

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

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2. PREAMBLE

- a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."
- b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

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| <p>a. ISSUED TO (<i>Name and Address</i>)</p> <p>QSA Global, Inc.
40 North Avenue
Burlington, MA 01803</p> | <p>b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION</p> <p>Safety Analysis Report for the Model No. 880 Series
Transport Packages, Revision No. 12,
dated June 2017.</p> |
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4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

Packaging

- (1) Model No. 880 Series Packages
- (2) Description

The Model No. 880 series packages are designed for use as radiography exposure devices (or source changers) and as transport packages for Type B quantities of radioactive material in special form. The Model No. 880 series packages have four versions called the 880SC, 880 Delta, 880 Sigma, and the 880 Elite. The 880 Delta and the 880SC have a maximum capacity of 150 Curies of Iridium-192 or 150 Curies of Selenium-75, the 880 Sigma has a maximum capacity of 130 Curies of Iridium-192 or 150 Curies of Selenium-75, and the 880 Elite has a maximum capacity of 50 Curies of Iridium-192 or 150 Curies of Selenium-75. The Delta and Sigma versions are identical and the Elite has a lighter weight depleted uranium shield. The 880SC version is identical to the Delta version except for a different lock plate assembly for the front and rear plates. There are three versions of an optional jacket to facilitate the use of the 880 Delta, Sigma and Elite packages as a radiography device/source changer and transport package. The 880SC can only use the Version 1 jacket.

The 880 Delta, 880 Sigma, and 880 Elite versions of the package, without the jacket, are cylindrical in shape with a diameter of 5 inches (127 mm) and a length of 13 5/16 inches (338 mm). With the Version 1 of the jacket, the shape of the package is an extruded triangle 9 inches (229 mm) high, 7 1/2 inches (191 mm) wide, and 13 5/16 (343 mm) inches long. With the Version 2 of the jacket, the package measures 13 1/2 inches (343 mm) long by 6 inches (152 mm) wide by 11.33 inches (288 mm) tall. With the Version 3 of the jacket, the package measures approximately 13 1/2 inches (343 mm) long by 6 inches (152 mm) wide by 9.7 inches (246 mm) tall.

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5.(a) (2) Description (continued)

The 880SC version of the package, without the jacket, is cylindrical in shape with a diameter of 5 inches (127 mm) and a length of 15 ¼ inches (387 mm). With Version 1 of the jacket, the only one that can be used, the shape of the package is an extruded triangle 9 inches (229 mm) high, 7 ½ inches (191 mm) wide, and 15 ¼ inches (387 mm) long.

The weight of the Delta and Sigma versions is 46 pounds (21 kg) without the jacket, 52 pounds (24 kg) with Version 1 of the jacket and 55 pounds (25 kg) with Version 2 or 3 of the jacket. The weight of the Elite version is 37 pounds (17 kg) without the jacket, 42 pounds (19 kg) with Version 1 of the jacket, and 45 pounds (20 kg) with Versions 2 or 3 of the jacket. The weight of the 880SC is 46 lbs (21 kg) without the jacket, and 52 pounds (24 kg) with Version 1 of the jacket.

The major components of the packages consist of a welded stainless steel cylindrical body, a depleted uranium shield, a containment system, and optional jackets. The Delta, Elite, and Sigma versions have a stainless steel rear plate with a locking assembly and a stainless steel front plate with a shielded port. The 880SC version has lock assembly plates and a shipping plug assembly.

The welded cylindrical body consists of a 5 inch (127 mm) diameter, 0.06 inch (1.5 mm) wall tube shell with 0.12 inch (3 mm) end-plates. A U-bracket is welded to each end-plate and is located on the inside cavity of the shell tube. The depleted uranium shield is centrally located within the welded body between the end-plate and is fastened to each U-bracket by a 0.37 inch (9.5 mm) diameter titanium shield pin. A U-shaped copper spacer fills the gap between the shield and the U-bracket. An S-shaped titanium source tube is cast into the center of the shield to provide a cavity for the source wire assembly and shipping plug assembly to travel through during use.

For the Delta, Sigma, and Elite versions, the front and rear plates are attached to the welded body with four tamperproof screws through rivnuts assembled into end-plates. The rear plate assembly consists of a source locking mechanism fastened to the rear plate. The front plate assembly consists of a shielded port mechanism contained within the front plate.

For the 880SC, front and rear locking plate assemblies are attached to the welded body with four tamperproof screws through rivnuts assembled into end-plates.

These locking assemblies, which are interchangeable, are used to secure a source wire assembly on one end of the package and a shipping plug assembly on the opposite end of the package. The locking plate assembly consists of a locking mechanism, consisting of a keyed plunger lock, fastened to the plate. The keyed plunger lock can only be engaged when the source wire and shipping plug assemblies are located in the fully shielded position.

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5.(a) (2) Description (continued)

For the 880SC version, a shipping plug assembly is loaded into the other locking plate assembly on the opposite side of the package. During transport and storage, this shipping plug assembly provides additional shielding to the package and it is only removed during radiography operations.

An optional polyurethane jacket covers the package cylinder, provides a handle and a stable base, and is attached to the shell cylinder either by rivets or screws located outside the shield cavity area. Version 1 of the jacket has a handle section that contains a wire molded in for additional reinforcement. Version 2 of the jacket incorporates wheels on the base to facilitate movement during use as a radiography exposure device. Version 3 of the jacket incorporates a PM-Tag assembly used for unit tracking purposes.

(3) Drawings

The packaging is constructed in accordance with the QSA Global, Inc., drawings R88000, Rev. W, sheets 1-6, and R88095, Rev. A, sheets 1-2, R880SC, Rev. E, sheets 1-6.

(b) Contents

(1) Type and form of material

Iridium-192 as a sealed source which meets the requirements of special form radioactive material.

Selenium-75 as a sealed source which meets the requirements of special form radioactive material.

(2) Maximum quantity of material per package

150 Curies (5.55 TBq) (output) Ir-192 for the Model No. 880 Delta and 880SC.
150 Curies (5.55 TBq) Se-75 for the Model No. 880 Delta and 880SC.

130 Curies (4.81 TBq) (output) Ir-192 for the Model No. 880 Sigma.
150 Curies (5.55 TBq) Se-75 for the Model No. 880 Sigma.

50 Curies (1.85 TBq) (output) Ir-192 for the Model No. 880 Elite.
150 Curies (5.55 TBq) Se-75 for the Model No. 880 Elite.

Output curies for Ir-192 are determined by measuring the source output at 1 meter and expressing its activity in curies derived from the following: 0.48 R/(hr-Ci) (Ref: American National Standards Institute N432-1980, "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography").

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(3) Maximum weight: 18 grams.

(4) Maximum decay heat: 3 Watts.

6. In addition to the requirements of Subpart G of 10 CFR Part 71:

- (a) The package must meet the Acceptance Tests and Maintenance Program of Chapter 8.0 of the application; and,
- (b) The package shall be prepared for shipment and operated in accordance with the Operating Procedures in Chapter 7.0 of the application.

7. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.

8. Revision No. 10 of this certificate may be used until September 30, 2018.

9. Expiration date: June 30, 2021.

REFERENCES

QSA Global, Inc., application "Model 880 Series Type B(U)-96 Transport Package", Revision No. 12, dated June 2017.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

/RA/

John McKirgan, Chief
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Date: September 12, 2017.