
Permit Conditions for Moisture / Density Gauges

Background

Authority to possess and operate a moisture/density gauge containing a radioactive source is granted to an individual by the Radiation Safety Committee after the user's application has been reviewed and approved by the USDA Radiation Safety Staff (RSS).

It is the responsibility of the Permit Holder named on the Radiation Source Permit to comply with all safety and regulatory requirements of the Nuclear Regulatory Commission and the USDA Radiation Safety Program.

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Acquisition Purchase orders for moisture/density gauges must be approved by the Radiation Safety Staff prior to the order being placed by a purchasing agent.

A Permit Holder must receive the prior approval from the RSS before a gauge is transferred from another licensed or permitted individual.

Receipt Upon receipt of any moisture/density gauge, the following information must be submitted to the RSS:

- Sealed Source Inventory Record (RSS-28);
 - A copy of the manufacturer's initial leak test results (if available); and
 - A copy of the manufacturer's information and specifications.
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Authorized Users Only the Permit Holder and the Associate Users listed in the Radiation Source Permit are authorized to use, transport, or leak test a moisture density gauge.

Routine Maintenance All servicing or cleaning of a moisture/density gauge involving exposure of the radioactive source must be performed by the manufacturer or by an authorized representative of the manufacturer.

General Storage Requirements Storage areas for nuclear gauges must meet the following requirements:

- Flammable materials must not be stored in the same area.
 - The storage area shall be locked and secured against unauthorized access.
 - The storage area shall be posted with a sign "Caution - Radioactive Materials" and an NRC-3 Form "Notice to Employees".
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Field Use Requirements Permits are routinely issued that allow use of moisture/density gauges at "temporary job sites". Gauges may be kept at temporary job sites for up to 180 days.

Gauges at temporary job sites shall be stored in an area or building that meets all of the general storage requirements listed above.

When in use, gauges shall be under the constant surveillance and immediate control of the Permit Holder or Associate User. When a gauge is not being used to take measurements, it should be placed in the operator's vehicle for safety.

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Transportation

All gauges shall be transported in a US DOT Type-A container with appropriate hazardous materials labels and markings. The case supplied by the manufacturer meets this specification.

During transport, the gauge shall be located as far back in the vehicle as possible and blocked and braced to prevent shifting. The case shall be locked.

If the driver and all passengers leave the vehicle unattended at any time during transport, the case shall be securely locked inside of or to the vehicle to prevent theft.

Documentation to be Carried During Transport

The following documents shall be carried within reach of the driver, either in a pocket in the driver's side door, or on the seat next to the driver:

- USDA Use Permit, including all Program Requirements documents;
- USDA Radioactive materials license;
- Transportation Declaration;
- Emergency Response Guideline; and
- Copy of the most recent leak test results.

NOTE: An example of a transportation bill of lading and emergency response guide are attached to this document.

The rationale for requiring these documents is that, in the case of an accident, these documents will be needed to satisfy State and Federal transportation requirements.

Leak Tests

A leak test of a moisture/density gauge must be performed at intervals not to exceed six months.

The test must be performed in accordance with the manufacturer's instructions.

NOTE: Never attempt to directly wipe the surface of the rod containing the cesium-137 source. Keep the shutter closed at all times when performing a leak test, wiping only the shutter area.

The RSS will supply leak test kits, perform the required analysis, and report the results back to the Permit Holder. The Permit Holder can use other companies to perform and analyze the leak test provided they are properly licensed to perform that service. It is the responsibility of the Permit Holder to provide a copy of the license for RSS to verify.

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Leak Test Limits

A sealed source has failed the leak test when the contamination on the filter paper used for the test exceeds 0.005 μCi (11,100 DPM). Devices exceeding this level are to be removed from service, and returned to the manufacturer for repair, replacement, or disposal. The RSS must be notified immediately if the leak test limit is exceeded in order to notify the NRC and to contact the manufacturer to determine if special shipping requirements are necessary.

The USDA ALARA program uses one other limit to monitor the performance of these tests.

- 1,110 DPM (10% of the limit) is a notification level. Users of devices exceeding this level will be notified of the test results to make them aware of the potential for source leakage in the future.

Disposal of Unused Gauges

The proper disposal of unused gauges is required. In most cases, the original manufacturer of the gauge will accept the return of the device.

Prior to disposing of any gauge, the Radiation Safety Staff must be notified. This allows the RSS to:

- Verify the license or permit of the recipient;
- Perform a records check;
- Verify that a current leak test is available for the device prior to shipping;
- Determine if the manufacturer has any special shipping or packaging requirements; and
- Amend the user's radioactive materials permit.

The disposal can be accomplished only after the written approval of the RSS is received by the Permit Holder. Copies of all shipping documents must be sent to the RSS for placement in the archive file maintained for all sealed radioactive sources.

Personnel Monitoring

All individuals who use a moisture/density gauge shall wear a radiation dosimeter (film badge) assigned to them.

The dosimeter shall not be placed in the gauge case during transportation.

The dosimeter shall be stored away from areas of extreme heat, cold or humidity when not in use.

NOTE: For more detailed information on dosimetry, refer to the USDA Permit Conditions for Personnel Monitoring.

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Training

All individuals listed on the Radiation Source Permit must receive refresher training every two years to update their knowledge of Department of Transportation regulations as well as general safety.

All individuals listed on the Radiation Source Permit must attend a one-day nuclear gauge safety training course every six years.

Records Retention

All documents relating to the purchase, transfer, or disposal of a gauge must be retained by the Permit Holder for as long as the permit is active.

The Radiation Safety Staff maintains records of the purchase, transfer, and disposal of a gauge as long as the Department's radioactive materials license is active.

Records of leak tests must be retained for three years. Both the Permit Holder and the Radiation Safety Staff must retain these records.

Questions

If there are any questions regarding the information in this document, contact:

USDA Radiation Safety Staff
5601 Sunnyside Avenue
Mail Stop 5510
Beltsville, MD 20705

Phone: (301) 504-2440

Fax: (301) 504-2450

Approved:

3/11/96

Date

By:

/s/

John T. Jensen

Director, Radiation Safety Staff

Example of Bill of Lading for Moisture / Density Gauge

Shipper U.S. Department of Agriculture
 Agency Name
 Address
 City, State, Zip

RQ, Radioactive Material, Special Form, n.o.s., UN2974, Class 7, Type "A" Package, containing:
 cesium-137, 0.3 GBq (8 mCi)
 americium-241, 1.5 GBq (40 mCi)

TOTAL ACTIVITY = 1.8 GBq (48 mCi)

Radioactive YELLOW-II Label, TI = 0.5

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

Shipper: (Signature of Permit Holder)

Example of Bill of Lading for Density Gauge

Shipper U.S. Department of Agriculture
 Agency Name
 Address
 City, State, Zip

Radioactive Material, Special Form, n.o.s., UN2974, Class 7, Type "A" Package, containing:
 cesium-137, 0.3 GBq (8 mCi)

Radioactive YELLOW-II Label, TI = 0.5

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

Shipper: (Signature of Permit Holder)

Proper Shipping Name and Hazard Class

RADIOACTIVE MATERIAL, Special Form, n.o.s., 7, UN 2974

Potential Hazards

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 expected.

Type A 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.

Type B 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.

Fire or Explosion

Packaging 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

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 from Radiation Authority.

Positive pressure self contained breathing apparatus (SCBA) and structural firefighters protective clothing will provide adequate protection against internal radiation exposure, but not external exposure.

Call the following for emergency assistance:

USDA Radiation Safety Office	301.734.4945
Troxler Electronic Laboratories	919.839.2676
Campbell Pacific Nuclear	800.535.5053

If no answer CALL CHEMTREC at 1-800-424-9300.

Fire

Do not move damaged containers; move undamaged containers out of fire zone.

Small Fires: Dry Chemical, CO², water spray, or regular foam.

Large Fires: water spray, fog (flooding amounts).

Spill or Leak

Do not touch damaged packages or spilled materials.

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.

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.