TRANSPORTATION OF HAZARDOUS MATERIALS UNDER:

MATERIALS OF TRADE EXEMPTION

Rev. 2.5

49 CFR 173.6

Florida Institute of Technology
Melbourne, Florida
2014
Materials of Trade Exemption
49 CFR 173.6
Rev. 2.5

*Hazardous Material:* a substance or material which has been determined by the U.S. Department of Transportation (DOT) to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce.

*Materials of Trade:* a hazardous material, other than a hazardous waste, that is carried on a motor vehicle:

- For the purpose of protecting the health and safety of the motor vehicle operator or passengers
- For the purpose of supporting the operation of a motor vehicle (including its auxiliary equipment) or;
- By a private motor carrier (including vehicles operated by a rail carrier) in direct support of a principal business other than transportation by a motor vehicle. In other words, this exemption only applies to University employees transporting materials for University business, not commercial carriers (FedEx, UPS).

*Combination Package:* a combination of packaging, for transport purposes, consisting of one or more inner packagings secured in a non-bulk outer packaging. Example: biological specimens in closed tight vials counts as inner packaging, the box or bucket with absorbent material, such as a pad or vermiculite inside, counts as the outer packaging. See packaging section for detailed information.

*Packing Group:* is a grouping according to the degree of danger presented by hazardous materials. Packing Group I indicates great danger; Packing Group II, medium danger; Packing Group III, minor danger. Packing Groups can be found on a chemical SDS, section 14. See 49 CFR 172.101(f) for more information regarding Packing Groups.

*Hazard Class:* the category of hazard assigned to a hazardous material under the definitional criteria of 49 CFR 173 of this subchapter and the provisions of the § 172.101 table. A material may meet the defining criteria for more than one hazard class but is assigned to only one hazard class. There are currently 9 hazard classes with multiple subdivisions.

**CONTACT INFORMATION**

For any question regarding materials of trade exemption or DOT compliance, please contact:

Timothy Fram – *Technical Shipping Officer*
Cell: 440-231-1876       Office: 321-674-8481       tfram2007@fit.edu

H. Greg Peebles III - *Director of Environmental and Regulatory Compliance*
Cell: 321-917-5484       Office: 321-674-7715       peebles@fit.edu
REFERENCE TABLE FOR MATERIALS OF TRADE EXEMPTION

To qualify for an exemption, the packaged materials conform to size limits below. A material of trade is limited to the following DOT hazard classes and Divisions **ONLY**.

<table>
<thead>
<tr>
<th>Hazard</th>
<th>DOT Class</th>
<th>Maximum Quantity by PG (Packing Group From DOT Hazmat Table)</th>
<th>Examples</th>
<th>Definitions found in: 49 CFR.173.XXX</th>
</tr>
</thead>
</table>
| Flammable Gasses                          | Class 2, Division 2.1      | I 220 lbs.  
II 220 lbs.  
III 220 lbs.                                                   | Propane                | 115                                   |
| Non-Flammable Gasses                      | Class 2, Division 2.2      | I 220 lbs.  
II 220 lbs.  
III 220 lbs.                                                   | Nitrogen               | 115                                   |
| Flammable and Combustible Liquids         | Class 3                    | I 0.5 Kg (1 lb) or 0.5 L (1 Pint)  
II 30 Kg (66 lb) or 30 L (8 gal)  
III 30 Kg (66 lb) or 30 L (8 gal)                                 | Acetone, paint         | 120                                   |
| Flammable Solids                          | Class 4, Division 4.1      | I 0.5 Kg (1 lb) or 0.5 L (1 Pint)  
II 30 Kg (66 lb) or 30 L (8 gal)  
III 30 Kg (66 lb) or 30 L (8 gal)                                 | Charcoal               | 124                                   |
| Dangerous When Wet                        | *Class 4, Division 4.3     | I Not exempt  
II 30 ml (1 ounce)  
III 30 ml (1 ounce)                                              | Sodium aluminum hydride | 124                                   |
| Oxidizers                                 | Class 5, Division 5.1      | I 0.5 Kg (1 lb) or 0.5 L (1 Pint)  
II 30 Kg (66 lb) or 30 L (8 gal)  
III 30 Kg (66 lb) or 30 L (8 gal)                                 | Bleach Compounds       | 128                                   |
| Organic Peroxides                         | Class 5, Division 5.2      | I 0.5 Kg (1 lb) or 0.5 L (1 Pint)  
II 30 Kg (66 lb) or 30 L (8 gal)  
III 30 Kg (66 lb) or 30 L (8 gal)                                 | Benzoyl Peroxide       | 128                                   |
| Toxic Materials                            | *Class 6, Division 6.1     | I 0.5 Kg (1 lb) or 0.5 L (1 Pint)  
II 30 Kg (66 lb) or 30 L (8 gal)  
III 30 Kg (66 lb) or 30 L (8 gal)                                 | Pesticides             | 132                                   |
| Biological Substance Category B           | *Class 6, Division 6.2     | Combination Package  
Multiple Inner packages  
Each ≤ 0.5 Kg (1.1 lbs) or 0.5 L (17 oz)  
Total Package ≤ 4 Kg (8.8 lbs) or 4 L (1 gal)                     | Diagnostic Specimens, Biological Products | 132                                   |
| Biological Substance Category B           | *Class 6, Division 6.2     | Combination Package  
Single inner package ≤16 kg (35.2 lbs) or 16 L (4.2 gal)       | Diagnostic Specimens, Biological Products | 132                                   |
| Regulated Medical Waste (not Category A)  | *Class 6, Division 6.2     | Combination Package  
Multiple Inner packages  
Each ≤ 4 Kg (8.8 lbs) or 4 L (1 gal)  
Total Package ≤ 16 kg (35.2 lbs) or 16 L (4.2 gal)                 | Sharps Containers      | 132                                   |
| Corrosive Materials                       | Class 8                    | I 0.5 Kg (1 lb) or 0.5 L (1 Pint)  
II 30 Kg (66 lb) or 30 L (8 gal)  
III 30 Kg (66 lb) or 30 L (8 gal)                                 | Hydrochloric Acid      | 136                                   |
| Miscellaneous                             | Class 9                    | I 0.5 Kg (1 lb) or 0.5 L (1 Pint)  
II 30 Kg (66 lb) or 30 L (8 gal)  
III 30 Kg (66 lb) or 30 L (8 gal)                                 | Dry Ice                | 140                                   |
| Other Regulated Material                  | ORMD                       | None                                                        | Hair Spray, Nail Polish | 144                                   |
These exceptions do not apply to Biological Substance Category A materials, Explosives, and Radioactive Materials.

* Information for DOT hazmat table can be found online at:

**PACKAGING**

1. Packages must be leak tight for liquids and gases and sift proof for solids, and be secured against shifting and protected against damage.
2. The packaging must be either the manufacture’s original package or a package of equal or greater strength and integrity.
3. Outer packagings are not required for receptacles such as cans and bottles that are secured against shifting in cages, carts, bins, boxes, or compartments.
4. Non-bulk packages must be marked with a common name (Ex. hair spray) or a proper shipping name from the Hazardous Materials regulations (Ex. Isopropyl alcohol), including the letters "RQ" if it contains a reportable quantity of a hazardous substance.
5. The aggregate gross weight of all materials of trade on a motor vehicle may not exceed 200 kg (440 pounds).
6. For Class 6, Division 6.2, the materials **must** be contained in a combination packaging. For liquids, the inner packaging (ex: sample vial or specimen jar) must be leak-proof, and the outer packaging (Ex: fiberboard box or drum) must contain sufficient absorbent material to absorb the entire contents of the inner packaging (ex: absorbent pad or vermiculite). For sharps, the inner packaging (sharps container) must be constructed of a rigid material resistant to punctures and securely closed to prevent leaks or punctures, and the outer packaging must be securely closed to prevent leaks or punctures. For solids, liquids, and sharps, the outer packaging must be a strong, tight packaging securely closed and secured against shifting, including relative motion between packages, within the vehicle on which it is being transported.
7. For Class 6, Division 6.2, Category B materials, OSHA requires that a biohazard label be placed on the outer or inner packaging.
8. For gasoline, a packaging must be made of metal or plastic and conform to the requirements of this subchapter or to the requirements of the Occupational Safety and Health Administration of the Department of Labor contained in 29 CFR 1910.106(d)(2) or 1926.152(a)(1).
9. A cylinder or other pressure vessel containing a Division 2.1 or 2.2 materials must conform to packaging, qualification, maintenance, and use requirements of this subchapter, except that outer packagings are not required. Manifolding of cylinders is authorized provided all valves are tightly closed.
10. A DOT specification cylinder (except DOT specification 39) must be marked and labeled as prescribed in this subchapter. Each DOT-39 cylinder must display the markings specified in 178.65(i).
11. A diluted mixture of a Class 9 material (not exceeding 2% concentration) may be transported in a tank having a capacity of up to 1500 L (400 gal.) and must be marked on two opposing sides with the four-digit identification number of the material. The identification number must be displayed on placards,
orange panels or, alternatively, a white square-on-point configuration having the same outside dimensions as a placard (at least 273 mm (10.8 inches) on a side), in the manner specified in § 172.332 (b) and (c) of this subchapter.

OPERATOR REQUIREMENTS

1. The operator of a motor vehicle that contains a material of trade must be informed of the presence of the hazardous material (including whether the package contains a reportable quantity) and must be informed of the requirements of this section.

2. The operator of the vehicle containing a material(s) of trade must know:
   a. General knowledge of Materials of Trade regulations
   b. Quantity limitations
   c. Packaging requirements
   d. Marking and labeling requirements

3. Material of Trade Exemptions (what you don’t need)
   a. Shipping papers (shipper’s declaration)
   b. Emergency response information
   c. Placarding
   d. Formal training or retention of training records

4. If refrigerant is required for the shipment then:
   a. The major safety concern is asphyxiation due to displacement of oxygen by gaseous nitrogen (N2) or carbon dioxide (CO2). Even though the amounts of refrigerant being transported are small, the expansion ratios for these materials are quite large and they can quickly displace the O2 in the environment. Although these particular materials are not regulated under the MOT exemption, they are still considered to be dangerous.
   b. Materials must be labeled as either dry ice or liquid nitrogen and the operator must have knowledge of the materials that are being transported. Materials should be transported in the trunk of the vehicle if possible. However, if not, then there should be adequate fresh air ventilation in the vehicle.
   c. Materials must be in secondary containment, properly secured, properly vented, and there must be enough absorbent material to absorb all of the liquid, to include the refrigerant.

5. OSHA requires that there be a spill kit in each vehicle suitable for cleaning up the materials that are being transported. In general, this would consist of personal protective equipment (e.g. gloves, eye protection), absorbent materials, broom and dustpan, and bags/buckets to contain clean-up debris. If refrigerant is used during the transport, then the operator should have a pair of cryogenic gloves available in the vehicle.

6. All spills of materials in transport must be reported to The Office of Environmental and Regulatory Compliance immediately.

7. Hazardous materials must never be taken on any form of public transportation (bus, plane, etc.).

8. The ERC office requires completion/review of the Florida Institute of Technology Materials of Trade Transportation Manifest before departure.
ADDITIONAL CLARIFICATION & EXAMPLE MANIFEST

1. The total amount of a particular hazardous material is only limited by the overall vehicle gross weight limitation (200 kg / 400 lbs.) as long as it is packaged accordingly as specified above. For example, in theory one could transport ~200 kg gross weight of hydrochloric acid (class 8, pg II) as long as each individual package does not exceed the 30 kg limitation. Important to keep in mind that the weight of the packaging contributes towards the 200 kg threshold, therefore it is impossible to carry 200 kg of just hydrochloric acid under this exception.

2. The operator of a motor vehicle can use his/her own vehicle for transportation of hazardous materials as long as it is for company business.

3. Example manifest:

Materials of Trade Transportation Manifest:

Operator(s): Timothy Fram
Greg Peebles
Date: 5/30/2014
Contact Number(s): 321-674-8481
Destination: ARL
Point of Origin: Fit

<table>
<thead>
<tr>
<th>Hazard Class Group: 8</th>
<th>*Self-packaging must be approved by the Technical Shipping Officer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Chemical</td>
<td>Subdivision (if applicable)</td>
</tr>
<tr>
<td>Hydrochloric acid (37%)</td>
<td>II</td>
</tr>
<tr>
<td>Acetic acid (99%)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard Class Group: 3</th>
<th>*Self-packaging must be approved by the Technical Shipping Officer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Chemical</td>
<td>Subdivision (if applicable)</td>
</tr>
<tr>
<td>Hexanes (95%)</td>
<td>II</td>
</tr>
</tbody>
</table>

Required Spill Kits (please denote below):

Acid, Solvent

Total weight of all hazardous materials and packaging (cannot exceed 200 kg / 400 lbs.): 15.05 kg
4. Spill kits: OSHA requires spill kits to accompany the operator when transporting hazardous materials. It is important that the appropriate kit is used to perform the necessary cleanup and prevent a potential reaction between chemicals and the sorbents. Below is a general outline of what kinds of spill kits to use for various chemical classes. It is important to note that some kits may need to be specially tailored for specific chemicals which are not covered below. Accidental release measures can be found in section 6 of a chemical’s SDS.

   a. Absorbents:
      i. Universal Spill Absorbent - 1:1:1 mixture of Oil-Dri (or unscented kitty litter), sodium bicarbonate, and sand. This all-purpose absorbent is good for most chemical spills including solvents, acids (not good for hydrofluoric acid), and bases.
      ii. Acid Spill Neutralizer - sodium bicarbonate, sodium carbonate, or calcium carbonate.
      iii. Alkali (Base) Neutralizer - sodium bisulfate.
      iv. Solvents/Organic Liquid Absorbent - Inert absorbents such as vermiculite, clay, sand, Oil-Dri.
      v. Bromine Neutralizer - 5% solution of sodium thiosulfate and inert absorbent.
      vi. Hydrofluoric Acid - HF compatible spill pillow or neutralize with lime and transfer to a polyethylene container.
      vii. Biological substances – disinfectant (1:10 dilution bleach & water; or ~70% solution ethyl alcohol & water; or chemical germicide), inert absorbent

   b. Personal Protective Equipment (PPE)
      i. Goggles with Face Shield
      ii. Nitrile Gloves
      iii. Lab Coat or Disposable Apron
      iv. Plastic Vinyl Booties or closed toed shoes
      v. Dust Mask/Respirator (All lab personnel must be properly fit tested before using a respirator.)

   c. Clean-Up Material
      i. Plastic Dust Pan and Scoop
      ii. Plastic Bags (30 Gallon, 3 mil thickness) for contaminated PPE
      iii. One Plastic Bucket (5 gallon polyethylene) with lid for spill and absorbent residues

5. Compatible Storage Groups: It is important to keep incompatible chemicals packaged separately in case of an accidental release due to container breakage or leaky seals. A good general rule is to not package any fuels with potential oxidizers, or acids and bases with each other. Below is a list of each group with examples; information on a chemical’s incompatibility can be found in their respective SDS, section 10.5. SOURCE: Prudent Practices in the Laboratory.

   a. Compatible Organic Bases
      i. Diethylamine
      ii. Piperidine
      iii. Triethanolamine
      iv. Benzylamine
      v. Benzytrimethylammonium hydroxide
### Florida Institute of Technology
Office of Environmental & Regulatory Compliance

<table>
<thead>
<tr>
<th>b. Compatible Pyrophoric &amp; Water-Reactive Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Sodium borohydride</td>
</tr>
<tr>
<td>ii. Benzoyl chloride</td>
</tr>
<tr>
<td>iii. Zinc dust</td>
</tr>
<tr>
<td>iv. Alkyl lithium solutions such as methyl lithium in tetrahydrofuran</td>
</tr>
<tr>
<td>v. Methanesulfonyl chloride</td>
</tr>
<tr>
<td>vi. Lithium aluminum hydride</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>c. Compatible Inorganic Bases</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Sodium hydroxide</td>
</tr>
<tr>
<td>ii. Ammonium hydroxide</td>
</tr>
<tr>
<td>iii. Lithium hydroxide</td>
</tr>
<tr>
<td>iv. Cesium hydroxide</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d. Compatible Organic Acids</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Acetic acid</td>
</tr>
<tr>
<td>ii. Citric acid</td>
</tr>
<tr>
<td>iii. Maleic acid</td>
</tr>
<tr>
<td>iv. Propionic acid</td>
</tr>
<tr>
<td>v. Benzoic acid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e. Compatible Oxidizers Including Peroxides</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Nitric acid</td>
</tr>
<tr>
<td>ii. Perchloric acid</td>
</tr>
<tr>
<td>iii. Sodium hypochlorite</td>
</tr>
<tr>
<td>iv. Hydrogen peroxide</td>
</tr>
<tr>
<td>v. 3-Chloroperoxybenzoic acid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>f. Compatible Inorganic Acids not Including Oxidizers or Combustibles</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Hydrochloric acid</td>
</tr>
<tr>
<td>ii. Sulfuric acid</td>
</tr>
<tr>
<td>iii. Phosphoric acid</td>
</tr>
<tr>
<td>iv. Hydrogen fluoride solution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>g. Poison Compressed Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Sulfur dioxide</td>
</tr>
<tr>
<td>ii. Hexafluoropropylene</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>h. Compatible Explosives or Other Highly Unstable Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Picric acid dry(&lt;10% H2O)</td>
</tr>
<tr>
<td>ii. Nitroguanidine</td>
</tr>
<tr>
<td>iii. Tetrazole</td>
</tr>
<tr>
<td>iv. Urea nitrate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>i. Nonreactive Flammables and Combustibles, Including Solvents</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Benzene</td>
</tr>
<tr>
<td>ii. Methanol</td>
</tr>
<tr>
<td>iii. Toluene</td>
</tr>
<tr>
<td>iv. Tetrahydrofuran</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>j. Incompatible with ALL Other Storage Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Picric acid moist (10-40% H2O)</td>
</tr>
<tr>
<td>ii. Phosphorus</td>
</tr>
<tr>
<td>iii. Benzyl azide</td>
</tr>
<tr>
<td>iv. Sodium hydrogen sulfide</td>
</tr>
</tbody>
</table>
$\S$ 173.6 Materials of trade exceptions.

When transported by motor vehicle in conformance with this section, a material of trade (see § 171.8 of this subchapter) is not subject to any other requirements of this subchapter besides those set forth or referenced in this section.

a) Materials and amounts. A material of trade is limited to the following:

1) A Class 3, 8, 9, Division 4.1, 5.1, 5.2, 6.1, or ORM-D material contained in a packaging having a gross mass or capacity not over—
   i) 0.5 kg (1 pound) or 0.5 L (1 pint) for a Packing Group I material;
   ii) 30 kg (66 pounds) or 30 L (8 gallons) for a Packing Group II, Packing Group III, or ORM-D material;
   iii) 1500 L (400 gallons) for a diluted mixture, not to exceed 2 percent concentration, of a Class 9 material.

2) A Division 2.1 or 2.2 material in a cylinder with a gross weight not over 100 kg (220 pounds), or a permanently mounted tank manufactured to the ASME Code of not more than 70 gallon water capacity for a non-liquefied Division 2.2 material with no subsidiary hazard.

3) A Division 4.3 material in Packing Group II or III contained in a packaging having a gross capacity not exceeding 30 mL (1 ounce).

4) A Division 6.2 material, other than a Category A infectious substance, contained in human or animal samples (including, but not limited to, secreta, excreta, blood and its components, tissue and tissue fluids, and body parts) being transported for research, diagnosis, investigational activities, or disease treatment or prevention, or is a biological product or regulated medical waste. The material must be contained in a combination packaging. For liquids, the inner packaging must be leakproof, and the outer packaging must contain sufficient absorbent material to absorb the entire contents of the inner packaging. For sharps, the inner packaging (sharps container) must be constructed of a rigid material resistant to punctures and securely closed to prevent leaks or punctures, and the outer packaging must be securely closed to prevent leaks or punctures. For solids, liquids, and sharps, the outer packaging must be a strong, tight packaging securely closed and secured against shifting, including relative motion between packages, within the vehicle on which it is being transported.
   i) For other than a regulated medical waste, the amount of Division 6.2 material in a combination packaging must conform to the following limitations:
      (A) One or more inner packagings, each of which may not contain more than 0.5 kg (1.1 lbs) or 0.5 L (17 ounces), and an outer packaging containing not more than 4 kg (8.8 lbs) or 4 L (1 gallon); or
      (B) A single inner packaging containing not more than 16 kg (35.2 lbs) or 16 L (4.2 gallons) in a single outer packaging.

   ii) For a regulated medical waste, a combination packaging must consist of one or more inner packagings, each of which may not contain more than 4 kg (8.8 lbs) or 4 L (1 gallon), and an outer packaging containing not more than 16 kg (35.2 lbs) or 16 L (4.2 gallons).
This section does not apply to a hazardous material that is self-reactive (see § 173.124), poisonous by inhalation (see § 173.133), or a hazardous waste.

b) Packaging.
   1) Packagings must be leak tight for liquids and gases, sift proof for solids, and be securely closed, secured against shifting, and protected against damage.
   2) Each material must be packaged in the manufacturer's original packaging, or a packaging of equal or greater strength and integrity.
   3) Outer packagings are not required for receptacles (e.g., cans and bottles) that are secured against shifting in cages, carts, bins, boxes or compartments.
   4) For gasoline, a packaging must be made of metal or plastic and conform to the requirements of this subchapter or to the requirements of the Occupational Safety and Health Administration of the Department of Labor contained in 29 CFR 1910.106(d)(2) or 1926.152(a)(1).
   5) A cylinder or other pressure vessel containing a Division 2.1 or 2.2 material must conform to packaging, qualification, maintenance, and use requirements of this subchapter, except that outer packagings are not required. Manifolding of cylinders is authorized provided all valves are tightly closed.

c) Hazard communication.
   1) A non-bulk packaging other than a cylinder (including a receptacle transported without an outer packaging) must be marked with a common name or proper shipping name to identify the material it contains, including the letters “RQ” if it contains a reportable quantity of a hazardous substance.
   2) A bulk packaging containing a diluted mixture of a Class 9 material must be marked on two opposing sides with the four-digit identification number of the material. The identification number must be displayed on placards, orange panels or, alternatively, a white square-on-point configuration having the same outside dimensions as a placard (at least 273 mm (10.8 inches) on a side), in the manner specified in § 172.332 (b) and (c) of this subchapter.
   3) A DOT specification cylinder (except DOT specification 39) must be marked and labeled as prescribed in this subchapter. Each DOT-39 cylinder must display the markings specified in 178.65(i).
   4) The operator of a motor vehicle that contains a material of trade must be informed of the presence of the hazardous material (including whether the package contains a reportable quantity) and must be informed of the requirements of this section.

d) Aggregate gross weight. Except for a material of trade authorized by paragraph (a)(1)(iii) of this section, the aggregate gross weight of all materials of trade on a motor vehicle may not exceed 200 kg (440 pounds).

e) Other exceptions. A material of trade may be transported on a motor vehicle under the provisions of this section with other hazardous materials without affecting its eligibility for exceptions provided by this section.