



U.S. Department
of Transportation
**Pipeline and
Hazardous Materials
Safety Administration**

East Building, PHH-23
1200 New Jersey Avenue Southeast
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION
FOR A TYPE B(U)
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0509/B(U)-96, REVISION 9**

**REVALIDATION OF CANADIAN COMPETENT AUTHORITY
CERTIFICATE CDN/2072/B(U)-96**

This certifies that the radioactive material package design described 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 Agency¹ and the United States of America².

1. Package Identification - F-127, F-127-X and RAI/F-127 Transport Packages, Serial Numbers 59 and up.
2. Package Description and Authorized Radioactive Contents - as described in Canada Certificate of Competent Authority CDN/2072/B(U)-96, Revision 9 (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. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.
 - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Hazardous Materials Technology, (PHH-23), Pipeline and Hazardous Materials Safety 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.

¹ "Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), No. TS-R-1 (ST-1, Revised)," 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/0509/B(U)-96, REVISION 9

- d. Records of Quality Assurance activities required by Paragraph 310 of the IAEA regulations¹ shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors in the United States exporting shipments under this certificate shall satisfy the applicable requirements of Subpart H of 10 CFR 71.
4. Marking and Labeling - The package shall bear the marking USA/0509/B(U)-96 in addition to other required markings and labeling.
5. Expiration Date - This certificate expires on April 30, 2020.

This certificate is issued in accordance with paragraph 808 of the IAEA Regulations and Section 173.473 of Title 49 of the Code of Federal Regulations, in response to the January 29, 2016 petition by Nordion (Canada) Inc., Ottawa, Ontario, and in consideration of other information on file in this Office.

Certified By:



Dr. Magdy El-Sibaie
Associate Administrator for Hazardous Materials Safety

Feb 29 2016

(DATE)

Revision 9 - Issued to revalidate Canadian Certificate of Approval No. CDN/2072/B(U)-96, Revision 9.



Certificate

CDN/2072/B(U)-96 (Rev. 9)

Transport Package Design

The transport package design identified below is certified by the Canadian Nuclear Safety Commission pursuant to paragraph 21(1)(h) of the *Nuclear Safety and Control Act* and Subsection 10(1) of the *Packaging and Transport of Nuclear Substances Regulations, 2015* and to the IAEA's *Regulations for the Safe Transport of Radioactive Material, 2012 Edition*.

REGISTRATION OF USE OF PACKAGES

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 instructions necessary for preparation of the package for shipment.

PACKAGE IDENTIFICATION

Designer: **Nordion (Canada) Inc.**
Make/Model: **F-127, F-127-X and RAI/F-127 Transport Packages, Serial Nos. 59 and up**
Mode of Transport: **Air, Sea, Road, Rail**

IDENTIFICATION MARK

The package shall bear the competent authority identification mark "**CDN/2072/B(U)-96**".

PACKAGE DESCRIPTION

The F-127, F-127-X and RAI/F-127 transport packages as shown on Nordion Drawing Nos. A06024 (Issue AE), F112701-001 (Issue L) or A09509 (Issue V), are finned cylindrical steel-encased-lead container assemblies with cylindrical fire shield, top shield cap and bottom shipping skid. The container assembly has a removable, lead-filled steel plug. Vent and drain lines are blocked either permanently or with removable cable assemblies. The containment system consists of either the authorized sealed sources or the F-407 leak-proof insert, and the container assembly.

An illustration of the package is shown on attached Drawing Nos. F-127(1996) Issue 3, F-127-X(1996) Issue 3 and RAI/F-127(1996) Issue 3.

Any modification to the package design must be submitted to the CNSC for approval prior to implementation.



The configuration of the package is as follows:

Shape: Cylinder	Shielding: Lead
Mass: 3580 kg	Outer Casing: Steel
Length: 800 mm	Height: 1240 mm
Width: 1020 mm	Diameter: n/a

AUTHORIZED RADIOACTIVE CONTENTS

The F-127 and F-127-X are authorized to contain not more than:

a) 2,200 TBq (60,000 Ci) of Cobalt 60 in the form of metal pellets or nickel-plated slugs in the following capsules, retained within a holder that distributes them throughout the cavity volume:

- i) Nordion capsule models C-132, C-133, C-140, C-146, C-151, C-164, C-174A, C-174B, C-177, C-185, AC-191, AC-195, C-196, C-198, C-199, C-200, C-205, C-215, C-230, TC-239, C-252, XC-310, XC-318, C-320, XC-325, XC-330 and AC-339; or
- ii) welded stainless steel capsules that meet the requirements of the International Organization of Standardization, International Standard 2919 under classification number E53424; or
- iii) capsules with valid special form certificates; or

b) 185 TBq (5,000 Ci) of Carbon 14 in the form of activated aluminum nitride pellets contained within an aluminum capsule and further contained within a sealed Nordion model F-407 insert; or

c) 444 TBq (12,000 Ci) of Cobalt 60 in the form of nickel-plated pellets within Nordion sealed source model C-373 or C-374 and the Nordion source holder model C-375; or

d) 3,700 TBq (100 000 Ci) of Cesium 137 contained in capsules with a valid special form radioactive material certificate.

The RAI/F-127 is authorized to contain not more than 2,200 TBq (60,000 Ci) of Cobalt 60 in the form of metal pellets or nickel-plated slugs in the Nordion model C-132 or C-198 capsule.

QUALITY ASSURANCE

Quality assurance for the design, manufacture, testing, documentation, use, maintenance and inspection of the package shall be in accordance with:



- Nordion Document No. IN/QA 0224 Z000 (Rev. 9)*, "Radioactive Material Transport Package Quality Plan"
- Nordion Document No. IN/DS 1861 F127 (Rev. 5), "Design, Manufacturing and Operating Specification for the F-127, F-127-X and RAI/F-127 Transport Packages"
- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition
- * or latest current revision

SHIPMENT

The preparation for shipment of the package shall be in accordance with:

- Nordion document No. IN/DS 1861 F127 (Rev. 5), "Design, Manufacturing and Operating Specification for the F-127, F-127-X and RAI/F-127 Transport Packages"
- Best Theratronics Limited Document No. IN/PP 2840 F127 (Rev. A), "Preparation for Shipment of the F-127 and F-127-X Transport Packaging for Cesium-137 Sealed Sources"
- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition

The average surface heat flux of the package with 2,200 TBq of Cobalt 60 is 164 W/m² and with 3,700 TBq of Cesium 137 is 95 W/m². For heat fluxes exceeding 15 W/m², supplementary arrangements must be made with the carrier to ensure adequate heat dissipation.

Air transport is restricted to a maximum of 960 TBq of Cobalt 60 to meet the temperature requirement of Paragraph 619 of the IAEA Regulations, 2012 Edition.

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

S. Faille
Designated Officer pursuant to paragraph 37(2)(a) of
the Nuclear Safety and Control Act

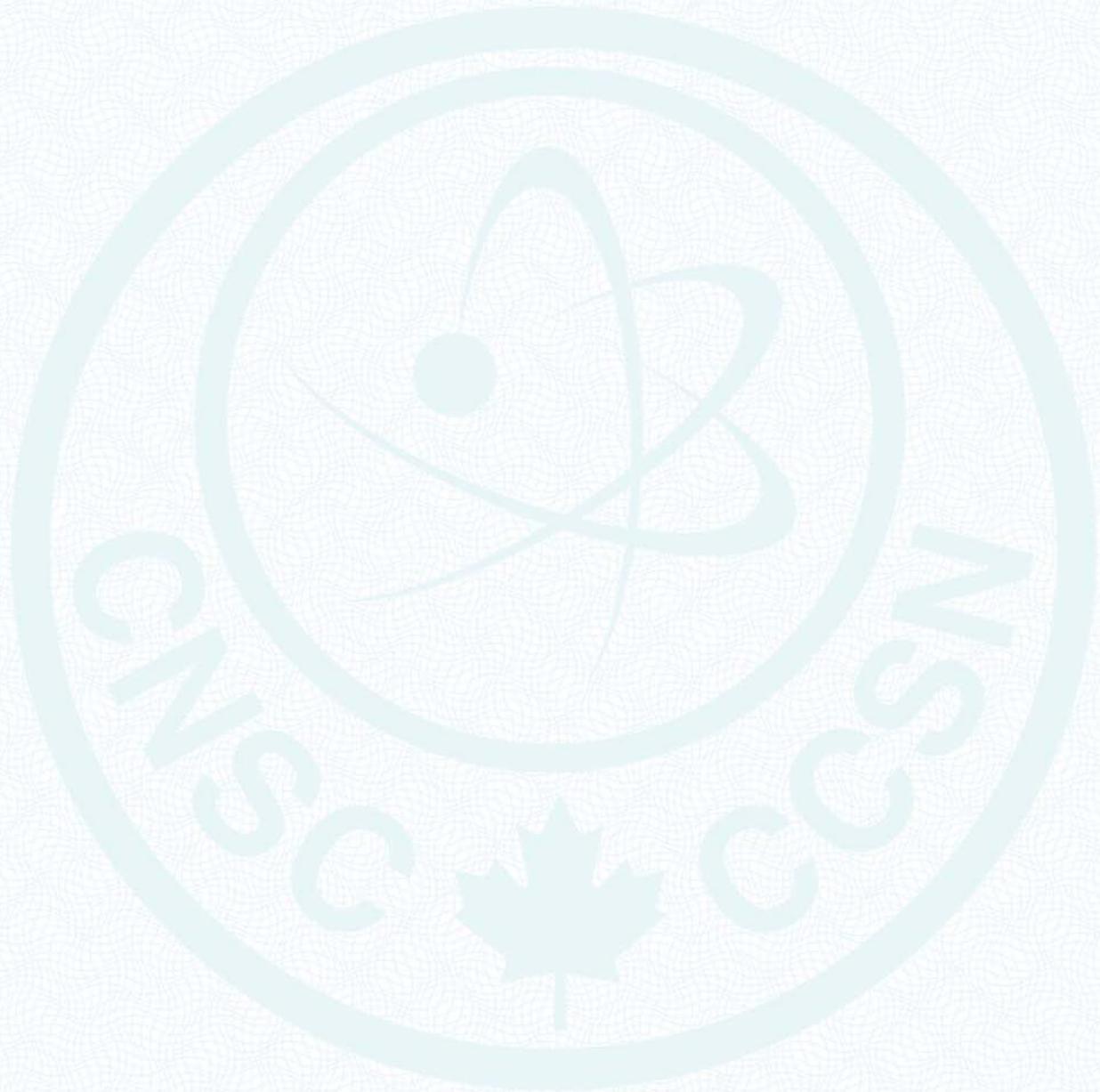


Canada's Nuclear Regulator
L'organisme de réglementation
nucléaire du Canada

NOTES

Revision 8: November 13, 2014. Certificate amended. Cesium 137 added to contents.

Revision 9: January 28, 2016. Certificate renewed.



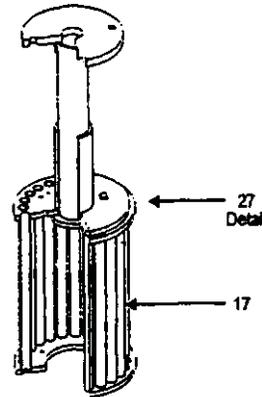
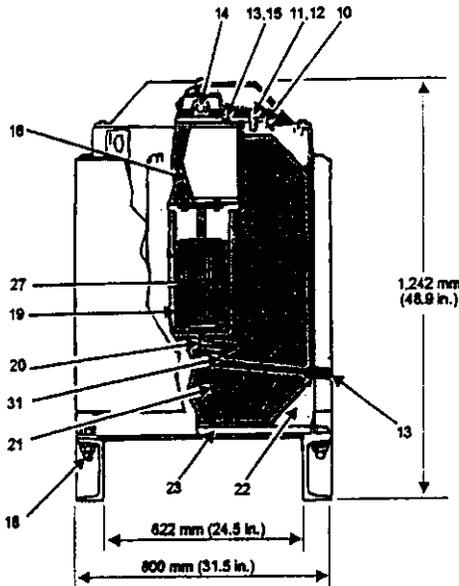
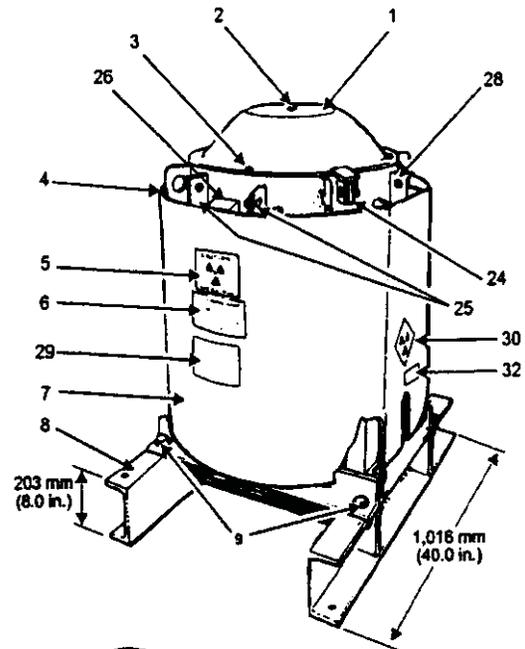
Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canada

Parts List

1. Shield Cap with Neoprene Gasket
2. 1/4 — 13 UNC x 3/4 in. lg Hex Bolt (1)
3. 1/2 — 13 UNC x 1 1/4 in. lg Hex Bolt (4)
4. 1/2 — 13 UNC x 11/16 in. lg Socket Head (4) to Retain Fireshield
5. Radiation Caution Plate (2)
6. MDS Nordion Identification Plate (2)
7. Removable Fireshield
8. Removable Skid
9. Skid Bolts: 1 — 8 UNC x 3 in. lg Hex Head (8)
10. Neoprene Gasket for Plug Assembly
11. Socket Head Screws: 3/4 — 10 UNC x 1 1/2 in. (9)
12. Wire Seal
13. Stainless Steel Pipe Plug
14. Plug Lift Lug
15. Vent Tube (sealed off)
16. RAI Plug Assembly
17. Sealed Source
18. Levelling Screw Block & Screws (3)
19. Cavity
20. Drain Tube
21. Lead Shielding
22. Vermiculite
23. Transite or equivalent: 25 mm (1 in.) thick
24. Cap Brackets (4): 1/2 — 13 UNC x 1 1/4 in. Bolts and Nuts
25. Fireshield Brackets (4): 1 — 8 UNC x 2 1/2 in. Bolts and Nuts
26. Caution Plate/Bracket
27. Source Holder Assembly
28. Fireshield Brackets (2): 3/4 — 10 UNC x 2 1/2 in. Bolts and Nuts
29. Storage Plaque (Heat Emitter) (2)
30. Category Label (2): on opposite sides of container
31. Stainless Steel Wire Brush
32. UN Number Labels (2): one next to each of the two radioactive category labels



Notes

1. CNSC Certificate CDN/2072/B(U)-96
2. Standard F-127 Modified to MDS Nordion Dwg. No.: C101502-A09509
3. Meets IAEA Type B(U) Requirements
4. Lead Shielding: 254 mm (10 in.)
5. Gross Weight: 3,580kg (7,900 lb.)
Plug Weight: 147 kg (325 lb.)
6. Projected Floor Loading: 4,405 kg/m² (905 lb./ft.²)
7. Authorized contents: 2,220 TBq (60,000 Ci) cobalt-60
8. For RAI/F-127 Serial Numbers 59 and up

MDS Nordion

447 March Road, P.O. Box 13500
 Kanata, Ontario, Canada, K2K 1X8
 Tel: (613) 592-2790 · Fax: (613) 592-6937

TITLE

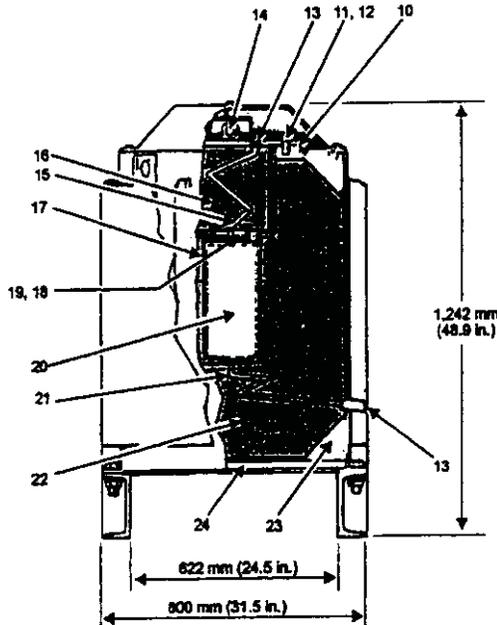
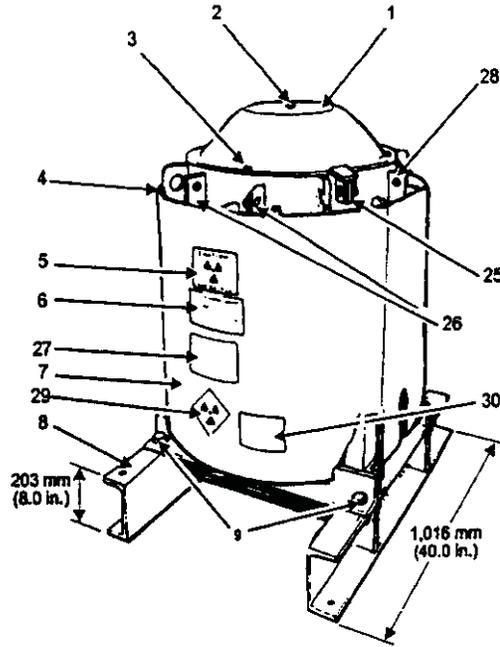
**RAI/F-127 Transport Packaging
 (To IAEA 1996 Transport Regulations)**

REF. IN/SS 1885 RAI-F127-96 C101502-A09509	REVISED Nov 03	DCN A2902-D-01A
DATE JUNE 2002	No.	ISSUE
DRAWN CHECKED APPROVED	RAI/F-127(1996)	3
SHEET 1 OF 1		

THIS DRAWING IS THE PROPERTY OF MDS NORDION INC. AND IS SUBMITTED FOR CONSIDERATION ON THE UNDERSTANDING THAT THERE SHALL BE NO EXPLOITATION OF ANY INFORMATION CONTAINED HEREIN EXCEPT WITH THE SPECIFIC WRITTEN AGREEMENT OF MDS NORDION INC.

Parts List

1. Shield Cap with Neoprene Gasket
2. ½ — 13 UNC x ¾ in. lg Hex Bolt (1)
3. ½ — 13 UNC x 1 ¼ in. lg Hex Bolt (4)
4. ½ — 13 UNC x 11/16 in. lg Socket HD (4) to Retain Fireshield
5. Radiation Caution Plate (2)
6. MDS Nordion Identification Plate (2)
7. Removable Fireshield
8. Removable Skid
9. Skid Bolts: 1 — 8 UNC x 3 in. lg Hex HD (8)
10. Neoprene Gasket for Plug Assembly
11. Stainless Steel Plug Bolts: ¾ — 10 UNC x 1 ½ in. lg Hex HD (9)
12. Wire Seal
13. Stainless Steel Pipe Plug
14. Plug Lift Lug
15. Vent Tube (sealed off)
16. Plug Assembly
17. Removable Insert
18. Spacer Plates (2) - Type I - Removable
19. Spacer Plates (1) - Type II - Removable
20. Cavity - without 3 Spacer Plates 183 mm Dia x 348 mm (6.4 x 13.7 in.)
With 3 Spacer Plates 163 mm Dia x 320 mm (6.4 x 12.8 in.)
21. Drain Tube (sealed off)
22. Lead Shielding
23. Vermiculite
24. Transit or equivalent: 25 mm (1 in.) thick
25. Cap Brackets (4): ½ — 13 UNC x 1 ¼ in. Bolts and Nuts
26. Fireshield Brackets (4): 1 — 8 UNC x 2 ½ in. Bolts and Nuts
27. Storage Plaque (Heat Emitter) (2)
28. Fireshield Brackets (2): ¾ — 10 UNC x 2 ½ in. Bolts and Nuts
29. Category Label (2): on opposite sides of the container
30. UN Number Labels (2): one next to each of the two radioactive category labels



Notes

1. CNSC Certificate CDN/2072/B(U)-96
2. Meets IAEA Type B(U) Requirements
3. Steel Encased Lead Shielding: 254 mm (10 in.)
4. Gross Weight: 3,580 kg (7,900 lb.)
Plug Weight: 147 kg (325 lb.)
5. Projected Floor Loading: 4,405 kg/m² (905 lb./ft.²)
6. Inserts Available:
F-128: Bucket
F-180: Cage for 64 Sealed Sources
F-218: Carrier for 8 Bulk Capsules
F-407: Leakproof insert for C-14
F-415: Bucket
7. Authorized contents: 1) 2,220 TBq (60,000 Ci) cobalt-60
2) 185 TBq (5,000 Ci) carbon-14
8. Drain Tube and Vent Tube are sealed off
9. For F-127-X Serial Numbers 59 and up

MDS Nordion

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TITLE

**F-127-X Transport Packaging
(To IAEA 1996 Transport Regulations)**

REF. INSS 1854 F127X-96
F112701-001

REVISED Nov 03

DCN A2902-D01A

DATE JUNE 2002

No.

F-127-X(1996)

ISSUE

3

DRAWN

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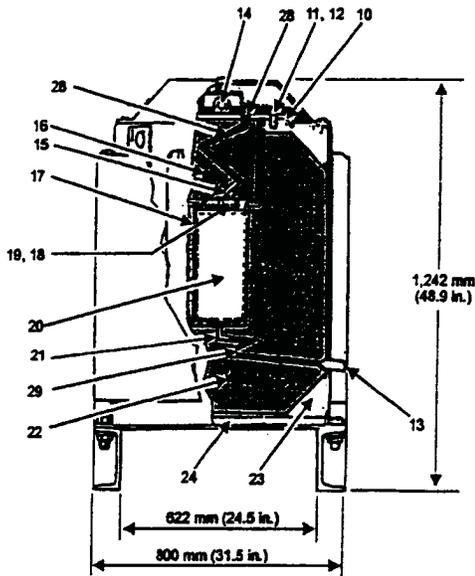
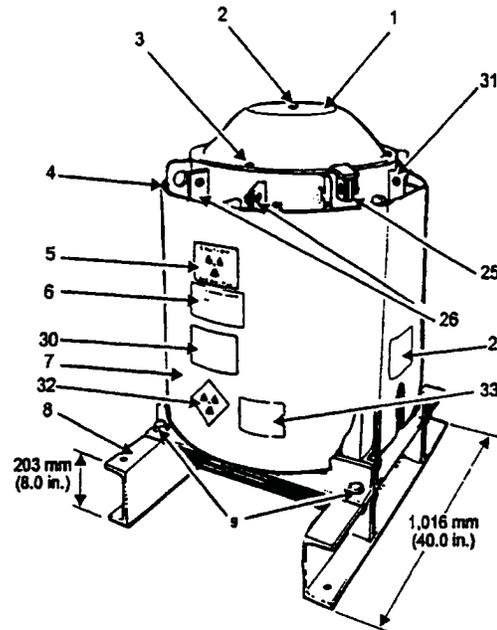
APPROVED

SHEET 1 OF 1

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5. Radiation Caution Plate (2)
6. MDS Nordion Identification Plate (2)
7. Removable Fireshield
8. Removable Skid
9. Skid Bolts: 1 — 8 UNC x 3 in. lg Hex HD (8)
10. Neoprene Gasket for Plug Assembly
11. Stainless Steel Plug Bolts: ½ — 10 UNC x 1 ½ in. lg Hex HD (9)
12. Wire Seal
13. Stainless Steel Pipe Plug
14. Plug Lift Lug
15. Vent Tube
16. Plug Assembly
17. Removable Insert
18. Spacer Plates (2) - Type I - Removable
19. Spacer Plates (1) - Type II - Removable
20. Cavity - without 3 Spacer Plates 163 mm Dia x 348 mm (6.4 x 13.7 in.)
With 3 Spacer Plates 163 mm Dia x 320 mm (6.4 x 12.6 in.)
21. Drain Tube
22. Lead Shielding
23. Vermiculite
24. Transite or equivalent: 25 mm (1 in.) thick
25. Cap Brackets (4): ½ — 13 UNC x 1 ¼ in. Bolts and Nuts
26. Fireshield Brackets (4): 1 — 8 UNC x 2 ½ in. Bolts and Nuts
27. Warning Plate
28. Ventline Safety Cable Assembly
29. Stainless Steel Wire Brush
30. Storage Plaque (Heat Emitter) (2)
31. Fireshield Brackets (2): ½ — 10 UNC x 2 ½ in. Bolts and Nuts
32. Category Label (2): on opposite sides of container
33. UN Number Labels (2): one next to each of the two radioactive category labels



Notes

1. CNSC Certificate CDN/2072/B(U)-98
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TITLE

**F-127 Transport Packaging
(To IAEA 1996 Transport Regulations)**

REF. IN/SS 1863 F127-96
F101102-A06024

REVISED Nov03 DCN A2902-D-01A

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DATE JUNE 2002

No. F-127(1996) ISSUE 3

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SHEET 1 OF 1



U.S. Department
of Transportation

East Building, PHH-23
1200 New Jersey Avenue SE
Washington, D.C. 20590

**Pipeline and
Hazardous Materials
Safety Administration**

CERTIFICATE NUMBER: USA/0509/B(U)-96, Revision 9

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