

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

1. a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE	PAGES
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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

- | | |
|---|---|
| a. ISSUED TO (<i>Name and Address</i>)
QSA Global, Inc.
40 North Avenue
Burlington, MA 01803 | b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION
QSA Global, Inc., application dated April 25, 2018. |
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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.

(a) Packaging

- (1) Model No.: 360
- (2) Description

The Model No. 360 series of packages consist of a family of five package configurations used to transport Ir-192, Yb-169, and Se-75 source assemblies that meet the requirements for special form material. These five packages are the Model Nos. 360-2, 360-4, 360-4W, 360-10, and 360-10W. The external dimensions of all models are identical and are approximately: 15 inches [38 centimeters (cm)] long, 13.5 inches (34 cm) wide, and 15.9 inches (40 cm) tall.

The major components of the package include: (i) the container assembly, (ii) the shield assembly, (iii) the shield retainer, (iv) the source securing assembly, (v) the cover assembly, and (vi) the source assemblies. Shielding is provided by either all tungsten or a combination of tungsten and depleted uranium shields. Models with the "W" designation use all tungsten shielding. An optional adapter tungsten shield can also be added to the top side of the Model No. 360 for additional shielding.

Depending on the source assembly to be transported, the source capsule will be attached to either a flexible steel wire or will be incorporated into a segment of a source chain. Each source securing mechanism incorporates a locking mechanism to secure the source inside the package and a source dust cap to further protect the end of the source assembly during transport. A lock assembly will secure the various lengths of the source assemblies in the Model Nos. 360-2, 360-4, and 360-4W. Those models have

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

the option of three loading positions: bottom, middle, or top. For the Model Nos. 360-10 and 360-10W, chain assemblies, which are shorter in length, will be secured to the locking assembly via stainless steel jumper extensions.

The maximum weight of the package varies depending on the configuration. The maximum package weights are listed in the table below:

Model No.	Package Weight
360-2	110 lbs. (50 kg)
360-4	130 lbs. (59 kg)
360-4W	155 lbs. (70.3 kg)
360-10	170 lbs. (77 kg)
360-10W	180 lbs. (82 kg)

(3) Drawings

The package is constructed in accordance with QSA Global, Inc., Drawing No. R36000, Rev. G, sheets 1-10.

The package user should reference QSA Global, Inc., Drawing No. R360-User, Revision C, sheets 1-2.

(b) Contents

(1) Type and form of material

Iridium-192 (Ir-192), Selenium-75 (Se-75), and Ytterbium-159 (Yb-159), as sealed sources, which meet the requirements of special form radioactive material.

All source wire assemblies consist of the source capsule attached to either a flexible steel wire or incorporated into a segment of a source chain.

(2) Maximum quantity of material per package:

The maximum quantity of Se-75 and Yb-169 is 5,000 curies (Ci) for all variations of the Model No. 360 transportation package. For Ir-192, the values may depend on the location of the package and are listed in Table 1 below.

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5. (b) (2) Maximum quantity of material per package (continued):

Table 1

Model No.	Activity Shield Location	Maximum Package Capacity	Maximum Number of Sources
360-2	Bottom	300 Ci	2
	Top or Middle	270 Ci	
360-4	Bottom	600 Ci	4
	Top of Middle	540 Ci	
360-4W	Any	260 Ci	4
360-10	Any	1,500 Ci	10
369-10W	Any	170 Ci	10

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").

- (3) Maximum weight of contents:

0.3 lbs. (138 grams) for the Model No. 360-2 package.

0.6 lbs. (276 grams) for the Model Nos. 360-4 and 360-4W packages.

1.5 lbs. (690 grams) for the Model Nos. 360-10 and 360-10W packages.

The maximum content weight includes the mass of radioactive material and the source capsule handling wire assembly for a shipment containing the maximum number of source wire assemblies that can be transported in a package (i.e., 2 source assemblies for the Model No. 360-2, 4 source assemblies for the Model Nos. 360-4 and 360-4W packages, and 10 source assemblies for the Model Nos. 360-10 and 360-10W packages).

- (4) Maximum decay heat: 21 watts

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

- (a) The package shall be prepared for shipment and operated in accordance with the Operating Procedures in Section No. 7 of the application;
- (b) The package must meet the Acceptance Tests and Maintenance Program of Section No. 8.0 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.

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8. Revision No. 2 of this certificate may be used until August 31, 2020.
9. Expiration date: August 31, 2023.

REFERENCES

QSA Global, Inc., application dated April 25, 2018.

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: 8/27/18

