



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration

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

**COMPETENT AUTHORITY CERTIFICATION FOR A
TYPE B(U)
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0714/B(U)-96, REVISION 3
REVALIDATION OF CANADIAN COMPETENT AUTHORITY
CERTIFICATE CDN/2084/B(U)-96**

The Competent Authority of the United States certifies that the radioactive material package design described in this certificate satisfies the regulatory requirements for a Type B(U) package as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America². The package design is approved for use within the United States for import and export shipments made in accordance with applicable international and domestic transport regulations.

1. Package Identification - Best Theratronics F-423 transport package containing a Gammacell 220 irradiator.
2. Package Description and Authorized Radioactive Contents - as described in Canadian Certificate of Competent Authority CDN/2084/B(U)-96, Revision 3 (attached). The package is authorized to contain a maximum of 963 TBq (26,000 Ci) of Cobalt-60 in a maximum of forty eight sealed sources. Each sealed source is authorized to contain a maximum of 185 TBq (5,000 Ci). Authorized sealed sources are identified in paragraph 4 of this certificate.
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 Engineering and Research, (PHH-23), Pipeline and Hazardous

¹ "Regulations for the Safe Transport of Radioactive Material, 2012 Edition, No. SSR-6" 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/0714/B(U)-96, REVISION 3

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.
 - d. Records of Management System activities required by Paragraph 306 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. Special Conditions - The sealed sources authorized are:
- a. Any sealed source which meets the requirements of special form radioactive material, or
 - b. MDS Nordion C-166, MDS Nordion C-167, MDS Nordion C-185 or J.L Shepherd 7810-220 sealed sources. These sources must have been leak tested within six months of transport and must not have been damaged during their service life.
5. Marking and Labeling - The package shall bear the marking USA/0714/B(U)-96 in addition to other required markings and labeling.
6. Expiration Date - This certificate expires on June 30, 2025. Previous editions which have not reached their expiration date may continue to be used.

CERTIFICATE USA/0714/B(U)-96, REVISION 3


This certificate is issued in accordance with paragraph(s) 810 of the IAEA Regulations and Section 173.473 of Title 49 of the Code of Federal Regulations, in response to the May 26, 2020 petition by Best Theratronics Ltd., Ottawa, Ontario, and in consideration of other information on file in this Office.

Certified By:



June 12, 2020

(DATE)

 William Schoonover
Associate Administrator for Hazardous
Materials Safety

Revision 3 - Issued to revalidate Canadian Certificate of Competent Authority No. CDN/2084/B(U)-96, Revision 3, subject to special conditions listed in paragraph 4 of this certificate.



Certificate

CDN/2084/B(U)-96 (Rev. 3)

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: **Best Theratronics**
Make/Model: **F-423 Transport Package**
Mode of Transport: **Air, Sea, Road, Rail**

IDENTIFICATION MARK

The package shall bear the competent authority identification mark "**CDN/2084/B(U)-96**".

PACKAGE DESCRIPTION

The F-423/GC220 consists of a stainless steel overpack construction filled with 203 mm thick polyurethane foam on the sides and 306 mm thick polyurethane foam on the ends and 102 mm of polyurethane foam in the bottom. The overpack is closed by a lid which consists of a 12.7 mm thick stainless steel top, a 6.4 mm thick steel sheet on the bottom and a 102 mm thick polyurethane foam in between. The lid is closed by forty 25.4 mm diameter bolts and includes a neoprene gasket.

The F-423 cavity contains a Gammacell 220 irradiator which is further retained in a stainless steel inner frame filled with polyurethane foam and a polyurethane foam bonnet and lower crush pad. The shielding is provided by the GC220 shielding head, which consist of a minimum 254 mm of lead, encased in a steel shell. The shielding material may also contain depleted uranium or tungsten.

Any modification to the package design must be submitted to the Canadian Nuclear Safety Commission for approval prior to implementation.



Illustrations of the package are shown on attached Best Theratronics Drawing No. F-423 (Issue 5), Sheets 1 to 3.

The configuration of the package is as follows:

Shape:	Rectangular	Shielding:	Lead
Mass:	9530 kg	Outer Casing:	n/a
Length:	2197 mm	Height:	2042 mm
Width:	1677 mm	Diameter:	n/a

AUTHORIZED RADIOACTIVE CONTENTS

The F-423/GC220 package is authorized to contain a maximum of 963 TBq of Co-60 in a maximum of 48 sealed sources having a maximum of 185 TBq per source.

The source models authorized are:

- the MDS Nordion C-198 which meets the requirements for special form radioactive material;
- the MDS Nordion C-166, C-167 and C-185 or the J.L. Shepherd source model 7810-220, or
- any sealed sources with a valid special form radioactive material certificate.

QUALITY ASSURANCE

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

- Best Theratronics Procedure No. IN/DS 2190 F423(4) "Design, Manufacturing and Operating Specifications for the F-423 Package"
- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition

SHIPMENT

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

- Best Theratronics Procedure No. IN/DS 2190 F423 (4) "Design, Manufacturing and Operating Specifications for the F-423 Package"
- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 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.

K. Owen-Whitred

K. Owen-Whitred
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 2: May 6, 2015. Certificate renewed.

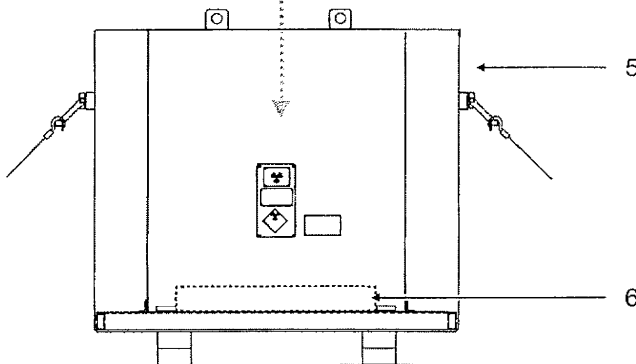
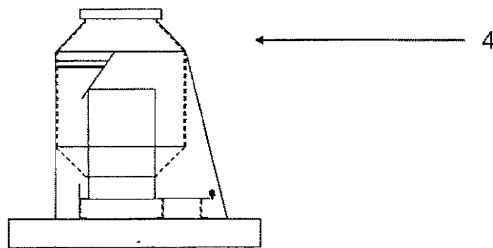
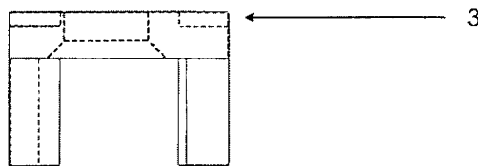
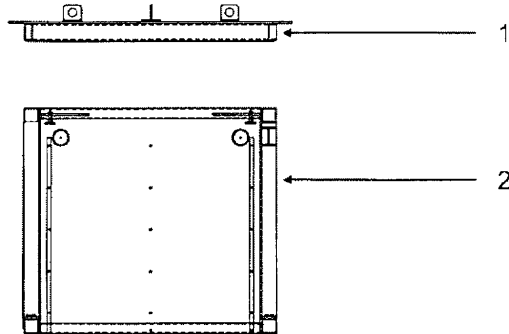
Revision 3: May 26, 2020. Certificate renewed.



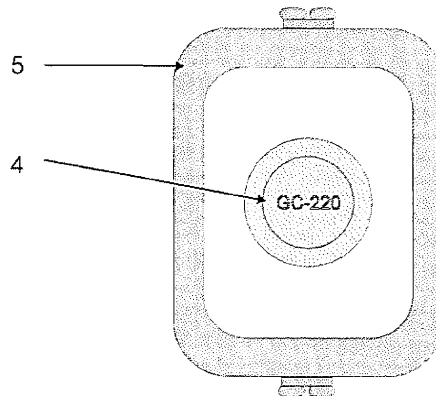
Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

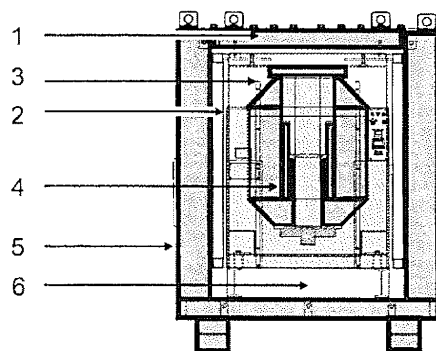
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ASSEMBLY SEQUENCE



Plan View



Sectional View

Notes

1. Meets IAEA Type B(U)-96 Requirements
2. Gross weight: 9,530 kg (21,000 lb.)
3. Floor loading (based on projected floor area): 2,590 kg/m² (530 lb./ft.²)
4. Maximum Radioactive Contents: 963 TBq (26,000 Ci) of Co-60
5. Preparation for shipment as per IN/PP 1554 F423/GC220

Parts List

1. Lid (see sheet 2)
2. Inner frame (see sheet 2)
3. Bonnet (see sheet 3)
4. Gammacell 220 (prepared for shipment) (see sheet 3)
5. F-423 Overpack (see sheet 2)
6. Lower Crush Pad (see sheet 2)

APR 16 2010

Best
Theratronics

413 March Road
Ottawa, Ontario
Canada, K2K 0E4
Tel: (613) 591-2100

TITLE

F-423 Transport Package

REF. IN/SS 1574 F423

REVISED Apr 10

DC 30466

DATE May 2000

No.

F-423

ISSUE

5

DRAWN

CHECKED

APPROVED

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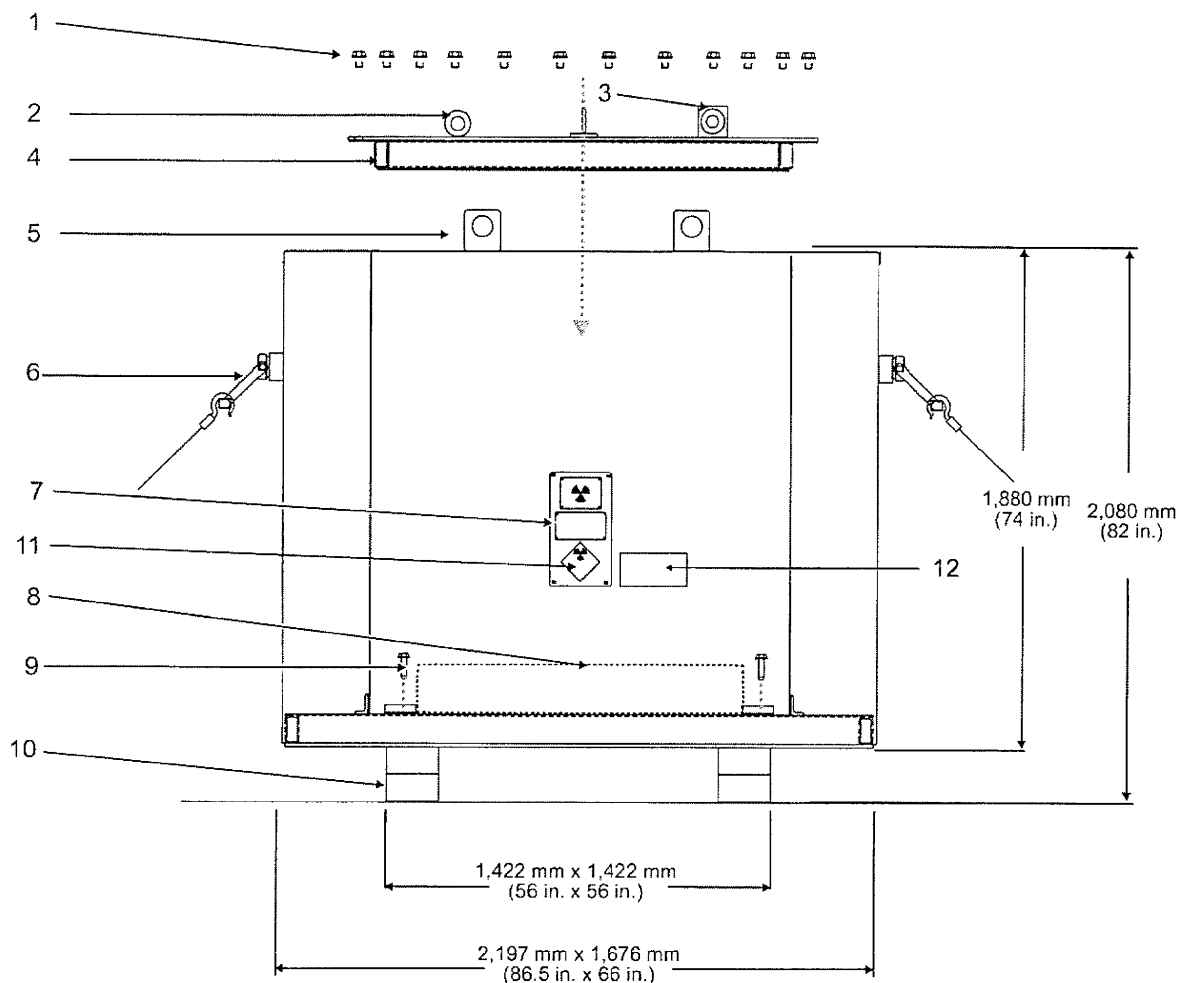
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SHEET 1 OF 3

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F-423 OUTER ASSEMBLY



Parts List

1. Screws (40 1.00-8 UNC x 2.5 LG alloy steel)
2. Lift Lug Guard (1 shown) (4)
3. Lift Lug (1 shown) (4)
4. Lid
5. Lift Lugs (4)
6. Tie-Down Rings (4)
7. Radiation warning and Identification plates (displayed on all 4 sides)
8. Lower Crush Pad
9. Screw (8 hex socket head, 0.63 -11 UNC-3A, 1.5 in long)
10. Foot Pad
11. Radioactive Category Labels (4)
12. UN Number Labels (4): one next to each of the radioactive category labels

Notes

1. Lid Weight: 470 kg (1,040 lb.)
2. Overpack Weight: 3,950 kg (8,710 lb.)
3. Lower Crush Pad Weight: 175 kg (390 lb.)
4. Lid: 1,715 mm x 1,400 mm (67.5 in. x 55.0 in.)
Opening: 1,550 mm x 1,232 mm (61 in. x 48.5 in.)

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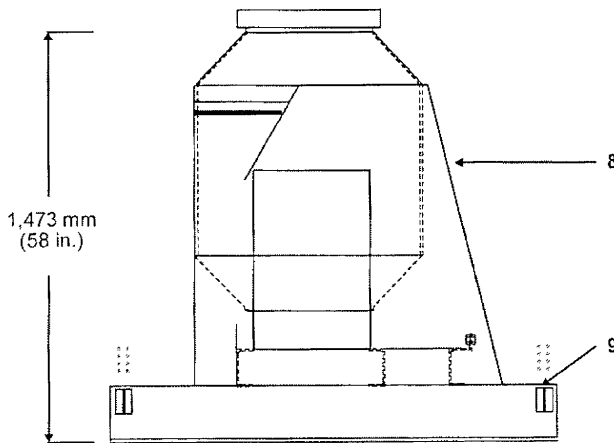
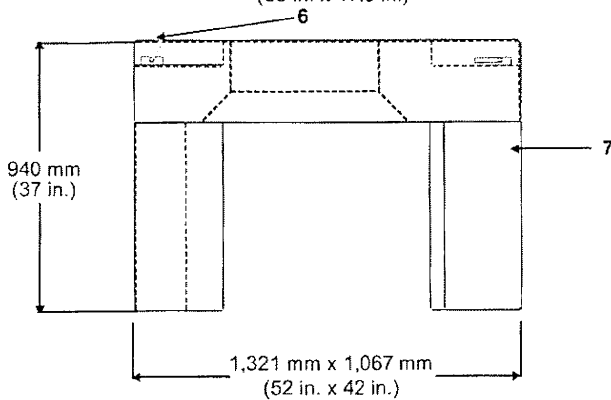
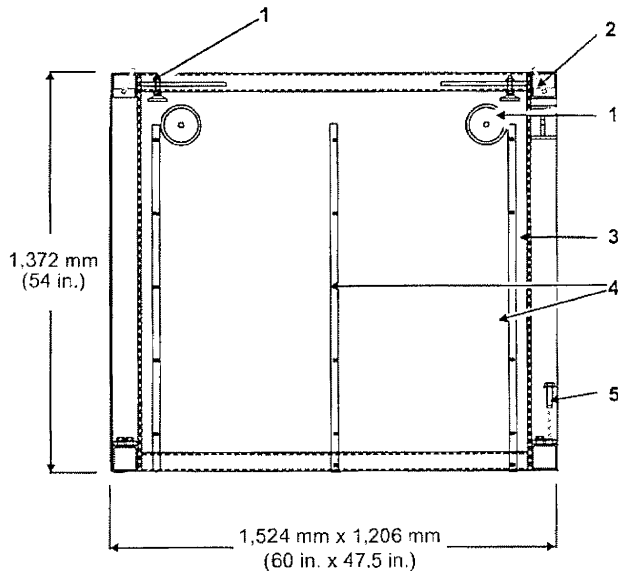
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SHEET 2 OF 3

F-423 INNER ASSEMBLY



Parts List

1. Clamping Pad (12)
2. Inner Assembly Hoist Ring (max. 5,000 lb.) 4x
3. Inner Frame
4. Rub Bars (10)
5. 0.62-11 UNC x 5.25 LG Cap Screw
(8x used to fasten inner frame to GC-220)
6. Bonnet Hoist Ring (max. 5,000 lb.) 4x
7. Bonnet
8. GC-220 Prepared for Shipment
9. Threaded holes for screws (see 5)

Notes

1. Inner Frame Weight: 570 kg (1,260 lb.)
2. Bonnet Weight: 395 kg (870 lb.)
3. For a detailed depiction of the GC-220, see specification IN/SS 1576 GC220

APR 16 2010

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Theratronics

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Canada, K2K 0E4
Tel: (613) 591-2100

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REF. IN/SS 1574 F423

REVISED Apr 10 DC 30466

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No. **F-423**

ISSUE

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SHEET 3 OF 3

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CERTIFICATE NUMBER: USA/0714/B(U)-96

ORIGINAL REGISTRANT(S) :

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Ottawa, Ontario, K2K 1X8
Canada

Best Theratronics Ltd.
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CANADA