gauge within the device, secure the device and contact Amersham Corporation for further instructions.

If radiation levels remain normal as the gauge is being removed, completely remove gauge and contact Amersham Corporation for shipping instructions.

2. When you have assured the container is empty, install the cover of the source changer and insert the closure bolts. Seal wire through the heads of two bolts.
3. Perform a radioactive contamination wipe test of the outer shipping package. This consists of rubbing filter paper or other absorbent material, using heavy finger pressure, over an area of 46.5 in.<sup>2</sup> (300 cm<sup>2</sup>) of the package surface. The activity on the filter paper should not exceed 0.001 uCi of removable contamination.
4. When you have assured the Model 820 is empty, survey the device and prepare the package for transport depending upon the radiation levels obtained, as given in 49 CFR 173.



## 8 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 the drawings referenced in the Certificate of Compliance for the 820.
2. The labels are inspected to assure they contain the required information given in 10 CFR 71.85(c) and 10 CFR 40.13.
3. 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 lbs. (445N). 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 and must be less than 0.005 microcuries. The source capsule is also subjected to a vacuum bubble leak test. Failure of either of these tests will prevent use of this source assembly.

#### 8.1.4 Component Tests

The lock assembly of the package is tested to assure that security of the source will be maintained. Failure of this test will prevent use of the package until is corrected and retested.

#### 8.1.5 Tests for Shielding Integrity

The radiation levels at the surface of the package and at 40 inches (1m) from the surface are measured using a small detector survey instrument (i.e. 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 at 40 inches (1m) 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 on Containment Vessel

Not applicable

8.2.5 Shielding

Prior to each use, a radiation survey of the package is made to assure that radiation levels do not exceed 200 milliroentgens per hour at the surface of the package nor ten milliroentgens per hour at 40 inches (1M) 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

### 8.2 Routine Checks Prior to Shipment

#### A. Labels

1. Ensure labels are securely fastened to the container. If not securely fastened reattach or replace with stainless steel pop-rivets or screws as appropriate.
2. Ensure that all labels required for the device are attached to the container.
3. Ensure labels are clean and easily legible. If labels are illegible or cannot be cleaned, replace the label. If any holes remain uncovered after replacement of the label, contact Amersham for guidance.

#### B. Device Housing

Examine the housing for signs of wear, damage or the omission of any required safety wires.

1. Ensure that the housing integrity is secure and has not been breached by puncture impacts, cracks or rust. Punctures, cracks and flaking or extensive, pitted rust are criteria for rejection.
2. Examine the flanges and ensure that they are intact, oriented properly and have no severe deformation. See descriptive drawings for the 820. Any items which do not meet this criteria must be repaired or the component replaced as applicable.
3. Ensure all safety wires are intact as required by the descriptive drawing for the 820. If a safety wire is missing, shows signs of damage or breaks, or if the gauge wire used is of lower-grade, then contact Amersham Corporation for guidance.

#### C. Threaded Holes

Ensure that the threaded holes used to secure container caps or covers will accommodate and engage the required size bolt [or by using the appropriate thread gauge].

#### D. Source Tube

1. Ensure that the source tube(s) allows for movement of a dummy source assembly without obstruction, snagging, jamming or hang-up. If any obstructions/snagging are encountered in any source tube contact Amersham Corporation.