TROXLER TRANSPORTATION GUIDE

This guide applies to Troxler nuclear gauges transported to, from, or within the United States.

Revision 37
(March 2022)

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PN 106978
Revision 37
March 2022

TRANSPORTATION GUIDE

OVERVIEW AND APPLICABILITY

This guide is designed to assist Troxler nuclear gauge users in complying with U.S. Department of Transportation (DOT) hazardous material (hazmat) regulations and International Air Transport Association (IATA) Dangerous Goods Regulations. Within the US DOT, the Pipeline and Hazardous Materials Safety Administration (PHMSA) is responsible for regulating and ensuring the safe and secure movement of hazardous materials to industry and consumers by all modes of transportation. The U.S. DOT regulations are published in Title 49 of the Code of Federal Regulations, Parts 100-185 (49 CFR 100-185), which can be viewed online at the PHMSA web site: https://www.phmsa.dot.gov/phmsa-regulations. IATA Dangerous Goods Regulations may be purchased from the IATA online store at: http://www.iata.org.

This guide highlights and explains the major requirements for shipping and transporting portable nuclear gauges in the U.S. However, use of this guide is not a substitute for reading and understanding the applicable regulatory requirements cited above. While every effort is made to keep the guide up-to-date, Troxler makes no warranty express or implied regarding the completeness and accuracy of the information contained herein. Responsibility for compliance with all regulatory requirements lies solely with those who persons prepare, ship, and transport nuclear gauges.

The U.S. DOT HAZMAT regulations apply to all U.S. domestic shipments by all modes of transport. IATA regulations apply to all shipments by air, both international and domestic. When shipping a nuclear gauge by Federal Express®, the gauge must be prepared in accordance with IATA regulations for shipment by air. Throughout this guide, you will see references to the applicable sections of the U.S. DOT regulations given in brackets, such as [§173.410].

The focus of this guide is on preparing nuclear gauges for shipment via common carriers and on transporting gauges as a private carrier. Private carriers generally own the goods (nuclear gauge) being transported and the transportation of the goods is incidental to their regular business activity. A company that owns a nuclear gauge and transports it to and from job sites in the course of business is considered a private carrier. Common and contract carriers, on the other hand, are “for hire” carriers whose primary business is transportation of goods for others.

The major requirements that apply to shipping a gauge via common carrier or transporting a gauge as private carrier include:

- A current copy of the International Atomic Energy Agency (IAEA) Certificate of Competent Authority (special form certificate) for each source in the gauge must be on file.
- The gauge must be in a TYPE A package and a copy of the complete TYPE A package testing results must be on file.
- The package must be properly marked, labeled, sealed, and inspected prior to each shipment.
- The package must be properly loaded and secured in the vehicle.
- Properly completed shipping papers (bill of lading) must be in the transport vehicle and immediately accessible to the driver
- An Emergency Response Information document must be in the transport vehicle with the shipping papers and immediately accessible to the driver
- An emergency response phone number must be manned continuously while the gauge is in transit (this service is provided free of charge by Troxler)

- A certificate of training must be on file for each hazmat employee involved in the shipment, essentially any individual involved in packaging, preparing shipping papers, or transporting a nuclear gauge (training classes are offered by Troxler).

TRAINING

If you own portable nuclear gauges, HAZMAT training is critical to your business. According to the U.S. DOT Office of Hazardous Material Safety:

> *"More than one-third of the Department's enforcement actions pertaining to violations of the hazardous materials transportation regulations involve the failure of hazmat employers to provide training or maintain test records. In most cases, violations are attributed to failure to provide function specific training. For example, an investigator questions incorrect entries on a shipping paper prepared by a hazmat employee who responds that he was not instructed, nor tested, by his hazmat employer regarding the preparation of shipping papers."*

The regulations define a *hazmat employee* as a person (including a self-employed person) who is employed by a hazmat employer and who:

- Loads, unloads, or handles hazmat (e.g., a nuclear gauge);
- Tests, reconditions, repairs, modifies, marks, or otherwise represents packaging's as qualified for use in thetransportation of hazmat;
- Prepares hazmat for transportation;
- Is responsible for safety of transporting hazmat; or
- Operates a vehicle used to transport hazardous materials.

Each hazmat employer must train and test, certify, and develop and retain records of current training for each hazmat employee (during the period of employment and 90 days thereafter).

Initial hazmat training must be completed within 90 days of employment or change in job function. Before completing training, an employee may only perform hazmat functions under the direct supervision of a properly trained and knowledgeable hazmat employee.

Recurrent training is required at least once every three years per USDOT hazardous material rules

Relevant training received from a previous employer or source may be used to satisfy the requirements provided a current record of training is obtained from the previous employer or source.

Hazmat employee training must include the following:

- General awareness/familiarization training
- Function-specific training
- Safety training
- Security awareness training

Training records must include:

- Hazmat employee's name;
- Completion date of most recent training;
- Training Materials (copy, description, or location);
- Name and address of hazmat trainer; and
- Certification that the hazmat employee has been trained and tested.

To assist you in meeting these training requirements, Troxler offers both initial and refresher hazmat training courses, including testing and certification. For further information about Troxler training opportunities, please consult our website: http://www.troxlerlabs.com.

CERTIFICATE OF COMPETENT AUTHORITY

The sealed sources in Troxler gauges meet the U.S. DOT requirements for classification as Special Form Radioactive Material. Special Form materials are designed and constructed to maintain their physical integrity and prevent radioactive contamination even under severe accident conditions. The testing requirements that "special form" materials must meet are described in §173.469. Sources meeting these requirements are issued a Certificate of Competent Authority by the International Atomic Energy Agency (IAEA).

A shipper must keep a copy of the IAEA Certificate of Competent Authority (also known as Special Form Certificate) for at least two years after the latest shipment of special form radioactive material [§173.476(a)]. An example of a special form certificate is shown in Appendix G. Please note that these certificates have expiration dates. You must have a current copy in your possession before you can legally ship special form radioactive materials. If shipping a gauge by air, a copy of the special form certificate must be included with the shipment.

Current copies of the certificates can be downloaded from the Troxler web site (www.troxlerlabs.com) or requested by calling Troxler. When requesting a special form certificate, please provide your gauge model number and serial number or the special form certificate number. You can determine the applicable special form certificate numbers by referring to the Troxler gauge certificate.

NOTE

Troxler issues a "gauge certificate" with each gauge. This certificate is sometimes confused with the special form certificate described above. The Troxler gauge certificate gives the gauge model and serial number, owner name and address, and information about the sources in the gauge, including the special form certificate number. The Troxler gauge certificate is not a legally required document for purposes of shipment. However, it is useful when being inspected by either your licensing agency or U.S. DOT, since it provides relevant gauge information.

TYPE A PACKAGES

The type, form, and quantity of radioactive material in most Troxler nuclear gauges requires the use of Type A packaging during transportation. The current Troxler gauge shipping cases meet all Type A package standards. The current Troxler cases are listed on Page 13. [§173.410 and §173.412]

Each shipper of a DOT Specification 7A package must maintain on file for at least two years after the latest shipment, and shall provide to DOT on request, complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with that §178.350.

Troxler, as the Package Manufacturer, provides a certification that the package meets all the requirements of §178.350 for the radioactive contents presented for transport, as well as a copy of documents that describe the package and provide the results of performance testing required by §173.465. [§173.415]

This packaging documentation is gauge and case specific and can be downloaded from the Troxler web site at http://www.troxlerlabs.com/Documents and search for TYPE A CERTIFICATION.

NOTE

The Troxler Model 4590 (EGauge) and 4540 (Combo EGauge) ships as an excepted package and does not require a Type-Apackage for transportation.

MARKING TYPE A PACKAGES

Each Specification 7A package (Troxler shipping case) must be marked on the outside "USA DOT 7A TYPE A" and "RADIOACTIVE MATERIAL." [§178.350(b)]

Each package must be marked with the proper shipping name and United Nations identification number (UN ID). [§172.301(a) and (c)]

The U.S. Environmental Protection Agency (EPA) requires notification of serious accidents involving certain quantities of hazardous substances. These "Reportable Quantities" must be identified by the abbreviation "RQ". For Troxler gauges containing 10 mCi or more of Americium-241 or Americium-241:Beryllium, the letters "RQ" must be marked on the package next to the proper shipping name. [§172.324(b)]

All of the above marking requirements are incorporated into a single label on each Troxler shipping case.

Each Specification 7A package (Troxler shipping case) must be marked with the name and address of the packaging manufacturer in letters at least 12.0 mm (0.47 inches) in height.

U.S. DOT requires the name and address of the shipper and consignee to be marked on the package, except when the package is transported by highway only and will not be transferred from one motor carrier to another. Therefore, when transporting a gauge to and from a job site by highway, name and address marking is not required. However, if a gauge is transported by a common carrier, name and address marking is required. [§172.301(d)]

For transport by air, IATA requires the full name and address of the shipper and the consignee to be shown on the same side of the package and near the proper shipping name marking. [IATA 7.1.4.1(b)]

LABELING TYPE A PACKAGES

Type A packages containing nuclear gauges are required to have RADIOACTIVE YELLOW-II hazard labels affixed to opposite sides (not top or bottom) near the proper shipping name marking. The following information must be entered on the labels in legible printing with a durable weather-resistant means of marking [§172.403(g)]:

- **Contents** – the name of the radionuclide(s) in the package (e.g., Cs-137 and Am-241:Be)
- **Activity** – the activity of the radioactive materials expressed in appropriate SI units, e.g., megabecquerels (MBq), gigabecquerels (GBq). You may also put the activity in parentheses after the SI units (e.g. Cs-137 296 MBq (8 mCi))
- **Transport Index** (for YELLOW-II or YELLOW-III labels only) – the maximum radiation level at one meter from the surface of the package in millirem/hour. See Appendix H for a list of TI values for Troxler gauges.

Type A packages containing nuclear gauges are not allowed on passenger-carrying aircraft in the U.S. When offered for transport by air, nuclear gauge packages must bear a CARGO AIRCRAFT ONLY label. [§173.448(f), §172.402(c)]. Outside the U.S., a portable nuclear gauge in a Type A package may be carried on a passenger aircraft.

The RADIOACTIVE label and the CARGO AIRCRAFT ONLY label must be on the same side of the package as the proper shipping name marking.

INSPECTING PACKAGE BEFORE SHIPMENT

The shipper must inspect each package (gauge shipping case) before each shipment to ensure it is in unimpaired physical condition, except for superficial marks, and that each closure device (hinge, hasp, latch, etc.) is properly installed, secured, and free of defects. No cracks or other significant defects should be evident. [§173.475]

The shipper must also ensure that external radiation and contamination levels are within allowable limits and are consistent with the Transport Index shown on the radioactive labels on the package. If the gauge is in undamaged condition, this requirement may be met by visual inspection of the gauge. However, if the gauge has been damaged then radiation measurements must be made with a survey instrument and a leak test performed on the sealed sources prior to shipping or transporting the gauge.

WARNING

Do not ship or transport a gauge with a sliding block that is not fully closed.

Ensure that all latches are securely closed on the package. A copy of the package closure instructions must be retained and be available for inspection upon request for 1 year after offering the package for transport. Refer to this document for details required to properly inspect and close the package. [§178.2(c)]

SECURITY SEALS

Each Type A package must incorporate a feature, such as a seal or lock, that is not readily breakable, and that, while intact, is evidence that the package has not been opened. The seal is required when transporting a gauge to or from a work site, as well as when shipping a gauge via common carrier. [§173.412]

SECURING PACKAGES IN VEHICLE

Any package of radioactive material must be secured against movement within the transport vehicle under conditions normally incident to transportation. [§177.834(a) and §173.448]

MINIMUM SEPARATION BETWEEN PACKAGES AND PEOPLE

Packages bearing RADIOACTIVE YELLOW-II or YELLOW-III labels shall not be carried in compartments that may be continuously occupied by passengers. The minimum allowed distance between radioactive packages and vehicle occupants must be determined based on the transport index as shown in the table below. If more than one package is present, the distance (measured from the nearest point on any package) must be based on the total transport index for all of the packages. [§177.842(b)]

Total Transport Index	Minimum Distance (Feet)
0.1 to 1.0	1
1.1 to 5.0	2
5.1 to 10.0	3
10.1 to 20.0	4
20.1 to 30.0	5
30.1 to 40.0	6
40.1 to 50.0	7

For example, a Troxler 3440 gauge with a TI of 0.6 must be kept at least 1 foot away from any area that may be continuously occupied by passengers. Two Troxler 3440s with a combined TI of 1.2 must be kept at least 2 feet from any area that may be continuously occupied by passengers.

SHIPPING PAPER PREPARATION AND RETENTION

Shipping paper examples are shown in Appendices C, D, and E. Shipping papers must include:

- UN identification number: UN 3332
- Proper shipping name: "Radioactive material, Type A package, special form"
- Hazard class: 7
- The letters “RQ” (reportable quantity) if the package contains 10 mCi or more of Am-241
- Radionuclide names: See Appendix G to determine nuclides for your gauge
- Activity: See Appendix G to determine activities for your gauge
- Label category: Radioactive Yellow-II
- Transport index (dose rate in mrem per hour at 1 meter): See Appendix G to determine TI for your gauge
- Emergency telephone number: 919-549-9539 (If you use Troxler's emergency phone number, then you must enter YOUR company's name immediately before, after, above, or below the emergency phone number)
- Shipment date (Date of acceptance by carrier)

For shipments by air the following additional requirements apply:

- Shipping case dimensions must be shown in the sequence length x width x height, e.g., L75 x W35 x H42 cm.
- The words “All packed in one Type A package” if the gauge contains multiple radionuclides in the description
- The words “Cargo Aircraft Only” must follow the hazmat description

Shippers and carriers must retain a copy of the shipping papers, or an electronic image thereof, for a period of 2 years after the date the hazardous material is accepted by a carrier. An electronic image includes an image transmitted by fax machine, an image on the screen of a computer, or an image generated by an optical imaging machine. The copy (paper or electronic) must be accessible at or through the principal place of business and immediately available upon request by an authorized official of federal, state, or local government. [§172.201(e)]

Private carriers who use the same shipping paper for multiple shipments of the same hazardous material may retain a single copy of the permanent shipping paper, instead of a copy for each shipment made, if the carrier also retains a separate record of each shipment made, including:

- Shipping name (proper shipping name)
- Identification number (UN identification number)
- Quantity transported (total activity of the sources in the shipment)
- Date of shipment

SHIPPER’S CERTIFICATION

For any shipment offered for transport by common carrier, the shipping papers must include a signed and dated shipper's certification statement:

> *"This is to certify that the above-mentioned materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."*

For transportation by air, the following statement must be added to the above certification:

> *"I declare that all of the applicable air transport requirements have been met."*

No certification is required for a hazardous material transported by motor vehicle by a private carrier if the material will not be reshipped or transferred to another carrier (i.e., no certification is required when a gauge is transferred to and from a job site in a Company vehicle). [§177.817(b)]

SHIPPING PAPER ACCESSIBILITY

When transporting hazmat by motor vehicle, the driver must ensure that the shipping papers are readily available to, and recognizable by, authorities in the event of an accident or inspection. The shipping paper must be clearly distinguished, if it is carried with any other papers, by either tabbing it or by having it appear first in the stack of papers.

The shipping documents that are required when shipping a nuclear gauge are the bill of lading and the Emergency Response Information sheet.

When the driver is at the vehicle's controls, the shipping paper must be within immediate reach while the driver is restrained by the lap belt. The paper must be either readily visible to a person entering the driver's compartment (e.g., on the seat next to the driver) or in a holder which is mounted to the inside of the door on the driver's side of the vehicle.

When the driver is not at the controls of the vehicle, the shipping papers must be on the driver's seat or in a holder which is mounted to the inside of the door on the driver's side of the vehicle. [§177.817(e)]

EMERGENCY RESPONSE INFORMATION

An emergency response information sheet must accompany the shipment of a nuclear gauge. This document must be in the transport vehicle and immediately accessible to the driver during transportation on a public highway. Troxler includes a copy of this document with each gauge. An example of an emergency response information sheet is shown in Appendix F. [§172, Subpart G]

EMERGENCY RESPONSE PHONE NUMBER

A 24-hour emergency response telephone number must be provided on the shipping paper. This number must be manned continuously, while the gauge is in transit, by someone who is knowledgeable of the hazards and characteristics of the hazardous material being shipped, has comprehensive emergency response and accident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information. [§172, Subpart G]

Troxler has an emergency response phone number **(919-549-9539)** that Troxler gauge owners may use. However, if you put Troxler's emergency phone number on your shipping papers, then you must put your company's name immediately before, after, above, or below the emergency response phone number. Both the

emergency phone number and your company's name must be printed in a prominent, readily identifiable, and clearly visible manner that allows the information to be easily and quickly found (e.g., highlighted, larger font, or different color text). [§172.604(b)(2)]

ACCIDENT NOTIFICATION REQUIREMENTS

Notify your licensing agency as soon as practical, but no later than 12 hours after a reportable incident. You are also required by §171.15 to notify, at the earliest practical moment, the **U.S. DOT at 1-800-424-8802** of an accident that occurs during the course of transportation (including loading, unloading, and temporary storage) in which fire, breakage, spillage, or suspected contamination occurs involving a shipment of radioactive material. Other possible incidents which must be reported within 30 day are listed in §171.16.

EXCEPTED PACKAGES

Excepted Packages are not subject to the specification packaging, marking (except for the UN ID), labeling, and shipping paper requirements (unless the quantity of radioactive material equals or exceeds the RQ value). Troxler models 3660, 4301, 4302, 4590 (EGauge) and 4540 (Combo EGauge) meet the radiation level and activity limits (Table 4 in §173.425) forExcepted Packages and are subject to the following requirements.

- The outside of the package must show the full name and address of the shipper and consignee.
- The outside of the package must be marked with the UN ID number: "UN 2911".
- The outside of the inner package or gauge must be marked "radioactive."
- For shipment by air, the package must bear the Radioactive Material, Excepted Package label with the UN ID number. (IATA 10.7.4.4.3)
- For shipment by air, a Shipper's Declaration for Dangerous Goods form is not required if the amount of radioactive material in the package is less than the RQ value. However, the air waybill must show the following description of the material. (IATA 10.8.8.3)

  "UN 2911, Radioactive material, excepted package, instruments, 1 package".
- Packages containing a reportable quantity (RQ), which includes models 4301 and 4302, are subject to modified shipping paper requirements. An emergency response phone is <u>not</u> required on the shipping papers per §172.604(d). The applicable shipping paper description for the 4301 and 4302 models is shown below:

  UN2911, Radioactive Material, Excepted Package, Instruments, 7, RQ
  Am-241, 1 package x 0.37 GBq (10 mCi)
  Dim L58 x W48 x H27 cm
- Shippers and carriers are subject to the hazmat employee training requirements.
- Shippers and carriers are subject to accident notification requirements.

RECORD RETENTION

Following is a summary of the record retention requirements applicable to shippers of Troxler nuclear gauges.

Record	Retention
Hazmat employee training records including: • Employee name • Training completion date • Description, copy, or the location of the training materials used • Name and address of the person providing the training • Certification that the hazmat employee has been trained and tested	A record of current training, inclusive of the preceding three years, in accordance with this section shall be created and retained by each hazmat employer for as long as that employee is employed by that employer as a hazmat employee and for 90 days thereafter. [§172.704(d)].
IAEA Certificate of Competent Authority for special form radioactive material	1 year after the latest shipment [§173.476(a)]
Type A package full test report and certification	2 years after the latest shipment [§173.415(a)]
Shipping papers	2 years after date of shipment [§172.201(e)]
Package closure instructions provided by the package manufacturer	1 year after the package is offered for shipment [§173.22(a)(4)]

APPENDIX A

TYPE A PACKAGE TESTING RESULTS

The type, form, and quantity of radioactive material in most Troxler nuclear gauges requires the use of Type A packaging during transportation. The Troxler gauge shipping cases meets all Type A package standards. [§173.410 and §173.412]

Each shipper of a DOT Specification 7A package must maintain on file for at least two years after the latest shipment, and shall provide to DOT on request, complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with that §178.350.

Troxler, as the "package manufacturer", provides a certification that the package meets all the requirements of §178.350 for the radioactive contents presented for transport, as well as a copy of documents that describe the package and provide the results of performance testing required by §173.465. [§173.415]

This packaging documentation is gauge and case specific. For a copy of the documentation for the Troxler packages, please go to http://www.troxlerlabs.com/Documents and search for TYPE A CERTIFICATION.

SUMMARY of TESTING PERFORMED per §173.465:

Water Spray: Subjected the package to a water spray simulating rainfall of approximately two inches per hour for one continuous hour.

Free Drop: The package was dropped from a height of four feet onto a non-yielding surface from a position to cause maximum damage to the package.

Stacking: Package was placed on a non-yielding surface and subjected to a compressive load of at least 13 kilopascals multiplied by the vertically projected area of the package, in square feet, for 24 continuous hours.

Penetration: The package was placed on a non-yielding surface. A 1-1/4" diameter, 13-pound steel cylinder with a hemispherical end was dropped in the vertical position from a height of 40" onto the package to a point to cause maximum damage to the package.

INSTRUCTIONS FOR FINDING TYPE A TESTING RESULTS FOR YOUR PACKAGE:

1. Find your gauge model number in the first column of the table below.
2. Find the corresponding case in the second column of this row.
3. Gauges that are no longer in production may not be listed. Please contact your Troxler representative or the Troxler corporate headquarters if you need assistance.
4. Shipping cases that are no longer in production may not be listed. Please contact your Troxler representative or the Troxler corporate headquarters if you need assistance.
5. As packaging documentation is gauge and case specific, go to http://www.troxlerlabs.com/Documents and search for TYPE A CERTIFICATION.

SUMMARY RESULTS OF TESTING

Consult the table below for applicable testing results, as described in the instructions on the previous page.

GAUGE MODEL (3)	CASE/ DRAWING #	§173.465 Performance Tests	DATE TEST COMPLETED
3400 SERIES- 3430, 3440	WATER RES/#1 110018 104333	(1)	02/18
3430 Plus, 3440 Plus	WATER RES/#1 110018 104333	(1)	02/18
3401, 3411	WATER RES/#1 104333	(2)	02/18
3450, 3451	WATER RES/#1 107860	(1)	02/18
4640	WATER RES/#1 105169	(1)	02/18
3241 SERIES- 3241-C, 3241-D, 3242	WATER RES/#1 105032	(1)	03/18
3630	PLASTIC/#6 123299.0001	(1)	04/18
3216, 3217, 3218, 3221, 3222	PLASTIC/#6 123299.3002	(2)	05/18
Accessory Combinations		(5)	10/18

Notes:

1. Test performed.
2. Engineering Evaluation – Case and contents similar to previously evaluated package.
3. Includes variants and sub-models
4. Gauge ships as an excepted package. Type-A package not required.
5. Accessory Combinations is an engineering evaluation for various packing combinations as they relate to the closure instructions associated with each case model and miscellaneous accessories.

APPENDIX B

PACKAGE CLOSURE INSTRUCTIONS

Full closure instructions include placing the gauge and accessories in the package. These instructions are included in the Type A package certification documentation, which may be downloaded from http://www.troxlerlabs.com/Documents and search for TYPE A CERTIFICATION.

If you are shipping a gauge with contents that are different from when it was originally packed and shipped, please refer to the Accessory Combinations document. This document is an engineering evaluation for various packing combinations as they relate to the closure instructions associated with each case model and miscellaneous accessories.

A copy of these package closure instructions must be retained and be available for inspection upon request for 1 year after offering the package for transport. [§173.22(a)(4)]

Ensure that all latches are securely closed on the package.

For full Package Closure Instructions for current Troxler cases, please reference or download the applicable documentation package from http://www.troxlerlabs.com/Documents.

For all other gauges or cases, please contact Troxler Laboratories.

APPENDIX C

PRIVATE CARRIER BILL OF LADING FOR A 3400 SERIES GAUGE

This document is NOT required to be dated. However, the carrier must retain a record of each shipment made, including: proper shipping name, UD identification number, activity transported, and date of shipment.

NOTE

Your source type, source activity, and TI may differ from this example. The "RQ" requirement applies only to gauges containing americium-241 sources 10 mCi or greater.

Your Company's Letterhead

BILL OF LADING

Shipper: ABC Paving Company
123 Main Street
Raleigh, NC

Qty	**Description**
1 pkg	UN 3332, Radioactive material, Type A package, Special Form, 7, RQ Cs-137, 0.30 GBq (8 mCi) Am-241, 1.48 GBq (40 mCi) Radioactive Yellow II, TI = 0.3 **EMERGENCY CONTACT: (919) 549-9539** **ABC PAVING COMPANY**

Shipper Name (Print): _____

Shipper Name (Signature): _____

APPENDIX D

COMMON CARRIER BILL OF LADING FOR A 3400 SERIES GAUGE SHIPPED BY GROUND

NOTE

Your source type, source activity, and TI may differ from this example. The "RQ" requirement applies only to gauges containing americium-241 sources with an activity of 10 mCi or greater.

SB Freightways
BILL OF LADING

	DATE	P.O. NO.	SHIPPER NO.
	SHIP DATE		

CONSIGNEE (TO)	SHIPPER/CONSIGNOR (FROM)
TROXLER ELECTRONIC LABS, INC	**APEX TESTING COMPANY**
3008 CORNWALLIS RD	**456 MAIN STREET**
RESEARCH TRIANGLE PARK, NC 27709	**COLUMBIA, SC 27601**

PHONE NO.	EMERGENCY RESPONSE NUMBER* (REQUIRED IF HM COLUMN MARKED)	ROUTE
	919-549-9539	

(SUBJECT TO CORRECTION)

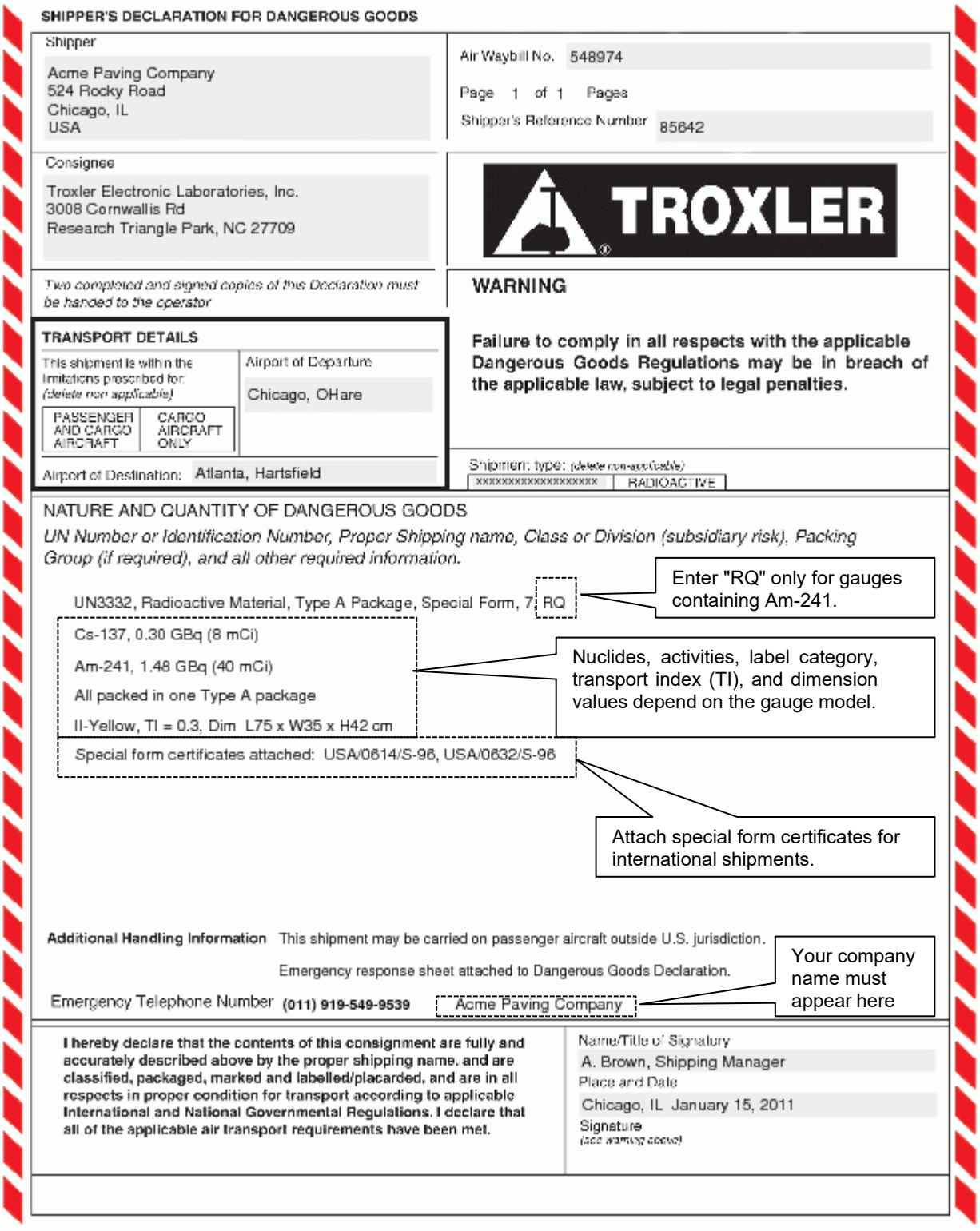
Number of Packages	HM *	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (lb)	Class or Rate Ref.	Cube (Optional)
1 case	x	UN 3332, Radioactive Material, Type A package,			
		Special Form, 7, RQ			
		Cs-137, 0.30 GBq (8 mCi)			
		Am-241, 1.48 GBq (40 mCi)			
		Radioactive Yellow II label, TI = 0.3			
		EMERGENCY PHONE: (919) 549-9539			
		ABC PAVING COMPANY			

THIS IS TO CERTIFY THAT THE ABOVE-NAMED MATERIALS ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED, AND LABELED AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE APPLICABLE REGULATIONS OF THE DEPARTMENT OF TRANSPORTATION.

SHIPPER/CONSIGNOR	CARRIER
W. BROWN	**SB FREIGHTWAYS**
AUTHORIZED SIGNATURE DATE	AUTHORIZED SIGNATURE

APPENDIX E

SHIPPER'S DECLARATION FOR DANGEROUS GOODS FOR TYPE A PACKAGE SHIPPED BY AIR



SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper

Acme Paving Company
524 Rocky Road
Chicago, IL
USA

Air Waybill No. 548974

Page 1 of 1 Pages

Shipper's Reference Number 85642

Consignee

Troxler Electronic Laboratories, Inc.
3008 Cornwallis Rd
Research Triangle Park, NC 27709

TROXLER

Two completed and signed copies of this Declaration must be handed to the operator

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: *(delete non-applicable)*

PASSENGER AND CARGO AIRCRAFT | CARGO AIRCRAFT ONLY

Airport of Departure: Chicago, OHare

Airport of Destination: Atlanta, Hartsfield

Shipment type: *(delete non-applicable)*

XXXXXXXXXXXXXXXXXXXX | RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

UN Number or Identification Number, Proper Shipping name, Class or Division (subsidiary risk), Packing Group (if required), and all other required information.

UN3332, Radioactive Material, Type A Package, Special Form, 7 RQ

Enter "RQ" only for gauges containing Am-241.

Cs-137, 0.30 GBq (8 mCi)

Am-241, 1.48 GBq (40 mCi)

All packed in one Type A package

II-Yellow, TI = 0.3, Dim L75 x W35 x H42 cm

Nuclides, activities, label category, transport index (TI), and dimension values depend on the gauge model.

Special form certificates attached: USA/0614/S-96, USA/0632/S-96

Attach special form certificates for international shipments.

Additional Handling Information This shipment may be carried on passenger aircraft outside U.S. jurisdiction.

Emergency response sheet attached to Dangerous Goods Declaration.

Emergency Telephone Number **(011) 919-549-9539**

Acme Paving Company

Your company name must appear here

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable International and National Governmental Regulations. I declare that all of the applicable air transport requirements have been met.

Name/Title of Signatory

A. Brown, Shipping Manager

Place and Date

Chicago, IL January 15, 2011

Signature

(see warning above)

APPENDIX F

EMERGENCY RESPONSE INFORMATION EXAMPLE

TROXLER NUCLEAR GAUGE EMERGENCY RESPONSE INFORMATION
REQUIRED FOR TRANSPORTATION

Call Troxler Electronic Laboratories, Inc. at (919) 549-9539 for Emergency Assistance.

1. PROPER SHIPPING NAME

- Radioactive material, Type A package, Special Form, UN3332

POTENTIAL HAZARDS

2. HEALTH HAZARDS

- Radiation presents minimal risk to lives of persons during transportation accidents.
- Undamaged packages are safe; damaged packages or materials released from packages can cause external radiation hazards. Contamination is not suspected.
- Packages (cartons, boxes, drums, articles, etc.) identified as "Type A" by marking on packages or by shipping papers contain non-life endangering amounts. Radioactive sources may be released if packages are damaged in moderately severe accidents.
- Packages (large and small, usually metal) identified as "Type B" by marking on packages or by shipping papers contain potentially life-endangering amounts. Because of design, evaluation, and testing of packages, life-endangering releases are not expected in accidents except those of utmost severity.
- Commonly available instruments can detect most of these materials.
- Water from cargo fire control is not expected to cause pollution.

3. FIRE OR EXPLOSION

- Packaging's can be consumed without content loss from sealed source capsule.
- Radioactive source capsules and Type B packages are designed to withstand temperatures of 1475 °F (800 °C).

EMERGENCY ACTION

4. IMMEDIATE PRECAUTIONS

- Priority response actions may be performed before taking radiation measurements.
- Priorities are life saving, control of fire and other hazards, and first aid.
- Isolate hazard area and deny entry. Notify Radiation Authority of accident conditions.
- Delay final cleanup until instruction or advice of Radiation Authority.
- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighter's protective clothing will provide adequate protection against internal radiation exposure, but not external radiation exposure.

5. FIRE

- Do not move damaged packages; move undamaged packages out of fire zone.
- **Small Fires:** Dry chemical, CO_2 water spray or regular foam.
- **Large Fires:** Water spray, fog (flooding amounts)

6. SPILL OR LEAK

- **Do not touch damaged packages or spilled material.**
- Slightly damaged or damp outer surfaces seldom indicate failure of inner container.
- If source is identified as being out of package, stay away and await advice from Radiation Authority.

7. FIRST AID

- Use first aid treatment according to the nature of the injury.
- Persons exposed to special form sources are not likely to be contaminated with radioactive material.

8. EMERGENCY RESPONSE GUIDE

- Guide 164 - UN 3332 - Radioactive material, Special Form
- Guide 163 - UN 2915 - Radioactive material

APPENDIX G

SPECIAL FORM CERTIFICATE EXAMPLE

U.S. Department of Transportation
Research and Special Programs Administration

400 Seventh St., S.W.
Washington, D.C. 20590

IAEA CERTIFICATE OF COMPETENT AUTHORITY
SPECIAL FORM RADIOACTIVE MATERIALS
CERTIFICATE NUMBER USA/0620/S, REVISION 0

This certifies that the source described has been demonstrated to meet the regulatory requirements for special form radioactive material as prescribed in the regulations of the International Atomic Energy Agency[1] and the United States of America[2] for the transport of radioactive materials.

1. Source Identification - AEA Technology QSA, Inc. Model number X.1188.

2. Source Description - Single encapsulation made of stainless steel and tungsten inert gas or laser seal welded. Minimum wall thickness is 0.48 mm (0.02 in.). Approximate outer dimensions are 10.1 mm (0.40 in.) in diameter and 9.7 mm (0.38 in.) in length. All sources shall be constructed and maintained in accordance with attached AEA Technology QSA, Inc. Drawing number RBA61869, Rev. A.

3. Radioactive Contents - No more than 74 GBq (2.0 Ci) Americium-241 oxide mixed with Beryllium and pressed into a solid pellet.

4. Quality Assurance - Records of Quality Assurance activities required by Paragraph 310 of the IAEA regulations[1] shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors and consignees in the United States exporting or importing shipments under this certificate shall satisfy the requirements of Subpart H of 10 CFR 71.

5. Expiration Date - This certificate expires April 1, 2008.

Make sure your copy is current.

This certificate is issued in accordance with paragraph 804 of the IAEA Regulations and Section 173.476 of Title 49 of the Code of Federal Regulations, in response to the petition and information dated January 17, 2003 and March 18, 2003 submitted by AEA Technology QSA, Inc., Burlington, MA, and in consideration of other information on file in this Office.

Certified by:

Robert A. McGuire
Associate Administrator for
Hazardous Materials Safety

APR - 8 2003
(DATE)

Revision 0 - Original issue.

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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.

APPENDIX H

TRANSPORT INDEXES FOR TROXLER GAUGES

The Transport Index (TI) for a nuclear gauge is defined as the highest dose rate (mrem/h) one meter from the shipping case.

1. Determine your case type using the case drawings (see page 11).
2. Find your gauge model number in the first column of the table below.
3. Find the corresponding case in the second column of this row.
4. If the gauge was manufactured with different source activities or sources, find this information in the third column.
5. The fourth column provides the TI for each gauge, case, and source combination.
6. Gauges that are no longer in production may not be listed.
7. Please contact your Troxler representative or the Troxler corporate headquarters if you need any assistance.

GAUGE MODEL	NUCLIDES	ACTIVITY	CASE/ DRAWING #	TRANSPORT INDEX (TI)
3241-C	Am-241	3.7 GBq	WATER RES/#1 105032	0.1
	Am-241	11.1 GBq	WATER RES/#1 105032	0.5
3241-D	Am-241	2.96 GBq	WATER RES/#1 105032	0.1
3216, 3217, 3218	Am-241	1.48 GBq	PLASTIC/#6 123299.0001	0.1
3242	Cf-252	3.7 MBq	WATER RES/#1 105032	0.4
3401	Am-241 Cs-137	1.48 GBq 0.3 GBq	WATER RES/#1 110018	0.4
3411	Am-241 Cs-137	1.48 GBq 0.3 GBq	WATER RES/#1 110018	0.5
3430	Am-241 Cs-137	1.48 GBq 0.3 GBq	WATER RES/#1 110018	0.3
3430M, 3440M	Cs-137 Cf-252	0.3 GBq 2.22 MBq	WATER RES/#1 110018	0.6
3440	Am-241 Cs-137	1.48 GBq 0.3 GBq	WATER RES/#1 110018	0.6
3430 Plus, 3440 Plus	Am-241 Cs-137	1.48 GBq 0.3 GBq	WATER RES/#1 110018	0.3
3450, 3451	Am-241 Cs-137	1.48 GBq 0.3 GBq	WATER RES/#1 107860	0.3
4640 SERIES	Cs-137	0.3 GBq	WATER RES/#1 105169	0.2