



US Army Corps
of Engineers ®

HTRW Center of Expertise Information - Fact Sheets

HTRW CX Regulatory Fact Sheet FY07-02

DOT Requirements for Transporting Fuels in Tanks

Gasoline and diesel fuel transportation compliance requirements during Civil Works Operations and Maintenance activities.

I. Purpose: This fact sheet has been developed in response to inquiries requesting a review and clarification of requirements associated with the classification and transportation of fuel in “portable tanks” on government owned and operated vehicles. Of specific concern is the transportation of petroleum products (i.e. fuels) in shop-fabricated tanks mounted on or in pick-up truck beds or tanks mounted on trailers.

II. USACE Impact: Civil works staff should conduct an inventory of in service portable and truck mounted tanks and determine their compliance status based on the discussions provided in this fact sheet. DOT (49 CFR §173.8) allows the use of non-specification tanks to transport fuel provided certain criteria are met and tanks are visually inspected annually and periodically tested. After a survey of tank types and use has been conducted a better determination of impacts, needs and actions can be developed.

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III. Fuel Classification: Historically (pre harmonization [HM-181]) DOT generally recognized flammable liquids as those liquids with a flash point (FP) of < 100°F (37.8°C) and *combustible*

liquids as those materials with a FP of $\geq 100^{\circ}\text{F}$ and $< 200^{\circ}\text{F}$.

With the harmonization initiative, DOT was faced with incorporating the international flash point (and boiling point, (BP)) criteria of Class 3 flammable liquids (49 CFR 173.120) into the hazardous materials regulations (HMR). Specifically, the upper FP criteria for United Nations flammable liquids was set at $\leq 141^{\circ}\text{F}$ (packing group criteria are defined in 173.121), bridging the existing flammable and combustible liquid FP ranges used in the US.

Current 49 CFR 173.120(b) language generally defines *combustible liquids* as materials with a FP $> 141^{\circ}\text{F}$ (60.5 C) and $< 200^{\circ}\text{F}$ (93 C). In recognition of the FP ranges used at the time domestically versus the new international criteria (i.e. $< 100^{\circ}\text{F}$ vs. $< 141^{\circ}\text{F}$), DOT adopted a domestic provision for reclassification of flammable liquids with FP $> 100^{\circ}\text{F}$ and $< 200^{\circ}\text{F}$ as combustible liquids. The following matrix illustrates this relationship.

Parameter	Pre HM-181	Post HM-181
Flammable liquid	$< 100^{\circ}\text{F}$	$< 141^{\circ}\text{F}$
Combustible liquid	$> 100^{\circ}\text{F}, < 200^{\circ}\text{F}$	$> 141^{\circ}\text{F}, < 200^{\circ}\text{F}$
Reclassified combustible liquid (Surface mode only; domestic)	N/A	$> 100^{\circ}\text{F}, < 141^{\circ}\text{F}$

Adoption of the international regulations domestically expanded the scope applicability of the regulations to materials with a a FP of 100 - 141^oF. DOT addressed the new regulatory burden by providing a *domestic exception* from the hazardous materials regulations (HMR) for combustible liquids provided certain provisions were met. 49 CFR 173.150(f) lays out those criteria. Specifically, materials classed or re-classed as combustible liquids, that are not a hazardous substance, hazardous waste or marine pollutant *and* are offered in *non-bulk* (≤ 119 gallons) packaging are not subject to the HMR [49 CFR 173.150(f)(2)]. Restated, if a material meets the definition of a combustible liquid ($> 100^{\circ}\text{F}, < 200^{\circ}\text{F}$) and no other hazard class, is not a hazardous waste, hazardous substance, or marine pollutant and is offered in containers ≤ 119 gallons, those materials are not subject to the HMR.

If combustible materials (FP $\geq 100^{\circ}\text{F}$ and $< 200^{\circ}\text{F}$) are offered in bulk packaging (> 119 gallons) *or* they meet the definition of a hazardous substance, hazardous waste, or marine pollutant, then 173.150(f)(3) defines the HMR criteria those materials are required to meet. Specifically the shipper must:

- Provide appropriate shipping papers (waybill, manifest etc.)
- Mark packages
- Display ID# on bulk packages
- Placard (bulk packaging only)
- Comply with specific provisions for carriage aboard aircraft and vessels
- Report incidents under 49 CFR 171.15 and 171.16
- Meet packaging requirements per 172.101 (173.203 for non-bulk)
- Meet general pre-transportation requirements and rail and highway carriage provisions (see 173.150(f)(3) for specifics)

Meet training requirements in Subpart H of 172

IV. Fuel Transportation Authorizations: DOT regulations allow the transportation of fuels in several ways. Small containers (i.e. 5 gallon cans) can usually be managed under the stand-alone provisions of materials of trade (49 CFR §173.6; see [previous fact sheet](#).) Fuels can also be transported in full compliance with the HMR and the associated specification packaging requirements. Thirdly, because of the international harmonization issues associated with flammable liquid classification, DOT developed two non-specification packaging authorizations for the domestic transportation of petroleum products (i.e. gasoline and diesel) within state boundaries. Those provisions eased impacts to existing companies conducting business in *intrastate* commerce and can be found at 49 CFR §173.8. “*Exceptions for non-specification packagings used in intrastate transportation.*” Crossing state boundaries (interstate transportation) voids authorization under 49 CFR §173.8. *Briefly stated, 49 CFR §173.8 allows the use of non-specification tanks to transport fuel provided certain criteria are met and tanks are visually inspected annually and periodically tested.* The details of those requirements follow.

The original intrastate transport provisions consisted of the following four components:

- §173.8(a) Non-specification bulk packagings,
- §173.8(b) Non-specification cargo tanks for petroleum products,
- §173.8(c) Permanently secured non-bulk tanks for petroleum products, and
- §173.8(d) Additional requirements.

49 CFR §173.8(a) allowed the use of non-specification bulk packagings for the transportation of most *hazardous materials* (beyond just petroleum products) by an intrastate carrier *until* July 1, 2000. The remaining provisions of §173.8 are now limited to petroleum products. The use of non-specification cargo tanks (49 CFR §173.8(b)) or permanently secured non-bulk tanks (§173.8(c)) to transport petroleum products are both contingent on meeting certain criteria (§173.8(d)). Those requirements will be discussed after the non-specification cargo tank and secured tank provisions.

49 CFR §173.8(b), allows the continued use of non-specification cargo tanks, with capacities < 3500 gallons, for petroleum products provided items 1 – 5 of §173.8(d) are met (see below). In addition, after July 1, 2000 the Subpart E provisions “Qualification and Maintenance of Cargo Tanks” (49 CFR 180.401 – 180.417) were made a formal requirement (i.e. qualifications, inspections, record keeping etc.). An exception to the provisions that address manhole assemblies (49 CFR 180.405(g) and 178.345-5) was allowed due the size of authorized tanks (< 3500 g).

49 CFR §173.8(c) allows the use of non-bulk tanks for petroleum products provided the capacity is < 119 gallons and the tank is permanently secured to the vehicle and is protected against leakage or damage in the event of a turnover. As with the cargo tank provisions, after July 1, 2000 the permanently secured non-bulk tanks are subject to the formal Subpart E “Qualification and Maintenance of Cargo Tanks” (49 CFR §180.401 – §180.417) requirements (i.e. qualifications, inspections, record keeping etc.).

49 CFR §173.8(d) *Additional requirements* can be paraphrased as follows: A packaging used under the provisions of paragraphs (b), or (c) of this section must -

1 Be operated by an intrastate motor carrier and in use as a packaging before October 1, 1998;

2 Be operated in conformance with the requirements of the State in which it is authorized;

3 Be specifically authorized by a State statute or regulation in effect before October 1, 1998, for use as a packaging for the hazardous materials being transported;

4 Be offered for transportation and transported in conformance with all other applicable requirements of this subchapter;

5 Not be used to transport a flammable cryogenic liquid, hazardous substance, hazardous waste, or marine pollutants (except gasoline); and

6 On or after July 1, 2000 for a tank authorized under §173.8(b) or (c) conform to all requirements in part 180 (except §180.405(g)) of this subchapter in the same manner as required for a DOT specification MC 306 cargo tank motor vehicle.

Three observations can be made based on the fuel classification and fuel transportation discussions.

(A) The scope of the HMR relative to petroleum products addresses *flammable* liquids in both non-bulk and bulk quantities. Gasoline is regulated and since the July 1, 2000 date has passed, any non-bulk or bulk tanks of gasoline are subject to Subpart E “Qualification and Maintenance of Cargo Tanks” (inspections, testing, and recordkeeping).

(B) Petroleum products that can be reclassified as combustible liquids (see §173.120) are not subject to the §173.8(c) provisions, provided the combustible liquid is not a hazard substance, hazardous waste, or a marine pollutant *and* if transported in a non-bulk packaging (< 119 g). Therefore, if *diesel fuel* can be classified as a combustible liquid under the provisions of 49 CFR §173.120, the inspection, testing and recordkeeping provisions of §173.8(c) will not apply. Users will have to refer to supplier MSDS information on their particular seasonal blend of diesel. Typically it can be expected that most diesel fuels will have flash points in the 125 – 140°F range, thus making it eligible for reclassification as combustible liquid.

(C) The provisions of §173.8(b) apply when either gasoline or diesel fuel is transported in tanks > 119 gallons, but < 3500 gallons. Bulk containers of gasoline or diesel are subject to inspection, testing, and recordkeeping requirements.

V. Compliance Requirements: Summaries of several scenarios likely to be encountered at projects and recommended solutions are summarized in Tables 1 and 2. Table 1 summarizes tank configurations and appropriate authorizations. Table 1 then references HMR compliance requirements and suggested shipping paper entries (Table 2) for the scenarios presented. Tank inspection and record keeping are addressed in the following section.

TABLE 1
Configurations and Authorizations

Scenario	Fuel	Tank Configuration	Use	Packaging Authorization	Shipping Paper	Labeling	Marking	Placarding	Other Requirements
1	Gasoline ⁽²⁾ FP < 100°F	Non-bulk (≤ 119 g)	<i>Intra</i> -state	§173.8(c)	Yes	Flammable Liquid	PSN UN# Address	Not required	Tank inspection DOT Training ⁽⁵⁾
2	Gasoline ⁽²⁾ FP < 100°F	Bulk (> 119 g)	<i>Intra</i> -state	§173.8(b)	Yes	N/A	UN# ⁽¹⁾	Flammable	Tank inspection DOT Training ⁽⁵⁾
3	Gasoline ⁽²⁾ FP < 100°F	Non-bulk/bulk	<u>Inter</u> -state	Specification Packaging §173.202/242 or exemption	Yes	Flammable Liquid (non-bulk)	PSN UN# Address	Flammable (bulk)	DOT Training ⁽⁵⁾ Specification packaging
4	Diesel ⁽³⁾ (FP ≥ 100°F)	Non-bulk (≤ 119 g)	<u>Inter</u> -state	Not regulated By HMR if combustible	Not required	None	None	None	No DOT training required ⁽⁶⁾
5	Diesel ⁽³⁾ (FP ≥ 100°F)	Non-bulk (≤ 119 g)	<i>Intra</i> -state	Not regulated By HMR if combustible	Not required	None	None	None	No DOT training required ⁽⁶⁾
6	Diesel ⁽³⁾ (FP ≥ 100°F)	Bulk (> 119 g)	<i>Intra</i> -state	§173.8(b)	Yes	N/A	UN# ⁽⁴⁾	Combustible	Tank inspection DOT Training ⁽⁵⁾
7	Diesel ⁽³⁾ (FP ≥ 100°F)	Bulk (> 119 g)	<u>Inter</u> -state	Specification packaging (§173.241) or exemption	Yes	N/A	UN# ⁽⁴⁾	Combustible	Tank inspection DOT Training ⁽⁵⁾

⁽¹⁾ Bulk tanks include cargo tanks mounted in or on a motor vehicle and/or a trailer

⁽²⁾ Denotes Gasoline as a flammable liquid

⁽³⁾ Denotes Diesel as reclassified combustible liquid

⁽⁴⁾ < 1000 gallons: 2 opposing sides (2X); ≥ 1000 gallons; 4 sides (4X)

⁽⁵⁾ May include security plan training

⁽⁶⁾ OSHA Hazard Communication requirements may apply

Table 2
Shipping Paper Entries

1. Gasoline, 3, UN1203, PGII –“49 CFR 173.8(c) Authorized Packaging”
2. Gasoline, 3, UN1203, PGII –“49 CFR 173.8(b) Authorized Packaging”
3. Gasoline, 3 UN1203, PG II
4/5. “Diesel Fuel, non-DOT regulated per 49 CFR 173.150(f)(2)”
6. Combustible liquid n.o.s. (diesel fuel), NA1993, PGIII –“49 CFR 173.8(b) Authorized Packaging”
7. Combustible liquid n.o.s. (diesel fuel), NA1993, PGIII
An editable version of DD Form 836 can be found at the end of Appendix A

VI. Tank Qualification, Inspection and Record keeping. With shipping papers, marking, labeling and placarding requirements addressed, the requirements associated with the tanks themselves also need to be evaluated. Since the compliance details of 49 CFR §180 could warrant a separate fact sheet, a preliminary discussion of the requirements can be summarized in two parts, the type of test or inspection required and the interval of testing or inspection. External visual inspections are required annually [49 CFR §180.407(d)] and internal annual inspections are required in the event a project has an insulated tank [49 CFR §180.407(e)]. Hydrostatic or pneumatic pressure testing is required on a 5-year cycle as defined at 49 CFR §180.407(g).

As noted from Table 1, scenarios 1 and 2 (gasoline), and 6 & 7 (diesel in bulk) will require annual visual inspections and 5-year pressure testing. It is unlikely a project has an internally lined tank, but in the event they are in use, an internal inspection might be required.

Based on these requirements, staff should inventory and conduct visual inspections of any existing cargo tanks and all permanently secured non-bulk tanks used for gasoline and diesel transportation as soon as practicable. During these inspections all manufacturer markings should be noted, and if a specification plate is found, all embossed or engraved information should be collected. Example external and internal inspection forms and pressure testing documentation forms have been developed and can be found in appendix A. These forms can be simplified substantially once the types of tanks have been determined. Selected sections of §180.407 language are included with each form to give the reader an understanding of the scope of the inspection requirements. Finally, staff need to follow up with State Department of Transportation regulations to ensure that non-specification tanks are authorized per 49 CFR §173.8(d)(3).

It is not anticipated that many tanks will fall under the scope of the regulations requiring formal inspection and testing (i.e. scenarios 4 and 5); however it is recommended that the inspection content and frequency schedules be followed for *all* tanks used to transport gasoline or diesel. For those tanks formally addressed by §173.8(b) & (c), specific care should be taken to address inspection and record keeping requirements. Any tanks that do not meet established criteria or authorizations should be removed from service

immediately. Figure 1 outlines and summarizes the decision process for determining appropriate compliance requirements assuming tanks are authorized. Prior to the selection of replacement tanks, a “needs” evaluation addressing supported fueling activities and quantity requirements should be conducted to determine if replace DOT *specification* tanks are appropriate or if custom fabricated tanks with DOT exemptions (DOT-E) are warranted.

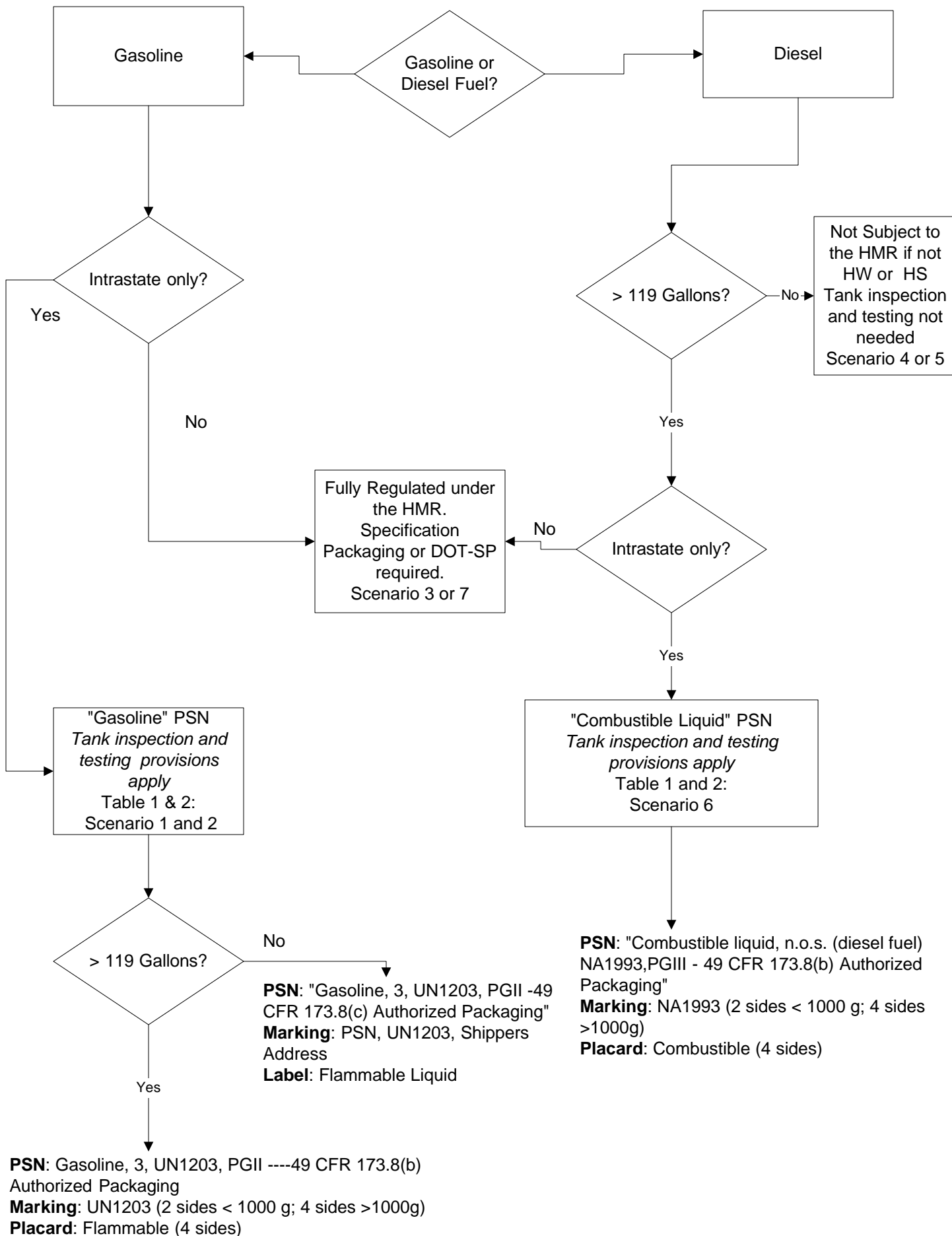
Finally, it should be remembered that Federal Motor Carrier Safety Regulations Group C vehicles (i.e. pick-up and pick with trailer) that require placards also require operators of those vehicles to have a commercial drivers license (49 CFR 383.91 – 383.93) with a hazardous materials endorsement. Further, depending on the type of cargo tank motor vehicle being operated, a tank vehicle endorsement may also be required.

VII. Governing Regulations and Recent Rulemaking: The October 30, 2003 Final Rule “Applicability of the Hazardous Materials Regulations to Loading, Unloading, and Storage” (68 FR 61906) clarified functions *not subject* to the HMR. Specifically, §171.1(d)(5) states “Transportation of a hazardous material in a motor vehicle, aircraft, or vessel operated by a Federal, state, or local government employee solely for noncommercial Federal, state or local government purposes.” However, it must be remembered that Defense Transportation Regulation (DTR) DOD Regulation 4500.9-R-Part II, Chapter 204 Hazardous Material states “*All DOD personnel (military, civilians and contractors) participating in the shipment/movement of HAZMAT must comply with the rules of regulatory bodies governing the safe transportation of HAZMAT for modes of transportation. Although exceptions are noted in the 49 CFR (173.7 (b)), U.S. Government Material, for shipments for national security, all DOD personnel will comply with 49 CFR unless otherwise authorized by the DTR.*”

DOD Regulation clearly states DOD will comply with the HMR, regardless of the language codified by the Pipeline and Hazardous Materials Safety Administration (PHMSA).

Summary: The use of existing DOT provisions allowing for non-specification packaging for petroleum fuels in intrastate transportation are dependent on fuel classification, the type of tank configuration and limitation to intrastate movement. In order to comply with the provisions, project staff must confirm that operational requirements are being met. That includes limiting transportation to within a state boundary, evaluating fuel transportation needs, conducting periodic inspections of tanks, maintaining appropriate records, and removing noncompliant tanks from service. The fact sheet narrative, attached flowchart and checklists should clarify the scope and aspects of compliance with the transportation of petroleum products and the applicability of 49 CFR §173.8 “*Exceptions for non-specification packagings used in intrastate transportation.*”

**Figure 1
Petroleum Fuel Transportation
Requirements**



Appendix A

Tank Inspection and Testing

I. External Inspection Form #1

II. Internal Inspection Form #2

III. Pressure Test Form #3

IV. Abstracts from 49 CFR §180.407

V. Example DD Form 836

US Army Corps of Engineers: Project _____

49 CFR 173.8(d) Inspection Form #1

49 CFR 180.407(d)
External

Manufacturer/Year: _____/_____ DOT Specification Yes No
Identification #: _____
Tank Description: _____ Specification #: _____
Maximum Allowed Working Pressure (MAWP): _____/_____

Is the Cargo Tank Motor Vehicle Lined: Yes No

Is the Cargo Tank Motor Vehicle Insulated: Yes No

Citation	Item	Compliant	Non-Compliant	Notes
§180.407(d)(2)(i)	Tank shell			
	Tank head			
§180.407(d)(2)(ii)	pipng			
	valves			
	gaskets			
§180.407(d)(2)(iii)	Manhole cover & Gaskets N/A (173.8(d)(6))			
§180.407(d)(2)(iv)	Emergency devices and valves			
§180.407(d)(2)(v)	Missing bolts, nuts, fusible links or elements			
§180.407(d)(2)(vi)	Legible marking UN# PSN			
§180.407(d)(2)(viii)	Tank Appurtenances Suspension System Connecting structures			

§180.407(d)(5) Shell Thickness: _____

Head Thickness: _____

Coupler (5th wheel) Present: Yes No

Upper Coupler dropped and inspected: Yes No NA

Pressure Relief Devices Present: Yes No NA

Pressure Relief Devices Removed: Yes No NA

Pressure Relief Devices Tested: Yes No NA

Pressure setting: _____ Opened At: _____ Closed At: _____

§180.407(g)(ii)[C] Device Reinstalled: Yes No

Repaired: Yes No

Replaced: Yes No

I certify the above inspection was conducted and entries required by §173.8(d)(6) and associated §180.407(d) were made:

Cargo Tank meets the requirements of 49 CFR 173.8 and 180.407

Cargo Tank fails the requirements of 49 CFR 173.8 and 180.407

Inspector Name: _____

Inspectors Signature: _____

Owner Signature: _____

§180.407(d) External visual inspection and testing

(d) *External visual inspection and testing.*

The following applies to the external visual inspection and testing of cargo tanks:

- (1) Where insulation precludes a complete external visual inspection as required by paragraphs (d)(2) through (d)(6) of this section, the cargo tank also must be given an internal visual inspection in accordance with paragraph (e) of this section. If external visual inspection is precluded because any part of the cargo tank wall is externally lined, coated, or designed to prevent an external visual inspection, those areas of the cargo tank must be internally inspected. If internal visual inspection is precluded because the cargo tank is lined, coated, or designed so as to prevent access for internal inspection, the tank must be hydrostatically or pneumatically tested in accordance with paragraph (g)(1)(iv) of this section. Those items able to be externally inspected must be externally inspected and noted in the inspection report.
- (2) The external visual inspection and testing must include as a minimum the following:
 - (i) The tank shell and heads must be inspected for corroded or abraded areas, dents, distortions, defects in welds and any other conditions, including leakage, that might render the tank unsafe for transportation service;
 - (ii) The piping, valves, and gaskets must be carefully inspected for corroded areas, defects in welds, and other conditions, including leakage, that might render the tank unsafe for transportation service;
 - (iii) All devices for tightening manhole covers must be operative and there must be no evidence of leakage at manhole covers or gaskets;
 - (iv) All emergency devices and valves including self-closing stop valves, excess flow valves and remote closure devices must be free from corrosion, distortion, erosion and any external damage that will prevent safe operation. Remote closure devices and self-closing stop valves must be functioned to demonstrate proper operation;
 - (v) Missing bolts, nuts and fusible links or elements must be replaced, and loose bolts and nuts must be tightened;
 - (vi) All markings on the cargo tank required by parts 172, 178 and 180 of this subchapter must be legible;
 - (vii) [Reserved]
 - (viii) All major appurtenances and structural attachments on the cargo tank including, but not limited to, suspension system attachments, connecting structures, and those elements of the upper coupler (fifth wheel) assembly that can be inspected without dismantling the upper coupler (fifth wheel) assembly must be inspected for any corrosion or damage which might prevent safe operation;
 - (ix) For cargo tanks transporting lading corrosive to the tank, areas covered by the upper coupler (fifth wheel) assembly must be inspected at least once in each two year period for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service. The upper coupler (fifth wheel) assembly must be removed from the cargo tank for this inspection.
- (3) All reclosing pressure relief valves must be externally inspected for any corrosion or damage which might prevent safe operation. All reclosing pressure relief valves on cargo tanks carrying lading corrosive to the valve must be removed from the cargo tank for inspection and testing. Each reclosing pressure relief valve required to be removed and tested must open at the required set pressure and reseal to a leak-tight condition at 90 percent of the set-to-discharge pressure or the pressure prescribed for the applicable cargo tank specification.
- (4) Ring stiffeners or other appurtenances, installed on cargo tanks constructed of mild steel or high-strength, low-alloy steel, that create air cavities adjacent to the tank shell that do not allow for external visual inspection must be thickness tested in accordance with paragraphs (i)(2) and (i)(3) of this section, at least once every 2 years. At least four symmetrically distributed readings must be taken to establish an average thickness for the ring stiffener or appurtenance. If any thickness reading is less than the average thickness by more than 10%, thickness testing in accordance with paragraphs (i)(2) and (i)(3) of this section must be conducted from the inside of the cargo tank on the area of the tank wall covered by the appurtenance or ring stiffener.
- (5) Corroded or abraded areas of the cargo tank wall must be thickness tested in accordance with the procedures set forth in paragraphs (i)(2), (i)(3), (i)(5) and (i)(6) of this section.
- (6) The gaskets on any full opening rear head must be:
 - (i) Visually inspected for cracks or splits caused by weather or wear; and
 - (ii) Replaced if cuts or cracks which are likely to cause leakage, or are of a depth one-half inch or more, are found.
- (7) The inspector must record the results of the external visual examination as specified in § 180.417(b).

US Army Corps of Engineers: Project _____

49 CFR 173.8(d) Inspection Form #2

49 CFR 180.407(e)
Internal

Manufacturer/Year: _____/_____ DOT Specification Yes No
Identification #: _____
Tank Description: _____ Specification/Serial #: _____
Maximum Allowed Working Pressure (MAWP): _____/_____

Is the Cargo Tank Motor Vehicle Lined: Yes No

Is the Cargo Tank Motor Vehicle Insulated: Yes No

Citation	Item	Compliant	Non-Compliant	Notes
§180.407(e)(2)(i)	Tank shell			
§180.407(e)(2)(ii)	Tank head			
§180.407(e)(2)(iii)	Lining			
§180.407(f) Lining Testing As required				
§180.407(e)(3)	Corroded Area detected			
§180.407(e)(3)	Corroded Area Tested			

§180.407(e)(3) Shell Thickness: _____ Head Thickness: _____

Coupler (5th wheel) Present: Yes No
Upper Coupler dropped and inspected: Yes No NA

Pressure Relief Devices Present: Yes No NA
Pressure Relief Devices Removed: Yes No NA
Pressure Relief Devices Tested: Yes No NA
Pressure setting: _____ Opened At: _____ Closed At: _____

§180.407(g)(ii)[C] Device Reinstalled: Yes No Repaired: Yes No Replaced: Yes No

I certify the above inspection was conducted and entries required by §173.8(d)(6) and associated §180.407(d) were made:

Cargo Tank meets the requirements of 49 CFR 173.8 and 180.407

Cargo Tank fails the requirements of 49 CFR 173.8 and 180.407

Inspector Name: _____

Inspectors Signature: _____

Owner Signature: _____

§180.407(e) – (f)

- (e) *Internal visual inspection.* (1) When the cargo tank is not equipped with a manhole or inspection opening, or the cargo tank design precludes an internal inspection, the tank shall be hydrostatically or pneumatically tested in accordance with 180.407(c) and (g).
- (2) The internal visual inspection must include as a minimum the following:
- (i) The tank shell and heads must be inspected for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service.
 - (ii) Tank liners must be inspected as specified in § 180.407(f).
 - (3) Corroded or abraded areas of the cargo tank wall must be thickness tested in accordance with paragraphs (i)(2), (i)(3), (i)(5) and (i)(6) of this section.
 - (4) The inspector must record the results of the internal visual inspection as specified in § 180.417(b).

(f) *Lining inspection.* The integrity of the lining on all lined cargo tanks, when lining is required by this subchapter, must be verified at least once each year as follows:

- (1) Rubber (elastomeric) lining must be tested for holes as follows:
- (i) Equipment must consist of:

- (A) A high frequency spark tester capable of producing sufficient voltage to ensure proper calibration;
 - (B) A probe with an “L” shaped 2.4 mm (0.09 inch) diameter wire with up to a 30.5 cm (12-inch) bottom leg (end bent to a 12.7 mm (0.5 inch) radius), or equally sensitive probe; and
 - (C) A steel calibration coupon 30.5 cm _____ 30.5 cm (12 inches _____ 12 inches) covered with the same material and thickness as that to be tested. The material on the coupon shall have a test hole to the metal substrate made by puncturing the material with a 22 gauge hypodermic needle or comparable piercing tool.
- (ii) The probe must be passed over the surface of the calibration coupon in a constant uninterrupted manner until the hole is found. The hole is detected by the white or light blue spark formed. (A sound lining causes a dark blue or purple spark.) The voltage must be adjusted to the lowest setting that will produce a minimum 12.7 mm (0.5 inch) spark measured from the top of the lining to the probe. To assure that the setting on the probe has not changed, the spark tester must be calibrated periodically using the test calibration coupon, and the same power source, probe, and cable length.
- (iii) After calibration, the probe must be passed over the lining in an uninterrupted stroke.
- (iv) Holes that are found must be repaired using equipment and procedures prescribed by the lining manufacturer or lining installer.
- (2) Linings made of other than rubber (elastomeric material) must be tested using equipment and procedures prescribed by the lining manufacturer or lining installer.
- (3) Degraded or defective areas of the cargo tank liner must be removed and the cargo tank wall below the defect must be inspected. Corroded areas of the tank wall must be thickness tested in accordance with paragraphs (i)(2), (i)(3), (i)(5) and (i)(6) of this section.
- (4) The inspector must record the results of the lining inspection as specified in § 180.417(b).

- (i) *Thickness testing.* (1) The shell and head thickness of all unlined cargo tanks used for the transportation of materials corrosive to the tank must be measured at least once every 2 years, except that cargo tanks measuring less than the sum of the minimum prescribed thickness, plus one fifth of the original corrosion allowance, must be tested annually.
- (2) Measurements must be made using a device capable of accurately measuring thickness to within ___0.002 of an inch.
- (3) Any person performing thickness testing must be trained in the proper use of the thickness testing device used in accordance with the manufacturer’s instruction.
- (4) Thickness testing must be performed in the following areas of the cargo tank wall, as a minimum:
- (i) Areas of the tank shell and heads and shell and head area around any piping that retains lading;
 - (ii) Areas of high shell stress such as the bottom center of the tank;
 - (iii) Areas near openings;
 - (iv) Areas around weld joints;
 - (v) Areas around shell reinforcements;
 - (vi) Areas around appurtenance attachments;
 - (vii) Areas near upper coupler (fifth wheel) assembly attachments;
 - (viii) Areas near suspension system attachments and connecting structures;
 - (ix) Known thin areas in the tank shell and nominal liquid level lines; and
 - (x) Connecting structures joining multiple cargo tanks of carbon steel in a self-supporting cargo tank motor vehicle.
- (5) Minimum thicknesses for MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, **MC 306**, MC 307, MC 310, MC 311, and MC 312 cargo tanks are determined based on the definition of minimum thickness found in § 178.320(a) of this subchapter. The following Tables I and II identify the “In-Service Minimum Thickness” values to be used to determine the minimum thickness for the referenced cargo tanks. The column headed “Minimum Manufactured Thickness” indicates the minimum values required for new construction of DOT 400 series cargo tanks, found in Tables I and II of §§ 178.346–2, 178.347–2, and 178.348–2 of this subchapter. In-Service Minimum Thicknesses for MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, **MC 306**, MC 307, MC 310, MC 311, and MC 312 cargo tanks are based on 90 percent of the manufactured thickness specified in the DOT specification, rounded to three places.

TABLE I.—IN-SERVICE MINIMUM THICKNESS FOR MC 300, MC 303, MC 304, MC 306, MC 307, MC 310, MC 311, AND MC 312 SPECIFICATION CARGO TANKS CONSTRUCTED OF STEEL AND STEEL ALLOYS

Minimum manufactured thickness (US gauge or inches)	Nominal decimal equivalent for (inches)	In-service minimum thickness reference (inches)
19	0.0418	0.038
18	0.0478	0.043
17	0.0538	0.048
16	0.0598	0.054
15	0.0673	0.061
14	0.0747	0.067
13	0.0897	0.081
12	0.1046	0.094
11	0.1196	0.108
10	0.1345	0.121
9	0.1495	0.135
8	0.1644	0.148
7	0.1793	0.161
3/16	0.1875	0.169
1/4	0.2500	0.225
5/16	0.3125	0.281
3/8	0.3750	0.338

TABLE II.—IN-SERVICE MINIMUM THICKNESS FOR MC 301, MC 302, MC 304, MC 305, MC 306, MC 307, MC 311, AND MC 312 SPECIFICATION CARGO TANKS CONSTRUCTED OF ALUMINUM AND ALUMINUM ALLOYS

Minimum manufactured thickness	In-service minimum thickness (inches)
0.078	0.070
0.087	0.078
0.096	0.086
0.109	0.098
0.130	0.117
0.141	0.127
0.151	0.136
0.172	0.155
0.173	0.156
0.194	0.175
0.216	0.194
0.237	0.213
0.270	0.243
0.360	0.324
0.450	0.405
0.540	0.486

US Army Corps of Engineers: Project _____

49 CFR 173.8(d) Inspection Form #3

**49 CFR 180.407(g)
Pressure Retest**

Manufacturer/Year: _____/_____ DOT Specification Yes No

Identification #: _____

Tank Description: _____ Specification/Serial #: _____

Maximum Allowed Working Pressure (MAWP): _____/_____

Is the Cargo Tank Motor Vehicle Lined: Yes No

Is the Cargo Tank Motor Vehicle Insulated: Yes No

Citation	Item	Compliant	Non-Compliant	Notes
§180.407(g)(i)	External Inspection Completed			
§180.407(g)(i)	Internal Inspection Completed			
§180.407(g)(ii)[A]	Self Closing Pressure Relief Value			
§180.407(g)(ii)[B]	Normal Vents			

§180.407(e)(3) Shell Thickness: _____

Head Thickness: _____

Coupler (5th wheel) Present: Yes No

Upper Coupler dropped and inspected: Yes No NA

Pressure Relief Devices Present: Yes No NA

Pressure Relief Devices Removed: Yes No NA

Pressure Relief Devices Tested: Yes No NA

Pressure setting: _____ Opened At: _____ Closed At: _____

§180.407(g)(ii)[C] Device Reinstalled: Yes No Repaired: Yes No Replaced: Yes No

Hydrostatic Test Conducted: Yes No Pneumatic Test Conducted: Yes No

I certify the above inspection was conducted and entries required by §173.8(d)(6) and associated §180.407(d) were made:

Cargo Tank meets the requirements of 49 CFR 173.8 and 180.407

Cargo Tank fails the requirements of 49 CFR 173.8 and 180.407

Inspector Name: _____

Inspectors Signature: _____

Owner Signature: _____

§180.407(g) Pressure Test

(g) *Pressure test.* All components of the cargo tank wall, as defined in § 178.320(a) of this subchapter, must be pressure tested as prescribed by this paragraph.

(1) *Test Procedure*—(i) As part of the pressure test, the inspector must perform an external and internal visual inspection, except that on an MC 338 cargo tank, or a cargo tank not equipped with a manhole or inspection opening, an internal inspection is not required.

(ii) All self-closing pressure relief valves, including emergency relief vents and normal vents, must be removed from the cargo tank for inspection and testing.

(A) Each self-closing pressure relief valve that is an emergency relief vent must open at the required set pressure and seat to a leak-tight condition at 90 percent of the set-to-discharge pressure or the pressure prescribed for the applicable cargo tank specification.

(B) Normal vents (1 psig vents) must be tested according to the testing criteria established by the valve manufacturer.

(C) Self-closing pressure relief devices not tested or failing the tests in this paragraph (g)(1)(ii) must be repaired or replaced.

(iii) Except for cargo tanks carrying lading corrosive to the tank, areas covered by the upper coupler (fifth wheel) assembly must be inspected for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service. The upper coupler (fifth wheel) assembly must be removed from the cargo tank for this inspection.

(iv) Each cargo tank must be tested hydrostatically or pneumatically to the internal pressure specified in the following table. At no time during the pressure test may a cargo tank be subject to pressures that exceed those identified in the following table:

Specification	Test Pressure
MC 300, 301, 302, 303, 305, 306	20.7 kPa (3 psig) or design pressure, whichever is greater

(v) [Reserved]

(vi) Each cargo tank of a multi-tank cargo tank motor vehicle must be tested with the adjacent cargo tanks empty and at atmospheric pressure.

(vii) All closures except pressure relief devices must be in place during the test. All prescribed loading and unloading venting devices rated at less than test pressure may be removed during the test. If retained, the devices must be rendered inoperative by clamps, plugs, or other equally effective restraining devices. Restraining devices may not prevent detection of leaks or damage the venting devices and must be removed immediately after the test is completed.

(viii) *Hydrostatic test method.* Each cargo tank, including its domes, must be filled with water or other liquid having similar viscosity, at a temperature not exceeding 100 °F. The cargo tank must then be pressurized to not less than the pressure specified in paragraph (g)(1)(iv) of this section. The cargo tank, including its closures, must hold the prescribed test pressure for at least 10 minutes during which time it shall be inspected for leakage, bulging or any other defect.

(ix) *Pneumatic test method.* Pneumatic testing may involve higher risk than hydrostatic testing. Therefore, suitable safeguards must be provided to protect personnel and facilities should failure occur during the test. The cargo tank must be pressurized with air or an inert gas. The pneumatic test pressure in the cargo tank must be reached by gradually increasing the pressure to one-half of the test pressure. Thereafter, the pressure must be increased in steps of approximately one-tenth of the test pressure until the required test pressure has been reached. The test pressure must be held for at least 5 minutes. The pressure must then be reduced to the MAWP, which must be maintained during the time the entire cargo tank surface is inspected. During the inspection, a suitable method must be used for detecting the existence of leaks. This method must consist either of coating the entire surface of all joints under pressure with a solution of soap and water, or using other equally sensitive methods.

(2) When testing an insulated cargo tank, the insulation and jacketing need not be removed unless it is otherwise impossible to reach test pressure and maintain a condition of pressure equilibrium after test pressure is reached, or the vacuum integrity cannot be maintained in the insulation space. If an MC 338 cargo tank used for the transportation of a flammable gas or oxygen, refrigerated liquid is opened for any reason, the cleanliness must be verified prior to closure using the procedures contained in § 178.338–15 of this subchapter.

(3) Each MC 330 and MC 331 cargo tank constructed of quenched and tempered steel in accordance with Part UHT in Section VIII of the ASME Code (IBR, see § 171.7 of this subchapter), or constructed of other than quenched and tempered steel but without postweld heat treatment, used for the transportation of anhydrous ammonia or any other hazardous materials that may cause corrosion stress cracking, must be internally inspected by the wet fluorescent magnetic particle method immediately prior to and in conjunction with the performance of the pressure test prescribed in this section. Each MC 330 and MC 331 cargo tank constructed of quenched and tempered steel in accordance with Part UHT in Section VIII of the ASME Code and used for the transportation of liquefied petroleum gas must be internally inspected by the wet fluorescent magnetic particle method immediately prior to and in conjunction with the performance of the pressure test prescribed in this section. The wet fluorescent magnetic particle inspection must be in accordance with Section V of the ASME Code and CGA Technical Bulletin TB–2 (IBR, see § 171.7 of this subchapter). This paragraph does not apply to cargo tanks that do not have manholes. (See § 180.417(c) for reporting requirements.)

(4) All pressure bearing portions of a cargo tank heating system employing a medium such as, but not limited to, steam or hot water for heating the lading must be hydrostatically pressure tested at least once every 5 years. The test pressure must be at least the maximum system design operating pressure and must be maintained for five minutes. A heating system employing flues for heating the lading must be tested to ensure against lading leakage into the flues or into the atmosphere.

(5) *Exceptions.* (i) Pressure testing is not required for MC 330 and MC 331 cargo tanks in dedicated sodium metal service.

(ii) Pressure testing is not required for uninsulated lined cargo tanks, with a design pressure or MAWP of 15 psig or less, which receive an external visual inspection and a lining inspection at least once each year.

(6) *Acceptance criteria.* A cargo tank that leaks, fails to retain test pressure or pneumatic inspection pressure, shows distortion, excessive permanent expansion, or other evidence of weakness that might render the cargo tank unsafe for transportation service, may not be returned to service, except as follows: A cargo tank with a heating system which does not hold pressure may remain in service as an unheated cargo tank if:

(i) The heating system remains in place and is structurally sound and no lading may leak into the heating system, and

(ii) The specification plate heating system information is changed to indicate that the cargo tank has no working heating system.

(7) The inspector must record the results of the pressure test as specified in § 180.417(b).

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DANGEROUS GOODS SHIPPING PAPER/DECLARATION AND EMERGENCY RESPONSE INFORMATION FOR HAZARDOUS MATERIALS TRANSPORTED BY GOVERNMENT VEHICLES								
1.a. NOMENCLATURE:			d. CONTAINER SEAL NO.:					
b. MODEL NO.:			e. SERIAL NO.:					
c. BUMPER NO.:			f. TCN NUMBER:					
2. SHIPPER NAME/ADDRESS/TELEPHONE NO. /DATE OF PREPARATION							3. PAGE _____ OF _____ PAGES	
4. CARGO (To be completed by the unit or shipper Transportation Office (TO))								
PROPER SHIPPING NAME <small>(Include RO, Technical Names, Additional Information per 49 CFR172.203, as required.)</small> a.	HAZARD CLASS/DIVISION b.	SUBSIDIARY HAZARD c.	UN/ID NUMBER d.	PACKING GROUP (PG) e.	PACKAGES		TOTAL NET QUANTITY h.	TOTAL AMMO (NEW) i.
					NUMBER f.	KIND g.		
5. CONSIGNEE NAME								
6. REMARKS								
7.a. COPY OF EMERGENCY RESPONSE GUIDE NUMBER(S)								
b. EMERGENCY NOTIFICATION. In all cases of accident, breakdown or fire, promptly call emergency assistance telephone number(s) in Item 7c below and then shipper and/or consignee in Item 2 above, in that order.								
c. 24-HOUR EMERGENCY ASSISTANCE TELEPHONE NUMBERS:								
DOD NON-EXPLOSIVE HAZMAT: 1-800-851-8061 1-804-279-3131 <small>(FOR CALLS FROM SHIPS AT SEA)</small>	DOD HAZ CLASS 1 (EXPLOSIVES) ONLY: (703) 697-0218 or 0219 <small>(COLLECT)</small> OR DSN 227-0218 <small>(WATCH OFFICER)</small>	CHEMICAL/BIOLOGICAL WARFARE MATERIAL DUTY HOURS: DSN 584-3044, 584-7211, 584-6455, Comm. (410) 436-3044, (410) 436-7211, (410) 436-6455 AFTER DUTY HOURS: DSN 584-2148, Comm. (410) 436-2148 <small>(Ask for TEU S3)</small>	SECURE HOLDING: 1-800-524-0331 OIL AND CHEMICAL SPILLS: NATIONAL RESPONSE CENTER (NRC) AND TERRORIST HOTLINE: 1-800-424-8802 AT SEA: 202-267-2675 <small>(COLLECT)</small>	DOD RADIOACTIVE MATERIALS: ARMY: (703) 697-0218 <small>(COLLECT)</small> USAF: (202) 767-4011 <small>(COLLECT)</small> USN/MC: Use 24-hour emergency response phone number provided by USN/MC activity initiating shipment. DLA: (717) 770-5283 <small>(COLLECT)</small>				
8. SHIPPER'S CERTIFICATION 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 regulations of the Department of Transportation.								
a. TYPE OR PRINT NAME OF SHIPPER CERTIFIER				c. SIGNATURE(S) OF VEHICLE OPERATOR(S)				
b. SIGNATURE OF SHIPPER CERTIFIER AND DATE								

DD FORM 836, NOV 2004

PREVIOUS EDITION IS OBSOLETE.

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Figure 204-3. DD Form 836, Dangerous Goods Shipping Paper/Declaration and Emergency Response Information for Hazardous Materials Transported by Government Vehicles