



U.S. Department  
of Transportation  
**Research and  
Special Programs  
Administration**

400 Seventh St., S.W.  
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION  
FOR A TYPE B(U)  
RADIOACTIVE MATERIALS PACKAGE DESIGN  
CERTIFICATE USA/6125/B(U), REVISION 13**

**REVALIDATION OF CANADIAN COMPETENT AUTHORITY CERTIFICATE CDN/2013/B(U)**

This certifies that the radioactive materials package design described below is hereby approved for use within the United States for import and export shipments only. Shipments must be made in accordance with the applicable regulations of the International Atomic Energy Agency<sup>1</sup> and the United States of America<sup>2</sup>.

1. Package Identification - MDS Nordion Gammacell 220 Irradiator, Serial Nos. 1 to 256 inclusive.
2. Packaging Description and Authorized Radioactive Contents - as described in Canadian Certificate of Competent Authority CDN/2013/B(U), Revision 12 (attached).
3. General Conditions -
  - a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation in accordance with the endorsed certificate.
  - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Hazardous Materials Technology, (DHM-23), Research and Special Programs Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.
  - c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.
4. Marking and Labeling - The package shall bear the marking USA/6125/B(U) in addition to other required markings and labeling.
5. Expiration Date - This certificate expires on October 31, 2007.

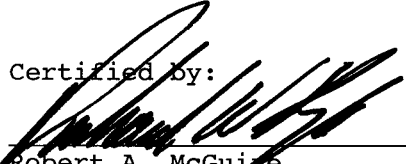
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1 "Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, 1973 Revised Edition, as amended," published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

2 Title 49, Code of Federal Regulations, Parts 100 - 199, United States of America.

**CERTIFICATE USA/6125/B(U), REVISION 13**

This certificate is issued in accordance with paragraph 806 of the IAEA Regulations and Section 173.473 of Title 49 of the Code of Federal Regulations, in response to the petition and information dated September 18, 2003 submitted by MDS Nordion, Inc., Kanata, Ontario, Canada, and in consideration of other information on file in this Office.

Certified by:

  
\_\_\_\_\_  
Robert A. McGuire  
Associate Administrator for  
Hazardous Materials Safety

OCT 29 2003

\_\_\_\_\_  
(DATE)

Revision 13 - Issued to revalidate Canadian Certificate of Approval No.  
CDN/2013/B(U), Revision 12.

# Certification



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

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## RADIOACTIVE MATERIAL TYPE B(U) PACKAGE DESIGN APPROVAL CERTIFICATE NO. CDN/2013/B(U), (REV. 12)

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30-A2-93-0

September 10, 2003

The Canadian Nuclear Safety Commission hereby certifies that the package, as described below, has been demonstrated to meet the regulatory requirements prescribed for Type B(U) packages as described in the Canadian *Packaging and Transport of Nuclear Substances Regulations*<sup>[1]</sup> and in the IAEA Regulations<sup>[2]</sup>, subject to the following limitations, terms and conditions.

All users of this authorization shall register their identity in writing with the Canadian Nuclear Safety Commission prior to the first use of this authorization and shall certify that they possess the necessary instructions for preparation of the package for shipment.

This certificate does not relieve the shipper from any requirement of the government of any country through or into which the package will be transported.

### PACKAGE IDENTIFICATION

MDS Nordion Gammacell 220 Irradiator, Serial Nos. 1 to 256 inclusive.

### PACKAGING DESCRIPTION

The MDS Nordion Gammacell 220 Irradiator, as shown on MDS Nordion Drawing No. A01885, (Rev. V) consists of a 760 mm diameter cylindrical steel-encased lead radiation shield which is welded to a support frame and is partially covered with sheet metal covers. A cavity in the radiation shield contains a cylindrical source cage, a drawer and a plug. A steel shipping cover, 57.1 mm thick with an 11.1 mm recess, registers on the plug and retains it in place. The drawer is retained on the top by the shipping cover and on the bottom by a shipping bracket. The radiation shield is wrapped in thermal insulation which is held in place by wire mesh. The wire mesh on the sides and bottom is further protected by sheet metal panels. A steel energy absorber (impact limiter) is mounted on top of the radiation shield and the assembly is placed inside a plywood shipping crate. The containment system consists of the capsule assemblies. The crate dimensions are 1700 mm high by 1090 mm wide by 1560 mm long and the total mass of the package is approximately 4400 kg.

Illustrations of the package are shown on attached Drawing Nos. DS-0284 (Rev. H) and DS-0284 (Rev. L).

The package shall bear the competent authority identification mark "CDN/2013/B(U)".

**AUTHORIZED RADIOACTIVE CONTENTS**

This package is authorized to contain not more than 963 TBq (26,000 Ci) of cobalt-60 in the form of metal pellets or slugs. Pellets and slugs are doubly encapsulated in C198 stainless steel capsule assemblies. The aluminum-sheathed slugs are encapsulated in C185 or C167 stainless steel capsule assemblies. All capsules are mounted in a cylindrical source cage.

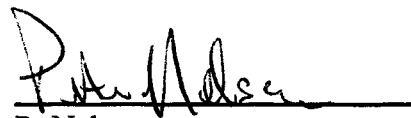
**SHIPMENT**

This package shall be prepared for shipment in accordance with MDS Nordion Engineering Specification No. DS-0766-J0300 (7) "Instructions for Modifications and Preparation for Shipment of the Gammacell 220", the Canadian *Packaging and Transport of Nuclear Substances Regulations*<sup>[1]</sup> and the IAEA Regulations<sup>[2]</sup>.

The average surface heat flux of this package with 963 TBq (26,000 Ci) of cobalt-60 is 32 W/m<sup>2</sup>. The decay heat output for this material is not greater than 400 W. For heat fluxes exceeding 15 W/m<sup>2</sup> supplementary arrangements must be made with the carrier to ensure adequate heat dissipation.

**EXPIRY DATE**

This certificate expires October 31, 2007.



P. Nelson  
Designated Officer pursuant to  
Subsection 37.(2)(a) of the  
Nuclear Safety and Control Act

**REFERENCES**

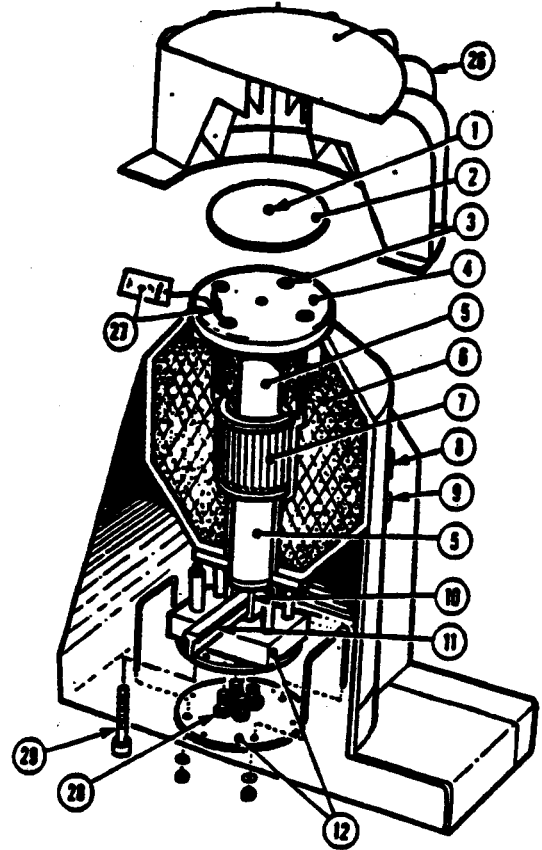
- [1] Canadian Packaging and Transport of Nuclear Substances Regulations, SORS/2000-208, May 31, 2000.
- [2] International Atomic Energy Agency Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, 1973 Revised Edition (as amended).

**NOTES**

- Revision 7: October 10, 1986. Certificate renewed.
- Revision 8: September 13, 1991. Certificate renewed.
- Revision 9: September 18, 1995. Certificate renewed.
- Revision 10: October 25, 1996. Authorized Radioactive Contents revised.
- Revision 11: October 18, 1999. Certificate renewed.
- Revision 12: September 10, 2003. Certificate renewed.

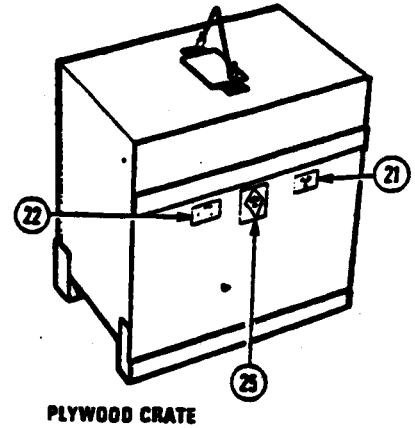
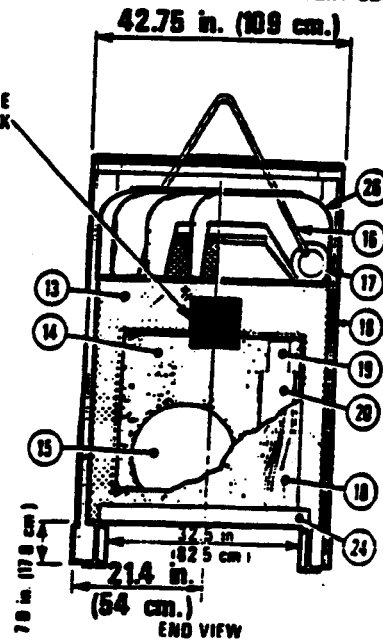
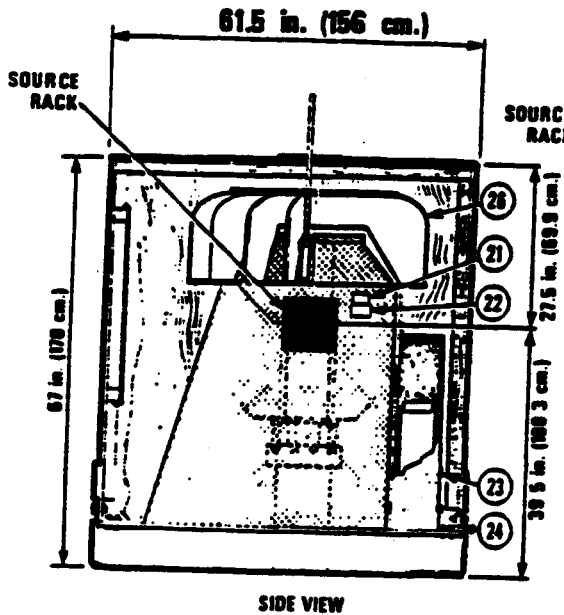
**PARTS LIST**

1. 3/8 in. - 16 SCREW (1)
2. 0.5 in. (1.27 cm.) THICK LEAD SHIELDING PLATE
3. 3/4 in. - 10 x 2-1/2 in. LG SOCKET HEAD SCREWS (4)
4. SHIPPING COVER - STEEL PLATE 1.75 in. (4.4 cm.) THICK
5. LOWER DRAWER
6. LEAD SHIELDING
7. STAINLESS STEEL SOURCE RACK 8.8 in. DIA (22.3 cm.) x 8.3 in. (21 cm.) WITH STAINLESS STEEL WELDED CAPSULES CONTAINING COBALT 60
8. RADIATION CAUTION PLATE WITH SPECIFIED CONTENT (1)  
AECL CP SPEC D60095
9. AECB CERTIFICATION PLATE (1) - AECL CP SPEC D60097
10. DRAWER BOTTOM BRACKET
11. T-ELEVATING BAR
12. SHIPPING BRACKET ASSEMBLY
13. KAOWOOL - 0.5 in. (1.27 cm.) THICK. POLYETHELENE (4 MIL) WIRE MESH 1 in. (2.54 cm.) STANDARD STEEL PACKING STRAPS 0.5 in. (1.27 cm.) WIDE. AECL CP SPEC P0121
14. PACKING MATERIAL
15. SHIELD COLLAR (END USE ONLY)
16. HOIST SLING
17. SHOULDER EYELET (2)
18. 0.5 in. (1.27 cm.) THICK PLYWOOD CRATE
19. SHIELDING PLUG (END USE ONLY)
20. UPPER DRAWER (END USE ONLY)
21. RADIATION CAUTION PLATE (2) - AECL CP SPEC D60096
22. AECB CERTIFICATION PLATE (2) - AECL CP SPEC D60097
23. 1/2 in. - 13 x 9 in. LG SQ HD BOLTS (3)
24. SHIPPING BRACKET (2) WITH 3/8 in. - 11 x 1-1/4 in. LG HEX HD SCREWS (8)
25. RADIOACTIVE I or II or III LABEL (2)
26. CRUSH SHIELD ASSEMBLY
27. WIRE SEAL & TAG - 'DO NOT OPEN'
28. 3/4-10 - 2.8 in. LG. SOCKET HD. SCREWS (4)
29. 3/4 - 10 - 5-1/2 in. LG. SOCKET HD. SCREWS (4)



**NOTES**

I.A.E.A. - TYPE B(u)  
 GROSS WEIGHT 9700 lb. (4400 kg.)  
 PROJECTED FLOOR LOADING 531 lb/sq ft. (0.26 kg/sq cm)  
 CAPACITY - 26,000 Ci 60 Co  
 AECB CERT CDN/2013/B (U) T.



**FOR UNIT  
 NUMBERS 1 TO 194**

**ATOMIC ENERGY OF CANADA LIMITED**  
 COMMERCIAL PRODUCTS

P.O. BOX 6300, Postal Station J, OTTAWA, CANADA, K2A 3W3

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TITLE

**GAMMACELL 220  
 "LIVE" SOURCE HEAD  
 CRATING FOR SHIPMENT**

REF. DWG. A01885

REVISED DEC 1983

DATE 31 JANUARY 1975

No.

REV.

DRAWN

CHECKED

APPROVED

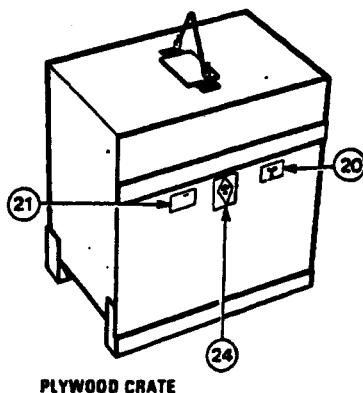
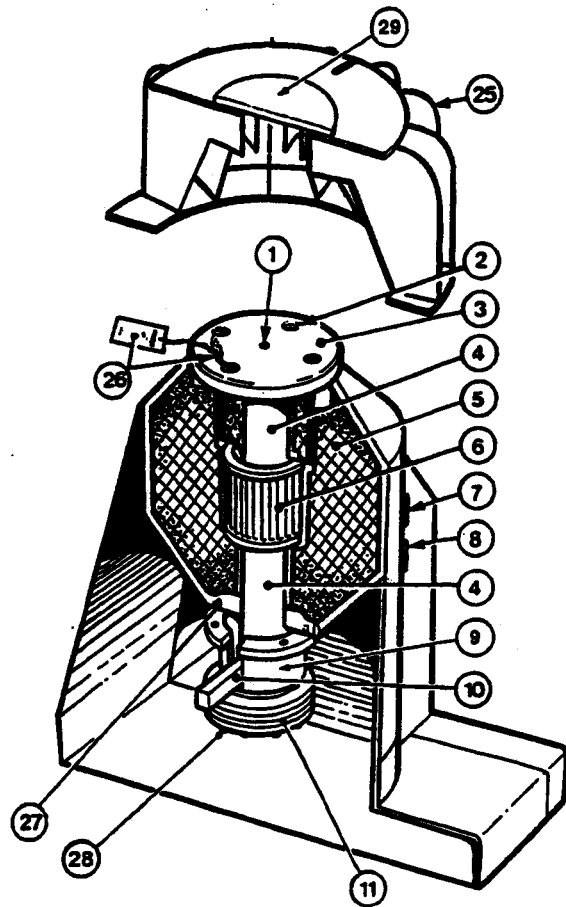
**DS-0284**

**H**

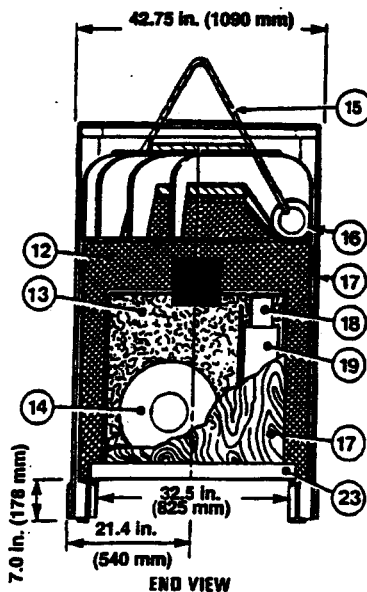
SHEET 1 OF 1

**Parts list**

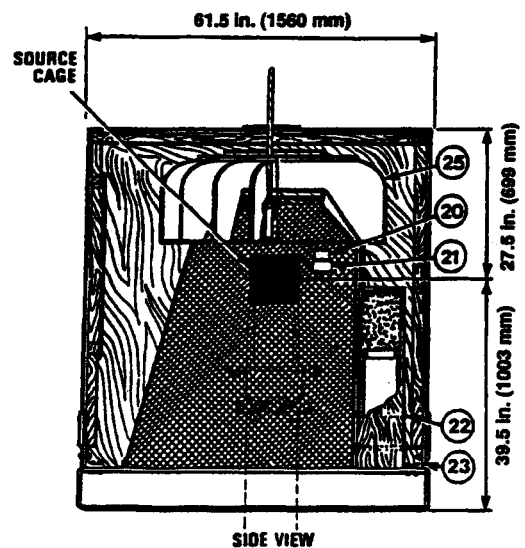
1. 3/8 in. - 16 tapped hole
2. 3/4 in. - 10 x 2 1/2 in. large socket head screws (4)
3. Shipping cover: steel plate 1.75 in. (44 mm) thick
4. Drawer, bottom
5. Lead shielding
6. Stainless steel source rack 8.8 in. diameter (223 mm) x 8.3 in. (210 mm) with stainless steel welded capsules containing cobalt-60
7. Radiation caution plate with specified content (1)  
Nordion specification DG0095
8. Nordion identification plate (1) Nordion specification DG0097
9. Shipping bracket assembly
10. Drawer support bar
11. Shield plates if required
12. Koawool: 0.5 in. (127 mm) thick polyethylene (4 MIL) wire mesh 1 in. (254 mm) standard steel packing straps 0.5 in. (127 mm) wide, Nordion specification P0121
13. Packing material
14. Shield collar (end use only)
15. Hoist sling
16. Lifting eyelet (2)
17. 0.5 in. (127 mm) thick plywood crate
18. Shielding plug (end use only)
19. Drawer, top (end use only)
20. Radiation caution plate (3) Nordion specification DG0096
21. Nordion identification plate (2) Nordion specification DG0097
22. 1/2 in. - 13 x 9 in. large square head bolts (3)
23. Shipping bracket (2) with 3/8 in - 11 x 1 1/4 in. large hexagonal head screws (8)
24. Radioactive I or II or III label (2)
25. Crush shield assembly
26. Wire seal and tag - "DO NOT OPEN"
27. 3/4 in. - 10 x 2 in. large socket head screws (4)
28. 3/4 in. - 10 x 2 in. large socket head screws (4)
29. Top shield, if required



PLYWOOD CRATE



END VIEW



SIDE VIEW

**Notes**

- I.A.E.A. - Type B(U)
- Gross weight: 9700 lb. (4400 kg)
- Projected floor loading:  
531 lb./sq. ft. (2600 kg/sq. m)
- Capacity: 26,000 Ci <sup>60</sup>Co
- AECB CERT CDN/2013/B (U)
- US DOT CERT. USA/6125/B (U)



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Kanata, Ontario, Canada, K2K 1X8  
Tel: (613) 592-2790 • Fax: (613) 592-6937 • Telex: 053-4162

TITLE		Gammacell 220 "Live" Source Head Crating for Shipment for serial #185 and up	
REF.DW.G.	A01885	REVISED	AUGUST 1991
DATE	31 JANUARY 1975	No.	DS-0284
DRAWN	CHECKED	APPROVED	REV.
SHEET 1 OF 1			L

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