

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

1. a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE	PAGES
9371	4	71-9371	USA/9371/B(U)-96	1	OF 4

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 (*Name and Address*)

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.

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, 12.5 inches (32 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 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.

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

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. K, sheets 1-10.

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

(b) Contents

(1) Type and form of material

Iridium-192 (Ir-192), Selenium-75 (Se-75), and Ytterbium-169 (Yb-169), 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 source activity in package shielding and are listed in Table 1 below.

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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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

(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, as supplemented;
- (b) The package must meet the Acceptance Tests and Maintenance Program of Section No. 8.0 of the application; and
- (c) In conjunction to the requirements of 6.(a) the package shall be lifted and tied down for transport as presented in QSA Global, Inc. Service Bulletin SB-19 Revision March 2023.

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. 3 of this certificate may be used until August 31, 2023.

9. Expiration date: August 31, 2028.

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REFERENCES

QSA Global, Inc., application dated April 25, 2018 as supplemented on August 29, 2022, March 22, 2023, March 29, 2023, and March 31, 2023.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Bernard White

White, Bernard signing on behalf
of Diaz-Sanabria, Yaira
on 04/21/23

Yaira K. Diaz Sanabria, Chief
Storage and Transportation Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

Date: See digital signature



SAFETY EVALUATION REPORT

Docket No. 71-9371
Model No. 360 Series Package
Certificate of Compliance No. 9371
Revision 4

GENERAL EVALUATION

By application dated August 29, 2022 (Agencywide Documents Access and Management System {ADAMS} Accession No. ML22251A097), as supplemented on March 22, 2023, March 29, 2023, and March 31, 2023 (ADAMS Accession Nos. ML23086C020, ML23090A172, and ML23095A068, respectively), QSA Global, Inc. requested an amendment to and renewal of Certificate of Compliance No. 9371, for the Model No. 360 Series package. Changes made to the enclosed certificate are indicated by vertical lines in the margin.

Following staff review of changes made to the associated safety analysis report (SAR), the staff finds that they do not affect the ability of the package to meet the requirements of title 10 of the *Code of Federal Regulations* (10 CFR) Part 71.

Packaging Drawings

The applicant submitted two revised drawings:

R36000, Rev. K (Sheets 1-10) Model 360 Transport Package

R360-USER, Rev. F (Sheets 1-2) Model 360 Transport Package

EVALUATION

The staff has reviewed the revised SAR and have determined that the changes have no impact on the packaging design, structural integrity, or safety functions. Therefore, the staff determined that the changes are acceptable.

The staff finds that the changes do not affect the ability of the package to meet the requirements of 10 CFR part 71.

Description of Structural Design

The applicant has proposed removal of the package hoist/tie-down rings, which are currently employed during package lifting as well as tie-down during transport. Therefore, the applicant is proposing sole reliance on the package grip brackets for lifting and tie-down operations. The proposed changes are reflected in revision 7 of the SAR and are illustrated in section 1.3.1 (drawing R36000, Rev. K) and 1.3.2 (drawing R360-USER, revision F). The drawings in SAR sections 1.3.1 and 1.3.2 are also proposed to be revised to indicate the material for the attachment hardware associated for the grip brackets.

The applicant has also proposed an alternate material of nylon-coated carbon steel (from the original stainless steel) for the optional cable assembly on the source securing mechanism shown in SAR figure 1.2L and section 1.3.1 (drawing R36000).

Hoist/tie-down rings

The hoist/tie-down rings and their associated hardware are removed from the package drawings and the body of the SAR. Staff notes that the hoist rings are still presented in the lifting evaluation presented in section 2.12.5 of the SAR, as the applicant determined that it should remain as legacy documentation.

Grip brackets

The materials of the grip brackets and their associated hardware are added to SAR table 3.2a, "Materials of Components Important to Safety" as they are employed as lifting and tie-down for this Type B Special Form transportation package, and as such, are identified as Category B package components per NUREG/CR-6407, "*Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety*". The materials of the grip brackets and their associated hardware presented in sections 1.3.1 and tables 2.2a and 3.2a. Staff reviewed these SAR sections and concludes that the materials meet the requirements of 10 CFR 71.43(d) as well as not being susceptible to brittle failure at the cold environmental operating conditions required per 10 CFR 71.71(c)(2).

The structural evaluation of the grip brackets as lifting devices is presented in SAR section 2.12.5, while their evaluation for tie-down purposes is presented in revised SAR section 2.12.6. Staff reviewed the lifting evaluation for the grip brackets employed in tandem and determined that they are capable of withstanding the required loading, considering the factor of safety of three (3), without exceeding the material yield strength. The staff reviewed the tie-down evaluation for the grip brackets, and determined that, based on the tie-down configuration in SAR Figure 3.3, they are capable of withstanding the required loading without exceeding the material yield strength. Therefore, staff determined that the lifting and tie-down requirements of 10 CFR 71.45 are satisfied.

Cable assembly

The optional cable assembly of the source securing mechanism attaches to the top of the cap cover and is anchored to a lower part of the mechanism assembly, allowing easy retrieval of the cap cover once it is removed. The staff determines that the applicant's proposed alternate material change to nylon-coated carbon steel is acceptable because the cable assembly is optional and serves no safety function for meeting 10 CFR Part 71.

Evaluation Findings

The staff reviewed the proposed changes summarized above and has the following findings:

Drawings submitted with the application provide a sufficiently detailed description of the structural and material properties of the package that meets the requirements of 10 CFR 71.33.

The staff has reviewed the package and concludes that the applicant has met the requirements of 10 CFR 71.43(d) for materials that exhibit no chemical or galvanic reaction with other packaging components or contents, as well as materials that exhibit no degradation when irradiated.

The staff has reviewed the lifting and tie-down systems for the package and concludes that they satisfy the material yield strength limitation requirements of 10 CFR 71.45(a) for lifting and 10 CFR 71.45(b) for tie-down.

The staff reviewed the material performance of the packaging under the normal conditions of transport required by 10 CFR 71.71(c)(2) and concludes that there will be no substantial reduction in the effectiveness of the packaging such that it satisfies the requirements of 10 CFR 71.51(a)(1) for a Type B package.

Based on review of the statements and representations in the application, the NRC staff concludes that the package has been adequately described and evaluated to demonstrate that it satisfies the structural and material integrity requirements of 10 CFR Part 71.

CONDITIONS

In addition to small editorial changes to the certificate, the following changes have been made:

Condition No. 5(a)(2), "Description," was revised to reflect updated dimensions resulting from the removal of the hoist rings in the package description.

Condition No. 5(a)(3), "Drawings," was updated to reflect the latest revisions of drawing Nos. R36000, Revision K (Sheets 1 - 10), "Model 360 Transport Package," and R360-USER, Revision F (Sheets 1 - 2), "Model 360 Transport Package. "

Condition No. 5(b)(1), "Contents," was edited to correct a typo.

Condition No. 6 has been edited to add an element to the condition identifying a reference containing details of lifting and tie-down procedures for the user of the package found in QSA Global, Inc. Service Bulletin SB-19 Revision March 2023.

Condition No. 8 has been edited to specify the termination date of the previous revision of the certificate (Revision 3).

Condition No. 9 has been revised to reflect a new expiration date of August 31, 2028.

The application date for this amendment was added to the REFERENCES section.

CONCLUSION

Based on the statements and representations in the application and the conditions listed above, the staff concludes that the Model No. 360 package design has been adequately described and evaluated, and that these changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9371, Revision No. 4.