# United States: 2002

*Hazardous Materials*

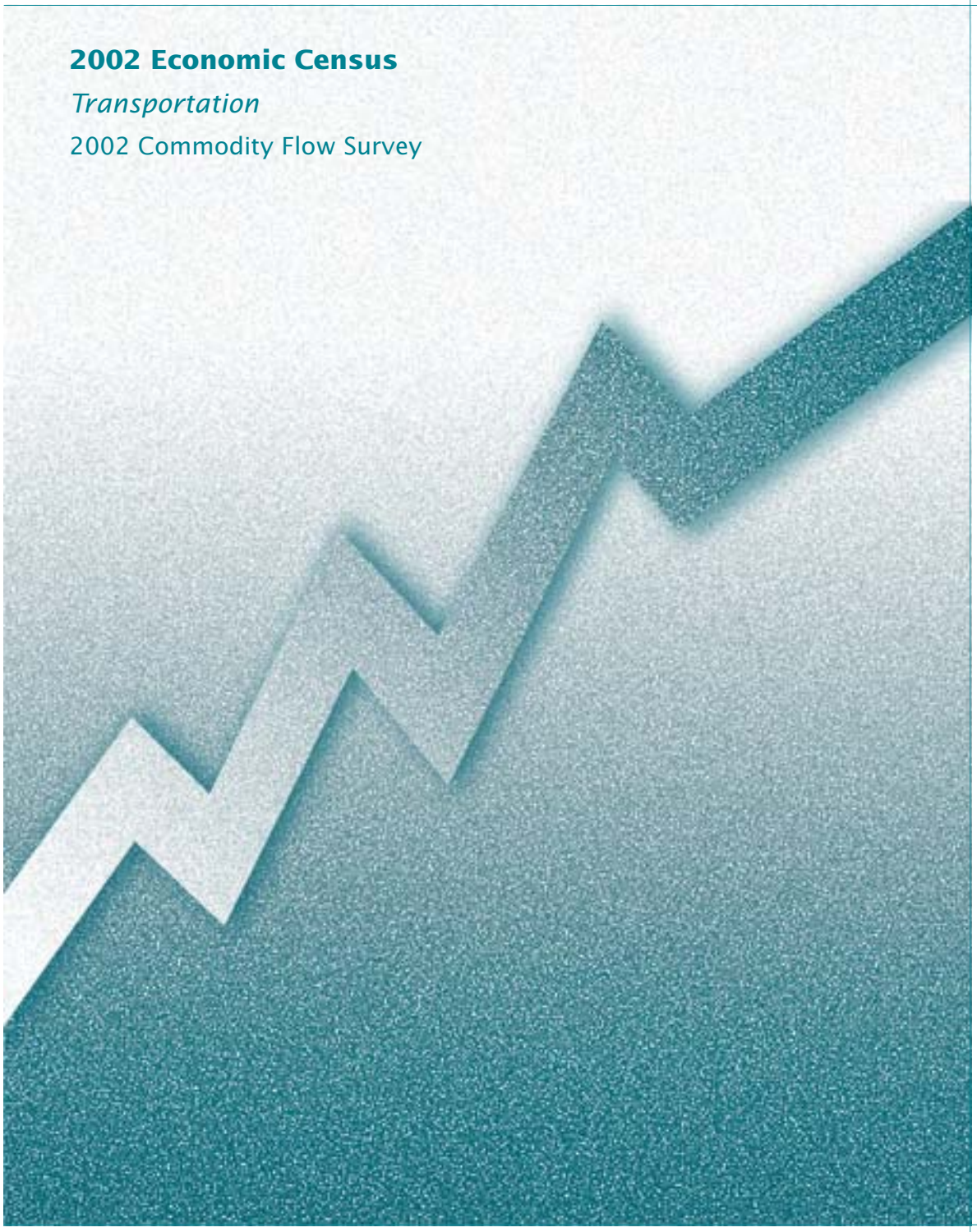
Issued December 2004

EC02TCF-US(HM)

## 2002 Economic Census

*Transportation*

2002 Commodity Flow Survey



U.S. Department of Transportation
BUREAU OF TRANSPORTATION STATISTICS

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU

ECONOMIC CENSUS 2002

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# Introduction to the Economic Census

## PURPOSES AND USES OF THE ECONOMIC CENSUS

The economic census is the major source of facts about the structure and functioning of the Nation's economy. It provides essential information for government, business, industry, and the general public. Title 13 of the United States Code (Sections 131, 191, and 224) directs the Census Bureau to take the economic census every 5 years, covering years ending in "2" and "7".

The economic census furnishes an important part of the framework for such composite measures as the gross domestic product estimates, input/output measures, production and price indexes, and other statistical series that measure short-term changes in economic conditions. Specific uses of economic census data include the following:

- Policymaking agencies of the federal government use the data to monitor economic activity and to assess the effectiveness of policies.
- State and local governments use the data to assess business activities and tax bases within their jurisdictions and to develop programs to attract business.
- Trade associations study trends in their own and competing industries, which allows them to keep their members informed of market changes.
- Individual businesses use the data to locate potential markets and to analyze their own production and sales performance relative to industry or area averages.

## BASIS OF REPORTING

The economic census is conducted on an establishment basis. A company operating at more than one location is required to file a separate report for each store, factory, shop, or other location. Each establishment is assigned a separate industry classification based on its primary activity and not that of its parent company.

## AVAILABILITY OF ADDITIONAL DATA

All results of the 2002 Economic Census are available on the Census Bureau Internet site (www.census.gov) and on compact discs and digital versatile discs (CD-ROMs and DVD-ROMs) for sale by the Census Bureau. The American FactFinder system at the Web site allows selective retrieval and downloading of the data. For more information, including a description of reports being issued, see the Web site, write to the U.S. Census Bureau, Washington, DC 20233-8300, or call Customer Services at 301-763-4636.

## HISTORICAL INFORMATION

The economic census has been taken as an integrated program at 5-year intervals since 1967 and before that for 1954, 1958, and 1963. Prior to that time, individual components of the economic census were taken separately at varying intervals.

The economic census traces its beginnings to the 1810 Decennial Census, when questions on manufacturing were included with those for population. Coverage of economic activities was expanded for the 1840 Decennial Census and subsequent censuses to include mining and some commercial activities. The 1905 Manufactures Census was the first time a census was taken apart from the regular decennial population census. Censuses covering retail and wholesale trade and construction industries were added in 1930, as were some service trades in 1933.

Censuses of construction, manufacturing, and the other business service censuses were suspended during World War II.

The 1954 Economic Census was the first census to be fully integrated, providing comparable census data across economic sectors and using consistent time periods, concepts, definitions, classifications, and reporting units. It was the first census to be taken by mail, using lists of firms provided by the administrative records of other Federal agencies. Since 1963, administrative records also have been used to provide basic statistics for very small firms, reducing or eliminating the need to send them census report forms.

The range of industries covered in the economic censuses expanded between 1967 and 2002. The census of construction industries began on a regular basis in 1967, and the scope of service industries, introduced in 1933, was broadened in 1967, 1977, and 1987. While a few transportation industries were covered as early as 1963, it was not until 1992 that the census broadened to include all of transportation, communications, and utilities. Also new for 1992 was coverage of financial, insurance, and real estate industries. With these additions, the economic census and the separate census of governments and census of agriculture collectively covered roughly 98 percent of all economic activity. New for 2002 is coverage of four industries classified in the Agriculture, Forestry, and Fishing sector under the SIC system: landscape agricultural services, landscaping services, veterinary services, and pet care services.

Printed statistical reports from the 1997 and earlier censuses provide historical figures for the study of long-term time series and are available in some large libraries. CD-ROMs issued from the 1987, 1992, and 1997 Economic Censuses contain databases including all or nearly all data published in print, plus additional statistics, such as ZIP Code statistics, published only on CD-ROM.

## SOURCES FOR MORE INFORMATION

More information about the scope, coverage, classification system, data items, and publications for each of the economic censuses and related surveys is published in the Guide to the 2002 Economic Census at www.census.gov/epcd/ec02/guide.html. More information on the methodology, procedures, and history of the censuses will be published in the History of the 2002 Economic Census at www.census.gov/econ/www/history.html.

# 2002 Commodity Flow Survey

## GENERAL

The 2002 Commodity Flow Survey (CFS) is undertaken through a partnership between the U.S. Census Bureau, U.S. Department of Commerce, and the Bureau of Transportation Statistics (BTS), U.S. Department of Transportation. This survey produces data on the movement of goods in the United States. It provides information on commodities shipped, their value, weight, and mode of transportation, as well as the origin and destination of shipments of manufacturing, mining, wholesale, and select retail establishments. The data from the CFS are used by public policy analysts and for transportation planning and decision making to assess the demand for transportation facilities and services, energy use, and safety risk and environmental concerns. The CFS was last conducted in 1997.

This report contains background information on the 2002 Commodity Flow Survey and then presents detailed tabular results on shipment characteristics by mode of transportation, commodity, distance shipped, and shipment weight. In Appendix A, key characteristics of the 2002 CFS are compared to those of the 1993 and 1997 surveys. Appendix B focuses on the reliability of the estimates and discusses sampling and nonsampling errors. Tables containing estimates of sampling variability corresponding to each table on shipment characteristics are also included in Appendix B.

This report presents data on hazardous material shipment characteristics. Additional reports will include data for the United States, census regions, divisions, states and selected metropolitan areas, as well as selected data on exports. Additional reports will include data for census regions, divisions, states, and selected metropolitan areas, as well as selected data on exports and hazardous material shipments.

## HAZARDOUS MATERIAL SHIPMENTS

The U.S. Department of Transportation defines hazardous materials as belonging to one of nine hazard classes, as shown below.

Hazardous Material Classes
- Class 1 - Explosives
- Class 2 - Gases
- Class 3 - Flammable liquids
- Class 4 - Flammable solid
- Class 5 - Oxidizers and Organic Peroxides
- Class 6 - Toxic Materials and Infectious Substances
- Class 7 - Radioactive Materials
- Class 8 - Corrosive Materials
- Class 9 - Miscellaneous Dangerous Goods

As part of the shipment characteristics collected in the 1997 CFS, we asked respondents to provide the four-digit United Nations (UN) or North American (NA) identification number. For the 1997 CFS data we used the UN/NA code to (1) identify the shipment as hazardous material, and (2) assign the shipment to one of the nine hazardous material classes for purposes of producing summary tabulations.

The data from the 1997 CFS for hazardous material shipments are aggregated to these nine classes, as well as their subcategories known as divisions. Data are also shown for selected UN/NA codes.

For the 2002 CFS twenty Standard Classification of Transported Goods (SCTG) codes were identified as always being a hazardous materials. Even if the respondent left the UN/NA code blank, we assigned the shipment to the appropriate UN/NA code. For example, every shipment of gasoline (SCTG 17100) was assigned a UN/NA code of 1203, either by the respondent or during our tabulation process. When an SCTG could have translated to more than one UN/NA code, we selected the dominant UN/NA code for all cases. To make the 1997 CFS results comparable with the 2002 CFS, the 1997 CFS estimates have been revised using the same SCTG-to-UN/NA coding process. A complete list of the affected SCTG and UN/NA codes is shown below:

| SCTG | Description | UN/NA |
|---|---|---|
| 08310 | Denatured ethyl alcohol, and undenatured alcohol that is 80 percent or more alcohol by volume | 1987 |
| 17100 | Gasoline | 1203 |
| 17200 | Aviation turbine fuel | 1863 |
| 18000 | Fuel oils | 1993 |
| 19201 | Kerosene | 1223 |
| 19310 | Liquefied natural gas | 1972 |
| 19321 | Propane, liquefied | 1075 |
| 19322 | Butane, liquefied | 1011 |
| 19329 | Liquefied gaseous hydrocarbons, n.e.c. | 1965 |
| 19330 | Gaseous hydrocarbons in a gaseous state | 1964 |
| 20101 | Sodium hydroxide | 1824 |
| 20102 | Potassium hydroxide (caustic potash) | 1814 |
| 20221 | Hydrogen chlorine (hydrochloric acid) | 1789 |
| 20222 | Sulfuric acid and oleum | 1830 |
| 20241 | Carbon dioxide | 1013 |
| 20242 | Hydrogen, nitrogen, oxygen, and rare gases, such as argon and helium | 1977 |
| 20263 | Calcium carbide | 1402 |
| 20291 | Chlorine | 1017 |
| 23902 | Prepared explosives, pyrotechnic products, matches, pyrophoric alloys and combustible preparation, n.e.c. | 1383 |
| 40120 | Munitions and ammunition, including bombs, grenades, and missiles | 0012 |

**Please note that because of the industry coverage and shipment definitions of the CFS, certain hazardous materials such as infectious substances or radioactive wastes were not well represented in the CFS data.**

The UN classification system has been adopted for worldwide use by the United Nations Committee of Experts on the Transport of Dangerous Goods. The UN system was incorporated into the Federal Code of Regulations by the U.S. Department of Transportation for domestic transportation in 1980. The NA system is a parallel hazard identification system used in North America when transporting hazardous materials that are not assigned a UN number or when transporting under specific North American exceptions. For additional information about the UN or NA codes, please refer to Title 49, Code of Federal Regulations, Part 172.101 or contact the Hazardous Materials Regulation Center, Research and Special Programs Administration, U.S. Department of Transportation, at telephone number 800-467-4922 or see the Internet site *http://hazmat.dot.gov.*

## INDUSTRY COVERAGE

The 2002 CFS covers business establishments with paid employees that are located in the United States and are classified using the 1997 North American Industry Classification System (NAICS) in mining, manufacturing, wholesale trade, and select retail trade industries, namely, electronic shopping and mail-order houses. Establishments classified in services, transportation, construction, and most retail industries are excluded from the survey. Farms, fisheries, foreign establishments, and most government-owned establishments are also excluded.

The survey also covers auxiliary establishments (i.e., warehouses and managing offices) of multiestablishment companies, which have nonauxiliary establishments that are in-scope to the CFS or are classified in retail trade. The coverage of managing offices has been expanded in the 2002

CFS, compared to the 1997 CFS. For the 1997 CFS, the number of in-scope managing offices was reduced to a large extent based on the results of the 1992 Economic Census. A managing office was considered in-scope to the 1997 CFS only if it had sales or end-of-year inventories in the 1992 Census. However, research conducted prior to the 2002 CFS showed that not all managing offices with shipping activity in the 1997 CFS indicated sales or inventories in the 1997 Economic Census. Therefore, the 1997 Economic Census results were not used in the determination of scope for managing offices in the 2002 CFS.

For the 1993 CFS and the 1997 CFS, establishments were classified based on the 1987 Standard Industrial Classification System (SIC). Though an attempt was made to maintain similar coverage between the 1997 CFS and the 2002 CFS, there were some changes in industry coverage due to the conversion from SIC to NAICS. Most notably, coverage of the logging industry changed from an in-scope Manufacturing SIC code (SIC 2411) to an out-of-scope Agriculture, Forestry, Fishing, and Hunting NAICS code (NAICS 1133). Also, coverage of the publishing industry changed from in-scope Manufacturing SIC codes (SIC 2711, 2721, 2731, 2741, and part of 2771) to out-of-scope Information NAICS codes (NAICS 5111 and 51223).

See Appendix A for a comparison between the 2002, 1997, and 1993 surveys. Also see Appendix C for a more detailed discussion on industry coverage and the sample design.

The NAICS industries covered in the 2002 CFS are listed in the following table:

| NAICS code | Description |
|---|---|
| 212 | Mining (Except Oil and Gas) |
| 311 | Food Manufacturing |
| 312 | Beverage and Tobacco Product Manufacturing |
| 313 | Textile Mills |
| 314 | Textile Product Mills |
| 315 | Apparel Manufacturing |
| 316 | Leather and Allied Product Manufacturing |
| 321 | Wood Product Manufacturing |
| 322 | Paper Manufacturing |
| 323 | Printing and Related Support Activities |
| 324 | Petroleum and Coal Products Manufacturing |
| 325 | Chemical Manufacturing |
| 326 | Plastics and Rubber Products Manufacturing |
| 327 | Nonmetallic Mineral Product Manufacturing |
| 331 | Primary Metal Manufacturing |
| 332 | Fabricated Metal Product Manufacturing |
| 333 | Machinery Manufacturing |
| 334 | Computer and Electronic Product Manufacturing |
| 335 | Electrical Equipment, Appliance, and Component Manufacturing |
| 336 | Transportation Equipment Manufacturing |
| 337 | Furniture and Related Product Manufacturing |
| 339 | Miscellaneous Manufacturing |
| 421 | Wholesale Trade, Durable Goods |
| 422 | Wholesale Trade, Nondurable Goods |
| 4541 | Electronic Shopping and Mail-Order Houses |
| 49310 | Warehousing and Storage |
| 551114 | Corporate, Subsidiary, and Regional Managing Offices |

## SHIPMENT COVERAGE

The CFS captures data on shipments originating from select types of business establishments located in the 50 states and the District of Columbia. The data do not cover shipments originating from business establishments located in Puerto Rico and other U.S. possessions and territories. Shipments traversing the U.S. from a foreign location to another foreign location (e.g., from Canada to Mexico) are not included, nor are shipments from a foreign location to a U.S. location.

Imported products are included in the CFS at the point that they left the importer's domestic location for shipment to another location. Shipments that are shipped through a foreign territory with both the origin and destination in the U.S. are included in the CFS data. The mileages calculated for these shipments exclude the international segments (e.g., shipments from New York to Michigan through Canada do not include any mileages for Canada). Export shipments are included, with the domestic destination defined as the U.S. port, airport, or border crossing of exit from the U.S.

The "Industry Coverage" section of the text lists the NAICS groups covered by the CFS. Other industry areas that are not covered, but may have significant shipping activity, include agriculture and government. For agriculture, specifically, this means that the CFS does not cover shipments of agricultural products from the farm site to the processing centers or terminal elevators (most likely short-distance local movements), but does cover the shipments of these products from the initial processing centers or terminal elevators onward.

## MILEAGE CALCULATIONS

To estimate the distance traveled by each freight shipment sampled for the 2002 Commodity Flow Survey, the BTS Mileage Calculation Team used routing algorithms and an integrated, intermodal transportation network developed and updated expressly for this purpose by the Oak Ridge National Laboratory (ORNL). The BTS Team worked at a secure data site within the Census Bureau. Each record contained the ZIP Code shipment origin and destination, and the mode or modal sequence required by the routing algorithm for distance estimation. Each record also contained information on type of commodity moved, its weight, dollar value, and hazardous materials status. For export shipments, data on the U.S. port of exit were also identified, along with foreign destination city and country. Processing of shipment records began in the fall of 2002, with completion in October 2003.

One essential exercise was editing and imputing both absent and invalid geographic data elements, specifically origin and destination ZIP Codes, prior to estimating the distance traveled for each freight shipment. For this purpose, the BTS Mileage Calculation Team developed and maintained databases of domestic city/state names and foreign city/country names. The missing data elements, along with other related data problems found by the BTS Team, were either: (1) imputed because of high probability of accurate correction by the BTS Team, such as imputing a missing destination ZIP Code, given a destination city and state; or (2) reported back to the Census Bureau, allowing for call-backs to shippers for clarification/correction.

For a domestic shipment, the mileage is calculated between the center of the geographic area (centroid) of the U.S. origin ZIP Code and the centroid of the destination ZIP Code. The mileage for the shipments within a ZIP Code is calculated by means of a formula that approximates the longest distance within the boundaries of that ZIP Code. The mileage for an export shipment is calculated between a shipments centroid of U.S. origin ZIP Code and its foreign destination country (city in the case of Canada and Mexico), via a U.S. port of exit (POE), be it seaport, airport, or border crossing. However, only the portion of mileage that falls within the U.S. is included in the CFS estimates. That is to say, once the export reaches the POE, the POE is considered the final domestic destination, the domestic route is finished, and any following mileage is not counted from the POE. These mileages are computed using routing algorithms that find the minimum impedance path over mathematical representations of the U.S. and North American highway, railway and waterway networks, and a transglobal representation of U.S.originating air freight and deep-sea transport networks. Shipment mileages were estimated for each record by summing over the distances of links contained within each minimum impedance path. Impedance was computed as a weighted combination of distance, time, and cost factors.

The ORNL multimodal network database is composed of mode-specific subnetworks representing each of the major transportation modes, such as highway, railway, waterway, and airway (pipeline network was not available due to security reasons). The links of these networks represent line-haul transportation facilities. Network nodes represent intersections and interchanges, along with the access points to the transportation network. To simulate local access, test links are created from each five-digit ZIP Code centroid to nearby nodes on the network. For the truck network,

local access is assumed to exist everywhere. For the other modes this is not true. Before any test links are created for these modes, a search procedure is used to determine if and where such networks are most likely to provide access to the ZIP Code. For shipments involving more than one mode, such as truck-rail or rail-water shipments, intermodal transfer links are added to the network database to connect the individual modal networks together for routing purposes. An intermodal terminals database and a number of terminal transfer models were developed at ORNL to identify likely transfer points for different classes of freight. A measure of link impedance was calculated for each access, line-haul, and intermodal transfer link traversed by a shipment. These impedances were mode specific and are based on various link characteristics. For example, the set of links characterizing the highway network included speed impacting factors, such as the presence of a divided or undivided roadway, the degree of access control, the rural or urban setting, the number of lanes, the degree of urban congestion, and the length of the link. Link impedance measures were also assigned to the local access links. Intermodal transfer link impedances are estimated in terms of the time it takes to move goods through a transfer facility. In the case of rail and air freight, intercarrier transfer penalties were also considered to obtain proper route selections. A shortest path algorithm is used to find the minimum impedance path between a shipment's origin ZIP Code centroid and destination ZIP Code centroid. The cumulative length of the local access plus line-haul links on this path provides the estimated distances used in CFS mileage computations. When rail and air freight were involved, these shipment distances were often averaged over more than one path between an origin-destination pair.

### Mileage Data for Pipeline Shipments

For pipeline shipments, ton-miles and average miles per shipment are not shown in the tables. For most of these shipments, the respondents reported the shipment destination as a pipeline facility on the main pipeline network. Therefore, for the majority of these shipments, the resulting mileage represented only the access distance through feeder pipelines to the main pipeline network, and not the actual distance through the main pipeline network. Pipeline shipments are included in the U.S. totals for ton-miles and average miles per shipment.

For security purposes, there is no pipeline network available in the public domain with which to route petroleum-based products. Hence, any modal distance, either single or multi, involving pipeline was considered as solely pipeline mileage from origin ZIP to destination ZIP and calculated to equal great circle distance (GCD). Note: Great circle distance is defined as the shortest distance between two points on the earth's surface, taking into account the earth's curvature.

## EXPLANATION OF TERMS

**Value of shipments.** The dollar value of the entire shipment. This was defined as the net selling value, f.o.b. plant, exclusive of freight charges and excise taxes. The value data are displayed in millions of dollars.

The total value of shipments, as measured by the CFS, and the U.S. gross domestic product (GDP) while similar in size provide different measures of economic activity in the United States and are not directly comparable. GDP is the value of all goods produced and services performed by labor and capital located in the United States. In 2002, the U.S. GDP was estimated at $10.4 trillion (measured in current U.S. dollars). The value of shipments, as measured by the CFS, is the market value of goods shipped from manufacturing, mining, wholesale, and mail order retail establishments, as well as warehouses and managing offices of multiunit establishments.

Three important differences can be identified between GDP and value of shipments:

1. GDP captures goods produced by all establishments located in the United States, while the CFS measures goods shipped from a subset of all goods-producing establishments.
2. GDP measures the value of goods produced and of services performed. CFS measures the value of goods shipped.
3. GDP counts only the value-added at each step in the production of a product. CFS captures the value of shipments of materials used to produce or manufacture a product, as well as the value of shipments of the finished product itself. This means that the value of the materials used to produce a particular product contributes multiple times to the value.

**Commodity.** Products that an establishment produces, sells, or distributes. This does not include items that are considered as excess or byproducts of the establishment's operation. Respondents reported the description and the five-digit Standard Classification of Transported Goods (SCTG) code for the major commodity contained in the shipment, defined as the commodity with the greatest weight in the total shipment.

**Average miles per shipment.** For the 1993 CFS, we excluded shipments of Standard Transportation Commodity Classification (STCC) 27, Printed Matter, from our calculation of average miles per shipment. We made this decision after determining that respondents in the 1993 CFS shipping newspapers, magazines, catalogs, etc., had used widely varying definitions of the term "shipment."

For the 1997 and 2002 CFS, we made numerous efforts throughout our data collection and editing to produce consistent results from establishments shipping SCTG 29, Printed Products. As a result, we have included printed products in the average miles per shipment estimates for 1997 and 2002.

**Distance shipped.** In Table 3, shipment data are presented for various "distance shipped" intervals. Shipments were categorized into these "distance shipped" intervals based on the great circle distance between their origin and destination ZIP Code centroids. All other distance-related data in this and other tables (i.e., ton-miles and average miles per shipment) are based on the mileage calculations. (See the "Mileage Calculations" section for more details.)

**Great circle distance.** The shortest distance between two points on the surface of a sphere over the surface of that sphere.

**Mode of transportation.** The type of transportation used for moving the shipment to its domestic destination. For exports, the domestic destination was the port of exit.

### Mode Definitions

In the instructions to the respondent, we defined the possible modes as follows:

1. **Parcel delivery/courier/U.S. Postal Service.** Delivery services that carry letters, parcels, packages, and other small shipments that typically weigh less than 100 pounds. Includes bus parcel delivery service.
2. **Private truck.** Trucks operated by a temporary or permanent employee of an establishment or the buyer/receiver of the shipment.
3. **For-hire truck.** Trucks that carry freight for a fee collected from the shipper, recipient of the shipment, or an arranger of the transportation.
4. **Railroad.** Any common carrier or private railroad.
5. **Shallow draft vessels.** Barges, ships, or ferries operating primarily on rivers and canals; in harbors, the Great Lakes, the Saint Lawrence Seaway; the Intra-coastal Waterway, the Inside Passage to Alaska, major bays and inlets; or in the ocean close to the shoreline.
6. **Deep draft vessel.** Barges, ships, or ferries operating primarily in the open ocean. Shipping on the Great Lakes and the Saint Lawrence Seaway is classified with shallow draft vessels.
7. **Pipeline.** Movements of oil, petroleum, gas, slurry, etc., through pipelines that extend to other establishments or locations beyond the shipper's establishment. Aqueducts for the movement of water are not included.
8. **Air.** Commercial or private aircraft, and all air service for shipments that typically weigh more than 100 pounds. Includes air freight and air express.
9. **Other mode.** Any mode not listed above.
10. **Unknown.** The shipment was not carried by a parcel delivery/courier/U.S. Postal Service, and the respondent could not determine what mode of transportation was used.

In the tables, we have used additional terms for mode, which we define as follows:

1. **Air (includes truck and air).** Shipments that used air or a combination of truck and air.
2. **Single modes.** Shipments using only one of the above-listed modes, except parcel or other and unknown.
3. **Multiple modes.** Shipments for which two or more of the following modes of transportation were used:

   Private truck
   For-hire truck
   Rail
   Shallow draft vessel
   Deep draft vessel
   Pipeline

   In addition, Parcel, U.S. Postal Service, or Courier shipments are considered multiple modes because this category includes all parcel shipments whether on the ground or via air tendered to a parcel or express carrier. In defining this mode, we did not combine these shipments with any other reported mode because by their nature, Parcel, U.S. Postal Service or Courier are already multimodal. For example, if the respondent reported a shipment's mode of transportation as "parcel" and "air," we treated the shipment as parcel only. Also in the CFS reports, the "Truck and Rail" and "Rail and Water" combinations included under "Multiple Modes" may not reflect all the movement of trailers or containers by rail and at least one other mode of transportation. Since the shipper may not always know the modal combinations used to transport the goods, some shipments moving by more than one mode may be reported as a single mode shipment. This may result in underestimation of multimodal shipments in the CFS.
4. **Other multiple modes.** Shipments using any other mode combinations not specifically listed in the tables.
5. **Other and unknown modes.** Shipments for which modes were not reported, or were reported by the respondent as "Other" or "Unknown."
6. **Truck.** Shipments using for-hire truck only, private truck only, or a combination of for-hire truck and private truck.
7. **Water.** Shipments using shallow draft vessel only, deep draft vessel only, or Great Lakes vessel only. Combinations of these modes, such as shallow draft vessel and Great Lakes vessel are included as "Other multiple modes." (Note: By definition, "shallow draft," "Great Lakes," and "deep draft" are mutually exclusive.)
8. **Great Lakes.** In the tables in this publication, "Great Lakes" appears as a single mode. ORNL's transportation network and mileage calculation system allowed for separate mileage calculations for Great Lakes between the origin and destination ZIP Codes.

### Other Definitions and Terms

**Shipment.** A shipment is a single movement of goods, commodities, or products from an establishment to a single customer or to another establishment owned or operated by the same company as the originating establishment (e.g., a warehouse, distribution center, or retail or wholesale outlet). Full or partial truckloads are counted as a single shipment only if all commodities on the truck are destined for the same location. If a truck makes multiple deliveries on a route, the goods delivered at each stop are counted as one shipment. Interoffice memos, payroll checks, or business correspondence are not considered shipments. Shipments such as refuse, scrap paper, waste, or recyclable materials are not considered shipments unless the establishment is in the business of selling or providing these materials.

**Standard Classification of Transported Goods (SCTG).** The commodities shown in this report are classified using the SCTG coding system. The SCTG coding system was developed jointly by agencies of the United States and Canadian governments based on the Harmonized Commodity Description and Coding System (Harmonized System) to address statistical needs in regard to products transported. See Appendix D for more details.

**Ton-miles.** The shipment weight multiplied by the mileage traveled by the shipment. The respondents reported shipment weight in pounds. Aggregated pound-miles were converted to ton-miles. Mileage was calculated as the distance between the shipment origin and destination ZIP Codes. For shipments by truck, rail, or shallow draft vessels, the mileage excludes international segments. For example, mileages from Alaska to the continental United States exclude any mileages through Canada (see the "Mileage Calculations" section for more details). For trucks making mutliple stops, the ton-miles are calculated for each delivery, and each drop-off point is treated as a final destination. Ton-miles estimates are displayed in millions.

**Tons shipped.** The total weight of the entire shipment. Respondents reported the weight in pounds. Aggregated pounds were converted to short-tons (2,000 pounds). For freight shipped to distribution centers for subsequent reshipment, the tonnage is counted each time the goods are transported.

**Total modal activity (Table 2 only).** The overall activity (e.g., ton-miles) of a specific mode of transportation, whether used in a single-mode shipment, or as part of a multiple-mode shipment. For example, the total modal activity for private truck is the total ton-miles carried by private truck in single-mode shipments, combined with the total ton-miles carried by private truck in all multiple-mode shipments that include private truck (private truck and for-hire truck, private truck and rail, private truck and air, etc.)

## ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in the tables for this publication:

| | |
|---|---|
| – | Represents an estimate equal to zero or less than 1 unit of measure. |
| D | Denotes estimates withheld to avoid disclosing data of individual companies. |
| S | Estimate does not meet publication standards because of high sampling variability or poor response quality. |
| CFS | Commodity Flow Survey. |
| lb | Pounds. |
| n.e.c. | Not elsewhere classified. |
| NA | Not applicable. |

## OTHER TRANSPORTATION DATA

Users of transportation data may be especially interested in the following reports:

**Vehicle Inventory and Use Survey** covers state and U.S. level statistics on the physical and operational characteristics of the nation's truck, van, minivan, and sport utility vehicle population. Some of the types of data collected include number of vehicles, major use, body type, annual miles, model year, vehicle size, fuel type, operator classification, engine size, range of operation, weeks operated, products carried, and hazardous materials carried. This survey shows comparative statistics reflecting percent changes in number of vehicles between 2002 and 1997 for most characteristics.

**Service Annual Survey** covers firms with paid employees that provide commercial motor freight transportation and public warehousing services. Data collected include operating revenue and operating revenue by source, percentage of motor carrier freight revenue by commodity type, size of shipments handled, length of haul, and vehicle fleet inventory.

For more information on any Census Bureau product, including a description of electronic and printed reports being issued, see the Web site or call Customer Services at 301-763-INFO (4636).

## Table 1a. Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** | **136** |
| **Single modes** | **644 489** | **97.6** | **2 158 533** | **98.5** | **311 897** | **95.5** | **105** |
| Truck[1] | 419 630 | 63.6 | 1 159 514 | 52.9 | 110 163 | 33.7 | 86 |
| For-hire truck | 189 803 | 28.8 | 449 503 | 20.5 | 65 112 | 19.9 | 285 |
| Private truck | 226 660 | 34.3 | 702 186 | 32.0 | 44 087 | 13.5 | 38 |
| Rail | 31 339 | 4.7 | 109 369 | 5.0 | 72 087 | 22.1 | 695 |
| Water | 46 856 | 7.1 | 228 197 | 10.4 | 70 649 | 21.6 | S |
| Air (includes truck and air) | 1 643 | .2 | 64 | – | 85 | – | 2 080 |
| Pipeline[2] | 145 021 | 22.0 | 661 390 | 30.2 | S | S | S |
| **Multiple modes** | **9 631** | **1.5** | **18 745** | **.9** | **12 488** | **3.8** | **849** |
| Parcel, U.S. Postal Service or courier | 4 268 | .6 | 245 | – | 119 | – | 837 |
| Other multiple modes | 5 363 | .8 | 18 500 | .8 | 12 369 | 3.8 | 1 371 |
| **Other and unknown modes** | **6 061** | **.9** | **14 241** | **.6** | **2 342** | **.7** | **57** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

## Table 1b. Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **Total** | **660 181** | **526 679** | **25.3** | **2 191 519** | **1 783 620** | **22.9** | **326 727** | **294 823** | **10.8** | **136** | **110** | **23.7** |
| **Single modes** | **644 489** | **510 417** | **26.3** | **2 158 533** | **1 752 056** | **23.2** | **311 897** | **273 865** | **13.9** | **105** | **89** | **17.1** |
| Truck[1] | 419 630 | 325 166 | 29.1 | 1 159 514 | 959 199 | 20.9 | 110 163 | 82 211 | 34.0 | 86 | 70 | 23.7 |
| For-hire truck | 189 803 | 144 469 | 31.4 | 449 503 | 369 991 | 21.5 | 65 112 | 49 238 | 32.2 | 285 | 251 | 13.4 |
| Private truck | 226 660 | 177 144 | 28.0 | 702 186 | 577 003 | 21.7 | 44 087 | 31 948 | 38.0 | 38 | 35 | 8.0 |
| Rail | 31 339 | 34 937 | –10.3 | 109 369 | 102 508 | 6.7 | 72 087 | 78 619 | –8.3 | 695 | 837 | –17.0 |
| Water | 46 856 | 33 071 | 41.7 | 228 197 | 167 716 | 36.1 | 70 649 | 63 089 | 12.0 | S | S | S |
| Air (includes truck and air) | 1 643 | 8 591 | –80.9 | 64 | 74 | –12.5 | 85 | 100 | –15.4 | 2 080 | 1 455 | 42.9 |
| Pipeline[2] | 145 021 | 108 653 | 33.5 | 661 390 | 522 560 | 26.6 | S | S | S | S | S | S |
| **Multiple modes** | **9 631** | **7 203** | **33.7** | **18 745** | **12 266** | **52.8** | **12 488** | **S** | **S** | **849** | **652** | **30.2** |
| Parcel, U.S. Postal Service or courier | 4 268 | 3 184 | 34.0 | 245 | 202 | 21.2 | 119 | 93 | 27.3 | 837 | 697 | 20.1 |
| Other multiple modes | 5 363 | 4 019 | 33.4 | 18 500 | 12 064 | 53.4 | 12 369 | S | S | 1 371 | 168 | 718.4 |
| **Other and unknown modes** | **6 061** | **9 058** | **–33.1** | **14 241** | **19 298** | **–26.2** | **2 342** | **1 885** | **24.2** | **57** | **33** | **73.2** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

## Table 1c. Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.6** | **96.9** | **98.5** | **98.2** | **95.5** | **92.9** |
| Truck[1] | 63.6 | 61.7 | 52.9 | 53.8 | 33.7 | 27.9 |
| For-hire truck | 28.8 | 27.4 | 20.5 | 20.7 | 19.9 | 16.7 |
| Private truck | 34.3 | 33.6 | 32.0 | 32.4 | 13.5 | 10.8 |
| Rail | 4.7 | 6.6 | 5.0 | 5.7 | 22.1 | 26.7 |
| Water | 7.1 | 6.3 | 10.4 | 9.4 | 21.6 | 21.4 |
| Air (includes truck and air) | .2 | 1.6 | – | – | – | – |
| Pipeline[2] | 22.0 | 20.6 | 30.2 | 29.3 | S | S |
| **Multiple modes** | **1.5** | **1.4** | **.9** | **.7** | **3.8** | **S** |
| Parcel, U.S. Postal Service or courier | .6 | .6 | – | – | – | – |
| Other multiple modes | .8 | .8 | .8 | .7 | 3.8 | S |
| **Other and unknown modes** | **.9** | **1.7** | **.6** | **1.1** | **.7** | **.6** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

## Table 2a. Hazardous Material Shipment Characteristics by Hazard Class for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class and description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** | **136** |
| Class 1, Explosives | 7 901 | 1.2 | 5 000 | .2 | 1 568 | .5 | 651 |
| Class 2, Gases | 73 932 | 11.2 | 213 358 | 9.7 | 37 262 | 11.4 | 95 |
| Class 3, Flammable liquids | 490 238 | 74.3 | 1 788 986 | 81.6 | 218 574 | 66.9 | 106 |
| Class 4, Flammable solids | 6 566 | 1.0 | 11 300 | .5 | 4 391 | 1.3 | 158 |
| Class 5, Oxidizers and organic peroxides | 5 471 | .8 | 12 670 | .6 | 4 221 | 1.3 | 407 |
| Class 6, Toxic (poison) | 8 275 | 1.3 | 8 459 | .4 | 4 254 | 1.3 | 626 |
| Class 7, Radioactive materials | 5 850 | .9 | 57 | – | 44 | – | S |
| Class 8, Corrosive materials | 38 324 | 5.8 | 90 671 | 4.1 | 36 260 | 11.1 | 301 |
| Class 9, Miscellaneous dangerous goods | 23 625 | 3.6 | 61 018 | 2.8 | 20 153 | 6.2 | 368 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

## Table 2b. Hazardous Material Shipment Characteristics by Hazard Class for the United States: 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and description | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **Total** | **660 181** | **526 679** | **25.3** | **2 191 519** | **1 783 620** | **22.9** | **326 727** | **294 823** | **10.8** | **136** | **110** | **23.7** |
| Class 1, Explosives | 7 901 | 5 584 | 41.5 | 5 000 | 1 718 | 191.0 | 1 568 | S | S | 651 | 771 | –15.6 |
| Class 2, Gases | 73 932 | 47 288 | 56.3 | 213 358 | 137 138 | 55.6 | 37 262 | 26 002 | 43.3 | 95 | 60 | 58.7 |
| Class 3, Flammable liquids | 490 238 | 386 994 | 26.7 | 1 788 986 | 1 450 591 | 23.3 | 218 574 | 184 824 | 18.3 | 106 | 69 | 54.3 |
| Class 4, Flammable solids | 6 566 | 4 238 | 54.9 | 11 300 | 14 832 | –23.8 | 4 391 | 9 735 | –54.9 | 158 | 660 | –76.0 |
| Class 5, Oxidizers and organic peroxides | 5 471 | 4 485 | 22.0 | 12 670 | 9 239 | 37.1 | 4 221 | 4 471 | –5.6 | 407 | 193 | 111.2 |
| Class 6, Toxic (poison) | 8 275 | 10 085 | –18.0 | 8 459 | 6 366 | 32.9 | 4 254 | 2 824 | 50.6 | 626 | 403 | 55.2 |
| Class 7, Radioactive materials | 5 850 | 2 722 | 114.9 | 57 | 87 | –35.1 | 44 | 48 | –8.8 | S | 445 | S |
| Class 8, Corrosive materials | 38 324 | 41 336 | –7.3 | 90 671 | 98 331 | –7.8 | 36 260 | 42 918 | –15.5 | 301 | 205 | 46.7 |
| Class 9, Miscellaneous dangerous goods | 23 625 | 23 946 | –1.3 | 61 018 | 65 317 | –6.6 | 20 153 | 22 727 | –11.3 | 368 | 323 | 13.9 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

## Table 2c. Hazardous Material Shipment Characteristics by Hazard Class for the United States: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and description | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| Class 1, Explosives | 1.2 | 1.1 | .2 | .1 | .5 | S |
| Class 2, Gases | 11.2 | 9.0 | 9.7 | 7.7 | 11.4 | 8.8 |
| Class 3, Flammable liquids | 74.3 | 73.5 | 81.6 | 81.3 | 66.9 | 62.7 |
| Class 4, Flammable solids | 1.0 | .8 | .5 | .8 | 1.3 | 3.3 |
| Class 5, Oxidizers and organic peroxides | .8 | .9 | .6 | .5 | 1.3 | 1.5 |
| Class 6, Toxic (poison) | 1.3 | 1.9 | .4 | .4 | 1.3 | 1.0 |
| Class 7, Radioactive materials | .9 | .5 | – | – | – | – |
| Class 8, Corrosive materials | 5.8 | 7.8 | 4.1 | 5.5 | 11.1 | 14.6 |
| Class 9, Miscellaneous dangerous goods | 3.6 | 4.5 | 2.8 | 3.7 | 6.2 | 7.7 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

## Table 3. Hazardous Material Shipment Characteristics for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** | **136** |
| 1005 | Ammonia, anhydrous | 2 246 | .3 | 11 922 | .5 | 2 674 | .8 | S |
| 1013 | Carbon dioxide | 1 399 | .2 | S | S | S | S | 58 |
| 1017 | Chlorine | 2 106 | .3 | 9 684 | .4 | 2 547 | .8 | 114 |
| 1066 | Nitrogen, compressed | 2 121 | .3 | 20 276 | .9 | S | S | 84 |
| 1072 | Oxygen, compressed | 2 813 | .4 | S | S | S | S | S |
| 1075 | Petroleum gases | 19 046 | 2.9 | 58 802 | 2.7 | 11 928 | 3.7 | 47 |
| 1114 | Benzene | 3 912 | .6 | 10 537 | .5 | 1 454 | .4 | 438 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 27 335 | 4.1 | 128 942 | 5.9 | 12 217 | 3.7 | 41 |
| 1203 | Gasoline | 269 796 | 40.9 | 1 009 262 | 46.1 | 108 979 | 33.4 | 57 |
| 1223 | Kerosene | 2 834 | .4 | 12 340 | .6 | 884 | .3 | 19 |
| 1230 | Methanol | S | S | S | S | S | S | 201 |
| 1268 | Petroleum distillates, n.o.s. | 5 205 | .8 | 10 842 | .5 | 1 931 | .6 | 213 |
| 1824 | Sodium hydroxide solution | 5 470 | .8 | 23 829 | 1.1 | 9 840 | 3.0 | 203 |
| 1830 | Sulfuric acid | 1 166 | .2 | 14 479 | .7 | 3 194 | 1.0 | 218 |
| 1863 | Fuel, aviation, turbine engine | 16 193 | 2.5 | 76 631 | 3.5 | 9 735 | 3.0 | 97 |
| 1962 | Ethylene | 3 991 | .6 | 11 103 | .5 | 510 | .2 | S |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 4 174 | .6 | 21 495 | 1.0 | 3 537 | 1.1 | 164 |
| 1993 | Flammable liquids, n.o.s. | 94 820 | 14.4 | 428 729 | 19.6 | 46 788 | 14.3 | 52 |
| 1999 | Tars, liquid | 2 478 | .4 | 19 438 | .9 | 4 563 | 1.4 | 162 |
| 3257 | Elevated temperature liquid, n.o.s. | 6 287 | 1.0 | 42 378 | 1.9 | 12 384 | 3.8 | 174 |
| | All other | 183 420 | 27.8 | 224 916 | 10.3 | 84 821 | 26.0 | 283 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

## Table 4. **Hazardous Versus Nonhazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2002**

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Mode of transportation | Tons | | | | | Ton-miles | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Hazardous | | Nonhazardous | | | Hazardous | | Nonhazardous | |
| | Total (thousands) | 2002 (thousands) | Percent | 2002 (thousands) | Percent | Total (millions) | 2002 (millions) | Percent | 2002 (millions) | Percent |
| **Total** | **11 667 919** | **2 191 519** | **18.8** | **9 476 400** | **81.2** | **3 137 898** | **326 727** | **10.4** | **2 811 171** | **89.6** |
| **Single modes** | **11 086 660** | **2 158 533** | **19.5** | **8 928 127** | **80.5** | **2 867 938** | **311 897** | **10.9** | **2 556 041** | **89.1** |
| Truck[1] | 7 842 836 | 1 159 514 | 14.8 | 6 683 322 | 85.2 | 1 255 908 | 110 163 | 8.8 | 1 145 745 | 91.2 |
| For-hire truck | 3 657 333 | 449 503 | 12.3 | 3 207 830 | 87.7 | 959 610 | 65 112 | 6.8 | 894 498 | 93.2 |
| Private truck | 4 149 658 | 702 186 | 16.9 | 3 447 472 | 83.1 | 291 114 | 44 087 | 15.1 | 247 027 | 84.9 |
| Rail | 1 873 884 | 109 369 | 5.8 | 1 764 516 | 94.2 | 1 261 612 | 72 087 | 5.7 | 1 189 525 | 94.3 |
| Water | 681 227 | 228 197 | 33.5 | 453 030 | 66.5 | 282 659 | 70 649 | 25.0 | 212 011 | 75.0 |
| Air (includes truck and air) | 3 760 | 64 | 1.7 | 3 696 | 98.3 | 5 835 | 85 | 1.5 | 5 751 | 98.5 |
| Pipeline[2] | 684 953 | 661 390 | 96.6 | 23 563 | 3.4 | S | S | S | S | S |
| **Multiple modes** | **216 686** | **18 745** | **8.7** | **197 941** | **91.3** | **225 715** | **12 488** | **5.5** | **213 228** | **94.5** |
| Parcel, U.S. Postal Service or courier | 25 513 | 245 | 1.0 | 25 268 | 99.0 | 19 004 | 119 | .6 | 18 885 | 99.4 |
| Other multiple modes | 191 173 | 18 500 | 9.7 | 172 673 | 90.3 | 206 712 | 12 369 | 6.0 | 194 343 | 94.0 |
| **Other and unknown modes** | **364 573** | **14 241** | **3.9** | **350 332** | **96.1** | **44 245** | **2 342** | **5.3** | **41 903** | **94.7** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

## Table 5a. **Hazardous Material Shipment Characteristics by Selected State of Origin: 2002**

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| State of origin | Value | | Tons[1] | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** | **136** |
| Texas | 127 188 | 19.3 | 467 196 | 21.3 | 72 291 | 22.1 | 138 |
| Louisiana | 53 408 | 8.1 | 222 696 | 10.2 | 61 920 | 19.0 | 157 |
| California | 67 693 | 10.3 | 198 490 | 9.1 | 15 689 | 4.8 | S |
| Illinois | 40 893 | 6.2 | 121 087 | 5.5 | 17 402 | 5.3 | S |
| New Jersey | 22 161 | 3.4 | 92 133 | 4.2 | 11 131 | 3.4 | 94 |
| Ohio | 27 971 | 4.2 | 81 342 | 3.7 | 8 482 | 2.6 | 147 |
| Indiana | 16 005 | 2.4 | 62 895 | 2.9 | 5 476 | 1.7 | 89 |
| Michigan | 23 835 | 3.6 | 61 040 | 2.8 | 4 992 | 1.5 | 145 |
| Florida | 17 919 | 2.7 | 56 647 | 2.6 | 3 170 | 1.0 | 123 |
| Tennessee | 18 492 | 2.8 | 53 674 | 2.4 | 7 057 | 2.2 | 185 |
| Washington | 15 471 | 2.3 | 52 179 | 2.4 | 6 274 | 1.9 | S |
| Pennsylvania | 24 885 | 3.8 | 51 191 | 2.3 | 5 633 | 1.7 | 180 |
| New York | 15 292 | 2.3 | 46 215 | 2.1 | 11 134 | 3.4 | 131 |
| Georgia | 17 011 | 2.6 | 46 213 | 2.1 | 4 148 | 1.3 | 150 |
| Utah | 10 120 | 1.5 | 42 874 | 2.0 | 10 538 | 3.2 | 161 |
| Kentucky | 11 718 | 1.8 | 40 932 | 1.9 | 4 213 | 1.3 | S |
| Mississippi | 8 761 | 1.3 | 36 542 | 1.7 | 16 540 | 5.1 | S |
| Alabama | 8 691 | 1.3 | 30 545 | 1.4 | 3 087 | .9 | 62 |
| North Carolina | 12 932 | 2.0 | 28 611 | 1.3 | 3 011 | .9 | 73 |
| West Virginia | 2 930 | .4 | S | S | S | S | S |
| All other states | 116 803 | 17.7 | 371 305 | 16.9 | 51 832 | 15.9 | 136 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]Selected states are sorted in descending order of estimated tons without regard to sampling variability.

# Table 5b. **Hazardous Material Shipment Characteristics by Selected State of Destination: 2002**

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| State of destination | Value | | Tons[1] | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** | **136** |
| Texas | 120 183 | 18.2 | 459 432 | 21.0 | 57 616 | 17.6 | 151 |
| California | 74 773 | 11.3 | 203 905 | 9.3 | 32 293 | 9.9 | 237 |
| Louisiana | 38 542 | 5.8 | 157 297 | 7.2 | 13 783 | 4.2 | 174 |
| Ohio | 28 692 | 4.3 | 105 770 | 4.8 | 17 208 | 5.3 | 130 |
| Illinois | 30 797 | 4.7 | 96 587 | 4.4 | 14 703 | 4.5 | S |
| Florida | 27 431 | 4.2 | 94 555 | 4.3 | 30 545 | 9.3 | 158 |
| New Jersey | 23 071 | 3.5 | 85 470 | 3.9 | 16 218 | 5.0 | S |
| Michigan | 23 135 | 3.5 | 68 731 | 3.1 | 8 682 | 2.7 | 162 |
| Indiana | 19 982 | 3.0 | 68 339 | 3.1 | 4 845 | 1.5 | 91 |
| Pennsylvania | 18 554 | 2.8 | 52 390 | 2.4 | 5 245 | 1.6 | 211 |
| Tennessee | 15 899 | 2.4 | 49 330 | 2.3 | 7 920 | 2.4 | 229 |
| New York | 15 474 | 2.3 | 48 093 | 2.2 | 8 663 | 2.7 | 165 |
| Georgia | 16 255 | 2.5 | 48 091 | 2.2 | 5 638 | 1.7 | 127 |
| Washington | 13 213 | 2.0 | 47 739 | 2.2 | 8 300 | 2.5 | 160 |
| Kentucky | 11 922 | 1.8 | 37 984 | 1.7 | 8 509 | 2.6 | S |
| Mississippi | 9 389 | 1.4 | 35 497 | 1.6 | 4 394 | 1.3 | S |
| North Carolina | 13 976 | 2.1 | 30 367 | 1.4 | 5 017 | 1.5 | 148 |
| Alabama | 9 613 | 1.5 | 30 093 | 1.4 | 4 003 | 1.2 | 108 |
| Utah | 6 261 | .9 | 27 951 | 1.3 | 2 295 | .7 | 151 |
| Missouri | 9 011 | 1.4 | 27 309 | 1.2 | 2 939 | .9 | 108 |
| All other states | 134 008 | 20.3 | 416 587 | 19.0 | 67 911 | 20.8 | 137 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]Selected states are sorted in descending order of estimated tons without regard to sampling variability.

# Table 6a. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **HAZARD CLASS 1, EXPLOSIVES** | | | | | | | |
| **Total** | **7 901** | **100.0** | **5 000** | **100.0** | **1 568** | **100.0** | **651** |
| **Single modes** | **7 748** | **98.1** | **4 984** | **99.7** | **1 557** | **99.3** | **532** |
| Truck[1] | 7 572 | 95.8 | 4 631 | 92.6 | 1 208 | 77.0 | 488 |
| For-hire truck | 6 171 | 78.1 | 1 551 | 31.0 | 836 | 53.3 | 890 |
| Private truck | 1 399 | 17.7 | S | S | 372 | 23.7 | 120 |
| Rail | 97 | 1.2 | 352 | 7.0 | 347 | 22.1 | 929 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | 1 | – | 2 | .1 | 2 084 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **137** | **1.7** | **S** | **S** | **S** | **S** | **835** |
| Parcel, U.S. Postal Service or courier | 137 | 1.7 | S | S | S | S | 835 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **9** |
| **HAZARD CLASS 2, GASES** | | | | | | | |
| **Total** | **73 932** | **100.0** | **213 358** | **100.0** | **37 262** | **100.0** | **95** |
| **Single modes** | **72 735** | **98.4** | **212 106** | **99.4** | **36 869** | **98.9** | **89** |
| Truck[1] | 47 020 | 63.6 | 96 865 | 45.4 | 13 537 | 36.3 | 82 |
| For-hire truck | 21 860 | 29.6 | 29 359 | 13.8 | 6 786 | 18.2 | 486 |
| Private truck | 25 146 | 34.0 | 67 308 | 31.5 | 6 564 | 17.6 | 38 |
| Rail | 8 966 | 12.1 | 29 230 | 13.7 | 16 604 | 44.6 | 641 |
| Water | 1 719 | 2.3 | 7 133 | 3.3 | 1 754 | 4.7 | 243 |
| Air (includes truck and air) | 243 | .3 | S | S | S | S | 1 450 |
| Pipeline[2] | 14 787 | 20.0 | 78 857 | 37.0 | S | S | S |
| **Multiple modes** | **687** | **.9** | **693** | **.3** | **337** | **.9** | **643** |
| Parcel, U.S. Postal Service or courier | 525 | .7 | S | S | 8 | – | 627 |
| Other multiple modes | 162 | .2 | 665 | .3 | 329 | .9 | S |
| **Other and unknown modes** | **510** | **.7** | **560** | **.3** | **57** | **.2** | **S** |
| **HAZARD CLASS 3, FLAMMABLE LIQUIDS** | | | | | | | |
| **Total** | **490 238** | **100.0** | **1 788 986** | **100.0** | **218 574** | **100.0** | **106** |
| **Single modes** | **480 024** | **97.9** | **1 760 755** | **98.4** | **206 688** | **94.6** | **75** |
| Truck[1] | 296 653 | 60.5 | 948 619 | 53.0 | 67 730 | 31.0 | 64 |
| For-hire truck | 119 551 | 24.4 | 346 831 | 19.4 | 35 535 | 16.3 | 192 |
| Private truck | 174 126 | 35.5 | 594 277 | 33.2 | 31 468 | 14.4 | 32 |
| Rail | 12 558 | 2.6 | 36 083 | 2.0 | 24 738 | 11.3 | 699 |
| Water | 41 414 | 8.4 | 199 304 | 11.1 | 60 466 | 27.7 | S |
| Air (includes truck and air) | 96 | – | S | S | S | S | 2 382 |
| Pipeline[2] | 129 303 | 26.4 | 576 739 | 32.2 | S | S | S |
| **Multiple modes** | **5 606** | **1.1** | **15 561** | **.9** | **9 933** | **4.5** | **979** |
| Parcel, U.S. Postal Service or courier | 1 743 | .4 | 121 | – | 57 | – | 966 |
| Other multiple modes | 3 863 | .8 | 15 440 | .9 | 9 875 | 4.5 | 1 535 |
| **Other and unknown modes** | **4 608** | **.9** | **12 671** | **.7** | **S** | **S** | **40** |
| **HAZARD CLASS 4, FLAMMABLE SOLIDS** | | | | | | | |
| **Total** | **6 566** | **100.0** | **11 300** | **100.0** | **4 391** | **100.0** | **158** |
| **Single modes** | **5 960** | **90.8** | **11 207** | **99.2** | **4 334** | **98.7** | **108** |
| Truck[1] | 5 150 | 78.4 | 6 711 | 59.4 | 1 388 | 31.6 | 99 |
| For-hire truck | 2 448 | 37.3 | 4 626 | 40.9 | 1 193 | 27.2 | 247 |
| Private truck | 2 690 | 41.0 | 2 083 | 18.4 | 192 | 4.4 | 42 |
| Rail | 622 | 9.5 | 3 157 | 27.9 | 2 470 | 56.2 | 870 |
| Water | 16 | .3 | 1 263 | 11.2 | S | S | 269 |
| Air (includes truck and air) | S | S | S | S | S | S | 1 987 |
| Pipeline[2] | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 150 | 2.3 | 7 | – | S | S | 411 |
| Other multiple modes | S | S | S | S | S | S | 3 924 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

# Table 6a. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002—Con.

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **HAZARD CLASS 5, OXIDIZERS AND ORGANIC PEROXIDES** | | | | | | | |
| **Total** | **5 471** | **100.0** | **12 670** | **100.0** | **4 221** | **100.0** | **407** |
| **Single modes** | **5 332** | **97.5** | **12 300** | **97.1** | **4 011** | **95.0** | **363** |
| Truck[1] | 4 587 | 83.8 | 9 870 | 77.9 | 2 710 | 64.2 | 353 |
| For-hire truck | 2 381 | 43.5 | 6 777 | 53.5 | 2 411 | 57.1 | 543 |
| Private truck | 2 198 | 40.2 | 3 037 | 24.0 | 280 | 6.6 | 68 |
| Rail | 743 | 13.6 | 2 430 | 19.2 | 1 300 | 30.8 | 631 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | – | – | S | S | 1 053 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **84** | **1.5** | **S** | **S** | **S** | **S** | **1 136** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 1 172 |
| Other multiple modes | 74 | 1.3 | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 6, TOXIC (POISON)** | | | | | | | |
| **Total** | **8 275** | **100.0** | **8 459** | **100.0** | **4 254** | **100.0** | **626** |
| **Single modes** | **7 703** | **93.1** | **8 242** | **97.4** | **4 125** | **97.0** | **597** |
| Truck[1] | 4 881 | 59.0 | 2 255 | 26.7 | 844 | 19.9 | 274 |
| For-hire truck | 3 702 | 44.7 | 1 762 | 20.8 | 774 | 18.2 | 525 |
| Private truck | 1 179 | 14.3 | 493 | 5.8 | 71 | 1.7 | 55 |
| Rail | 1 145 | 13.8 | 1 908 | 22.6 | 1 714 | 40.3 | 899 |
| Water | 962 | 11.6 | 2 325 | 27.5 | S | S | 639 |
| Air (includes truck and air) | S | S | S | S | S | S | 1 893 |
| Pipeline[2] | S | S | 1 753 | 20.7 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **826** |
| Parcel, U.S. Postal Service or courier | 97 | 1.2 | S | S | S | S | 821 |
| Other multiple modes | S | S | S | S | S | S | 1 185 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **38** | **.9** | **S** |
| **HAZARD CLASS 7, RADIOACTIVE MATERIALS** | | | | | | | |
| **Total** | **5 850** | **100.0** | **57** | **100.0** | **44** | **100.0** | **S** |
| **Single modes** | **5 410** | **92.5** | **52** | **92.3** | **38** | **87.7** | **S** |
| Truck[1] | 5 367 | 91.7 | 52 | 91.0 | 37 | 84.5 | S |
| For-hire truck | 3 271 | 55.9 | 22 | 39.1 | 24 | 55.1 | S |
| Private truck | 2 096 | 35.8 | 29 | 51.9 | S | S | S |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | 43 | .7 | 1 | 1.2 | 1 | 3.2 | 1 912 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **440** | **7.5** | **4** | **7.3** | **5** | **12.1** | **1 185** |
| Parcel, U.S. Postal Service or courier | 440 | 7.5 | 4 | 7.3 | 5 | 12.1 | 1 185 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 8, CORROSIVE MATERIALS** | | | | | | | |
| **Total** | **38 324** | **100.0** | **90 671** | **100.0** | **36 260** | **100.0** | **301** |
| **Single modes** | **36 990** | **96.5** | **88 852** | **98.0** | **34 824** | **96.0** | **262** |
| Truck[1] | 31 819 | 83.0 | 51 385 | 56.7 | 15 798 | 43.6 | 201 |
| For-hire truck | 19 457 | 50.8 | 35 613 | 39.3 | 13 263 | 36.6 | 463 |
| Private truck | 12 206 | 31.8 | 15 714 | 17.3 | 2 506 | 6.9 | 73 |
| Rail | 3 962 | 10.3 | 23 949 | 26.4 | 15 606 | 43.0 | 649 |
| Water | 774 | 2.0 | 9 552 | 10.5 | 3 259 | 9.0 | 255 |
| Air (includes truck and air) | 165 | .4 | S | S | S | S | 2 007 |
| Pipeline[2] | 270 | .7 | 3 959 | 4.4 | S | S | S |
| **Multiple modes** | **887** | **2.3** | **1 072** | **1.2** | **1 187** | **3.3** | **698** |
| Parcel, U.S. Postal Service or courier | 623 | 1.6 | S | S | S | S | 695 |
| Other multiple modes | 265 | .7 | 1 010 | 1.1 | 1 159 | 3.2 | S |
| **Other and unknown modes** | **S** | **S** | **747** | **.8** | **249** | **.7** | **318** |

See footnotes at end of table.

## Table 6a. **Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002**—Con.

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **HAZARD CLASS 9, MISCELLANEOUS DANGEROUS GOODS** | | | | | | | |
| **Total** | **23 625** | **100.0** | **61 018** | **100.0** | **20 153** | **100.0** | **368** |
| **Single modes** | **22 588** | **95.6** | **60 036** | **98.4** | **19 451** | **96.5** | **310** |
| Truck[1] | 16 581 | 70.2 | 39 126 | 64.1 | 6 910 | 34.3 | 227 |
| For-hire truck | 10 961 | 46.4 | 22 961 | 37.6 | 4 289 | 21.3 | 297 |
| Private truck | 5 621 | 23.8 | 16 165 | 26.5 | 2 621 | 13.0 | 146 |
| Rail | 3 246 | 13.7 | 12 260 | 20.1 | 9 307 | 46.2 | 860 |
| Water | 1 972 | 8.3 | 8 619 | 14.1 | 3 204 | 15.9 | 476 |
| Air (includes truck and air) | 788 | 3.3 | S | S | S | S | 2 268 |
| Pipeline[2] | S | S | S | S | S | S | S |
| **Multiple modes** | **864** | **3.7** | **S** | **S** | **688** | **3.4** | **750** |
| Parcel, U.S. Postal Service or courier | 544 | 2.3 | 3 | – | 3 | – | 731 |
| Other multiple modes | 320 | 1.4 | S | S | 684 | 3.4 | 1 075 |
| **Other and unknown modes** | **173** | **.7** | **S** | **S** | **S** | **S** | **962** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

# Table 6b. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **HAZARD CLASS 1, EXPLOSIVES** | | | | | | | | | | | | |
| **Total** | **7 901** | **5 584** | **41.5** | **5 000** | **1 718** | **191.0** | **1 568** | **S** | **S** | **651** | **771** | **–15.6** |
| **Single modes** | **7 748** | **5 012** | **54.6** | **4 984** | **1 682** | **196.3** | **1 557** | **S** | **S** | **532** | **503** | **5.8** |
| Truck[1] | 7 572 | 4 109 | 84.3 | 4 631 | 1 268 | 265.2 | 1 208 | 498 | 142.8 | 488 | 413 | 18.2 |
| For-hire truck | 6 171 | 3 054 | 102.1 | 1 551 | 411 | 277.0 | 836 | 277 | 201.7 | 890 | 913 | –2.6 |
| Private truck | 1 399 | 1 049 | 33.3 | S | 857 | S | 372 | S | S | 120 | 172 | –29.9 |
| Rail | 97 | 701 | –86.1 | 352 | S | S | 347 | S | S | 929 | 1 689 | –45.0 |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | 202 | S | 1 | 1 | –34.1 | 2 | 1 | 91.9 | 2 084 | 1 724 | 20.9 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **137** | **457** | **–70.1** | **S** | **20** | **S** | **S** | **16** | **S** | **835** | **900** | **–7.2** |
| Parcel, U.S. Postal Service or courier | 137 | 454 | –69.9 | S | 19 | S | S | 15 | S | 835 | 900 | –7.2 |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 807 | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **9** | **397** | **–97.6** |
| **HAZARD CLASS 2, GASES** | | | | | | | | | | | | |
| **Total** | **73 932** | **47 288** | **56.3** | **213 358** | **137 138** | **55.6** | **37 262** | **26 002** | **43.3** | **95** | **60** | **58.7** |
| **Single modes** | **72 735** | **45 151** | **61.1** | **212 106** | **132 652** | **59.9** | **36 869** | **25 567** | **44.2** | **89** | **53** | **68.4** |
| Truck[1] | 47 020 | 24 589 | 91.2 | 96 865 | 62 518 | 54.9 | 13 537 | 7 299 | 85.5 | 82 | 47 | 76.7 |
| For-hire truck | 21 860 | 9 657 | 126.4 | 29 359 | 20 224 | 45.2 | 6 786 | 3 628 | 87.0 | 486 | 392 | 24.0 |
| Private truck | 25 146 | 14 764 | 70.3 | 67 308 | 41 872 | 60.7 | 6 564 | 3 591 | 82.8 | 38 | 27 | 39.5 |
| Rail | 8 966 | 5 979 | 50.0 | 29 230 | 17 929 | 63.0 | 16 604 | 12 421 | 33.7 | 641 | 679 | –5.7 |
| Water | 1 719 | 1 497 | 14.8 | 7 133 | 6 475 | 10.2 | 1 754 | 2 018 | –13.1 | 243 | 721 | –66.3 |
| Air (includes truck and air) | 243 | 477 | –49.0 | S | 5 | S | S | 5 | S | 1 450 | 1 440 | .7 |
| Pipeline[2] | 14 787 | 12 608 | 17.3 | 78 857 | 45 725 | 72.5 | S | S | S | S | S | S |
| **Multiple modes** | **687** | **497** | **38.3** | **693** | **538** | **28.7** | **337** | **124** | **172.0** | **643** | **362** | **77.5** |
| Parcel, U.S. Postal Service or courier | 525 | 276 | 90.1 | S | S | S | 8 | S | S | 627 | 430 | 45.9 |
| Other multiple modes | 162 | 220 | –26.7 | 665 | 484 | 37.3 | 329 | 111 | 197.3 | S | S | S |
| **Other and unknown modes** | **510** | **1 641** | **–68.9** | **560** | **S** | **S** | **57** | **311** | **–81.6** | **S** | **S** | **S** |
| **HAZARD CLASS 3, FLAMMABLE LIQUIDS** | | | | | | | | | | | | |
| **Total** | **490 238** | **386 994** | **26.7** | **1 788 986** | **1 450 591** | **23.3** | **218 574** | **184 824** | **18.3** | **106** | **69** | **54.3** |
| **Single modes** | **480 024** | **378 279** | **26.9** | **1 760 755** | **1 427 902** | **23.3** | **206 688** | **166 356** | **24.2** | **75** | **62** | **21.8** |
| Truck[1] | 296 653 | 237 771 | 24.8 | 948 619 | 787 773 | 20.4 | 67 730 | 50 743 | 33.5 | 64 | 57 | 12.8 |
| For-hire truck | 119 551 | 91 581 | 30.5 | 346 831 | 281 931 | 23.0 | 35 535 | 25 991 | 36.7 | 192 | 177 | 8.1 |
| Private truck | 174 126 | 143 496 | 21.3 | 594 277 | 495 750 | 19.9 | 31 468 | 23 932 | 31.5 | 32 | 30 | 9.3 |
| Rail | 12 558 | 11 499 | 9.2 | 36 083 | 28 513 | 26.5 | 24 738 | 21 525 | 14.9 | 699 | 843 | –17.1 |
| Water | 41 414 | 26 859 | 54.2 | 199 304 | 137 824 | 44.6 | 60 466 | 48 059 | 25.8 | S | S | S |
| Air (includes truck and air) | 96 | S | S | S | 38 | S | S | 54 | S | 2 382 | 1 287 | 85.1 |
| Pipeline[2] | 129 303 | 95 337 | 35.6 | 576 739 | 473 753 | 21.7 | S | S | S | S | S | S |
| **Multiple modes** | **5 606** | **3 549** | **58.0** | **15 561** | **10 420** | **49.3** | **9 933** | **S** | **S** | **979** | **528** | **85.4** |
| Parcel, U.S. Postal Service or courier | 1 743 | 560 | 211.5 | 121 | 58 | 109.1 | 57 | 25 | 127.4 | 966 | 607 | 59.1 |
| Other multiple modes | 3 863 | 2 989 | 29.2 | 15 440 | 10 363 | 49.0 | 9 875 | S | S | 1 535 | S | S |
| **Other and unknown modes** | **4 608** | **5 166** | **–10.8** | **12 671** | **12 269** | **3.3** | **S** | **917** | **S** | **40** | **20** | **100.4** |
| **HAZARD CLASS 4, FLAMMABLE SOLIDS** | | | | | | | | | | | | |
| **Total** | **6 566** | **4 238** | **54.9** | **11 300** | **14 832** | **–23.8** | **4 391** | **9 735** | **–54.9** | **158** | **660** | **–76.0** |
| **Single modes** | **5 960** | **4 017** | **48.4** | **11 207** | **14 679** | **–23.7** | **4 334** | **9 610** | **–54.9** | **108** | **491** | **–77.9** |
| Truck[1] | 5 150 | 3 101 | 66.1 | 6 711 | 7 786 | –13.8 | 1 388 | 936 | 48.2 | 99 | 423 | –76.7 |
| For-hire truck | 2 448 | 2 039 | 20.1 | 4 626 | 3 827 | 20.9 | 1 193 | 743 | 60.5 | 247 | 417 | –40.7 |
| Private truck | 2 690 | 1 050 | 156.1 | 2 083 | S | S | 192 | 187 | 2.7 | 42 | 426 | –90.1 |
| Rail | 622 | 855 | –27.3 | 3 157 | 6 478 | –51.3 | 2 470 | 8 639 | –71.4 | 870 | 1 379 | –37.0 |
| Water | 16 | S | S | 1 263 | S | S | S | S | S | 269 | 227 | 18.9 |
| Air (includes truck and air) | S | 14 | S | S | S | S | S | S | S | 1 987 | 1 320 | 50.5 |
| Pipeline[2] | S | S | S | S | 390 | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **149** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **1 083** | **S** |
| Parcel, U.S. Postal Service or courier | 150 | S | S | 7 | 6 | 19.5 | S | 5 | S | 411 | 1 080 | –62.0 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 3 924 | 1 617 | 142.6 |
| **Other and unknown modes** | **S** | **73** | **S** | **S** | **S** | **S** | **S** | **9** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

# Table 6b. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002 and 1997—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **HAZARD CLASS 5, OXIDIZERS AND ORGANIC PEROXIDES** | | | | | | | | | | | | |
| **Total** | **5 471** | **4 485** | **22.0** | **12 670** | **9 239** | **37.1** | **4 221** | **4 471** | **–5.6** | **407** | **193** | **111.2** |
| **Single modes** | **5 332** | **4 363** | **22.2** | **12 300** | **9 024** | **36.3** | **4 011** | **4 389** | **–8.6** | **363** | **177** | **104.5** |
| Truck[1] | 4 587 | 3 246 | 41.3 | 9 870 | 5 839 | 69.0 | 2 710 | 1 568 | 72.8 | 353 | 161 | 119.6 |
| For-hire truck | 2 381 | 1 969 | 20.9 | 6 777 | 2 954 | 129.4 | 2 411 | 1 163 | 107.3 | 543 | 490 | 10.8 |
| Private truck | 2 198 | 1 255 | 75.2 | 3 037 | 2 871 | 5.8 | 280 | 395 | –29.2 | 68 | 60 | 13.2 |
| Rail | 743 | 1 115 | –33.4 | 2 430 | 3 182 | –23.6 | 1 300 | 2 820 | –53.9 | 631 | 870 | –27.4 |
| Water | – | S | S | – | S | S | – | S | S | – | S | S |
| Air (includes truck and air) | S | – | S | – | S | S | S | S | S | 1 053 | 1 978 | –46.8 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **84** | **38** | **122.6** | **S** | **S** | **S** | **S** | **S** | **S** | **1 136** | **432** | **162.7** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | 1 | S | S | – | S | 1 172 | 421 | 178.7 |
| Other multiple modes | 74 | 19 | 290.0 | S | S | S | S | S | S | S | 2 307 | S |
| **Other and unknown modes** | **S** | **84** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **74** | **S** |
| **HAZARD CLASS 6, TOXIC (POISON)** | | | | | | | | | | | | |
| **Total** | **8 275** | **10 085** | **–18.0** | **8 459** | **6 366** | **32.9** | **4 254** | **2 824** | **50.6** | **626** | **403** | **55.2** |
| **Single modes** | **7 703** | **9 397** | **–18.0** | **8 242** | **6 225** | **32.4** | **4 125** | **2 710** | **52.2** | **597** | **384** | **55.5** |
| Truck[1] | 4 881 | 7 272 | –32.9 | 2 255 | 2 840 | –20.6 | 844 | 967 | –12.7 | 274 | 254 | 8.1 |
| For-hire truck | 3 702 | 4 426 | –16.4 | 1 762 | 1 875 | –6.0 | 774 | 827 | –6.4 | 525 | 505 | 4.1 |
| Private truck | 1 179 | 2 743 | –57.0 | 493 | 893 | –44.8 | 71 | 125 | –43.4 | 55 | 179 | –69.0 |
| Rail | 1 145 | 1 477 | –22.5 | 1 908 | 1 949 | –2.1 | 1 714 | 1 446 | 18.6 | 899 | 724 | 24.2 |
| Water | 962 | S | S | 2 325 | S | S | S | S | S | 639 | 268 | 138.2 |
| Air (includes truck and air) | S | 87 | S | S | S | S | S | S | S | 1 893 | 1 523 | 24.3 |
| Pipeline[2] | S | 184 | S | 1 753 | 374 | 368.1 | S | S | S | S | S | S |
| **Multiple modes** | **S** | **447** | **S** | **S** | **89** | **S** | **S** | **S** | **S** | **826** | **523** | **57.8** |
| Parcel, U.S. Postal Service or courier | 97 | 338 | –71.4 | S | 3 | S | S | 2 | S | 821 | 517 | 58.9 |
| Other multiple modes | S | 109 | S | S | 86 | S | S | S | S | 1 185 | 1 361 | –12.9 |
| **Other and unknown modes** | **S** | **241** | **S** | **S** | **52** | **S** | **38** | **18** | **108.2** | **S** | **97** | **S** |
| **HAZARD CLASS 7, RADIOACTIVE MATERIALS** | | | | | | | | | | | | |
| **Total** | **5 850** | **2 722** | **114.9** | **57** | **87** | **–35.1** | **44** | **48** | **–8.8** | **S** | **445** | **S** |
| **Single modes** | **5 410** | **2 169** | **149.4** | **52** | **67** | **–21.7** | **38** | **32** | **17.7** | **S** | **447** | **S** |
| Truck[1] | 5 367 | 1 456 | 268.6 | 52 | 56 | –8.2 | 37 | 17 | 112.9 | S | 77 | S |
| For-hire truck | 3 271 | 583 | 460.8 | 22 | 32 | –31.3 | 24 | 14 | 71.4 | S | 312 | S |
| Private truck | 2 096 | 873 | 140.2 | 29 | 24 | 23.1 | S | S | S | S | 27 | S |
| Rail | – | S | S | – | S | S | – | S | S | – | 1 462 | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | 43 | 462 | –90.7 | 1 | 7 | –90.5 | 1 | 10 | –86.6 | 1 912 | 1 468 | 30.3 |
| Pipeline[2] | – | S | S | – | S | S | S | S | S | S | S | S |
| **Multiple modes** | **440** | **352** | **25.1** | **4** | **11** | **–63.4** | **5** | **15** | **–64.9** | **1 185** | **1 087** | **9.0** |
| Parcel, U.S. Postal Service or courier | 440 | 352 | 25.1 | 4 | 11 | –63.4 | 5 | 15 | –64.9 | 1 185 | 1 087 | 9.0 |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 8, CORROSIVE MATERIALS** | | | | | | | | | | | | |
| **Total** | **38 324** | **41 336** | **–7.3** | **90 671** | **98 331** | **–7.8** | **36 260** | **42 918** | **–15.5** | **301** | **205** | **46.7** |
| **Single modes** | **36 990** | **39 280** | **–5.8** | **88 852** | **95 184** | **–6.7** | **34 824** | **41 784** | **–16.7** | **262** | **180** | **45.9** |
| Truck[1] | 31 819 | 28 108 | 13.2 | 51 385 | 49 528 | 3.7 | 15 798 | 12 416 | 27.2 | 201 | 148 | 35.4 |
| For-hire truck | 19 457 | 19 549 | –.5 | 35 613 | 32 015 | 11.2 | 13 263 | 10 463 | 26.8 | 463 | 410 | 13.0 |
| Private truck | 12 206 | 8 243 | 48.1 | 15 714 | 17 260 | –9.0 | 2 506 | 1 919 | 30.6 | 73 | 61 | 18.7 |
| Rail | 3 962 | 7 492 | –47.1 | 23 949 | 25 707 | –6.8 | 15 606 | 17 948 | –13.0 | 649 | 916 | –29.1 |
| Water | 774 | 3 110 | –75.1 | 9 552 | 18 206 | –47.5 | 3 259 | 11 401 | –71.4 | 255 | 471 | –45.9 |
| Air (includes truck and air) | 165 | 155 | 6.2 | S | 3 | S | S | 5 | S | 2 007 | 1 529 | 31.2 |
| Pipeline[2] | 270 | S | S | 3 959 | 1 740 | 127.5 | S | S | S | S | S | S |
| **Multiple modes** | **887** | **874** | **1.5** | **1 072** | **644** | **66.4** | **1 187** | **703** | **69.0** | **698** | **569** | **22.7** |
| Parcel, U.S. Postal Service or courier | 623 | 606 | 2.8 | S | 45 | S | S | 15 | S | 695 | 562 | 23.6 |
| Other multiple modes | 265 | 269 | –1.5 | 1 010 | 600 | 68.4 | 1 159 | 688 | 68.6 | S | 1 023 | S |
| **Other and unknown modes** | **S** | **1 181** | **S** | **747** | **2 502** | **–70.2** | **249** | **S** | **S** | **318** | **106** | **201.6** |

See footnotes at end of table.

## Table 6b. **Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **HAZARD CLASS 9, MISCELLANEOUS DANGEROUS GOODS** | | | | | | | | | | | | |
| **Total** | **23 625** | **23 946** | **–1.3** | **61 018** | **65 317** | **–6.6** | **20 153** | **22 727** | **–11.3** | **368** | **323** | **13.9** |
| **Single modes** | **22 588** | **22 750** | **–.7** | **60 036** | **64 641** | **–7.1** | **19 451** | **22 167** | **–12.3** | **310** | **268** | **15.4** |
| Truck[1] | 16 581 | 15 515 | 6.9 | 39 126 | 41 592 | –5.9 | 6 910 | 7 766 | –11.0 | 227 | 189 | 19.7 |
| For-hire truck | 10 961 | 11 611 | –5.6 | 22 961 | 26 722 | –14.1 | 4 289 | 6 132 | –30.1 | 297 | 324 | –8.4 |
| Private truck | 5 621 | 3 671 | 53.1 | 16 165 | 13 721 | 17.8 | 2 621 | 1 575 | 66.5 | 146 | 81 | 79.5 |
| Rail | 3 246 | 5 567 | –41.7 | 12 260 | 18 334 | –33.1 | 9 307 | 13 064 | –28.8 | 860 | 710 | 21.2 |
| Water | 1 972 | S | S | 8 619 | S | S | 3 204 | S | S | 476 | 402 | 18.6 |
| Air (includes truck and air) | 788 | 381 | 107.1 | S | 9 | S | S | 14 | S | 2 268 | 1 347 | 68.4 |
| Pipeline[2] | S | S | S | S | S | S | S | S | S | S | S | S |
| **Multiple modes** | **864** | **841** | **2.7** | **S** | **418** | **S** | **688** | **409** | **68.0** | **750** | **696** | **7.7** |
| Parcel, U.S. Postal Service or courier | 544 | 465 | 17.1 | 3 | 4 | –31.9 | 3 | 2 | 36.5 | 731 | 686 | 6.6 |
| Other multiple modes | 320 | 376 | –15.1 | S | 414 | S | 684 | 407 | 68.2 | 1 075 | 1 446 | –25.7 |
| **Other and unknown modes** | **173** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **962** | **194** | **395.6** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

# Table 6c. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **HAZARD CLASS 1, EXPLOSIVES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **S** |
| **Single modes** | **98.1** | **89.7** | **99.7** | **97.9** | **99.3** | **S** |
| Truck[1] | 95.8 | 73.6 | 92.6 | 73.8 | 77.0 | 39.1 |
| For-hire truck | 78.1 | 54.7 | 31.0 | 23.9 | 53.3 | 21.8 |
| Private truck | 17.7 | 18.8 | S | 49.9 | 23.7 | S |
| Rail | 1.2 | 12.6 | 7.0 | S | 22.1 | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | 3.6 | – | – | .1 | – |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **1.7** | **8.2** | **S** | **1.1** | **S** | **1.3** |
| Parcel, U.S. Postal Service or courier | 1.7 | 8.1 | S | 1.1 | S | 1.2 |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 2, GASES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **98.4** | **95.5** | **99.4** | **96.7** | **98.9** | **98.3** |
| Truck[1] | 63.6 | 52.0 | 45.4 | 45.6 | 36.3 | 28.1 |
| For-hire truck | 29.6 | 20.4 | 13.8 | 14.7 | 18.2 | 14.0 |
| Private truck | 34.0 | 31.2 | 31.5 | 30.5 | 17.6 | 13.8 |
| Rail | 12.1 | 12.6 | 13.7 | 13.1 | 44.6 | 47.8 |
| Water | 2.3 | 3.2 | 3.3 | 4.7 | 4.7 | 7.8 |
| Air (includes truck and air) | .3 | 1.0 | S | – | S | – |
| Pipeline[2] | 20.0 | 26.7 | 37.0 | 33.3 | S | S |
| **Multiple modes** | **.9** | **1.1** | **.3** | **.4** | **.9** | **.5** |
| Parcel, U.S. Postal Service or courier | .7 | .6 | S | S | – | S |
| Other multiple modes | .2 | .5 | .3 | .4 | .9 | .4 |
| **Other and unknown modes** | **.7** | **3.5** | **.3** | **S** | **.2** | **1.2** |
| **HAZARD CLASS 3, FLAMMABLE LIQUIDS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.9** | **97.7** | **98.4** | **98.4** | **94.6** | **90.0** |
| Truck[1] | 60.5 | 61.4 | 53.0 | 54.3 | 31.0 | 27.5 |
| For-hire truck | 24.4 | 23.7 | 19.4 | 19.4 | 16.3 | 14.1 |
| Private truck | 35.5 | 37.1 | 33.2 | 34.2 | 14.4 | 12.9 |
| Rail | 2.6 | 3.0 | 2.0 | 2.0 | 11.3 | 11.6 |
| Water | 8.4 | 6.9 | 11.1 | 9.5 | 27.7 | 26.0 |
| Air (includes truck and air) | – | S | S | – | S | – |
| Pipeline[2] | 26.4 | 24.6 | 32.2 | 32.7 | S | S |
| **Multiple modes** | **1.1** | **.9** | **.9** | **.7** | **4.5** | **S** |
| Parcel, U.S. Postal Service or courier | .4 | .1 | – | – | – | – |
| Other multiple modes | .8 | .8 | .9 | .7 | 4.5 | S |
| **Other and unknown modes** | **.9** | **1.3** | **.7** | **.8** | **S** | **.5** |
| **HAZARD CLASS 4, FLAMMABLE SOLIDS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **90.8** | **94.8** | **99.2** | **99.0** | **98.7** | **98.7** |
| Truck[1] | 78.4 | 73.2 | 59.4 | 52.5 | 31.6 | 9.6 |
| For-hire truck | 37.3 | 48.1 | 40.9 | 25.8 | 27.2 | 7.6 |
| Private truck | 41.0 | 24.8 | 18.4 | S | 4.4 | 1.9 |
| Rail | 9.5 | 20.2 | 27.9 | 43.7 | 56.2 | 88.7 |
| Water | .3 | S | 11.2 | S | S | S |
| Air (includes truck and air) | S | .3 | S | S | S | S |
| Pipeline[2] | S | S | S | 2.6 | S | S |
| **Multiple modes** | **S** | **3.5** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 2.3 | S | – | – | S | – |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **1.7** | **S** | **S** | **S** | **–** |

See footnotes at end of table.

## Table 6c. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: Percent of Total for 2002 and 1997—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **HAZARD CLASS 5, OXIDIZERS AND ORGANIC PEROXIDES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.5** | **97.3** | **97.1** | **97.7** | **95.0** | **98.2** |
| Truck[1] | 83.8 | 72.4 | 77.9 | 63.2 | 64.2 | 35.1 |
| For-hire truck | 43.5 | 43.9 | 53.5 | 32.0 | 57.1 | 26.0 |
| Private truck | 40.2 | 28.0 | 24.0 | 31.1 | 6.6 | 8.8 |
| Rail | 13.6 | 24.9 | 19.2 | 34.4 | 30.8 | 63.1 |
| Water | – | S | – | S | – | S |
| Air (includes truck and air) | S | – | – | S | S | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **1.5** | **.8** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | – | S | – |
| Other multiple modes | 1.3 | .4 | S | S | S | S |
| **Other and unknown modes** | **S** | **1.9** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 6, TOXIC (POISON)** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **93.1** | **93.2** | **97.4** | **97.8** | **97.0** | **96.0** |
| Truck[1] | 59.0 | 72.1 | 26.7 | 44.6 | 19.9 | 34.2 |
| For-hire truck | 44.7 | 43.9 | 20.8 | 29.4 | 18.2 | 29.3 |
| Private truck | 14.3 | 27.2 | 5.8 | 14.0 | 1.7 | 4.4 |
| Rail | 13.8 | 14.6 | 22.6 | 30.6 | 40.3 | 51.2 |
| Water | 11.6 | S | 27.5 | S | S | S |
| Air (includes truck and air) | S | .9 | S | S | S | S |
| Pipeline[2] | S | 1.8 | 20.7 | 5.9 | S | S |
| **Multiple modes** | **S** | **4.4** | **S** | **1.4** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 1.2 | 3.4 | S | – | S | – |
| Other multiple modes | S | 1.1 | S | 1.3 | S | S |
| **Other and unknown modes** | **S** | **2.4** | **S** | **.8** | **.9** | **.6** |
| **HAZARD CLASS 7, RADIOACTIVE MATERIALS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **92.5** | **79.7** | **92.3** | **76.5** | **87.7** | **68.0** |
| Truck[1] | 91.7 | 53.5 | 91.0 | 64.4 | 84.5 | 36.2 |
| For-hire truck | 55.9 | 21.4 | 39.1 | 37.0 | 55.1 | 29.3 |
| Private truck | 35.8 | 32.1 | 51.9 | 27.4 | S | S |
| Rail | – | S | – | S | – | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | .7 | 17.0 | 1.2 | 8.4 | 3.2 | 21.9 |
| Pipeline[2] | – | S | – | S | S | S |
| **Multiple modes** | **7.5** | **12.9** | **7.3** | **13.0** | **12.1** | **31.3** |
| Parcel, U.S. Postal Service or courier | 7.5 | 12.9 | 7.3 | 13.0 | 12.1 | 31.3 |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 8, CORROSIVE MATERIALS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **96.5** | **95.0** | **98.0** | **96.8** | **96.0** | **97.4** |
| Truck[1] | 83.0 | 68.0 | 56.7 | 50.4 | 43.6 | 28.9 |
| For-hire truck | 50.8 | 47.3 | 39.3 | 32.6 | 36.6 | 24.4 |
| Private truck | 31.8 | 19.9 | 17.3 | 17.6 | 6.9 | 4.5 |
| Rail | 10.3 | 18.1 | 26.4 | 26.1 | 43.0 | 41.8 |
| Water | 2.0 | 7.5 | 10.5 | 18.5 | 9.0 | 26.6 |
| Air (includes truck and air) | .4 | .4 | S | – | S | – |
| Pipeline[2] | .7 | S | 4.4 | 1.8 | S | S |
| **Multiple modes** | **2.3** | **2.1** | **1.2** | **.7** | **3.3** | **1.6** |
| Parcel, U.S. Postal Service or courier | 1.6 | 1.5 | S | – | S | – |
| Other multiple modes | .7 | .7 | 1.1 | .6 | 3.2 | 1.6 |
| **Other and unknown modes** | **S** | **2.9** | **.8** | **2.5** | **.7** | **S** |

See footnotes at end of table.

## Table 6c. **Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: Percent of Total for 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **HAZARD CLASS 9, MISCELLANEOUS DANGEROUS GOODS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **95.6** | **95.0** | **98.4** | **99.0** | **96.5** | **97.5** |
| Truck[1] | 70.2 | 64.8 | 64.1 | 63.7 | 34.3 | 34.2 |
| For-hire truck | 46.4 | 48.5 | 37.6 | 40.9 | 21.3 | 27.0 |
| Private truck | 23.8 | 15.3 | 26.5 | 21.0 | 13.0 | 6.9 |
| Rail | 13.7 | 23.2 | 20.1 | 28.1 | 46.2 | 57.5 |
| Water | 8.3 | S | 14.1 | S | 15.9 | S |
| Air (includes truck and air) | 3.3 | 1.6 | S | – | S | – |
| Pipeline[2] | S | S | S | S | S | S |
| **Multiple modes** | **3.7** | **3.5** | **S** | **.6** | **3.4** | **1.8** |
| Parcel, U.S. Postal Service or courier | 2.3 | 1.9 | – | – | – | – |
| Other multiple modes | 1.4 | 1.6 | S | .6 | 3.4 | 1.8 |
| **Other and unknown modes** | **.7** | **S** | **S** | **S** | **S** | **S** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

# Table 7a. Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **DIVISION 1.1, EXPLOSIVES WITH A MASS EXPLOSION HAZARD** | | | | | | | |
| **Total** | **470** | **100.0** | **S** | **S** | **S** | **S** | **S** |
| **Single modes** | **458** | **97.5** | **S** | **S** | **S** | **S** | **S** |
| Truck[1] | 458 | 97.5 | S | S | S | S | S |
| For-hire truck | 337 | 71.7 | S | S | S | S | 849 |
| Private truck | S | S | S | S | S | S | 56 |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **916** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 916 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **4** |
| **DIVISION 1.2, EXPLOSIVES WITH A PROJECTION HAZARD** | | | | | | | |
| **Total** | **S** | **S** | **S** | **S** | **S** | **S** | **1 045** |
| **Single modes** | **S** | **S** | **S** | **S** | **S** | **S** | **1 045** |
| Truck[1] | S | S | S | S | S | S | 1 045 |
| For-hire truck | S | S | S | S | S | S | 1 045 |
| Private truck | – | – | – | – | – | – | – |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| **DIVISION 1.3, EXPLOSIVES WITH PREDOMINANTLY A FIRE HAZARD** | | | | | | | |
| **Total** | **S** | **S** | **27** | **100.0** | **21** | **100.0** | **786** |
| **Single modes** | **S** | **S** | **27** | **100.0** | **21** | **100.0** | **786** |
| Truck[1] | S | S | S | S | 19 | 89.5 | 779 |
| For-hire truck | S | S | S | S | S | S | 861 |
| Private truck | S | S | S | S | S | S | 239 |
| Rail | S | S | S | S | S | S | 836 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 2 310 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| **DIVISION 1.4, EXPLOSIVES WITH NO SIGNIFICANT BLAST HAZARD** | | | | | | | |
| **Total** | **5 245** | **100.0** | **597** | **100.0** | **426** | **100.0** | **834** |
| **Single modes** | **5 108** | **97.4** | **587** | **98.4** | **415** | **97.5** | **836** |
| Truck[1] | 5 033 | 96.0 | 586 | 98.3 | 414 | 97.1 | 802 |
| For-hire truck | 4 594 | 87.6 | 564 | 94.6 | 406 | 95.4 | 964 |
| Private truck | S | S | 22 | 3.7 | S | S | 243 |
| Rail | S | S | S | S | S | S | 534 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | 1 | – | S | S | 2 001 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **136** | **2.6** | **S** | **S** | **S** | **S** | **835** |
| Parcel, U.S. Postal Service or courier | 136 | 2.6 | S | S | S | S | 835 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

## Table 7a. **Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002**—Con.

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **DIVISION 1.5, VERY INSENSITIVE EXPLOSIVES, BLASTING AGENT** | | | | | | | |
| **Total** | **944** | **100.0** | **4 325** | **100.0** | **1 113** | **100.0** | **S** |
| **Single modes** | **940** | **99.6** | **4 322** | **99.9** | **1 113** | **100.0** | **S** |
| Truck[1] | 888 | 94.1 | 3 972 | 91.8 | 768 | 69.0 | 139 |
| For-hire truck | 144 | 15.2 | 960 | 22.2 | 410 | 36.8 | 405 |
| Private truck | 742 | 78.6 | S | S | 358 | 32.1 | 91 |
| Rail | 48 | 5.1 | 350 | 8.1 | 345 | 31.0 | 984 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 2 197 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **615** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 615 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **8** |
| **DIVISION 2.1, FLAMMABLE GASES** | | | | | | | |
| **Total** | **39 955** | **100.0** | **122 465** | **100.0** | **22 064** | **100.0** | **96** |
| **Single modes** | **39 626** | **99.2** | **121 749** | **99.4** | **21 795** | **98.8** | **95** |
| Truck[1] | 16 998 | 42.5 | 44 031 | 36.0 | 5 295 | 24.0 | 81 |
| For-hire truck | 6 241 | 15.6 | 18 571 | 15.2 | 3 651 | 16.5 | 461 |
| Private truck | 10 757 | 26.9 | 25 460 | 20.8 | 1 643 | 7.4 | 27 |
| Rail | 7 579 | 19.0 | 22 755 | 18.6 | 13 061 | 59.2 | 659 |
| Water | 1 528 | 3.8 | 6 206 | 5.1 | 1 248 | 5.7 | 226 |
| Air (includes truck and air) | S | S | S | S | S | S | 1 549 |
| Pipeline[2] | 13 463 | 33.7 | 48 740 | 39.8 | S | S | S |
| **Multiple modes** | **122** | **.3** | **530** | **.4** | **262** | **1.2** | **805** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 715 |
| Other multiple modes | 76 | .2 | 529 | .4 | 260 | 1.2 | S |
| **Other and unknown modes** | **S** | **S** | **186** | **.2** | **8** | **–** | **S** |
| **DIVISION 2.2, NONFLAMMABLE, NONTOXIC COMPRESSED GASES** | | | | | | | |
| **Total** | **27 024** | **100.0** | **66 329** | **100.0** | **9 012** | **100.0** | **92** |
| **Single modes** | **26 260** | **97.2** | **66 118** | **99.7** | **8 918** | **99.0** | **83** |
| Truck[1] | 25 111 | 92.9 | 40 261 | 60.7 | 6 540 | 72.6 | 81 |
| For-hire truck | 13 254 | 49.0 | 4 598 | 6.9 | 2 137 | 23.7 | 630 |
| Private truck | 11 847 | 43.8 | 35 479 | 53.5 | 4 219 | 46.8 | 42 |
| Rail | 218 | .8 | 385 | .6 | S | S | 857 |
| Water | S | S | S | S | S | S | 100 |
| Air (includes truck and air) | 186 | .7 | S | S | S | S | 1 298 |
| Pipeline[2] | S | S | S | S | S | S | S |
| **Multiple modes** | **547** | **2.0** | **65** | **.1** | **S** | **S** | **629** |
| Parcel, U.S. Postal Service or courier | 467 | 1.7 | S | S | 6 | – | 624 |
| Other multiple modes | 80 | .3 | S | S | S | S | 1 053 |
| **Other and unknown modes** | **217** | **.8** | **147** | **.2** | **S** | **S** | **S** |
| **DIVISION 2.3, GASES TOXIC BY INHALATION** | | | | | | | |
| **Total** | **6 953** | **100.0** | **24 564** | **100.0** | **6 186** | **100.0** | **117** |
| **Single modes** | **6 850** | **98.5** | **24 239** | **98.7** | **6 155** | **99.5** | **117** |
| Truck[1] | 4 911 | 70.6 | 12 574 | 51.2 | 1 702 | 27.5 | 105 |
| For-hire truck | 2 366 | 34.0 | 6 190 | 25.2 | 998 | 16.1 | 212 |
| Private truck | 2 542 | 36.6 | 6 368 | 25.9 | S | S | 60 |
| Rail | 1 169 | 16.8 | 6 090 | 24.8 | 3 226 | 52.2 | 549 |
| Water | S | S | S | S | S | S | 460 |
| Air (includes truck and air) | S | S | S | S | S | S | 610 |
| Pipeline[2] | 624 | 9.0 | 4 685 | 19.1 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **316** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | – | – | 318 |
| Other multiple modes | S | S | S | S | S | S | 1 |
| **Other and unknown modes** | **86** | **1.2** | **S** | **S** | **31** | **.5** | **S** |

See footnotes at end of table.

Table 7a. **Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002**—Con.

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **DIVISION 4.1, FLAMMABLE SOLIDS** | | | | | | | |
| **Total** | **3 229** | **100.0** | **9 214** | **100.0** | **3 123** | **100.0** | **256** |
| **Single modes** | **2 787** | **86.3** | **9 185** | **99.7** | **3 108** | **99.5** | **S** |
| Truck[1] | 2 369 | 73.4 | 5 051 | 54.8 | 513 | 16.4 | S |
| For-hire truck | 321 | 9.9 | 3 442 | 37.4 | 398 | 12.7 | 283 |
| Private truck | 2 048 | 63.4 | 1 609 | 17.5 | 115 | 3.7 | S |
| Rail | S | S | 2 795 | 30.3 | 2 118 | 67.8 | 859 |
| Water | 16 | .5 | 1 263 | 13.7 | S | S | 269 |
| Air (includes truck and air) | S | S | S | S | S | S | 1 974 |
| Pipeline[2] | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **1 023** |
| Parcel, U.S. Postal Service or courier | 41 | 1.3 | 1 | – | 1 | – | 883 |
| Other multiple modes | S | S | S | S | S | S | 4 858 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.2, SPONTANEOUSLY COMBUSTIBLE MATERIALS** | | | | | | | |
| **Total** | **1 849** | **100.0** | **927** | **100.0** | **526** | **100.0** | **108** |
| **Single modes** | **1 750** | **94.7** | **917** | **98.9** | **512** | **97.3** | **84** |
| Truck[1] | 1 552 | 84.0 | 616 | 66.5 | S | S | 82 |
| For-hire truck | S | S | 551 | 59.4 | S | S | 191 |
| Private truck | 474 | 25.6 | 65 | 7.0 | S | S | 41 |
| Rail | 195 | 10.5 | S | S | 250 | 47.5 | 819 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 2 002 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **97** | **5.2** | **6** | **.7** | **S** | **S** | **254** |
| Parcel, U.S. Postal Service or courier | 96 | 5.2 | 6 | .6 | S | S | 254 |
| Other multiple modes | S | S | S | S | S | S | 1 913 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.3, DANGEROUS WHEN WET MATERIALS** | | | | | | | |
| **Total** | **S** | **S** | **1 159** | **100.0** | **S** | **S** | **369** |
| **Single modes** | **S** | **S** | **1 105** | **95.4** | **S** | **S** | **315** |
| Truck[1] | S | S | 1 044 | 90.0 | S | S | 310 |
| For-hire truck | S | S | S | S | S | S | 615 |
| Private truck | 168 | 11.3 | 410 | 35.3 | S | S | 79 |
| Rail | S | S | S | S | S | S | 1 507 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 2 498 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **56** | **3.8** | **S** | **S** | **S** | **S** | **604** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 592 |
| Other multiple modes | S | S | S | S | S | S | 1 081 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 5.1, OXIDIZERS** | | | | | | | |
| **Total** | **4 610** | **100.0** | **11 773** | **100.0** | **3 807** | **100.0** | **398** |
| **Single modes** | **4 475** | **97.1** | **11 403** | **96.9** | **3 598** | **94.5** | **353** |
| Truck[1] | 3 737 | 81.1 | 8 976 | 76.2 | 2 303 | 60.5 | 343 |
| For-hire truck | 1 664 | 36.1 | 5 897 | 50.1 | S | S | 539 |
| Private truck | 2 066 | 44.8 | 3 023 | 25.7 | 278 | 7.3 | 68 |
| Rail | 736 | 16.0 | 2 427 | 20.6 | 1 295 | 34.0 | 623 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | – | – | S | S | 1 071 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **84** | **1.8** | **S** | **S** | **S** | **S** | **1 173** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 1 216 |
| Other multiple modes | 74 | 1.6 | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

## Table 7a. **Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002**—Con.

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **DIVISION 5.2, ORGANIC PEROXIDES** | | | | | | | |
| **Total** | **861** | **100.0** | **S** | **S** | **S** | **S** | **511** |
| **Single modes** | **857** | **99.5** | **S** | **S** | **S** | **S** | **484** |
| Truck[1] | S | S | S | S | S | S | 480 |
| For-hire truck | S | S | S | S | S | S | 574 |
| Private truck | S | S | 14 | 1.5 | 2 | .4 | 77 |
| Rail | S | S | S | S | S | S | 2 245 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 823 |
| Pipeline[2] | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **633** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 633 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **1 208** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

# Table 7b. Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **DIVISION 1.1, EXPLOSIVES WITH A MASS EXPLOSION HAZARD** | | | | | | | | | | | | |
| **Total** | **470** | **1 515** | **–69.0** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **294** | **S** |
| **Single modes** | **458** | **1 509** | **–69.6** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **319** | **S** |
| Truck[1] | 458 | 1 060 | –56.8 | S | 326 | S | S | S | S | S | 316 | S |
| For-hire truck | 337 | 703 | –52.1 | S | 107 | S | S | 65 | S | 849 | 605 | 40.4 |
| Private truck | S | 357 | S | S | S | S | S | S | S | 56 | 152 | –62.8 |
| Rail | – | S | S | – | S | S | – | S | S | – | 1 744 | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | S | – | S | S | – | S | S | – | 177 | – |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **916** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | S | S | 916 | S | S |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **4** | **67** | **–94.6** |
| **DIVISION 1.2, EXPLOSIVES WITH A PROJECTION HAZARD** | | | | | | | | | | | | |
| **Total** | **S** | **S** | **S** | **S** | **16** | **S** | **S** | **15** | **S** | **1 045** | **853** | **22.5** |
| **Single modes** | **S** | **S** | **S** | **S** | **16** | **S** | **S** | **15** | **S** | **1 045** | **838** | **24.6** |
| Truck[1] | S | S | S | S | 16 | S | S | 15 | S | 1 045 | 837 | 24.8 |
| For-hire truck | S | S | S | S | 15 | S | S | 15 | S | 1 045 | 873 | 19.7 |
| Private truck | – | S | S | – | S | S | – | S | S | – | 9 | – |
| Rail | – | – | – | – | – | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | S | – | S | S | – | S | S | – | 1 231 | – |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **1 239** | **–** |
| **DIVISION 1.3, EXPLOSIVES WITH PREDOMINANTLY A FIRE HAZARD** | | | | | | | | | | | | |
| **Total** | **S** | **690** | **S** | **27** | **30** | **–9.5** | **21** | **25** | **–15.9** | **786** | **448** | **75.6** |
| **Single modes** | **S** | **631** | **S** | **27** | **23** | **18.8** | **21** | **21** | **1.4** | **786** | **729** | **7.8** |
| Truck[1] | S | 629 | S | S | 23 | S | 19 | 21 | –9.2 | 779 | 704 | 10.6 |
| For-hire truck | S | 603 | S | S | 20 | S | S | 20 | S | 861 | 949 | –9.3 |
| Private truck | S | 25 | S | S | S | S | S | S | S | 239 | 333 | –28.2 |
| Rail | S | – | S | S | – | S | S | – | S | 836 | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 2 310 | 2 364 | –2.3 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | – | S | S | – | S | S | – | S | S | – | S | S |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **293** | **–** |
| **DIVISION 1.4, EXPLOSIVES WITH NO SIGNIFICANT BLAST HAZARD** | | | | | | | | | | | | |
| **Total** | **5 245** | **2 762** | **89.9** | **597** | **340** | **75.7** | **426** | **235** | **81.5** | **834** | **838** | **–.5** |
| **Single modes** | **5 108** | **2 256** | **126.5** | **587** | **317** | **85.0** | **415** | **216** | **91.7** | **836** | **604** | **38.5** |
| Truck[1] | 5 033 | 1 806 | 178.6 | 586 | 288 | 103.6 | 414 | 180 | 130.0 | 802 | 478 | 67.9 |
| For-hire truck | 4 594 | 1 374 | 234.3 | 564 | 212 | 166.5 | 406 | 157 | 158.3 | 964 | 1 031 | –6.6 |
| Private truck | S | 427 | S | 22 | 76 | –71.0 | S | 23 | S | 243 | 194 | 25.2 |
| Rail | S | S | S | S | S | S | S | S | S | 534 | 1 663 | –67.9 |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | 189 | S | 1 | 1 | –53.4 | S | 1 | S | 2 001 | 1 723 | 16.1 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **136** | **451** | **–70.0** | **S** | **18** | **S** | **S** | **16** | **S** | **835** | **922** | **–9.4** |
| Parcel, U.S. Postal Service or courier | 136 | 448 | –69.7 | S | 18 | S | S | 15 | S | 835 | 922 | –9.4 |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 940 | – |
| **Other and unknown modes** | **S** | **55** | **S** | **S** | **4** | **S** | **S** | **S** | **S** | **S** | **408** | **S** |

See footnotes at end of table.

Table 7b. **Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **DIVISION 1.5, VERY INSENSITIVE EXPLOSIVES, BLASTING AGENT** | | | | | | | | | | | | |
| **Total** | **944** | **260** | **262.4** | **4 325** | **620** | **598.0** | **1 113** | **98** | **S** | **S** | **102** | **S** |
| **Single modes** | **940** | **260** | **261.9** | **4 322** | **616** | **601.5** | **1 113** | **97** | **S** | **S** | **102** | **S** |
| Truck[1] | 888 | 260 | 241.9 | 3 972 | 616 | 544.7 | 768 | 97 | 689.9 | 139 | 102 | 36.4 |
| For-hire truck | 144 | 20 | 615.1 | 960 | 58 | S | 410 | 20 | S | 405 | 334 | 21.5 |
| Private truck | 742 | 240 | 209.7 | S | 558 | S | 358 | S | S | 91 | 92 | –1.0 |
| Rail | 48 | – | – | 350 | – | – | 345 | – | – | 984 | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | – | S | S | – | S | S | – | S | 2 197 | – | – |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **615** | **518** | **18.7** |
| Parcel, U.S. Postal Service or courier | S | – | S | S | – | S | S | – | S | 615 | – | – |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 518 | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **8** | **104** | **–92.6** |
| **DIVISION 2.1, FLAMMABLE GASES** | | | | | | | | | | | | |
| **Total** | **39 955** | **28 773** | **38.9** | **122 465** | **80 861** | **51.5** | **22 064** | **11 124** | **98.4** | **96** | **54** | **77.3** |
| **Single modes** | **39 626** | **27 494** | **44.1** | **121 749** | **79 181** | **53.8** | **21 795** | **10 908** | **99.8** | **95** | **51** | **86.1** |
| Truck[1] | 16 998 | 11 599 | 46.5 | 44 031 | 26 838 | 64.1 | 5 295 | 2 616 | 102.4 | 81 | 44 | 84.1 |
| For-hire truck | 6 241 | 3 946 | 58.2 | 18 571 | 13 013 | 42.7 | 3 651 | 1 741 | 109.7 | 461 | 364 | 26.7 |
| Private truck | 10 757 | 7 531 | 42.8 | 25 460 | 13 544 | 88.0 | 1 643 | 855 | 92.2 | 27 | 22 | 23.1 |
| Rail | 7 579 | 2 961 | 156.0 | 22 755 | 8 608 | 164.3 | 13 061 | 5 401 | 141.8 | 659 | 604 | 9.2 |
| Water | 1 528 | 1 084 | 41.0 | 6 206 | 4 205 | 47.6 | 1 248 | 1 086 | 14.9 | 226 | 317 | –28.7 |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 1 549 | 2 816 | –45.0 |
| Pipeline[2] | 13 463 | 11 850 | 13.6 | 48 740 | 39 530 | 23.3 | S | S | S | S | S | S |
| **Multiple modes** | **122** | **219** | **–44.1** | **530** | **479** | **10.7** | **262** | **100** | **161.7** | **805** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | 23 | S | S | 2 | S | S | 1 | S | 715 | 602 | 18.8 |
| Other multiple modes | 76 | 196 | –61.1 | 529 | 478 | 10.6 | 260 | 99 | 162.9 | S | 142 | S |
| **Other and unknown modes** | **S** | **1 061** | **S** | **186** | **1 201** | **–84.5** | **8** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 2.2, NONFLAMMABLE, NONTOXIC COMPRESSED GASES** | | | | | | | | | | | | |
| **Total** | **27 024** | **12 597** | **114.5** | **66 329** | **34 109** | **94.5** | **9 012** | **5 451** | **65.3** | **92** | **61** | **51.0** |
| **Single modes** | **26 260** | **11 959** | **119.6** | **66 118** | **32 849** | **101.3** | **8 918** | **5 306** | **68.1** | **83** | **50** | **64.4** |
| Truck[1] | 25 111 | 10 606 | 136.8 | 40 261 | 28 207 | 42.7 | 6 540 | 3 359 | 94.7 | 81 | 47 | 72.1 |
| For-hire truck | 13 254 | 4 467 | 196.7 | 4 598 | 2 924 | 57.3 | 2 137 | 850 | 151.5 | 630 | 457 | 37.8 |
| Private truck | 11 847 | 6 111 | 93.9 | 35 479 | 25 218 | 40.7 | 4 219 | 2 465 | 71.2 | 42 | 30 | 41.5 |
| Rail | 218 | 253 | –13.9 | 385 | 453 | –15.1 | S | 283 | S | 857 | 682 | 25.5 |
| Water | S | S | S | S | S | S | S | S | S | 100 | 1 401 | –92.8 |
| Air (includes truck and air) | 186 | 475 | –60.8 | S | 4 | S | S | 3 | S | 1 298 | 1 221 | 6.3 |
| Pipeline[2] | S | 437 | S | S | 4 075 | S | S | S | S | S | S | S |
| **Multiple modes** | **547** | **270** | **102.5** | **65** | **S** | **S** | **S** | **23** | **S** | **629** | **406** | **54.9** |
| Parcel, U.S. Postal Service or courier | 467 | 246 | 90.1 | S | S | S | 6 | S | S | 624 | 406 | 53.6 |
| Other multiple modes | 80 | 24 | 227.3 | S | S | S | S | S | S | 1 053 | S | S |
| **Other and unknown modes** | **217** | **368** | **–41.0** | **147** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 2.3, GASES TOXIC BY INHALATION** | | | | | | | | | | | | |
| **Total** | **6 953** | **5 918** | **17.5** | **24 564** | **22 168** | **10.8** | **6 186** | **9 426** | **–34.4** | **117** | **91** | **28.8** |
| **Single modes** | **6 850** | **5 698** | **20.2** | **24 239** | **20 622** | **17.5** | **6 155** | **9 354** | **–34.2** | **117** | **125** | **–6.3** |
| Truck[1] | 4 911 | 2 384 | 106.0 | 12 574 | 7 473 | 68.3 | 1 702 | 1 324 | 28.5 | 105 | 72 | 45.2 |
| For-hire truck | 2 366 | 1 244 | 90.2 | 6 190 | 4 287 | 44.4 | 998 | S | S | 212 | 184 | 15.0 |
| Private truck | 2 542 | 1 122 | 126.6 | 6 368 | 3 111 | 104.7 | S | 271 | S | 60 | 46 | 30.0 |
| Rail | 1 169 | 2 765 | –57.7 | 6 090 | 8 868 | –31.3 | 3 226 | 6 736 | –52.1 | 549 | 764 | –28.1 |
| Water | S | 224 | S | S | 2 161 | S | S | 869 | S | 460 | 1 024 | –55.0 |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 610 | 1 103 | –44.7 |
| Pipeline[2] | 624 | 322 | 93.5 | 4 685 | 2 120 | 121.0 | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **316** | **788** | **–59.9** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | – | S | – | S | S | 318 | 790 | –59.8 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 1 | 477 | –99.7 |
| **Other and unknown modes** | **86** | **212** | **–59.5** | **S** | **S** | **S** | **31** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

# Table 7b. **Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **DIVISION 4.1, FLAMMABLE SOLIDS** | | | | | | | | | | | | |
| **Total** | **3 229** | **2 001** | **61.4** | **9 214** | **10 137** | **–9.1** | **3 123** | **8 446** | **–63.0** | **256** | **880** | **–70.9** |
| **Single modes** | **2 787** | **1 864** | **49.5** | **9 185** | **10 037** | **–8.5** | **3 108** | **8 338** | **–62.7** | **S** | **775** | **S** |
| Truck[1] | 2 369 | 1 575 | 50.4 | 5 051 | 3 718 | 35.8 | 513 | 488 | 5.3 | S | 682 | S |
| For-hire truck | 321 | 971 | –67.0 | 3 442 | 2 917 | 18.0 | 398 | 415 | –4.2 | 283 | 417 | –32.1 |
| Private truck | 2 048 | 593 | 245.1 | 1 609 | 599 | 168.7 | 115 | 67 | 72.4 | S | 943 | S |
| Rail | S | 232 | S | 2 795 | 5 904 | –52.7 | 2 118 | 7 815 | –72.9 | 859 | 1 391 | –38.2 |
| Water | 16 | S | S | 1 263 | S | S | S | S | S | 269 | 108 | 148.4 |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 1 974 | 1 408 | 40.2 |
| Pipeline[2] | S | S | S | S | 390 | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **1 023** | **1 010** | **1.3** |
| Parcel, U.S. Postal Service or courier | 41 | S | S | 1 | 6 | –86.8 | 1 | 5 | –85.4 | 883 | 1 007 | –12.4 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 4 858 | 1 657 | 193.2 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **426** | **S** |
| **DIVISION 4.2, SPONTANEOUSLY COMBUSTIBLE MATERIALS** | | | | | | | | | | | | |
| **Total** | **1 849** | **1 098** | **68.4** | **927** | **956** | **–3.0** | **526** | **785** | **–32.9** | **108** | **165** | **–34.5** |
| **Single modes** | **1 750** | **1 086** | **61.2** | **917** | **949** | **–3.5** | **512** | **780** | **–34.3** | **84** | **172** | **–51.3** |
| Truck[1] | 1 552 | 597 | 160.1 | 616 | 560 | 10.1 | S | 167 | S | 82 | 137 | –39.7 |
| For-hire truck | S | 401 | S | 551 | 385 | 42.9 | S | 133 | S | 191 | 335 | –42.9 |
| Private truck | 474 | 196 | 142.4 | 65 | 174 | –63.0 | S | 35 | S | 41 | 62 | –34.0 |
| Rail | 195 | 489 | –60.2 | S | 390 | S | 250 | 613 | –59.1 | 819 | 1 559 | –47.5 |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | – | S | S | – | S | 2 002 | 1 167 | 71.5 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **97** | **S** | **S** | **6** | **S** | **S** | **S** | **S** | **S** | **254** | **303** | **–16.2** |
| Parcel, U.S. Postal Service or courier | 96 | S | S | 6 | S | S | S | S | S | 254 | 264 | –3.8 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 1 913 | 1 806 | 6.0 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **7** | **S** |
| **DIVISION 4.3, DANGEROUS WHEN WET MATERIALS** | | | | | | | | | | | | |
| **Total** | **S** | **1 140** | **S** | **1 159** | **S** | **S** | **S** | **505** | **S** | **369** | **477** | **–22.6** |
| **Single modes** | **S** | **1 068** | **S** | **1 105** | **S** | **S** | **S** | **493** | **S** | **315** | **295** | **7.0** |
| Truck[1] | S | 930 | S | 1 044 | S | S | S | 282 | S | 310 | 284 | 9.2 |
| For-hire truck | S | 667 | S | S | 525 | S | S | 195 | S | 615 | 508 | 21.1 |
| Private truck | 168 | 261 | –35.8 | 410 | S | S | S | S | S | 79 | 241 | –67.0 |
| Rail | S | 135 | S | S | 184 | S | S | 211 | S | 1 507 | 940 | 60.4 |
| Water | – | S | S | – | S | S | – | S | S | – | 228 | – |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 2 498 | 1 351 | 84.9 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **56** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **604** | **1 825** | **–66.9** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | S | S | 592 | 1 829 | –67.7 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 1 081 | 1 433 | –24.6 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **40** | **S** |
| **DIVISION 5.1, OXIDIZERS** | | | | | | | | | | | | |
| **Total** | **4 610** | **4 153** | **11.0** | **11 773** | **9 148** | **28.7** | **3 807** | **4 412** | **–13.7** | **398** | **185** | **114.9** |
| **Single modes** | **4 475** | **4 039** | **10.8** | **11 403** | **8 935** | **27.6** | **3 598** | **4 332** | **–16.9** | **353** | **169** | **108.7** |
| Truck[1] | 3 737 | 2 922 | 27.9 | 8 976 | 5 750 | 56.1 | 2 303 | 1 511 | 52.4 | 343 | 154 | 122.6 |
| For-hire truck | 1 664 | 1 774 | –6.2 | 5 897 | 2 897 | 103.5 | S | 1 126 | S | 539 | 487 | 10.8 |
| Private truck | 2 066 | 1 138 | 81.5 | 3 023 | 2 845 | 6.3 | 278 | 384 | –27.7 | 68 | 55 | 22.4 |
| Rail | 736 | 1 115 | –34.0 | 2 427 | 3 182 | –23.7 | 1 295 | 2 820 | –54.1 | 623 | 870 | –28.4 |
| Water | – | S | S | – | S | S | – | S | S | – | S | S |
| Air (includes truck and air) | S | S | S | – | – | S | S | S | S | 1 071 | 814 | 31.5 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **84** | **35** | **138.9** | **S** | **S** | **S** | **S** | **S** | **S** | **1 173** | **439** | **167.2** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | – | S | 1 216 | 427 | 184.6 |
| Other multiple modes | 74 | S | S | S | S | S | S | S | S | S | 2 359 | S |
| **Other and unknown modes** | **S** | **79** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **75** | **S** |

See footnotes at end of table.

## Table 7b. **Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| **DIVISION 5.2, ORGANIC PEROXIDES** | | | | | | | | | | | | |
| **Total** | **861** | **332** | **159.1** | **S** | **92** | **S** | **S** | **60** | **S** | **511** | **324** | **58.0** |
| **Single modes** | **857** | **324** | **164.4** | **S** | **89** | **S** | **S** | **57** | **S** | **484** | **329** | **47.1** |
| Truck[1] | S | 324 | S | S | 89 | S | S | 57 | S | 480 | 287 | 67.2 |
| For-hire truck | S | 195 | S | S | 57 | S | S | 37 | S | 574 | 531 | 8.2 |
| Private truck | S | 116 | S | 14 | 26 | –48.1 | 2 | S | S | 77 | 160 | –51.6 |
| Rail | S | – | S | S | – | S | S | – | S | 2 245 | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 823 | 2 424 | –66.1 |
| Pipeline[2] | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **633** | **353** | **79.3** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | S | S | 633 | 344 | 83.9 |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 1 718 | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **1 208** | **37** | **S** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

# Table 7c. Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 1.1, EXPLOSIVES WITH A MASS EXPLOSION HAZARD** | | | | | | |
| **Total** | **100.0** | **100.0** | **S** | **S** | **S** | **S** |
| **Single modes** | **97.5** | **99.6** | **S** | **S** | **S** | **S** |
| Truck[1] | 97.5 | 69.9 | S | 45.6 | S | S |
| For-hire truck | 71.7 | 46.4 | S | 15.0 | S | 7.2 |
| Private truck | S | 23.5 | S | S | S | S |
| Rail | – | S | – | S | – | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | – | S | – | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 1.2, EXPLOSIVES WITH A PROJECTION HAZARD** | | | | | | |
| **Total** | **S** | **S** | **S** | **100.0** | **S** | **100.0** |
| **Single modes** | **S** | **S** | **S** | **99.9** | **S** | **99.8** |
| Truck[1] | S | S | S | 99.5 | S | 99.4 |
| For-hire truck | S | S | S | 98.1 | S | 99.4 |
| Private truck | – | S | – | S | – | S |
| Rail | – | – | – | – | – | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | – | S | – | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **–** | **S** | **–** | **S** |
| **DIVISION 1.3, EXPLOSIVES WITH PREDOMINANTLY A FIRE HAZARD** | | | | | | |
| **Total** | **S** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **S** | **91.5** | **100.0** | **76.1** | **100.0** | **83.0** |
| Truck[1] | S | 91.1 | S | 76.1 | 89.5 | 82.9 |
| For-hire truck | S | 87.4 | S | 66.7 | S | 81.0 |
| Private truck | S | 3.7 | S | S | S | S |
| Rail | S | – | S | – | S | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **–** | **S** | **–** | **S** | **–** | **S** |
| Parcel, U.S. Postal Service or courier | – | S | – | S | – | S |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **–** | **S** | **–** | **S** |
| **DIVISION 1.4, EXPLOSIVES WITH NO SIGNIFICANT BLAST HAZARD** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.4** | **81.7** | **98.4** | **93.4** | **97.5** | **92.3** |
| Truck[1] | 96.0 | 65.4 | 98.3 | 84.8 | 97.1 | 76.7 |
| For-hire truck | 87.6 | 49.7 | 94.6 | 62.3 | 95.4 | 67.0 |
| Private truck | S | 15.5 | 3.7 | 22.5 | S | 9.6 |
| Rail | S | S | S | S | S | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | 6.9 | – | .3 | S | .4 |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **2.6** | **16.3** | **S** | **5.3** | **S** | **6.7** |
| Parcel, U.S. Postal Service or courier | 2.6 | 16.2 | S | 5.2 | S | 6.4 |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **2.0** | **S** | **1.3** | **S** | **S** |

See footnotes at end of table.

## Table 7c. Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 1.5, VERY INSENSITIVE EXPLOSIVES, BLASTING AGENT** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **99.6** | **99.7** | **99.9** | **99.4** | **100.0** | **99.4** |
| Truck[1] | 94.1 | 99.7 | 91.8 | 99.4 | 69.0 | 99.4 |
| For-hire truck | 15.2 | 7.7 | 22.2 | 9.3 | 36.8 | 20.1 |
| Private truck | 78.6 | 92.0 | S | 90.1 | 32.1 | S |
| Rail | 5.1 | – | 8.1 | – | 31.0 | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | – | S | – | S | – |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | – | S | – | S | – |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 2.1, FLAMMABLE GASES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **99.2** | **95.6** | **99.4** | **97.9** | **98.8** | **98.1** |
| Truck[1] | 42.5 | 40.3 | 36.0 | 33.2 | 24.0 | 23.5 |
| For-hire truck | 15.6 | 13.7 | 15.2 | 16.1 | 16.5 | 15.7 |
| Private truck | 26.9 | 26.2 | 20.8 | 16.7 | 7.4 | 7.7 |
| Rail | 19.0 | 10.3 | 18.6 | 10.6 | 59.2 | 48.6 |
| Water | 3.8 | 3.8 | 5.1 | 5.2 | 5.7 | 9.8 |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline[2] | 33.7 | 41.2 | 39.8 | 48.9 | S | S |
| **Multiple modes** | **.3** | **.8** | **.4** | **.6** | **1.2** | **.9** |
| Parcel, U.S. Postal Service or courier | S | – | S | – | S | – |
| Other multiple modes | .2 | .7 | .4 | .6 | 1.2 | .9 |
| **Other and unknown modes** | **S** | **3.7** | **.2** | **1.5** | **–** | **S** |
| **DIVISION 2.2, NONFLAMMABLE, NONTOXIC COMPRESSED GASES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.2** | **94.9** | **99.7** | **96.3** | **99.0** | **97.3** |
| Truck[1] | 92.9 | 84.2 | 60.7 | 82.7 | 72.6 | 61.6 |
| For-hire truck | 49.0 | 35.5 | 6.9 | 8.6 | 23.7 | 15.6 |
| Private truck | 43.8 | 48.5 | 53.5 | 73.9 | 46.8 | 45.2 |
| Rail | .8 | 2.0 | .6 | 1.3 | S | 5.2 |
| Water | S | S | S | S | S | S |
| Air (includes truck and air) | .7 | 3.8 | S | – | S | – |
| Pipeline[2] | S | 3.5 | S | 11.9 | S | S |
| **Multiple modes** | **2.0** | **2.1** | **.1** | **S** | **S** | **.4** |
| Parcel, U.S. Postal Service or courier | 1.7 | 2.0 | S | S | – | S |
| Other multiple modes | .3 | .2 | S | S | S | S |
| **Other and unknown modes** | **.8** | **2.9** | **.2** | **S** | **S** | **S** |
| **DIVISION 2.3, GASES TOXIC BY INHALATION** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **98.5** | **96.3** | **98.7** | **93.0** | **99.5** | **99.2** |
| Truck[1] | 70.6 | 40.3 | 51.2 | 33.7 | 27.5 | 14.1 |
| For-hire truck | 34.0 | 21.0 | 25.2 | 19.3 | 16.1 | S |
| Private truck | 36.6 | 19.0 | 25.9 | 14.0 | S | 2.9 |
| Rail | 16.8 | 46.7 | 24.8 | 40.0 | 52.2 | 71.5 |
| Water | S | 3.8 | S | 9.7 | S | 9.2 |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline[2] | 9.0 | 5.4 | 19.1 | 9.6 | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | – | – | S |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **1.2** | **3.6** | **S** | **S** | **.5** | **S** |

See footnotes at end of table.

# Table 7c. Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 4.1, FLAMMABLE SOLIDS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **86.3** | **93.2** | **99.7** | **99.0** | **99.5** | **98.7** |
| Truck[1] | 73.4 | 78.7 | 54.8 | 36.7 | 16.4 | 5.8 |
| For-hire truck | 9.9 | 48.5 | 37.4 | 28.8 | 12.7 | 4.9 |
| Private truck | 63.4 | 29.7 | 17.5 | 5.9 | 3.7 | .8 |
| Rail | S | 11.6 | 30.3 | 58.2 | 67.8 | 92.5 |
| Water | .5 | S | 13.7 | S | S | S |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline[2] | S | S | S | 3.8 | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 1.3 | S | – | – | – | – |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.2, SPONTANEOUSLY COMBUSTIBLE MATERIALS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **94.7** | **98.9** | **98.9** | **99.3** | **97.3** | **99.4** |
| Truck[1] | 84.0 | 54.3 | 66.5 | 58.6 | S | 21.3 |
| For-hire truck | S | 36.5 | 59.4 | 40.3 | S | 16.9 |
| Private truck | 25.6 | 17.8 | 7.0 | 18.3 | S | 4.4 |
| Rail | 10.5 | 44.5 | S | 40.8 | 47.5 | 78.1 |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | – | S | – |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **5.2** | **S** | **.7** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 5.2 | S | .6 | S | S | S |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.3, DANGEROUS WHEN WET MATERIALS** | | | | | | |
| **Total** | **S** | **100.0** | **100.0** | **S** | **S** | **100.0** |
| **Single modes** | **S** | **93.7** | **95.4** | **S** | **S** | **97.6** |
| Truck[1] | S | 81.6 | 90.0 | S | S | 55.8 |
| For-hire truck | S | 58.5 | S | 14.0 | S | 38.7 |
| Private truck | 11.3 | 22.9 | 35.3 | S | S | S |
| Rail | S | 11.8 | S | 4.9 | S | 41.8 |
| Water | – | S | – | S | – | S |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **3.8** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 5.1, OXIDIZERS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.1** | **97.3** | **96.9** | **97.7** | **94.5** | **98.2** |
| Truck[1] | 81.1 | 70.4 | 76.2 | 62.9 | 60.5 | 34.3 |
| For-hire truck | 36.1 | 42.7 | 50.1 | 31.7 | S | 25.5 |
| Private truck | 44.8 | 27.4 | 25.7 | 31.1 | 7.3 | 8.7 |
| Rail | 16.0 | 26.9 | 20.6 | 34.8 | 34.0 | 63.9 |
| Water | – | S | – | S | – | S |
| Air (includes truck and air) | S | S | – | – | S | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **1.8** | **.8** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | – |
| Other multiple modes | 1.6 | S | S | S | S | S |
| **Other and unknown modes** | **S** | **1.9** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

## Table 7c. Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 5.2, ORGANIC PEROXIDES** | | | | | | |
| **Total** | **100.0** | **100.0** | **S** | **100.0** | **S** | **100.0** |
| **Single modes** | **99.5** | **97.5** | **S** | **97.3** | **S** | **95.5** |
| Truck[1] | S | 97.5 | S | 97.3 | S | 95.5 |
| For-hire truck | S | 58.8 | S | 61.9 | S | 61.9 |
| Private truck | S | 35.0 | 1.5 | 28.8 | .4 | S |
| Rail | S | – | S | – | S | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

# Table 8. Hazardous Material Shipment Characteristics by Selected UN Numbers and Mode of Transportation: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1], description, and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **UN 1066, NITROGEN, COMPRESSED** | | | | | | | |
| **Total** | **2 121** | **100.0** | **20 276** | **100.0** | **S** | **S** | **84** |
| **Single modes** | **2 108** | **99.4** | **20 266** | **100.0** | **S** | **S** | **82** |
| Truck[2] | 1 965 | 92.6 | 15 779 | 77.8 | 2 128 | 95.8 | 82 |
| For-hire truck | S | S | S | S | S | S | 566 |
| Private truck | 1 089 | 51.3 | 14 389 | 71.0 | S | S | 55 |
| Rail | S | S | S | S | S | S | 471 |
| Water | S | S | S | S | S | S | 6 |
| Air (includes truck and air) | S | S | S | S | S | S | 2 564 |
| Pipeline[3] | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **1 296** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 1 296 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **43** |
| **UN 1072, OXYGEN, COMPRESSED** | | | | | | | |
| **Total** | **2 813** | **100.0** | **S** | **S** | **S** | **S** | **S** |
| **Single modes** | **2 789** | **99.2** | **S** | **S** | **S** | **S** | **S** |
| Truck[2] | 2 475 | 88.0 | S | S | S | S | S |
| For-hire truck | S | S | S | S | 94 | 5.2 | 295 |
| Private truck | 1 182 | 42.0 | 6 828 | 30.9 | S | S | 36 |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 1 616 |
| Pipeline[3] | S | S | S | S | S | S | S |
| **Multiple modes** | **2** | **–** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S |
| Other multiple modes | S | S | S | S | S | S | 39 |
| **Other and unknown modes** | **22** | **.8** | **S** | **S** | **S** | **S** | **16** |
| **UN 1075, PETROLEUM GASES** | | | | | | | |
| **Total** | **19 046** | **100.0** | **58 802** | **100.0** | **11 928** | **100.0** | **47** |
| **Single modes** | **18 794** | **98.7** | **58 158** | **98.9** | **11 665** | **97.8** | **47** |
| Truck[2] | 11 375 | 59.7 | 30 426 | 51.7 | 4 227 | 35.4 | 40 |
| For-hire truck | 3 643 | 19.1 | 13 761 | 23.4 | S | S | 241 |
| Private truck | 7 733 | 40.6 | 16 664 | 28.3 | 1 417 | 11.9 | 24 |
| Rail | 3 574 | 18.8 | 12 291 | 20.9 | 6 091 | 51.1 | 671 |
| Water | 137 | .7 | 546 | .9 | 158 | 1.3 | 286 |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | 3 708 | 19.5 | 14 895 | 25.3 | S | S | S |
| **Multiple modes** | **77** | **.4** | **529** | **.9** | **260** | **2.2** | **1 009** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S |
| Other multiple modes | 76 | .4 | 529 | .9 | 260 | 2.2 | S |
| **Other and unknown modes** | **S** | **S** | **116** | **.2** | **4** | **–** | **S** |
| **UN 1202, GAS OIL, DIESEL FUEL, HEATING OIL, LIGHT** | | | | | | | |
| **Total** | **27 335** | **100.0** | **128 942** | **100.0** | **12 217** | **100.0** | **41** |
| **Single modes** | **26 553** | **97.1** | **125 075** | **97.0** | **10 254** | **83.9** | **37** |
| Truck[2] | 10 972 | 40.1 | 44 803 | 34.7 | 3 004 | 24.6 | 36 |
| For-hire truck | 4 204 | 15.4 | 17 856 | 13.8 | S | S | 99 |
| Private truck | 6 762 | 24.7 | 26 916 | 20.9 | 880 | 7.2 | 23 |
| Rail | S | S | S | S | S | S | 634 |
| Water | S | S | S | S | S | S | S |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | 10 775 | 39.4 | 53 000 | 41.1 | S | S | S |
| **Multiple modes** | **419** | **1.5** | **2 045** | **1.6** | **S** | **S** | **1 964** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 269 |
| Other multiple modes | 418 | 1.5 | 2 045 | 1.6 | S | S | 2 014 |
| **Other and unknown modes** | **S** | **S** | **1 822** | **1.4** | **S** | **S** | **S** |

See footnotes at end of table.

# Table 8. **Hazardous Material Shipment Characteristics by Selected UN Numbers and Mode of Transportation: 2002**—Con.

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1], description, and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **UN 1203, GASOLINE** | | | | | | | |
| **Total** | **269 796** | **100.0** | **1 009 262** | **100.0** | **108 979** | **100.0** | **57** |
| **Single modes** | **266 038** | **98.6** | **999 558** | **99.0** | **105 243** | **96.6** | **50** |
| Truck[2] | 173 810 | 64.4 | 606 724 | 60.1 | 36 443 | 33.4 | 49 |
| For-hire truck | 62 819 | 23.3 | 217 391 | 21.5 | 17 223 | 15.8 | 89 |
| Private truck | 108 255 | 40.1 | 382 329 | 37.9 | 18 603 | 17.1 | 35 |
| Rail | 759 | .3 | 5 083 | .5 | 2 389 | 2.2 | 349 |
| Water | 13 647 | 5.1 | 67 172 | 6.7 | 29 631 | 27.2 | S |
| Air (includes truck and air) | S | S | S | S | S | S | 1 921 |
| Pipeline[3] | 77 821 | 28.8 | 320 579 | 31.8 | S | S | S |
| **Multiple modes** | **1 436** | **.5** | **3 099** | **.3** | **1 993** | **1.8** | **518** |
| Parcel, U.S. Postal Service or courier | 595 | .2 | 32 | – | 13 | – | 492 |
| Other multiple modes | 841 | .3 | 3 067 | .3 | 1 980 | 1.8 | 1 233 |
| **Other and unknown modes** | **2 322** | **.9** | **6 605** | **.7** | **S** | **S** | **S** |
| **UN 1824, SODIUM HYDROXIDE SOLUTION** | | | | | | | |
| **Total** | **5 470** | **100.0** | **23 829** | **100.0** | **9 840** | **100.0** | **203** |
| **Single modes** | **5 342** | **97.7** | **23 122** | **97.0** | **9 226** | **93.8** | **190** |
| Truck[2] | 3 834 | 70.1 | 9 390 | 39.4 | 2 102 | 21.4 | 172 |
| For-hire truck | 1 773 | 32.4 | 5 168 | 21.7 | 1 426 | 14.5 | 438 |
| Private truck | 2 061 | 37.7 | 4 222 | 17.7 | S | S | 61 |
| Rail | 1 028 | 18.8 | 8 158 | 34.2 | 4 839 | 49.2 | 554 |
| Water | 391 | 7.1 | 4 955 | 20.8 | 2 278 | 23.1 | 476 |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | 89 | 1.6 | 618 | 2.6 | S | S | S |
| **Multiple modes** | **80** | **1.5** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 45 | .8 | 5 | – | S | S | 413 |
| Other multiple modes | S | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **120** |
| **UN 1863, FUEL, AVIATION, TURBINE ENGINE** | | | | | | | |
| **Total** | **16 193** | **100.0** | **76 631** | **100.0** | **9 735** | **100.0** | **97** |
| **Single modes** | **16 074** | **99.3** | **76 068** | **99.3** | **9 714** | **99.8** | **96** |
| Truck[2] | 2 582 | 15.9 | 11 618 | 15.2 | 750 | 7.7 | 62 |
| For-hire truck | 1 435 | 8.9 | 5 996 | 7.8 | 495 | 5.1 | 85 |
| Private truck | 1 147 | 7.1 | 5 622 | 7.3 | 255 | 2.6 | 41 |
| Rail | 893 | 5.5 | 4 397 | 5.7 | 1 816 | 18.7 | 413 |
| Water | 1 398 | 8.6 | 7 161 | 9.3 | 3 560 | 36.6 | 450 |
| Air (includes truck and air) | S | S | S | S | S | S | 1 852 |
| Pipeline[3] | 11 201 | 69.2 | 52 893 | 69.0 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S |
| Other multiple modes | S | S | S | S | S | S | 1 033 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **5** |
| **UN 1964,HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.** | | | | | | | |
| **Total** | **4 174** | **100.0** | **21 495** | **100.0** | **3 537** | **100.0** | **164** |
| **Single modes** | **4 148** | **99.4** | **21 443** | **99.8** | **3 534** | **99.9** | **170** |
| Truck[2] | 611 | 14.6 | S | S | 302 | 8.5 | 124 |
| For-hire truck | 280 | 6.7 | 1 077 | 5.0 | S | S | S |
| Private truck | S | S | S | S | S | S | 39 |
| Rail | 701 | 16.8 | 2 434 | 11.3 | 2 393 | 67.7 | 977 |
| Water | S | S | S | S | S | S | 191 |
| Air (includes truck and air) | S | S | S | S | S | S | 2 307 |
| Pipeline[3] | 2 313 | 55.4 | 8 684 | 40.4 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **467** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 467 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **21** | **.5** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

# Table 8. **Hazardous Material Shipment Characteristics by Selected UN Numbers and Mode of Transportation: 2002**—Con.

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1], description, and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| **UN 1993, FLAMMABLE LIQUIDS, N.O.S.** | | | | | | | |
| **Total** | **94 820** | **100.0** | **428 729** | **100.0** | **46 788** | **100.0** | **52** |
| **Single modes** | **92 769** | **97.8** | **419 079** | **97.7** | **44 169** | **94.4** | **45** |
| Truck[2] | 56 224 | 59.3 | 230 517 | 53.8 | 17 310 | 37.0 | 41 |
| For-hire truck | 18 436 | 19.4 | 71 730 | 16.7 | 7 238 | 15.5 | 162 |
| Private truck | 37 628 | 39.7 | 158 336 | 36.9 | 9 965 | 21.3 | 25 |
| Rail | 1 613 | 1.7 | 6 472 | 1.5 | 4 471 | 9.6 | 759 |
| Water | 10 827 | 11.4 | 56 945 | 13.3 | 11 526 | 24.6 | S |
| Air (includes truck and air) | 9 | – | S | S | S | S | 2 476 |
| Pipeline[3] | 24 096 | 25.4 | 125 145 | 29.2 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **1 110** |
| Parcel, U.S. Postal Service or courier | 54 | – | 4 | – | S | S | 1 219 |
| Other multiple modes | S | S | S | S | S | S | S |
| **Other and unknown modes** | **697** | **.7** | **3 181** | **.7** | **61** | **.1** | **14** |
| **UN 3257, ELEVATED TEMPERATURE LIQUID, N.O.S.** | | | | | | | |
| **Total** | **6 287** | **100.0** | **42 378** | **100.0** | **12 384** | **100.0** | **174** |
| **Single modes** | **6 240** | **99.3** | **41 909** | **98.9** | **12 244** | **98.9** | **174** |
| Truck[2] | 4 216 | 67.1 | 26 898 | 63.5 | 3 368 | 27.2 | 119 |
| For-hire truck | 2 896 | 46.1 | 17 673 | 41.7 | 2 242 | 18.1 | 120 |
| Private truck | 1 320 | 21.0 | 9 225 | 21.8 | 1 126 | 9.1 | 116 |
| Rail | 1 168 | 18.6 | 9 068 | 21.4 | 6 998 | 56.5 | 885 |
| Water | S | S | 5 943 | 14.0 | S | S | 398 |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **315** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – |
| Other multiple modes | S | S | S | S | S | S | 315 |
| **Other and unknown modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| **ALL OTHER** | | | | | | | |
| **Total** | **212 126** | **100.0** | **359 091** | **100.0** | **107 304** | **100.0** | **256** |
| **Single modes** | **203 633** | **96.0** | **351 815** | **98.0** | **101 838** | **94.9** | **193** |
| Truck[2] | 151 567 | 71.5 | 167 952 | 46.8 | 39 894 | 37.2 | 152 |
| For-hire truck | 92 151 | 43.4 | 97 035 | 27.0 | 30 583 | 28.5 | 464 |
| Private truck | 59 154 | 27.9 | 70 580 | 19.7 | 9 073 | 8.5 | 52 |
| Rail | 21 403 | 10.1 | 60 498 | 16.8 | 42 571 | 39.7 | 712 |
| Water | 14 419 | 6.8 | 56 950 | 15.9 | 16 155 | 15.1 | 240 |
| Air (includes truck and air) | 1 620 | .8 | 60 | – | 76 | – | 2 066 |
| Pipeline[3] | 14 624 | 6.9 | 66 356 | 18.5 | S | S | S |
| **Multiple modes** | **6 195** | **2.9** | **5 717** | **1.6** | **5 006** | **4.7** | **882** |
| Parcel, U.S. Postal Service or courier | 3 565 | 1.7 | 201 | – | 101 | – | 869 |
| Other multiple modes | 2 630 | 1.2 | 5 516 | 1.5 | 4 905 | 4.6 | 1 770 |
| **Other and unknown modes** | **2 299** | **1.1** | **1 559** | **.4** | **461** | **.4** | **97** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.
[2]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[3]Estimates for pipeline exclude shipments of crude petroleum.

## Table 9a. Hazardous Material Shipment Characteristics by For-Hire Truck for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **189 803** | **100.0** | **449 503** | **100.0** | **65 112** | **100.0** | **285** |
| 1005 | Ammonia, anhydrous | 926 | .5 | 4 881 | 1.1 | 563 | .9 | S |
| 1075 | Petroleum, gases | 3 643 | 1.9 | 13 761 | 3.1 | S | S | 241 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 4 204 | 2.2 | 17 856 | 4.0 | S | S | 99 |
| 1203 | Gasoline | 62 819 | 33.1 | 217 391 | 48.4 | 17 223 | 26.5 | 89 |
| 1263 | Paint including paint, lacquer, enamel, stain | 16 838 | 8.9 | 4 731 | 1.1 | 2 340 | 3.6 | 434 |
| 1268 | Petroleum distillates, n.o.s. | 1 924 | 1.0 | 3 999 | .9 | 397 | .6 | 252 |
| 1760 | Corrosive liquids, n.o.s. | 2 196 | 1.2 | 2 734 | .6 | 1 300 | 2.0 | 584 |
| 1824 | Sodium hydroxide solution | 1 773 | .9 | 5 168 | 1.1 | 1 426 | 2.2 | 438 |
| 1830 | Sulfuric acid | 621 | .3 | 4 834 | 1.1 | 880 | 1.4 | 245 |
| 1863 | Fuel, aviation, turbine engine | 1 435 | .8 | 5 996 | 1.3 | 495 | .8 | 85 |
| 1942 | Ammonium nitrate, with not more than 0.2 percent total | S | S | S | S | S | S | 180 |
| 1987 | Alcohols, n.o.s. | 1 879 | 1.0 | 3 232 | .7 | 612 | .9 | 480 |
| 1993 | Flammable liquids, n.o.s. | 18 436 | 9.7 | 71 730 | 16.0 | 7 238 | 11.1 | 162 |
| 1999 | Tars, liquid | 1 009 | .5 | 6 888 | 1.5 | S | S | 142 |
| 2448 | Sulfur, molten | 62 | – | 3 037 | .7 | 195 | .3 | 64 |
| 2794 | Batteries, wet, filled with acid, electric storage | 3 013 | 1.6 | 2 483 | .6 | S | S | 473 |
| 2924 | Flammable liquids, corrosive, n.o.s. | 162 | – | S | S | S | S | S |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 2 008 | 1.1 | 2 908 | .6 | 1 026 | 1.6 | 424 |
| 3257 | Elevated temperature liquid, n.o.s. | 2 896 | 1.5 | 17 673 | 3.9 | 2 242 | 3.4 | 120 |
| 3264 | Corrosive liquid, acidic, inorganic, n.o.s. | 1 593 | .8 | S | S | S | S | 441 |
| | All other | 61 890 | 32.6 | 50 341 | 11.2 | 19 230 | 29.5 | 510 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

## Table 9b. Hazardous Material Shipment Characteristics by Private Truck for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **226 660** | **100.0** | **702 186** | **100.0** | **44 087** | **100.0** | **38** |
| 0332 | Explosive, blasting, type E or agent blasting, type E | 667 | .3 | S | S | 333 | .8 | 95 |
| 1005 | Ammonia, anhydrous | 640 | .3 | 2 810 | .4 | S | S | S |
| 1006 | Argon, compressed | 2 150 | .9 | 5 387 | .8 | S | S | S |
| 1013 | Carbon dioxide | 966 | .4 | S | S | S | S | 46 |
| 1017 | Chlorine | 1 301 | .6 | S | S | S | S | 83 |
| 1066 | Nitrogen, compressed | 1 089 | .5 | 14 389 | 2.0 | S | S | 55 |
| 1072 | Oxygen, compressed | 1 182 | .5 | 6 828 | 1.0 | S | S | 36 |
| 1075 | Petroleum gases | 7 733 | 3.4 | 16 664 | 2.4 | 1 417 | 3.2 | 24 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 6 762 | 3.0 | 26 916 | 3.8 | 880 | 2.0 | 23 |
| 1203 | Gasoline | 108 255 | 47.8 | 382 329 | 54.4 | 18 603 | 42.2 | 35 |
| 1223 | Kerosene | 1 479 | .7 | 5 987 | .9 | 246 | .6 | 16 |
| 1263 | Paint including paint, lacquer, enamel, stain | 8 793 | 3.9 | 3 316 | .5 | 331 | .7 | 37 |
| 1267 | Petorleum crude oil | S | S | S | S | S | S | 75 |
| 1789 | Hydrochloric acid | 634 | .3 | 2 475 | .4 | 226 | .5 | 87 |
| 1824 | Sodium hydroxide solution | 2 061 | .9 | 4 222 | .6 | S | S | 61 |
| 1863 | Fuel, aviation, turbine engine | 1 147 | .5 | 5 622 | .8 | 255 | .6 | 41 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | 39 |
| 1993 | Flammable liquids, n.o.s. | 37 628 | 16.6 | 158 336 | 22.5 | 9 965 | 22.6 | 25 |
| 3077 | Environmentally hazardous substance, solid, n.o.s. | S | S | S | S | S | S | 225 |
| 3257 | Elevated temperature liquid, n.o.s. | 1 320 | .6 | 9 225 | 1.3 | 1 126 | 2.6 | 116 |
| | All other | 39 088 | 17.2 | 28 385 | 4.0 | 3 713 | 8.4 | 59 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

## Table 9c. Hazardous Material Shipment Characteristics by Rail for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **31 339** | **100.0** | **109 369** | **100.0** | **72 087** | **100.0** | **695** |
| 1010 | Butadienes, stablilized | S | S | S | S | S | S | 715 |
| 1017 | Chlorine | 371 | 1.2 | 3 626 | 3.3 | 1 951 | 2.7 | 556 |
| 1055 | Isobutylene see also petroleum gases, liquefied | S | S | S | S | S | S | 243 |
| 1075 | Petroleum, gases | 3 574 | 11.4 | 12 291 | 11.2 | 6 091 | 8.4 | 671 |
| 1086 | Vinyl chloride, stablized | 576 | 1.8 | 1 554 | 1.4 | 1 020 | 1.4 | 651 |
| 1203 | Gasoline | 759 | 2.4 | 5 083 | 4.6 | 2 389 | 3.3 | 349 |
| 1230 | Methanol | S | S | S | S | S | S | 1 089 |
| 1268 | Petroleum distillates, n.o.s. | 589 | 1.9 | 1 662 | 1.5 | 1 287 | 1.8 | 726 |
| 1805 | Phosphoric acid, liquid | 534 | 1.7 | 1 588 | 1.5 | 1 748 | 2.4 | 1 152 |
| 1824 | Sodium hydroxide solution | 1 028 | 3.3 | 8 158 | 7.5 | 4 839 | 6.7 | 554 |
| 1830 | Sulfuric acid | 138 | .4 | S | S | S | S | 377 |
| 1863 | Fuel, aviation, turbine engine | 893 | 2.8 | 4 397 | 4.0 | 1 816 | 2.5 | 413 |
| 1910 | Calcium oxide | S | S | S | S | S | S | 904 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 701 | 2.2 | 2 434 | 2.2 | 2 393 | 3.3 | 977 |
| 1987 | Alcohols, n.o.s. | 1 138 | 3.6 | 3 085 | 2.8 | 2 711 | 3.8 | 866 |
| 1993 | Flammable liquids, n.o.s. | 1 613 | 5.1 | 6 472 | 5.9 | 4 471 | 6.2 | 759 |
| 1999 | Tars, liquid | 246 | .8 | 1 618 | 1.5 | S | S | 523 |
| 2448 | Sulfur, molten | S | S | 2 452 | 2.2 | 1 859 | 2.6 | 876 |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 1 447 | 4.6 | 2 049 | 1.9 | 1 704 | 2.4 | 901 |
| 3257 | Elevated temperature liquid, n.o.s. | 1 168 | 3.7 | 9 068 | 8.3 | 6 998 | 9.7 | 885 |
| | All other | 14 169 | 45.2 | 31 339 | 28.7 | 22 437 | 31.1 | 725 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

## Table 9d. Hazardous Material Shipment Characteristics by Water for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **46 856** | **100.0** | **228 197** | **100.0** | **70 649** | **100.0** | **S** |
| 1010 | Butadienes, stablilized | S | S | S | S | 604 | .9 | S |
| 1114 | Benzene | 2 559 | 5.5 | 6 095 | 2.7 | 645 | .9 | 110 |
| 1145 | Cyclohexane | S | S | S | S | S | S | 179 |
| 1202 | Gas oil, diesel fuel, heating oil, light | S | S | S | S | S | S | S |
| 1203 | Gasoline | 13 647 | 29.1 | 67 172 | 29.4 | 29 631 | 41.9 | S |
| 1223 | Kerosene | 395 | .8 | 2 074 | .9 | 403 | .6 | 287 |
| 1230 | Methanol | S | S | S | S | S | S | S |
| 1268 | Petroleum distillates, n.o.s. | 420 | .9 | 2 456 | 1.1 | S | S | S |
| 1270 | Petroleum oil | S | S | S | S | S | S | 1 307 |
| 1307 | Xylenes | 422 | .9 | 1 247 | .5 | S | S | S |
| 1824 | Sodium hydroxide solution | 391 | .8 | 4 955 | 2.2 | 2 278 | 3.2 | 476 |
| 1830 | Sulfuric acid | S | S | 2 579 | 1.1 | 454 | .6 | 185 |
| 1863 | Fuel, aviation, turbine engine | 1 398 | 3.0 | 7 161 | 3.1 | 3 560 | 5.0 | 450 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | 191 |
| 1993 | Flammable liquids, n.o.s. | 10 827 | 23.1 | 56 945 | 25.0 | 11 526 | 16.3 | S |
| 1999 | Tars, liquid | S | S | S | S | S | S | S |
| 2398 | Methyl tert-butyl ether | S | S | S | S | S | S | 86 |
| 2448 | Sulfur, molten | 16 | – | 1 263 | .6 | S | S | 269 |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 1 092 | 2.3 | 2 303 | 1.0 | S | S | 632 |
| 3257 | Elevated temperature liquid, n.o.s. | S | S | 5 943 | 2.6 | S | S | 398 |
| | All other | 5 366 | 11.5 | 16 716 | 7.3 | 6 482 | 9.2 | 277 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

## Table 9e. Hazardous Material Shipment Characteristics by Air (Includes Truck and Air) for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **1 643** | **100.0** | **64** | **100.0** | **85** | **100.0** | **2 080** |
| 0012 | Cartridges for weapons, inert projectile or cartridges, small arms | S | S | S | S | S | S | 2 006 |
| 0186 | Rocket motors | S | S | S | S | S | S | 2 310 |
| 1057 | Lighters or lighter refills containing flammable gas | S | S | S | S | S | S | 371 |
| 1072 | Oxygen, compressed | S | S | S | S | S | S | 1 616 |
| 1197 | Extracts, flavoring liquid | 3 | .2 | S | S | S | S | 1 205 |
| 1648 | Acetonitrile | S | S | S | S | S | S | 2 789 |
| 1760 | Corrosive liquids, n.o.s. | S | S | S | S | S | S | 1 916 |
| 1845 | Carbon dioxide, solid or dry ice | S | S | S | S | S | S | 2 184 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | 2 307 |
| 1993 | Flammable liquids, n.o.s. | 9 | .6 | S | S | S | S | 2 476 |
| 2047 | Dichloropropenes | S | S | S | S | S | S | 2 698 |
| 2283 | Isobutyl methacrylate, stabilized | S | S | S | S | S | S | 2 905 |
| 2794 | Batteries, wet, filled with acid, electric storage | S | S | S | S | S | S | 1 429 |
| 2811 | Toxic solids, organic, n.o.s. | S | S | S | S | S | S | 2 831 |
| 2915 | Radioactive material, type A package nonspecified | S | S | S | S | S | S | 1 959 |
| 3166 | Engines, internal combustion, flammable gas powered | S | S | S | S | S | S | 1 434 |
| 3178 | Flammable solid, inorganic, n.o.s. | S | S | S | S | S | S | 1 970 |
| 3268 | Air bag inflators, or air bag modules, seat-belt pretensioners | S | S | S | S | S | S | 1 363 |
| 3295 | Hydrocarbons, liquids, n.o.s. | S | S | S | S | S | S | 2 731 |
| 3316 | Chemical kits | S | S | S | S | S | S | 1 710 |
| | All other | 659 | 40.1 | 5 | 7.4 | 8 | 9.2 | 2 002 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

## Table 9f. Hazardous Material Shipment Characteristics by Pipeline for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **145 021** | **100.0** | **661 390** | **100.0** | **58 914** | **100.0** | **37** |
| 1005 | Ammonia, anhydrous | S | S | S | S | S | S | 278 |
| 1011 | Butane | 481 | .3 | 2 486 | .4 | S | S | 54 |
| 1013 | Carbon dioxide | S | S | S | S | S | S | S |
| 1066 | Nitrogen, compressed | S | S | S | S | S | S | 22 |
| 1072 | Oxygen, compressed | S | S | S | S | S | S | 85 |
| 1075 | Petroleum gases | 3 708 | 2.6 | 14 895 | 2.3 | 1 188 | 2.0 | S |
| 1077 | Propylene | 1 521 | 1.0 | 4 724 | .7 | 42 | – | S |
| 1114 | Benzene | S | S | S | S | S | S | S |
| 1202 | Gas oil, diesel fuel, heating oil, light | 10 775 | 7.4 | 53 000 | 8.0 | 1 739 | 3.0 | 201 |
| 1203 | Gasoline | 77 821 | 53.7 | 320 579 | 48.5 | 36 780 | 62.4 | 57 |
| 1223 | Kerosene | S | S | S | S | S | S | S |
| 1230 | Methanol | S | S | S | S | S | S | 4 |
| 1830 | Sulfuric acid | S | S | 1 775 | .3 | 6 | – | 4 |
| 1863 | Fuel, aviation, turbine engine | 11 201 | 7.7 | 52 893 | 8.0 | 3 588 | 6.1 | S |
| 1962 | Ethylene | 3 908 | 2.7 | 10 802 | 1.6 | 455 | .8 | 46 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 2 313 | 1.6 | 8 684 | 1.3 | S | S | S |
| 1965 | Hydrocarbon gas mixture, liquefied, n.o.s. | 471 | .3 | S | S | S | S | 12 |
| 1993 | Flammable liquids, n.o.s. | 24 096 | 16.6 | 125 145 | 18.9 | 10 859 | 18.4 | 23 |
| 2398 | Methyl tert-butyl ether | 511 | .4 | 1 920 | .3 | 8 | – | 4 |
| 3295 | Hydrocarbons, liquid, n.o.s. | S | S | S | S | S | S | 7 |
| | All other | 2 639 | 1.8 | 12 559 | 1.9 | S | S | 38 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

## Table 10. **Shipment Characteristics by Selected Commodities for Hazardous Materials for the United States: 2002**

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| SCTG code[1] | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Hazardous | | | Hazardous | | | Hazardous | |
| | | Total (million dollars) | 2002 (million dollars) | Percent | Total (thousands) | 2002 (thousands) | Percent | Total (millions) | 2002 (millions) | Percent |
| | **Total** | **8 397 210** | **660 181** | **7.9** | **11 667 919** | **2 191 519** | **18.8** | **3 137 898** | **326 727** | **10.4** |
| 17 | Gasoline and aviation turbine fuel | 279 407 | 279 407 | 100.0 | 1 063 569 | 1 063 569 | 100.0 | 117 219 | 117 219 | 100.0 |
| 18 | Fuel oils | 116 119 | 116 119 | 100.0 | 549 007 | 549 007 | 100.0 | 55 464 | 55 464 | 100.0 |
| 19 | Coal and petroleum products, n.e.c. | 82 130 | 41 855 | 51.0 | 447 975 | 199 735 | 44.6 | 93 001 | 40 959 | 44.0 |
| 20 | Basic chemicals | 153 656 | 84 087 | 54.7 | 347 670 | 273 077 | 78.5 | 115 961 | 72 552 | 62.6 |
| 22 | Fertilizers | 34 049 | 5 587 | 16.4 | 264 319 | 27 987 | 10.6 | 87 605 | 8 376 | 9.6 |
| 23 | Chemical products and preparations, n.e.c. | 226 598 | 53 008 | 23.4 | 105 962 | 34 891 | 32.9 | 53 657 | 14 324 | 26.7 |
| | All other SCTG codes | 7 505 251 | 80 118 | 1.1 | 8 889 416 | 43 253 | .5 | 2 614 990 | 17 833 | .7 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]SCTG codes were selected based on estimated tons without regard to sampling variability.

Note: Percentages represent the proportion of hazardous materials to the two-digit commodity total.

## Table 11a. **Hazardous Material Shipment Characteristics by Selected Commodities for the United States: 2002**

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| SCTG code[1] | Commodity description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** | **136** |
| 17 | Gasoline and aviation turbine fuel | 279 407 | 42.3 | 1 063 569 | 48.5 | 117 219 | 35.9 | 52 |
| 18 | Fuel oils | 116 119 | 17.6 | 549 007 | 25.1 | 55 464 | 17.0 | 32 |
| 19 | Coal and petroleum products, n.e.c. | 41 855 | 6.3 | 199 735 | 9.1 | 40 959 | 12.5 | 64 |
| 20 | Basic chemicals | 84 087 | 12.7 | 273 077 | 12.5 | 72 552 | 22.2 | 223 |
| 22 | Fertilizers | 5 587 | .8 | 27 987 | 1.3 | 8 376 | 2.6 | 142 |
| 23 | Chemical products and preparations, n.e.c. | 53 008 | 8.0 | 34 891 | 1.6 | 14 324 | 4.4 | 326 |
| | All other SCTG codes | 80 118 | 12.1 | 43 253 | 2.0 | 17 833 | 5.5 | 221 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]SCTG codes were selected based on estimated tons without regard to sampling variability.

Note: Percentages represent the proportion of hazardous materials by two-digit commodity to total hazardous material shipments.

## Table 11b. Hazardous Material Shipment Characteristics by Selected Commodities for the United States: 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| SCTG code | Commodity description | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change | 2002 (millions) | 1997 (millions) | Percent change | 2002 | 1997 | Percent change |
| | **Total** | **660 181** | **526 679** | **25.3** | **2 191 519** | **1 783 620** | **22.9** | **326 727** | **294 823** | **10.8** | **136** | **110** | **23.7** |
| 17 | Gasoline and aviation turbine fuel | 279 407 | 217 862 | 28.2 | 1 063 569 | 871 449 | 22.0 | 117 219 | 101 890 | 15.0 | 52 | 45 | 13.9 |
| 18 | Fuel oils | 116 119 | 93 112 | 24.7 | 549 007 | 473 869 | 15.9 | 55 464 | 48 476 | 14.4 | 32 | 28 | 11.7 |
| 19 | Coal and petroleum products, n.e.c. | 41 855 | 31 951 | 31.0 | 199 735 | 157 065 | 27.2 | 40 959 | 29 528 | 38.7 | 64 | 53 | 20.5 |
| 20 | Basic chemicals | 84 087 | 83 770 | .4 | 273 077 | 205 042 | 33.2 | 72 552 | 83 771 | –13.4 | 223 | 123 | 81.3 |
| 22 | Fertilizers | 5 587 | 5 212 | 7.2 | 27 987 | 25 711 | 8.9 | 8 376 | 9 836 | –14.8 | 142 | 128 | 10.5 |
| 23 | Chemical products and preparations, n.e.c. | 53 008 | 36 918 | 43.6 | 34 891 | 19 800 | 76.2 | 14 324 | 8 664 | 65.3 | 326 | 202 | 61.3 |
| | All other SCTG codes | 80 118 | 57 854 | 38.5 | 43 253 | 30 683 | 41.0 | 17 833 | 12 657 | 40.9 | 221 | 311 | –28.7 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]SCTG codes were selected based on estimated tons without regard to sampling variability.

Note: Percentages represent the proportion of hazardous materials by two-digit commodity to total hazardous material shipments.

## Table 11c. Hazardous Material Shipment Characteristics by Selected Commodities for the United States: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| SCTG code[1] | Commodity description | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|---|
| | | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| | **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 17 | Gasoline and aviation turbine fuel | 42.3 | 41.4 | 48.5 | 48.9 | 35.9 | 34.6 |
| 18 | Fuel oils | 17.6 | 17.7 | 25.1 | 26.6 | 17.0 | 16.4 |
| 19 | Coal and petroleum products, n.e.c. | 6.3 | 6.1 | 9.1 | 8.8 | 12.5 | 10.0 |
| 20 | Basic chemicals | 12.7 | 15.9 | 12.5 | 11.5 | 22.2 | 28.4 |
| 22 | Fertilizers | .8 | 1.0 | 1.3 | 1.4 | 2.6 | 3.3 |
| 23 | Chemical products and preparations, n.e.c. | 8.0 | 7.0 | 1.6 | 1.1 | 4.4 | 2.9 |
| | All other SCTG codes | 12.1 | 11.0 | 2.0 | 1.7 | 5.5 | 4.3 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]SCTG codes were selected based on estimated tons without regard to sampling variability.

Note: Percentages represent the proportion of hazardous materials by two-digit commodity to total hazardous material shipments.

## Table 12a. Hazardous Material Shipment Characteristics by Truck for Intrastate Versus Interstate for Selected Commodities for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| SCTG code[1] | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Intrastate (percent) | Interstate (percent) | 2002 (thousands) | Intrastate (percent) | Interstate (percent) | 2002 (millions) | Intrastate (percent) | Interstate (percent) |
| | **Total** | **419 630** | **68.6** | **31.4** | **1 159 514** | **81.4** | **18.6** | **110 163** | **34.9** | **65.1** |
| 17 | Gasoline and aviation turbine fuel | 171 999 | 88.4 | 11.6 | 604 113 | 87.7 | 12.3 | 36 561 | 52.6 | 47.4 |
| 18 | Fuel oils | 63 853 | 87.9 | 12.1 | 275 702 | 86.7 | 13.3 | 19 408 | 41.5 | 58.5 |
| 19 | Coal and petroleum products, n.e.c. | 22 225 | 72.3 | 27.7 | 99 030 | 73.9 | 26.1 | 10 693 | 41.3 | 58.7 |
| 20 | Basic chemicals | 38 495 | 47.8 | 52.2 | 101 783 | 62.9 | 37.1 | 19 314 | 19.8 | 80.2 |
| 22 | Fertilizers | 3 743 | 67.8 | 32.2 | 18 172 | 68.4 | 31.6 | 2 890 | S | 76.2 |
| 23 | Chemical products and preparations, n.e.c. | 49 520 | 35.6 | 64.4 | 31 305 | 39.7 | 60.3 | 11 780 | 8.6 | 91.4 |
| | All other SCTG codes | 69 795 | 36.1 | 63.9 | 29 409 | 42.8 | 57.2 | 9 515 | 12.7 | 87.3 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]SCTG codes were selected based on estimated tons without regard to sampling variability.

Note: Truck as a single mode includes shipments by private truck only for-hire truck only or a combination of private truck and for-hire truck.

Note: For purposes of this table, individual shipment data are classified as either completely "interstate" or completely "intrastate." All shipments with the state of destination different than the state of origin are classified as "interstate." All shipments having the state of origin the same as the state of destination are classified as "intrastate."

## Table 12b. Hazardous Material Shipment Characteristics by For-Hire Truck for Intrastate Versus Interstate for Selected Commodities for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| SCTG code[1] | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Intrastate (percent) | Interstate (percent) | 2002 (thousands) | Intrastate (percent) | Interstate (percent) | 2002 (millions) | Intrastate (percent) | Interstate (percent) |
| | **Total** | **189 803** | **52.5** | **47.5** | **449 503** | **75.9** | **24.1** | **65 112** | **23.6** | **76.4** |
| 17 | Gasoline and aviation turbine fuel | 62 840 | 88.1 | 11.9 | 221 265 | 87.4 | 12.6 | 17 477 | 40.7 | 59.3 |
| 18 | Fuel oils | 19 432 | 82.4 | 17.6 | 86 417 | 82.7 | 17.3 | 8 421 | 31.2 | 68.8 |
| 19 | Coal and petroleum products, n.e.c. | 9 442 | 53.7 | 46.3 | 46 979 | 58.7 | 41.3 | 7 226 | 29.1 | 70.9 |
| 20 | Basic chemicals | 25 560 | 33.1 | 66.9 | 47 938 | 62.5 | 37.5 | 12 792 | 13.9 | 86.1 |
| 22 | Fertilizers | 2 258 | 57.8 | 42.2 | 12 327 | 63.3 | 36.7 | 2 394 | S | 76.9 |
| 23 | Chemical products and preparations, n.e.c. | 36 093 | 23.3 | 76.7 | 21 207 | 25.4 | 74.6 | 10 465 | 5.2 | 94.8 |
| | All other SCTG codes | 34 178 | 14.5 | 85.5 | 13 370 | 40.5 | 59.5 | 6 338 | 10.0 | 90.0 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]SCTG codes were selected based on estimated tons without regard to sampling variability.

Note: For purposes of this table, individual shipment data are classified as either completely "interstate" or completely "intrastate." All shipments with the state of destination different than the state of origin are classified as "interstate." All shipments having the state of origin the same as the state of destination are classified as "intrastate."

## Table 12c. Hazardous Material Shipment Characteristics by Private Truck for Intrastate Versus Interstate for Selected Commodities for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| SCTG code[1] | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Intrastate (percent) | Interstate (percent) | 2002 (thousands) | Intrastate (percent) | Interstate (percent) | 2002 (millions) | Intrastate (percent) | Interstate (percent) |
| | **Total** | **226 660** | **81.9** | **18.1** | **702 186** | **84.9** | **15.1** | **44 087** | **51.8** | **48.2** |
| 17 | Gasoline and aviation turbine fuel | 106 424 | 88.4 | 11.6 | 375 843 | 87.8 | 12.2 | 18 467 | 64.5 | 35.5 |
| 18 | Fuel oils | 44 264 | 90.5 | 9.5 | 188 806 | 88.7 | 11.3 | 10 880 | 49.9 | 50.1 |
| 19 | Coal and petroleum products, n.e.c. | 12 782 | 86.1 | 13.9 | 52 051 | 87.6 | 12.4 | 3 467 | 66.8 | 33.2 |
| 20 | Basic chemicals | 12 922 | 77.0 | 23.0 | 53 661 | 63.4 | 36.6 | 6 339 | 32.1 | 67.9 |
| 22 | Fertilizers | 1 472 | 83.5 | 16.5 | 5 761 | 79.7 | 20.3 | 473 | 27.7 | 72.3 |
| 23 | Chemical products and preparations, n.e.c. | 13 410 | 68.9 | 31.1 | 10 092 | 69.8 | 30.2 | 1 315 | 35.0 | 65.0 |
| | All other SCTG codes | 35 385 | 57.0 | 43.0 | 15 971 | 44.7 | S | 3 147 | 18.2 | 81.8 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]SCTG codes were selected based on estimated tons without regard to sampling variability.

Note: For purposes of this table, individual shipment data are classified as either completely "interstate" or completely "intrastate." All shipments with the state of destination different than the state of origin are classified as "interstate." All shipments having the state of origin the same as the state of destination are classified as "intrastate."

## Table 13a. Hazardous Material Shipment Characteristics by Truck for Intrastate Versus Interstate for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Intrastate (percent) | Interstate (percent) | 2002 (thousands) | Intrastate (percent) | Interstate (percent) | 2002 (millions) | Intrastate (percent) | Interstate (percent) |
| | **Total** | **419 630** | **68.6** | **31.4** | **1 159 514** | **81.4** | **18.6** | **110 163** | **34.9** | **65.1** |
| 1005 | Ammonia, anhydrous | 1 566 | 85.8 | 14.2 | 7 691 | 84.3 | 15.7 | 757 | S | 44.1 |
| 1006 | Argon, compressed | 2 526 | 80.9 | 19.1 | 6 029 | 81.6 | 18.4 | 637 | 41.0 | S |
| 1013 | Carbon dioxide | 1 177 | 58.3 | 41.7 | S | 43.0 | S | S | S | S |
| 1066 | Nitrogen, compressed | 1 965 | 34.2 | S | 15 779 | 47.7 | S | 2 128 | 15.8 | S |
| 1072 | Oxygen, compressed | 2 475 | 49.0 | S | 7 256 | 63.4 | S | 634 | 23.2 | S |
| 1075 | Petroleum gases | 11 375 | 70.0 | 30.0 | 30 426 | 72.2 | 27.8 | 4 227 | 38.2 | S |
| 1202 | Gas oil, diesel fuel, heating oil, light | 10 972 | 91.5 | 8.5 | 44 803 | 91.3 | 8.7 | 3 004 | 43.4 | S |
| 1203 | Gasoline | 173 810 | 88.2 | 11.8 | 606 724 | 87.9 | 12.1 | 36 443 | 52.9 | 47.1 |
| 1223 | Kerosene | 1 646 | 87.5 | S | 6 653 | 87.3 | S | 292 | 75.5 | 24.5 |
| 1263 | Paint including paint, lacquer, enamel stain | 25 635 | 38.7 | 61.3 | 8 048 | 41.9 | 58.1 | 2 671 | 12.8 | 87.2 |
| 1268 | Petroleum distillates, n.o.s. | 3 920 | 64.4 | 35.6 | 5 451 | 83.6 | 16.4 | 524 | 47.2 | 52.8 |
| 1824 | Sodium hydroxide solution | 3 834 | 56.4 | S | 9 390 | 63.3 | 36.7 | 2 102 | 31.1 | 68.9 |
| 1830 | Sulfuric acid | 843 | 56.9 | 43.1 | 5 817 | 77.9 | 22.1 | 963 | 30.4 | 69.6 |
| 1863 | Fuel, aviation, turbine engine | 2 582 | 83.9 | 16.1 | 11 618 | 83.3 | 16.7 | 750 | 48.8 | 51.2 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 611 | 89.5 | 10.5 | S | S | S | 302 | 49.2 | S |
| 1993 | Flammable liquids, n.o.s. | 56 224 | 83.8 | 16.2 | 230 517 | 85.2 | 14.8 | 17 310 | 38.9 | 61.1 |
| 1999 | Tars, liquid | 1 201 | 52.4 | S | 7 830 | 57.4 | S | S | 26.6 | S |
| 3077 | Environmentally hazardous substance, solid, n.o.s. | S | 18.0 | S | S | 18.7 | S | S | 8.1 | S |
| 3257 | Elevated temperature liquid, n.o.s. | 4 216 | 64.6 | 35.4 | 26 898 | 65.9 | 34.1 | 3 368 | 44.7 | 55.3 |
| 3264 | Corrosive liquid, acidic, inorganic, n.o.s. | 1 692 | 15.6 | 84.4 | S | S | S | S | S | S |
| | All other | 107 676 | 37.3 | 62.7 | 100 347 | 56.0 | 44.0 | 28 034 | 13.4 | 86.6 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

Note: Truck as a single mode includes shipments by private truck only for-hire truck only or a combination of private truck and for-hire truck.

Note: For purposes of this table, individual shipment data are classified as either completely "interstate" or completely "intrastate." All shipments with the state of destination different than the state of origin are classified as "interstate." All shipments having the state of origin the same as the state of destination are classified as "intrastate."

## Table 13b. Hazardous Material Shipment Characteristics by For-Hire Truck for Intrastate Versus Interstate for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Intrastate (percent) | Interstate (percent) | 2002 (thousands) | Intrastate (percent) | Interstate (percent) | 2002 (millions) | Intrastate (percent) | Interstate (percent) |
| | **Total** | **189 803** | **52.5** | **47.5** | **449 503** | **75.9** | **24.1** | **65 112** | **23.6** | **76.4** |
| 1005 | Ammonia, anhydrous | 926 | S | 15.8 | 4 881 | S | 16.0 | 563 | S | 30.1 |
| 1075 | Petroleum gases | 3 643 | 50.3 | S | 13 761 | 52.4 | S | S | 19.9 | S |
| 1202 | Gas oil, diesel fuel, heating oil, light | 4 204 | 87.2 | 12.8 | 17 856 | 88.5 | 11.5 | S | 29.6 | S |
| 1203 | Gasoline | 62 819 | 87.0 | 13.0 | 217 391 | 87.3 | 12.7 | 17 223 | 40.2 | 59.8 |
| 1263 | Paint | 16 838 | S | 73.3 | 4 731 | S | 72.5 | 2 340 | S | 91.4 |
| 1268 | Petroleum distillates, n.o.s. | 1 924 | 56.8 | S | 3 999 | S | 17.0 | 397 | 41.7 | 58.3 |
| 1760 | Corrosive liquids, n.o.s. | 2 196 | 23.0 | 77.0 | 2 734 | 24.8 | 75.2 | 1 300 | 5.4 | 94.6 |
| 1824 | Sodium hydroxide solution | 1 773 | 25.5 | S | 5 168 | 54.6 | 45.4 | 1 426 | 16.5 | 83.5 |
| 1830 | Sulfuric acid | 621 | 52.6 | S | 4 834 | 80.2 | 19.8 | 880 | 29.3 | 70.7 |
| 1863 | Fuel, aviation, turbine engine | 1 435 | 88.2 | 11.8 | 5 996 | 88.1 | 11.9 | 495 | 51.0 | S |
| 1942 | Ammonium nitrate, with not more than 0.2 percent total | S | S | S | S | S | S | S | 15.1 | S |
| 1987 | Alcohols, n.o.s. | 1 879 | 41.7 | 58.3 | 3 232 | 58.6 | 41.4 | 612 | 27.8 | 72.2 |
| 1993 | Flammable liquids, n.o.s. | 18 436 | 73.3 | 26.7 | 71 730 | 80.2 | 19.8 | 7 238 | 28.7 | 71.3 |
| 1999 | Tars, liquids | 1 009 | 46.7 | S | 6 888 | 53.6 | S | S | 25.6 | S |
| 2448 | Sulfur, molten | 62 | 85.5 | 14.5 | 3 037 | 81.2 | 18.8 | 195 | 59.3 | 40.7 |
| 2794 | Batteries, wet, filled with acid | 3 013 | S | 81.0 | 2 483 | S | 77.7 | S | S | S |
| 2924 | Flammable liquids, corrosive, n.o.s. | 162 | S | 54.6 | S | S | 1.4 | S | S | 41.4 |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 2 008 | 19.1 | 80.9 | 2 908 | 24.8 | 75.2 | 1 026 | 4.7 | 95.3 |
| 3257 | Elevated temperature liquid, n.o.s. | 2 896 | 64.8 | 35.2 | 17 673 | 66.4 | 33.6 | 2 242 | 45.6 | 54.4 |
| 3264 | Corrosive liquid, acidic, inorganic, n.o.s. | 1 593 | 11.9 | 88.1 | S | S | S | S | S | S |
| | All other | 61 890 | 19.9 | 80.1 | 50 341 | 44.5 | 55.5 | 19 230 | 8.0 | 92.0 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

Note: For purposes of this table, individual shipment data are classified as either completely "interstate" or completely "intrastate." All shipments with the state of destination different than the state of origin are classified as "interstate." All shipments having the state of origin the same as the state of destination are classified as "intrastate."

## Table 13c. Hazardous Material Shipment Characteristics by Private Truck for Intrastate Versus Interstate for Selected UN Numbers for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| UN number[1] | Description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Intrastate (percent) | Interstate (percent) | 2002 (thousands) | Intrastate (percent) | Interstate (percent) | 2002 (millions) | Intrastate (percent) | Interstate (percent) |
| | **Total** | **226 660** | **81.9** | **18.1** | **702 186** | **84.9** | **15.1** | **44 087** | **51.8** | **48.2** |
| 0332 | Explosive, blasting, type E or Agent blasting, Type E | 667 | 76.3 | 23.7 | S | S | 18.3 | 333 | 52.4 | 47.6 |
| 1005 | Ammonia, anhydrous | 640 | 88.1 | S | 2 810 | 84.8 | S | S | S | S |
| 1006 | Argon, compressed | 2 150 | 84.4 | 15.6 | 5 387 | 83.6 | 16.4 | S | S | S |
| 1013 | Carbon dioxide | 966 | 57.0 | 43.0 | S | 42.8 | S | S | S | S |
| 1017 | Chlorine | 1 301 | S | 8.0 | S | S | S | S | S | S |
| 1066 | Nitrogen, compressed | 1 089 | 50.3 | 49.7 | 14 389 | 46.0 | S | S | 19.8 | S |
| 1072 | Oxygen, compressed | 1 182 | 78.3 | 21.7 | 6 828 | 64.1 | S | S | 25.4 | S |
| 1075 | Petroleum gases | 7 733 | 79.3 | 20.7 | 16 664 | 88.5 | 11.5 | 1 417 | S | 25.7 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 6 762 | 94.2 | 5.8 | 26 916 | 93.1 | 6.9 | 880 | 76.6 | 23.4 |
| 1203 | Gasoline | 108 255 | 88.7 | 11.3 | 382 329 | 88.2 | 11.8 | 18 603 | 65.2 | 34.8 |
| 1223 | Kerosene | 1 479 | 89.5 | S | 5 987 | 89.0 | S | 246 | 82.6 | S |
| 1263 | Paint including paint, lacquer, enamel, stain | 8 793 | 61.6 | S | 3 316 | 62.5 | S | 331 | 42.5 | 57.5 |
| 1267 | Petroleum crude oil | S | S | – | S | S | – | S | S | – |
| 1789 | Hydrochloric acid | 634 | 68.6 | 31.4 | 2 475 | S | 14.4 | 226 | S | 48.5 |
| 1824 | Sodium hydroxide solution | 2 061 | 83.0 | 17.0 | 4 222 | 74.0 | 26.0 | S | S | S |
| 1863 | Fuel, aviation, turbine engine | 1 147 | 78.5 | S | 5 622 | 78.2 | S | 255 | 44.5 | 55.5 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | S | S | S |
| 1993 | Flammable liquids, n.o.s. | 37 628 | 89.1 | 10.9 | 158 336 | 87.5 | 12.5 | 9 965 | 46.6 | 53.4 |
| 3077 | Environmentally hazardous substance, solid, n.o.s. | S | S | S | S | 3.0 | S | S | S | S |
| 3257 | Elevated temperature liquid, n.o.s. | 1 320 | 64.0 | 36.0 | 9 225 | 64.8 | 35.2 | 1 126 | 43.0 | 57.0 |
| | All other | 39 088 | 65.7 | 34.3 | 28 385 | 70.3 | 29.7 | 3 713 | 30.6 | 69.4 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]UN numbers were selected based on estimated tons without regard to sampling variability.

Note: For purposes of this table, individual shipment data are classified as either completely "interstate" or completely "intrastate." All shipments with the state of destination different than the state of origin are classified as "interstate." All shipments having the state of origin the same as the state of destination are classified as "intrastate."

## Table 14a. Hazardous Material Shipment Characteristics for Toxic by Inhalation (TIH) for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent |
| **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** |
| Toxic by inhalation | 6 947 | 1.1 | 25 806 | 1.2 | 6 404 | 2.0 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: Toxic by inhalation (TIH) gases and volatile liquids that are toxic when inhaled.

## Table 14b. Hazardous Material Shipment Characteristics for Toxic by Inhalation (TIH) for the United States: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Description | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| Toxic by inhalation | 1.1 | 1.4 | 1.2 | 1.3 | 2.0 | 3.5 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: Toxic by inhalation (TIH) gases and volatile liquids that are toxic when inhaled.

## Table 15a. Hazardous Material Shipment Characteristics for Packing Group I for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent |
| **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** |
| Packing group I | 177 392 | 26.9 | 577 058 | 26.3 | 80 162 | 24.5 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: Packing Groups I, II, and III reflect the level of hazard associated with the material being shipped. Packing Group I is the most rigorous.

## Table 15b. Hazardous Material Shipment Characteristics for Packing Group I for the United States: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Description | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| Packing group I | 26.9 | 28.9 | 26.3 | 28.0 | 24.5 | 24.8 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: Packing Groups I, II, and III reflect the level of hazard associated with the material being shipped. Packing Group I is the most rigorous.

## Table 16a. Hazardous Material Shipment Characteristics for Export by Country of Destination: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| Country of destination | Value | | Tons | |
|---|---|---|---|---|
| | 2002 (million dollars) | Percent | 2002 (thousands) | Percent |
| **Total** | **25 634** | **100.0** | **39 428** | **100.0** |
| Canada | 6 473 | 25.3 | 9 770 | 24.8 |
| Mexico | 2 161 | 8.4 | 4 971 | 12.6 |
| All others | 17 001 | 66.3 | 24 687 | 62.6 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

## Table 16b. Hazardous Material Shipment Characteristics for Export by Country of Destination: 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Country of destination | Value | | | Tons | | |
|---|---|---|---|---|---|---|
| | 2002 (million dollars) | 1997 (million dollars) | Percent change | 2002 (thousands) | 1997 (thousands) | Percent change |
| **Total** | **25 634** | **30 604** | **–16.2** | **39 428** | **42 141** | **–6.4** |
| Canada | 6 473 | 9 686 | –33.2 | 9 770 | 16 167 | –39.6 |
| Mexico | 2 161 | 3 500 | –38.3 | 4 971 | S | S |
| All others | 17 001 | 17 418 | –2.4 | 24 687 | 14 519 | 70.0 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

## Table 16c. Hazardous Material Shipment Characteristics for Export by Country of Destination: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Country of destination | Value (percent) | | Tons (percent) | |
|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** |
| Canada | 25.3 | 31.7 | 24.8 | 38.4 |
| Mexico | 8.4 | 11.4 | 12.6 | S |
| All others | 66.3 | 56.9 | 62.6 | 34.5 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

## Table 17. Hazardous Material Shipment Characteristics for Selected NAICS Codes for the United States: 2002

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not be additive]

| NAICS code[1] | Classification description | Value | | Tons | | Ton-miles | | Average miles per shipment |
|---|---|---|---|---|---|---|---|---|
| | | 2002 (million dollars) | Percent | 2002 (thousands) | Percent | 2002 (millions) | Percent | |
| | **Total** | **660 181** | **100.0** | **2 191 519** | **100.0** | **326 727** | **100.0** | **136** |
| 422700 | Petroleum and petroleum products wholesalers | 235 248 | 35.6 | 873 650 | 39.9 | 68 168 | 20.9 | 34 |
| 324000 | Petroleum and coal products manufacturing | 186 726 | 28.3 | 873 138 | 39.8 | 132 413 | 40.5 | 127 |
| 325000 | Chemical manufacturing | 103 790 | 15.7 | 273 889 | 12.5 | 81 627 | 25.0 | 574 |
| 551114 | Corporate, subsidiary, and regional managing offices | 32 279 | 4.9 | 76 773 | 3.5 | 20 041 | 6.1 | 217 |
| 422600 | Chemical and allied products wholesalers | 17 240 | 2.6 | 31 627 | 1.4 | 3 668 | 1.1 | 292 |
| | Others | 84 898 | 12.9 | 62 443 | 2.8 | 20 809 | 6.4 | 151 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]NAICS codes were selected based on estimated tons without sampling variability.

# Appendix A. Comparability With the 1993 and 1997 Commodity Flow Surveys

The following tables show a comparison of the key characteristics among the 1993, 1997, and 2002 Commodity Flow Surveys.

**Industry Coverage**

| 1993 | 1997 | 2002 |
|---|---|---|
| Based on 1987 SIC | Based on 1987 SIC | Based on 1997 NAICS[1] |
| Manufacturing (excluding Printing Trade Services (SIC 279)) | Manufacturing (excluding Printing Trade Services (SIC 279)) | Manufacturing (excluding Prepress Services (NAICS 323122)) |
| Mining (except mining services (SICs 108, 124, 138, 148) and oil and gas extraction (SICs 131 and 132)) | Mining (except mining services (SICs 108,124, 138, 148) and oil and gas extraction (SICs 131 and 132)) | Mining (except support activities (NAICS 213) and oil and gas extraction (NAICS 211)) |
| Wholesale (merchants and manufacturers' sales branches and government-owned liquor stores) | Wholesale (merchants and manufacturers' sales branches and government-owned liquor stores) | Wholesale (merchants and manufacturers' sales branches and government-owned liquor stores) |
| Retail catalog and mail order houses | Retail catalog and mail order houses | Retail electronic shopping and mail order houses |
| Auxiliaries (e.g., warehouses) | Auxiliaries (e.g., warehouses) | Auxiliaries[2] (e.g., warehouses) |

[1]Because of changes in the classification of establishments between SIC and NAICS, establishments classified in the following industries were covered in the 1993 and 1997 surveys, but not in the 2002 survey: NAICS 11331, Logging; NAICS 5111, Newspaper, Periodical, Book, and Database Publishers; and NAICS 51223, Music Publishers. Detailed information about NAICS can be found on the Census Bureau Web site at: http://www.census.gov/epcd/www/naics.html.

[2]Coverage of auxiliaries has been expanded for the 2002 CFS. In comparison, for the 1997 CFS, the number of in-scope managing offices was reduced to a large extent based on the results of the 1992 Economic Census. For the 1997 CFS, a managing office was considered in-scope only if it had sales or end-of-year inventories in the 1992 Census. Research conducted prior to the 2002 CFS showed that not all managing offices with shipping activity in the 1997 CFS indicated sales or inventories in the 1997 Economic Census. Therefore, the 1997 Economic Census results were not used to determine scope for managing offices in the 2002 CFS. For the 2002 survey, the inclusion of an increased number of auxiliaries (intermediary distribution centers) which support the operations of retail stores (most of which are, themselves out-of-scope) has more of an impact on the estimates of value and tonnage and less on ton-miles.

**Commodity Classification System**

| 1993 | 1997 | 2002 |
|---|---|---|
| Standard Transportation Commodity Classification (STCC), developed by the Association of American Railroads (AAR) | Standard Classification of Transported Goods (SCTG) | Standard Classification of Transported Goods (SCTG) |

**Sample Size**

| 1993 | 1997 | 2002 |
|---|---|---|
| Approximately 200,000 establishments selected from a universe of about 790,000 in-scope establishments. | Approximately 100,000 establishments selected from a universe of about 770,000 in-scope establishments. | Approximately 50,000 establishments selected from a universe of about 760,000 in-scope establishments. |

**Survey Methodology**

| 1993 | 1997 | 2002 |
|---|---|---|
| Respondents reported for a sample of their individual outbound shipments for a 2-week period during each of the four calendar quarters of the reference year. | Respondents reported for a sample of their individual outbound shipments for a 1-week period during each of the four calendar quarters of the reference year. | Respondents reported for a sample of their individual outbound shipments for a 1-week period during each of the four calendar quarters of the reference year. |
| Respondents reported key characteristics for each sampled shipment | Respondents reported key characteristics for each sampled shipment. | Respondents reported key characteristics for each sampled shipment. |

**Reported Mode of Transportation**

| 1993 | 1997 | 2002 |
|---|---|---|
| For-hire truck | For-hire truck | For-hire truck |
| Private truck | Private truck | Private truck |
| Rail | Rail | Rail |
| Air | Air | Air |
| Inland Water | Shallow draft vessel | Shallow draft vessel |
| Deep Sea Water | Deep draft vessel | Deep draft vessel |
| Pipeline | Pipeline | Pipeline |
| Parcel, U.S. Postal Service, or courier | Parcel, U.S. Postal Service, or courier | Parcel, U.S. Postal Service, or courier |
| Other | Other | Other |
| Unknown | Unknown | Unknown |

**Data Items Requested**

| 1993 | 1997 | 2002 |
|---|---|---|
| For each shipment: | For each shipment: | For each shipment: |
| Total value | Total value | Total value |
| Total weight | Total weight | Total weight |
| Commodity that contributes the most to the shipment's weight (STCC) | Commodity that contributes the most to the shipment's weight (SCTG) | Commodity that contributes the most to the shipment's weight (SCTG) |
| All known modes of transportation | All known modes of transportation | All known modes of transportation |
| Single origin (assumed to be the mailing address unless the respondent provided a different physical location address) | Single origin (assumed to be the mailing address unless the respondent provided a different physical location address) | Single origin (assumed to be the mailing address unless the respondent provided a different physical location address) |
| Destination | Destination | Destination |
| Containerized (Y/N) | Containerized (Y/N) | |
| Hazardous material (Y/N) | Hazardous material (UN/NA) code | Hazardous material (UN/NA) code |
| Export (Y/N) | Export (Y/N) | Export (Y/N) |
| If export: mode of export, foreign city and country of destination; U.S. port, airport, or border crossing of exit. | If export: mode of export, foreign city and country of destination; U.S. port, airport, or border crossing of exit. | If export: mode of export, foreign city and country of destination; U.S. port, airport, or border crossing of exit. |

# Appendix B.
# Reliability of the Estimates

The estimates in this publication may differ from the actual, unknown population values. Statisticians define this difference as the total error of the estimate. When describing the accuracy of survey results, it is convenient to discuss total error as the sum of sampling error and nonsampling error. Sampling error is the average difference between the estimate and the result that would be obtained from a complete enumeration of the sampling frame conducted under the same survey conditions. Nonsampling error encompasses all other factors that contribute to the total error of a sample survey estimate.

The sampling error of the estimates in this publication can be estimated from the selected sample because the sample was selected using probability sampling. Common measures related to sampling error are the sampling variance, the standard error, and the coefficient of variation (CV). The sampling variance is the squared difference, averaged over all possible samples of the same size and design, between the estimator and its average value. The standard error is the square root of the sampling variance. The CV expresses the standard error as a percentage of the estimate to which it refers. This publication presents these measures in Appendix B.

Nonsampling errors are difficult to measure and can be introduced through inadequacies in the questionnaire, nonresponse, inaccurate reporting by respondents, errors in the application of survey procedures, incorrect recording of answers, and errors in data entry and processing. No measures of nonsampling error are presented in this publication, however, every effort is made to minimize their effect on the estimates. Data users should take into account both the measures of sampling error and the potential effects of nonsampling error when using these estimates.

More detailed descriptions of sampling and nonsampling errors for the 2002 CFS are provided in the following sections.

### Sampling Error

Because the estimates are based on a sample, exact agreement with results that would be obtained from a complete enumeration of all shipments made in 2002 from all establishments included on the sampling frame using the same enumeration procedures is not expected. However, because probability sampling was used at each stage of selection, it is possible to estimate the sampling variability of the survey estimates. For CFS estimates, sampling variability arises from each of the three stages of sampling. (See Appendix C for a description of the sample design.)

The particular sample used in this survey is one of a large number of samples of the same size that could have been selected using the same design. If all possible samples had been surveyed under the same conditions, an estimate of a population parameter of interest could have been obtained from each sample. These samples give rise to a distribution of estimates for the population parameter. A statistical measure of the variability among these estimates is the standard error, which can be approximated from any one sample. The *standard error* is defined as the square root of the variance. The *coefficient of variation* (or relative standard error) of an estimator is the standard error of the estimator divided by the estimator. Note that measures of sampling variability, such as the standard error and coefficient of variation, are estimated from the sample and are also subject to sampling variability. (Technically, we should refer to the *estimated* standard error or the *estimated* coefficient of variation of an estimator. However, for the sake of brevity, we have omitted this detail.) It is important to note that the standard error only measures sampling variability. It does not measure systematic biases of the sample. The Census Bureau recommends that individuals using estimates contained in this report incorporate this information into their analyses, as sampling error could affect the conclusions drawn from these estimates.

An estimate from a particular sample and the standard error associated with the estimate can be used to construct a confidence interval. A *confidence interval* is a range about a given estimator that has a specified probability of containing the result of a complete enumeration of the sampling frame conducted under the same survey conditions. Associated with each interval is a percentage of confidence, which is interpreted as follows. If, for each possible sample, an estimate of a population parameter and its approximate standard error were obtained, then:

1. For approximately 90 percent of the possible samples, the interval from 1.645 standard errors below to 1.645 standard errors above the estimate would include the result as obtained from a complete enumeration of the sampling frame conducted under the same survey conditions.

2. For approximately 95 percent of the possible samples, the interval from 1.96 standard errors below to 1.96 standard errors above the estimate would include the result as obtained from a complete enumeration of the sampling frame conducted under the same survey conditions.

   To illustrate the computation of a confidence interval for an estimate of total value of shipments, assume that an estimate of total value is $10,750 million and the coefficient of variation for this estimate is 1.8 percent, or 0.018. First obtain the standard error of the estimate by multiplying the value of shipments estimate by its coefficient of variation. For this example, multiply $10,750 million by 0.018. This yields a standard error of $193.5 million. The upper and lower bounds of the 90-percent confidence interval are computed as $10,750 million plus or minus 1.645 times $193.5 million. Consequently, the 90-percent confidence interval is $10,432 million to $11,068 million. If corresponding confidence intervals were constructed for all possible samples of the same size and design, approximately 9 out of 10 (90 percent) of these intervals would contain the result obtained from a complete enumeration.

### Nonsampling Error

Nonsampling error encompasses all other factors that contribute to the total error of a sample survey estimate and may also occur in censuses. It is often helpful to think of nonsampling error as arising from deficiencies or mistakes in the survey process. In the CFS, nonsampling error can be attributed to many sources: inability to obtain information about all units in the sample; response errors; differences in the interpretation of the questions; mistakes in coding or keying the data obtained; and other errors of collection, response, coverage, and processing. Although no direct measurement of the potential biases due to nonsampling error has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence. The Census Bureau recommends that individuals using estimates in this report incorporate this information into their analyses, as nonsampling error could affect the conclusions drawn from these estimates.

A potential source of bias in the estimates is nonresponse. Nonresponse is defined as the inability to obtain all the intended measurements or responses from all units in the sample. Four levels of nonresponse can occur in the CFS: item, shipment, quarter (reporting week), and establishment. Item nonresponse occurs either when a question is unanswered or the response to the question fails computer or analyst edits. Nonresponse to the shipment value or weight items is corrected by imputation, which is the procedure by which a missing value is replaced by a predicted value obtained from an appropriate model. (See Appendix C for a description of the imputation procedure.) Shipment, quarter, and establishment nonresponse are used to describe the inability to obtain any of the substantive measurements about a sampled shipment, quarter, or establishment, respectively. Shipment and quarter nonresponse are corrected by reweighting. Reweighting allocates characteristics to the nonrespondents in proportion to the characteristics observed for the respondents. The amount of bias introduced by this nonresponse adjustment procedure depends on the extent to which the nonrespondents differ, characteristically, from the respondents. Establishment nonresponse is corrected during the estimation procedure by the industry-level adjustment weight. (See Appendix C for a description of the estimation procedure.) In most cases of establishment nonresponse, none of the four questionnaires have been returned to the Census Bureau, after several attempts to elicit a response. Approximately 63 percent of the establishments provided at least one quarter of data that contributed to tabulation.

Some possible sources of bias that are attributed to respondent-conducted sampling include misunderstanding the definition of a shipment, constructing an incomplete frame of shipments from which to sample, ordering the shipment sampling frame by selected shipment characteristics, and selecting shipment records by a method other than the one specified in the questionnaire's instructions. We often contact respondents who reported shipments having an untypically large value or weight when compared to the rest of their reported shipments. Upon contact, if we are able to collect information on all of a given respondent's large shipments made either for a particular reporting week or for the entire quarter, then we identify these large shipments as certainty shipments. (See Appendix C for a description of how certainty shipments are used in the estimation process.)

## DEFINITION OF TERMS

### Confidentiality

Title 13 of the United States Code authorizes the Census Bureau to conduct censuses and surveys. Section 9 of the same Title requires that any information collected from the public under the authority of Title 13 be maintained as confidential. Section 214 of Title 13 and Sections 3559 and 3571 of Title 18 of the United States Code provide for the imposition of penalties of up to 5 years in prison and up to $250,000 in fines for wrongful disclosure of confidential census information. In accordance with Title 13, no estimates are published that would disclose the operations of an individual firm.

The Census Bureau's internal Disclosure Review Board sets the confidentiality rules for all data releases. A checklist approach is used to ensure that all potential risks to the confidentiality of the data are considered and addressed.

### Disclosure Limitation

Disclosure is the release of data that have been deemed confidential. It generally reveals information about a specific individual or establishment or permits deduction of sensitive information about a particular individual or establishment. Disclosure limitation is the process used to protect the confidentiality of the survey data provided by an individual or firm. Using disclosure limitation procedures, the Census Bureau modifies or removes the characteristics that put confidential information at risk for disclosure. Although it may appear that a table shows information about a specific individual or business, the Census Bureau has taken steps to disguise or suppress the original data while making sure the results are still useful. The techniques used by the Census Bureau to protect confidentiality in tabulations vary, depending on the type of data.

### Unpublished Estimates

Some unpublished estimates can be derived directly from this report by subtracting published estimates from their respective totals. However, the estimates obtained by such subtraction would be subject to poor response, high sampling variability, or other factors that may make them potentially misleading.

Individuals who use estimates in this report to create new estimates should cite the Census Bureau as the source of only the original estimates.

## Table B–1a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** | **7.1** |
| **Single modes** | **3.1** | **.2** | **4.2** | **.2** | **4.9** | **.9** | **6.1** |
| Truck | 3.7 | 1.4 | 4.6 | 1.3 | 7.0 | 2.0 | 6.3 |
| For-hire truck | 5.2 | 1.2 | 6.2 | .8 | 9.4 | 1.8 | 7.4 |
| Private truck | 4.8 | 1.3 | 5.3 | 1.3 | 7.9 | 1.1 | 5.3 |
| Rail | 7.7 | .4 | 6.6 | .3 | 5.8 | 1.6 | 2.6 |
| Water | 12.5 | .8 | 14.3 | 1.3 | 12.0 | 2.2 | S |
| Air (includes truck and air) | 20.7 | – | 38.0 | – | 39.2 | – | 8.2 |
| Pipeline | 6.6 | 1.2 | 7.0 | 1.4 | S | S | S |
| **Multiple modes** | **14.9** | **.2** | **24.3** | **.2** | **19.9** | **.9** | **12.8** |
| Parcel, U.S. Postal Service or courier | 14.6 | .1 | 20.2 | – | 13.0 | – | 13.2 |
| Other multiple modes | 23.6 | .2 | 24.7 | .2 | 20.1 | .9 | 22.6 |
| **Other and unknown modes** | **18.7** | **.2** | **19.0** | **.1** | **46.0** | **.4** | **39.0** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–1b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2002 and 1997

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **Total** | **3.0** | **3.4** | **5.7** | **4.2** | **2.8** | **6.2** | **4.4** | **5.5** | **7.8** | **7.1** | **7.6** | **12.9** |
| **Single modes** | **3.1** | **3.4** | **5.8** | **4.2** | **2.8** | **6.2** | **4.9** | **5.7** | **8.5** | **6.1** | **6.7** | **10.6** |
| Truck | 3.7 | 3.5 | 6.5 | 4.6 | 4.5 | 7.8 | 7.0 | 8.5 | 14.8 | 6.3 | 5.0 | 10.0 |
| For-hire truck | 5.2 | 6.3 | 10.8 | 6.2 | 7.5 | 11.8 | 9.4 | 12.7 | 20.9 | 7.4 | 5.5 | 10.4 |
| Private truck | 4.8 | 3.1 | 7.4 | 5.3 | 3.3 | 7.7 | 7.9 | 9.0 | 16.6 | 5.3 | 4.1 | 7.2 |
| Rail | 7.7 | 15.5 | 15.5 | 6.6 | 8.9 | 11.9 | 5.8 | 12.2 | 12.4 | 2.6 | 6.0 | 5.4 |
| Water | 12.5 | 11.3 | 23.9 | 14.3 | 13.2 | 26.5 | 12.0 | 14.5 | 21.0 | S | S | S |
| Air (includes truck and air) | 20.7 | 46.4 | 9.7 | 38.0 | 19.2 | 37.2 | 39.2 | 20.1 | 37.3 | 8.2 | 3.5 | 12.8 |
| Pipeline | 6.6 | 5.1 | 11.2 | 7.0 | 6.3 | 11.9 | S | S | S | S | S | S |
| **Multiple modes** | **14.9** | **11.1** | **24.8** | **24.3** | **25.4** | **53.8** | **19.9** | **S** | **S** | **12.8** | **8.9** | **20.3** |
| Parcel, U.S. Postal Service or courier | 14.6 | 11.6 | 25.0 | 20.2 | 25.3 | 39.3 | 13.0 | 16.4 | 26.6 | 13.2 | 8.1 | 18.6 |
| Other multiple modes | 23.6 | 14.5 | 37.0 | 24.7 | 25.6 | 54.6 | 20.1 | S | S | 22.6 | 44.0 | 404.9 |
| **Other and unknown modes** | **18.7** | **12.5** | **15.1** | **19.0** | **9.5** | **15.7** | **46.0** | **20.4** | **62.5** | **39.0** | **33.1** | **88.6** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–1c. Estimated Standard Errors for Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: Percent of Total for 2002 and 1997

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Mode of transportation | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| **Single modes** | **.2** | **.2** | **.2** | **.2** | **.9** | **3.1** |
| Truck | 1.4 | 1.6 | 1.3 | 1.9 | 2.0 | 2.6 |
| For-hire truck | 1.2 | 1.1 | .8 | 1.2 | 1.8 | 2.0 |
| Private truck | 1.3 | 1.2 | 1.3 | 1.1 | 1.1 | 1.2 |
| Rail | .4 | .7 | .3 | .5 | 1.6 | 2.9 |
| Water | .8 | .8 | 1.3 | 1.2 | 2.2 | 2.8 |
| Air (includes truck and air) | – | .6 | – | – | – | – |
| Pipeline | 1.2 | 1.0 | 1.4 | 1.6 | S | S |
| **Multiple modes** | **.2** | **.2** | **.2** | **.2** | **.9** | **S** |
| Parcel, U.S. Postal Service or courier | .1 | – | – | – | – | – |
| Other multiple modes | .2 | .1 | .2 | .2 | .9 | S |
| **Other and unknown modes** | **.2** | **.2** | **.1** | **–** | **.4** | **.1** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–2a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Hazard class and description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** | **7.1** |
| Class 1, Explosives | 23.8 | .3 | 43.2 | – | 29.5 | .1 | 10.9 |
| Class 2, Gases | 7.9 | .8 | 15.6 | 1.1 | 8.9 | .9 | 29.0 |
| Class 3, Flammable liquids | 3.7 | 1.4 | 4.3 | 1.4 | 5.2 | 1.6 | 12.2 |
| Class 4, Flammable solids | 22.1 | .2 | 8.8 | – | 14.0 | .2 | 46.3 |
| Class 5, Oxidizers and organic peroxides | 21.8 | .2 | 26.8 | .2 | 25.3 | .3 | 18.7 |
| Class 6, Toxic (poison) | 11.6 | .2 | 15.9 | – | 22.2 | .3 | 21.3 |
| Class 7, Radioactive materials | 39.0 | .3 | 31.2 | – | 31.7 | – | S |
| Class 8, Corrosive materials | 6.9 | .5 | 9.7 | .6 | 10.1 | 1.1 | 14.9 |
| Class 9, Miscellaneous dangerous goods | 13.4 | .5 | 20.6 | .6 | 11.8 | .7 | 9.3 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–2b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class for the United States: 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and description | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **Total** | **3.0** | **3.4** | **5.7** | **4.2** | **2.8** | **6.2** | **4.4** | **5.5** | **7.8** | **7.1** | **7.6** | **12.9** |
| Class 1, Explosives | 23.8 | 7.3 | 35.3 | 43.2 | 21.7 | 140.7 | 29.5 | S | S | 10.9 | 8.4 | 11.6 |
| Class 2, Gases | 7.9 | 6.1 | 15.7 | 15.6 | 5.0 | 25.5 | 8.9 | 13.8 | 23.5 | 29.0 | 12.8 | 50.4 |
| Class 3, Flammable liquids | 3.7 | 3.4 | 6.4 | 4.3 | 3.0 | 6.5 | 5.2 | 9.4 | 12.7 | 12.2 | 6.3 | 21.3 |
| Class 4, Flammable solids | 22.1 | 8.1 | 36.5 | 8.8 | 22.8 | 18.7 | 14.0 | 35.1 | 17.1 | 46.3 | 15.0 | 11.7 |
| Class 5, Oxidizers and organic peroxides | 21.8 | 13.7 | 31.4 | 26.8 | 12.1 | 40.3 | 25.3 | 18.7 | 29.7 | 18.7 | 13.9 | 49.2 |
| Class 6, Toxic (poison) | 11.6 | 8.8 | 11.9 | 15.9 | 16.4 | 30.3 | 22.2 | 10.9 | 37.2 | 21.3 | 13.4 | 39.0 |
| Class 7, Radioactive materials | 39.0 | 20.9 | 95.2 | 31.2 | 24.0 | 25.6 | 31.7 | 26.7 | 37.7 | S | 27.7 | S |
| Class 8, Corrosive materials | 6.9 | 20.3 | 19.9 | 9.7 | 8.1 | 11.7 | 10.1 | 17.2 | 16.9 | 14.9 | 18.6 | 34.9 |
| Class 9, Miscellaneous dangerous goods | 13.4 | 7.6 | 15.2 | 20.6 | 14.1 | 23.3 | 11.8 | 12.7 | 15.4 | 9.3 | 8.8 | 14.6 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–2c. Estimated Standard Errors for Hazardous Material Shipment Characteristics by Hazard Class for the United States: Percent of Total for 2002 and 1997

[For explanation of terms and meaning of abbreviations and symbols, see introductory text]

| Hazard class and description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | – | – | – | – | – | – |
| Class 1, Explosives | .3 | – | – | – | .1 | S |
| Class 2, Gases | .8 | .5 | 1.1 | .4 | .9 | 1.0 |
| Class 3, Flammable liquids | 1.4 | 1.3 | 1.4 | .7 | 1.6 | 3.5 |
| Class 4, Flammable solids | .2 | – | – | .2 | .2 | 1.0 |
| Class 5, Oxidizers and organic peroxides | .2 | .1 | .2 | – | .3 | .3 |
| Class 6, Toxic (poison) | .2 | .2 | – | – | .3 | – |
| Class 7, Radioactive materials | .3 | .1 | – | – | – | – |
| Class 8, Corrosive materials | .5 | 1.2 | .6 | .4 | 1.1 | 2.4 |
| Class 9, Miscellaneous dangerous goods | .5 | .3 | .6 | .5 | .7 | .9 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–3. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** | **7.1** |
| 1005 | Ammonia, anhydrous | 27.2 | – | 27.1 | .1 | 27.8 | .2 | S |
| 1013 | Carbon dioxide | 33.9 | – | S | S | S | S | 33.1 |
| 1017 | Chlorine | 35.2 | .1 | 27.4 | .1 | 18.2 | .1 | 13.9 |
| 1066 | Nitrogen, compressed | 33.9 | .1 | 42.1 | .3 | S | S | 20.8 |
| 1072 | Oxygen, compressed | 38.2 | .2 | S | S | S | S | S |
| 1075 | Petroleum gases | 12.9 | .4 | 14.0 | .4 | 26.0 | .8 | 43.5 |
| 1114 | Benzene | 40.2 | .2 | 39.6 | .2 | 29.0 | .1 | 30.4 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 11.3 | .4 | 11.1 | .5 | 21.5 | .8 | 16.0 |
| 1203 | Gasoline | 3.6 | 1.5 | 3.8 | 1.7 | 11.1 | 2.6 | 10.7 |
| 1223 | Kerosene | 19.9 | – | 21.6 | .1 | 18.5 | – | 28.0 |
| 1230 | Methanol | S | S | S | S | S | S | 27.6 |
| 1268 | Petroleum distillates, n.o.s. | 7.7 | – | 16.1 | – | 18.7 | .1 | 34.5 |
| 1824 | Sodium hydroxide solution | 20.2 | .1 | 15.3 | .2 | 15.9 | .4 | 19.7 |
| 1830 | Sulfuric acid | 24.4 | – | 15.8 | .1 | 37.2 | .3 | 33.6 |
| 1863 | Fuel, aviation, turbine engine | 11.7 | .3 | 12.3 | .4 | 19.3 | .6 | 14.6 |
| 1962 | Ethylene | 32.8 | .2 | 34.9 | .2 | 45.7 | – | S |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 33.9 | .2 | 36.3 | .3 | 32.1 | .4 | 15.1 |
| 1993 | Flammable liquids, n.o.s. | 8.7 | 1.0 | 8.4 | 1.1 | 9.6 | 1.4 | 19.2 |
| 1999 | Tars, liquid | 35.8 | .1 | 41.3 | .3 | 27.7 | .4 | 15.9 |
| 3257 | Elevated temperature liquid, n.o.s. | 25.4 | .3 | 25.6 | .5 | 17.8 | .7 | 22.9 |
| | All other | 6.5 | 1.4 | 9.8 | 1.0 | 7.2 | 2.1 | 11.4 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–4. Estimated Measures of Reliability for Hazardous Versus Nonhazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Mode of transportation | Tons | | | | | Ton-miles | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Hazardous | | Nonhazardous | | | Hazardous | | Nonhazardous | |
| | Coefficient of variation of number | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage |
| **Total** | **1.1** | **4.2** | **.7** | **1.3** | **.7** | **3.2** | **4.4** | **.5** | **3.4** | **.5** |
| **Single modes** | **1.4** | **4.2** | **.7** | **1.5** | **.7** | **3.0** | **4.9** | **.5** | **3.2** | **.5** |
| Truck | 1.9 | 4.6 | .7 | 2.2 | .7 | 3.2 | 7.0 | .5 | 3.1 | .5 |
| For-hire truck | 3.8 | 6.2 | .7 | 4.2 | .7 | 3.6 | 9.4 | .6 | 3.5 | .6 |
| Private truck | 2.3 | 5.3 | .7 | 2.2 | .7 | 3.9 | 7.9 | .8 | 3.6 | .8 |
| Rail | 3.3 | 6.6 | .4 | 3.4 | .4 | 6.6 | 5.8 | .4 | 6.9 | .4 |
| Water | 8.5 | 14.3 | 3.2 | 8.7 | 3.2 | 8.0 | 12.0 | 3.0 | 10.1 | 3.0 |
| Air (includes truck and air) | 12.7 | 38.0 | .5 | 12.5 | .5 | 17.4 | 39.2 | .5 | 17.3 | .5 |
| Pipeline | 6.8 | 7.0 | .5 | 15.0 | .5 | S | S | S | S | S |
| **Multiple modes** | **8.1** | **24.3** | **1.8** | **8.5** | **1.8** | **13.6** | **19.9** | **1.3** | **14.9** | **1.3** |
| Parcel, U.S. Postal Service or courier | 4.8 | 20.2 | .2 | 4.9 | .2 | 4.9 | 13.0 | – | 4.9 | – |
| Other multiple modes | 9.3 | 24.7 | 2.1 | 10.0 | 2.1 | 14.9 | 20.1 | 1.5 | 16.4 | 1.5 |
| **Other and unknown modes** | **12.9** | **19.0** | **1.1** | **13.4** | **1.1** | **10.5** | **46.0** | **1.7** | **9.8** | **1.7** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–5a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Selected State of Origin: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| State of origin | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** | **7.1** |
| Texas | 12.8 | 1.9 | 15.9 | 2.5 | 11.3 | 2.3 | 12.7 |
| Louisiana | 7.4 | .5 | 7.9 | .8 | 10.1 | 1.6 | 33.9 |
| California | 9.1 | 1.0 | 10.8 | 1.1 | 12.3 | .7 | S |
| Illinois | 11.7 | .6 | 15.3 | .7 | 22.6 | 1.3 | S |
| New Jersey | 15.4 | .5 | 22.0 | 1.0 | 27.3 | .9 | 29.6 |
| Ohio | 10.9 | .5 | 15.6 | .6 | 32.2 | .6 | 44.5 |
| Indiana | 26.3 | .7 | 32.6 | 1.0 | 31.6 | .6 | 22.7 |
| Michigan | 24.0 | .8 | 19.4 | .5 | 48.1 | .8 | 24.4 |
| Florida | 14.1 | .4 | 12.7 | .3 | 14.3 | .1 | 31.0 |
| Tennessee | 15.7 | .4 | 25.1 | .5 | 24.9 | .6 | 20.6 |
| Washington | 13.0 | .3 | 13.0 | .4 | 16.6 | .3 | S |
| Pennsylvania | 18.5 | .7 | 20.5 | .4 | 26.6 | .6 | 21.2 |
| New York | 17.7 | .5 | 26.5 | .6 | 41.0 | 1.2 | 42.5 |
| Georgia | 8.9 | .2 | 16.4 | .3 | 24.9 | .3 | 33.5 |
| Utah | 23.7 | .4 | 24.2 | .5 | 38.0 | 1.2 | 27.7 |
| Kentucky | 13.4 | .3 | 24.1 | .5 | 32.7 | .4 | S |
| Mississippi | 17.2 | .3 | 19.9 | .4 | 37.1 | 1.8 | S |
| Alabama | 23.0 | .3 | 20.0 | .3 | 20.6 | .2 | 28.3 |
| North Carolina | 17.6 | .4 | 18.5 | .3 | 26.1 | .3 | 37.1 |
| West Virginia | 38.4 | .2 | S | S | S | S | S |
| All other states | 3.6 | .7 | 5.3 | 1.1 | 8.6 | 1.5 | 18.9 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–5b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Selected State of Destination: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| State of destination | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** | **7.1** |
| Texas | 13.3 | 1.9 | 16.4 | 2.6 | 9.4 | 1.5 | 22.0 |
| California | 8.1 | 1.0 | 10.3 | 1.1 | 18.1 | 1.7 | 22.0 |
| Louisiana | 11.5 | .6 | 11.0 | .7 | 26.4 | 1.1 | 23.5 |
| Ohio | 11.0 | .5 | 18.9 | .8 | 20.1 | 1.1 | 35.1 |
| Illinois | 13.7 | .6 | 15.5 | .6 | 25.1 | 1.2 | S |
| Florida | 10.2 | .5 | 9.7 | .5 | 18.9 | 1.5 | 13.6 |
| New Jersey | 16.8 | .6 | 25.7 | 1.0 | 35.2 | 1.6 | S |
| Michigan | 10.6 | .4 | 15.6 | .5 | 10.9 | .3 | 37.7 |
| Indiana | 18.6 | .6 | 27.9 | .9 | 11.9 | .2 | 46.9 |
| Pennsylvania | 11.1 | .3 | 13.6 | .3 | 9.3 | .1 | 35.2 |
| Tennessee | 17.5 | .4 | 25.6 | .5 | 22.4 | .5 | 23.5 |
| New York | 16.0 | .4 | 22.5 | .5 | 24.0 | .8 | 27.6 |
| Georgia | 9.1 | .2 | 15.8 | .4 | 7.7 | .1 | 26.3 |
| Washington | 11.8 | .3 | 12.9 | .3 | 18.5 | .4 | 47.1 |
| Kentucky | 13.1 | .2 | 16.5 | .3 | 19.3 | .6 | S |
| Mississippi | 12.8 | .2 | 13.7 | .2 | 14.4 | .2 | S |
| North Carolina | 14.7 | .4 | 16.6 | .3 | 13.3 | .2 | 43.1 |
| Alabama | 15.5 | .2 | 16.1 | .2 | 11.5 | .1 | 43.4 |
| Utah | 16.5 | .2 | 21.0 | .3 | 19.1 | .1 | 27.2 |
| Missouri | 12.9 | .2 | 14.0 | .2 | 11.7 | .1 | 45.6 |
| All other states | 4.2 | .6 | 3.9 | .8 | 6.7 | 1.0 | 8.7 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

# Table B–6a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Hazard class and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **HAZARD CLASS 1, EXPLOSIVES** | | | | | | | |
| **Total** | **23.8** | **–** | **43.2** | **–** | **29.5** | **–** | **10.9** |
| **Single modes** | **24.5** | **1.8** | **43.2** | **.2** | **29.5** | **.4** | **20.6** |
| Truck | 24.6 | 2.5 | 44.1 | 3.2 | 27.8 | 5.5 | 23.4 |
| For-hire truck | 27.0 | 4.4 | 33.9 | 12.0 | 27.9 | 9.6 | 8.6 |
| Private truck | 34.9 | 3.9 | S | S | 44.1 | 5.6 | 15.6 |
| Rail | 48.8 | 1.8 | 41.3 | 3.1 | 44.3 | 5.6 | 19.9 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | 44.4 | – | 46.1 | .6 | 15.5 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **38.3** | **1.8** | **S** | **S** | **S** | **S** | **10.7** |
| Parcel, U.S. Postal Service or courier | 38.3 | 1.8 | S | S | S | S | 10.7 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **32.2** |
| **HAZARD CLASS 2, GASES** | | | | | | | |
| **Total** | **7.9** | **–** | **15.6** | **–** | **8.9** | **–** | **29.0** |
| **Single modes** | **8.1** | **.5** | **15.7** | **.1** | **8.8** | **.3** | **27.1** |
| Truck | 9.6 | 4.4 | 17.4 | 5.9 | 15.5 | 4.5 | 28.3 |
| For-hire truck | 13.4 | 3.6 | 20.1 | 2.9 | 25.2 | 3.7 | 17.9 |
| Private truck | 12.4 | 4.0 | 23.3 | 5.7 | 27.9 | 5.1 | 25.9 |
| Rail | 16.4 | 1.8 | 15.5 | 2.4 | 12.7 | 4.7 | 7.2 |
| Water | 38.0 | .6 | 32.4 | 1.6 | 31.2 | 1.5 | 31.2 |
| Air (includes truck and air) | 34.4 | .1 | S | S | S | S | 16.7 |
| Pipeline | 23.8 | 3.6 | 35.3 | 5.8 | S | S | S |
| **Multiple modes** | **28.1** | **.4** | **34.9** | **.1** | **44.8** | **.3** | **25.5** |
| Parcel, U.S. Postal Service or courier | 37.5 | .4 | S | S | 30.5 | – | 27.6 |
| Other multiple modes | 32.2 | – | 36.8 | .1 | 45.6 | .3 | S |
| **Other and unknown modes** | **40.0** | **.2** | **23.8** | **–** | **30.8** | **–** | **S** |
| **HAZARD CLASS 3, FLAMMABLE LIQUIDS** | | | | | | | |
| **Total** | **3.7** | **–** | **4.3** | **–** | **5.2** | **–** | **12.2** |
| **Single modes** | **3.7** | **.2** | **4.2** | **.2** | **6.3** | **1.3** | **9.4** |
| Truck | 4.3 | 1.4 | 5.1 | 1.1 | 8.4 | 2.8 | 7.0 |
| For-hire truck | 8.0 | 1.4 | 8.0 | .8 | 16.8 | 3.0 | 9.0 |
| Private truck | 4.6 | 1.6 | 5.0 | 1.3 | 9.5 | 1.1 | 10.1 |
| Rail | 10.8 | .2 | 8.5 | .1 | 13.7 | 1.8 | 7.9 |
| Water | 13.8 | 1.2 | 15.6 | 1.7 | 12.3 | 2.9 | S |
| Air (includes truck and air) | 30.8 | – | S | S | S | S | 11.2 |
| Pipeline | 7.3 | 1.4 | 7.4 | 1.6 | S | S | S |
| **Multiple modes** | **20.9** | **.3** | **30.0** | **.2** | **22.0** | **1.3** | **15.4** |
| Parcel, U.S. Postal Service or courier | 32.3 | .1 | 34.1 | – | 26.5 | – | 15.5 |
| Other multiple modes | 24.6 | .2 | 30.2 | .2 | 22.1 | 1.3 | 26.6 |
| **Other and unknown modes** | **19.4** | **.2** | **22.6** | **.1** | **S** | **S** | **43.4** |
| **HAZARD CLASS 4, FLAMMABLE SOLIDS** | | | | | | | |
| **Total** | **22.1** | **–** | **8.8** | **–** | **14.0** | **–** | **46.3** |
| **Single modes** | **24.4** | **5.4** | **8.9** | **.3** | **14.4** | **.8** | **32.2** |
| Truck | 27.5 | 7.6 | 11.7 | 5.7 | 40.8 | 6.4 | 24.8 |
| For-hire truck | 40.1 | 7.8 | 19.5 | 6.3 | 48.6 | 6.9 | 20.5 |
| Private truck | 36.1 | 7.1 | 15.8 | 4.0 | 25.5 | 1.8 | 28.6 |
| Rail | 39.2 | 4.3 | 21.4 | 3.7 | 13.2 | 6.2 | 14.4 |
| Water | 44.1 | .4 | 49.9 | 5.1 | S | S | 30.1 |
| Air (includes truck and air) | S | S | S | S | S | S | 19.9 |
| Pipeline | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 32.5 | 1.3 | 29.0 | – | S | S | 23.6 |
| Other multiple modes | S | S | S | S | S | S | 26.6 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

Table B–6a. **Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002**—Con.

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Hazard class and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **HAZARD CLASS 5, OXIDIZERS AND ORGANIC PEROXIDES** | | | | | | | |
| **Total** | **21.8** | **–** | **26.8** | **–** | **25.3** | **–** | **18.7** |
| **Single modes** | **22.4** | **1.4** | **26.6** | **1.3** | **25.6** | **1.9** | **14.3** |
| Truck | 26.4 | 4.6 | 33.5 | 6.7 | 39.1 | 8.6 | 15.9 |
| For-hire truck | 19.7 | 6.4 | 37.6 | 7.7 | 44.0 | 9.5 | 13.0 |
| Private truck | 37.3 | 5.4 | 32.1 | 5.1 | 21.4 | 2.1 | 17.3 |
| Rail | 40.6 | 4.9 | 24.2 | 6.7 | 22.0 | 9.1 | 16.3 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | 49.6 | – | S | S | 26.6 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **41.4** | **1.2** | **S** | **S** | **S** | **S** | **18.2** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 23.0 |
| Other multiple modes | 49.3 | 1.2 | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 6, TOXIC (POISON)** | | | | | | | |
| **Total** | **11.6** | **–** | **15.9** | **–** | **22.2** | **–** | **21.3** |
| **Single modes** | **12.5** | **2.8** | **16.9** | **2.7** | **22.9** | **1.9** | **25.4** |
| Truck | 13.5 | 2.9 | 15.1 | 5.2 | 13.7 | 6.1 | 14.0 |
| For-hire truck | 18.8 | 3.7 | 14.1 | 3.6 | 14.0 | 5.2 | 14.5 |
| Private truck | 21.0 | 3.5 | 29.0 | 2.5 | 30.2 | 1.0 | 15.5 |
| Rail | 14.0 | 2.4 | 14.0 | 5.6 | 15.8 | 6.0 | 6.0 |
| Water | 42.0 | 4.0 | 43.5 | 8.5 | S | S | 23.8 |
| Air (includes truck and air) | S | S | S | S | S | S | 25.1 |
| Pipeline | S | S | 47.5 | 6.5 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **16.9** |
| Parcel, U.S. Postal Service or courier | 48.7 | 1.2 | S | S | S | S | 19.3 |
| Other multiple modes | S | S | S | S | S | S | 25.2 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **45.0** | **1.0** | **S** |
| **HAZARD CLASS 7, RADIOACTIVE MATERIALS** | | | | | | | |
| **Total** | **39.0** | **–** | **31.2** | **–** | **31.7** | **–** | **S** |
| **Single modes** | **41.9** | **5.3** | **32.5** | **2.4** | **34.4** | **5.0** | **S** |
| Truck | 42.2 | 8.5 | 32.8 | 2.1 | 35.3 | 6.8 | S |
| For-hire truck | 47.4 | 11.1 | 34.4 | 12.6 | 30.4 | 9.0 | S |
| Private truck | 43.6 | 8.7 | 44.0 | 11.7 | S | S | S |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | 42.2 | 7.6 | 41.4 | 1.7 | 43.5 | 7.0 | 23.7 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **45.5** | **5.3** | **42.5** | **2.5** | **42.0** | **5.0** | **23.6** |
| Parcel, U.S. Postal Service or courier | 45.5 | 5.3 | 42.5 | 2.5 | 42.0 | 5.0 | 23.6 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 8, CORROSIVE MATERIALS** | | | | | | | |
| **Total** | **6.9** | **–** | **9.7** | **–** | **10.1** | **–** | **14.9** |
| **Single modes** | **6.7** | **.8** | **9.6** | **.5** | **9.7** | **1.1** | **14.9** |
| Truck | 7.0 | 1.4 | 10.4 | 1.8 | 13.2 | 3.9 | 11.9 |
| For-hire truck | 11.1 | 3.3 | 12.8 | 2.8 | 15.7 | 4.6 | 8.4 |
| Private truck | 8.3 | 3.1 | 12.4 | 1.3 | 21.3 | 1.0 | 9.9 |
| Rail | 11.9 | 1.1 | 14.4 | 2.5 | 15.1 | 4.4 | 5.1 |
| Water | 32.0 | .7 | 18.9 | 2.0 | 31.2 | 2.8 | 25.6 |
| Air (includes truck and air) | 33.1 | .1 | S | S | S | S | 15.7 |
| Pipeline | 44.5 | .2 | 45.2 | 1.4 | S | S | S |
| **Multiple modes** | **19.1** | **.4** | **31.1** | **.3** | **38.4** | **1.1** | **22.7** |
| Parcel, U.S. Postal Service or courier | 23.8 | .4 | S | S | S | S | 22.4 |
| Other multiple modes | 31.6 | .2 | 32.6 | .3 | 39.4 | 1.1 | S |
| **Other and unknown modes** | **S** | **S** | **36.8** | **.3** | **42.7** | **.2** | **37.5** |

See footnotes at end of table.

## Table B–6a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002—Con.

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Hazard class and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **HAZARD CLASS 9, MISCELLANEOUS DANGEROUS GOODS** | | | | | | | |
| **Total** | **13.4** | **–** | **20.6** | **–** | **11.8** | **–** | **9.3** |
| **Single modes** | **14.3** | **1.9** | **21.0** | **.9** | **12.2** | **1.6** | **11.4** |
| Truck | 18.1 | 4.6 | 26.7 | 6.5 | 22.0 | 4.5 | 13.0 |
| For-hire truck | 17.4 | 5.3 | 25.0 | 4.8 | 16.1 | 2.5 | 21.0 |
| Private truck | 44.1 | 5.8 | 35.7 | 4.7 | 45.7 | 3.8 | 20.3 |
| Rail | 14.3 | 2.3 | 19.7 | 3.5 | 15.3 | 5.4 | 4.5 |
| Water | 26.4 | 2.3 | 30.4 | 5.3 | 38.8 | 6.3 | 26.8 |
| Air (includes truck and air) | 39.3 | 1.2 | S | S | S | S | 11.2 |
| Pipeline | S | S | S | S | S | S | S |
| **Multiple modes** | **19.7** | **1.8** | **S** | **S** | **38.1** | **1.6** | **33.5** |
| Parcel, U.S. Postal Service or courier | 21.6 | 1.0 | 24.2 | – | 20.1 | – | 39.1 |
| Other multiple modes | 32.4 | 1.1 | S | S | 38.3 | 1.6 | 23.9 |
| **Other and unknown modes** | **46.2** | **.3** | **S** | **S** | **S** | **S** | **22.5** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs*.

# Table B–6b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002 and 1997

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Hazard class and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **HAZARD CLASS 1, EXPLOSIVES** | | | | | | | | | | | | |
| **Total** | **23.8** | **7.3** | **35.3** | **43.2** | **21.7** | **140.7** | **29.5** | **S** | **S** | **10.9** | **8.4** | **11.6** |
| **Single modes** | **24.5** | **7.9** | **39.7** | **43.2** | **22.2** | **143.9** | **29.5** | **S** | **S** | **20.6** | **13.5** | **26.1** |
| Truck | 24.6 | 6.8 | 47.1 | 44.1 | 18.9 | 175.1 | 27.8 | 26.4 | 93.1 | 23.4 | 13.5 | 32.0 |
| For-hire truck | 27.0 | 10.3 | 58.4 | 33.9 | 19.7 | 147.9 | 27.9 | 14.4 | 94.8 | 8.6 | 6.7 | 10.6 |
| Private truck | 34.9 | 13.1 | 49.7 | S | 26.0 | S | 44.1 | S | S | 15.6 | 12.7 | 14.1 |
| Rail | 48.8 | 48.1 | 9.5 | 41.3 | S | S | 44.3 | S | S | 19.9 | 20.2 | 15.6 |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | 32.5 | S | 44.4 | 27.4 | 34.4 | 46.1 | 26.8 | 102.4 | 15.5 | 10.1 | 22.3 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **38.3** | **17.0** | **12.5** | **S** | **13.3** | **S** | **S** | **16.3** | **S** | **10.7** | **8.8** | **12.8** |
| Parcel, U.S. Postal Service or courier | 38.3 | 17.1 | 12.6 | S | 14.3 | S | S | 16.4 | S | 10.7 | 8.8 | 12.8 |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 30.1 | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **32.2** | **33.2** | **1.1** |
| **HAZARD CLASS 2, GASES** | | | | | | | | | | | | |
| **Total** | **7.9** | **6.1** | **15.7** | **15.6** | **5.0** | **25.5** | **8.9** | **13.8** | **23.5** | **29.0** | **12.8** | **50.4** |
| **Single modes** | **8.1** | **5.4** | **15.6** | **15.7** | **4.3** | **26.0** | **8.8** | **14.1** | **24.0** | **27.1** | **14.6** | **51.9** |
| Truck | 9.6 | 8.6 | 24.6 | 17.4 | 7.0 | 29.0 | 15.5 | 10.5 | 34.8 | 28.3 | 12.6 | 54.7 |
| For-hire truck | 13.4 | 6.4 | 33.6 | 20.1 | 15.8 | 37.1 | 25.2 | 18.0 | 57.9 | 17.9 | 12.1 | 26.7 |
| Private truck | 12.4 | 15.4 | 33.8 | 23.3 | 8.6 | 39.9 | 27.9 | 12.4 | 55.8 | 25.9 | 5.2 | 36.9 |
| Rail | 16.4 | 15.2 | 33.5 | 15.5 | 10.2 | 30.2 | 12.7 | 18.3 | 29.8 | 7.2 | 11.2 | 12.5 |
| Water | 38.0 | 15.5 | 47.1 | 32.4 | 21.4 | 42.8 | 31.2 | 39.1 | 43.5 | 31.2 | 21.5 | 12.8 |
| Air (includes truck and air) | 34.4 | 25.3 | 21.8 | S | 32.7 | S | S | 48.4 | S | 16.7 | 12.1 | 20.7 |
| Pipeline | 23.8 | 9.0 | 29.8 | 35.3 | 5.8 | 61.8 | S | S | S | S | S | S |
| **Multiple modes** | **28.1** | **22.0** | **49.4** | **34.9** | **30.7** | **59.9** | **44.8** | **35.0** | **154.5** | **25.5** | **23.9** | **62.1** |
| Parcel, U.S. Postal Service or courier | 37.5 | 19.3 | 80.2 | S | S | S | 30.5 | S | S | 27.6 | 18.3 | 48.3 |
| Other multiple modes | 32.2 | 34.6 | 34.6 | 36.8 | 32.3 | 67.2 | 45.6 | 35.5 | 171.8 | S | S | S |
| **Other and unknown modes** | **40.0** | **32.4** | **16.0** | **23.8** | **S** | **S** | **30.8** | **46.6** | **10.3** | **S** | **S** | **S** |
| **HAZARD CLASS 3, FLAMMABLE LIQUIDS** | | | | | | | | | | | | |
| **Total** | **3.7** | **3.4** | **6.4** | **4.3** | **3.0** | **6.5** | **5.2** | **9.4** | **12.7** | **12.2** | **6.3** | **21.3** |
| **Single modes** | **3.7** | **3.4** | **6.4** | **4.2** | **3.0** | **6.4** | **6.3** | **8.5** | **13.2** | **9.4** | **5.7** | **13.3** |
| Truck | 4.3 | 4.3 | 7.6 | 5.1 | 4.5 | 8.2 | 8.4 | 7.3 | 14.8 | 7.0 | 5.7 | 10.2 |
| For-hire truck | 8.0 | 6.7 | 13.6 | 8.0 | 8.7 | 14.5 | 16.8 | 9.4 | 26.3 | 9.0 | 9.4 | 14.1 |
| Private truck | 4.6 | 3.4 | 6.9 | 5.0 | 2.9 | 6.9 | 9.5 | 10.1 | 18.2 | 10.1 | 5.2 | 12.4 |
| Rail | 10.8 | 9.1 | 15.4 | 8.5 | 11.6 | 18.2 | 13.7 | 11.0 | 20.1 | 7.9 | 5.6 | 8.0 |
| Water | 13.8 | 12.7 | 28.9 | 15.6 | 13.1 | 29.5 | 12.3 | 16.6 | 26.0 | S | S | S |
| Air (includes truck and air) | 30.8 | S | S | S | 33.8 | S | S | 39.9 | S | 11.2 | 8.4 | 26.0 |
| Pipeline | 7.3 | 6.2 | 12.9 | 7.4 | 6.8 | 12.2 | S | S | S | S | S | S |
| **Multiple modes** | **20.9** | **18.8** | **44.4** | **30.0** | **29.8** | **63.1** | **22.0** | **S** | **S** | **15.4** | **11.1** | **35.2** |
| Parcel, U.S. Postal Service or courier | 32.3 | 19.7 | 117.9 | 34.1 | 30.1 | 95.1 | 26.5 | 24.6 | 82.2 | 15.5 | 7.8 | 27.6 |
| Other multiple modes | 24.6 | 20.7 | 41.5 | 30.2 | 29.9 | 63.3 | 22.1 | S | S | 26.6 | S | S |
| **Other and unknown modes** | **19.4** | **16.0** | **22.5** | **22.6** | **12.1** | **26.4** | **S** | **18.6** | **S** | **43.4** | **16.2** | **92.8** |
| **HAZARD CLASS 4, FLAMMABLE SOLIDS** | | | | | | | | | | | | |
| **Total** | **22.1** | **8.1** | **36.5** | **8.8** | **22.8** | **18.7** | **14.0** | **35.1** | **17.1** | **46.3** | **15.0** | **11.7** |
| **Single modes** | **24.4** | **7.4** | **37.9** | **8.9** | **23.2** | **19.0** | **14.4** | **35.7** | **17.4** | **32.2** | **13.2** | **7.7** |
| Truck | 27.5 | 9.4 | 48.2 | 11.7 | 36.9 | 33.3 | 40.8 | 10.9 | 62.6 | 24.8 | 16.1 | 6.9 |
| For-hire truck | 40.1 | 9.9 | 49.6 | 19.5 | 7.4 | 25.3 | 48.6 | 15.1 | 81.7 | 20.5 | 9.1 | 13.3 |
| Private truck | 36.1 | 21.1 | 107.1 | 15.8 | S | S | 25.5 | 35.0 | 44.5 | 28.6 | 27.1 | 3.9 |
| Rail | 39.2 | 14.1 | 30.3 | 21.4 | 37.0 | 20.8 | 13.2 | 39.7 | 12.0 | 14.4 | 10.0 | 11.0 |
| Water | 44.1 | S | S | 49.9 | S | S | S | S | S | 30.1 | 29.5 | 50.0 |
| Air (includes truck and air) | S | 45.8 | S | S | S | S | S | S | S | 19.9 | 19.8 | 42.2 |
| Pipeline | S | S | S | S | 46.4 | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **48.3** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **16.2** | **S** |
| Parcel, U.S. Postal Service or courier | 32.5 | S | S | 29.0 | 43.4 | 62.4 | S | 47.7 | S | 23.6 | 16.9 | 11.0 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 26.6 | 26.1 | 90.5 |
| **Other and unknown modes** | **S** | **37.5** | **S** | **S** | **S** | **S** | **S** | **46.2** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

Table B–6b. **Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002 and 1997**—Con.

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Hazard class and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **HAZARD CLASS 5, OXIDIZERS AND ORGANIC PEROXIDES** | | | | | | | | | | | | |
| **Total** | **21.8** | **13.7** | **31.4** | **26.8** | **12.1** | **40.3** | **25.3** | **18.7** | **29.7** | **18.7** | **13.9** | **49.2** |
| **Single modes** | **22.4** | **13.9** | **32.3** | **26.6** | **12.1** | **39.7** | **25.6** | **18.8** | **29.0** | **14.3** | **14.5** | **41.6** |
| Truck | 26.4 | 14.7 | 42.7 | 33.5 | 14.1 | 61.4 | 39.1 | 18.7 | 74.8 | 15.9 | 15.1 | 48.1 |
| For-hire truck | 19.7 | 16.7 | 31.2 | 37.6 | 20.5 | 98.3 | 44.0 | 22.1 | 102.2 | 13.0 | 7.7 | 16.7 |
| Private truck | 37.3 | 13.7 | 69.6 | 32.1 | 12.6 | 36.4 | 21.4 | 15.5 | 18.7 | 17.3 | 18.1 | 28.3 |
| Rail | 40.6 | 40.2 | 38.1 | 24.2 | 21.2 | 24.5 | 22.0 | 26.1 | 15.7 | 16.3 | 11.4 | 14.4 |
| Water | – | S | S | – | S | S | – | S | S | – | S | S |
| Air (includes truck and air) | S | 46.3 | S | 49.6 | S | S | S | S | S | 26.6 | 23.9 | 19.0 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **41.4** | **35.6** | **121.5** | **S** | **S** | **S** | **S** | **S** | **S** | **18.2** | **12.1** | **57.3** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | 47.7 | S | S | 34.4 | S | 23.0 | 9.2 | 69.1 |
| Other multiple modes | 49.3 | 43.8 | 257.1 | S | S | S | S | S | S | S | 23.1 | S |
| **Other and unknown modes** | **S** | **36.4** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **42.0** | **S** |
| **HAZARD CLASS 6, TOXIC (POISON)** | | | | | | | | | | | | |
| **Total** | **11.6** | **8.8** | **11.9** | **15.9** | **16.4** | **30.3** | **22.2** | **10.9** | **37.2** | **21.3** | **13.4** | **39.0** |
| **Single modes** | **12.5** | **8.7** | **12.5** | **16.9** | **16.8** | **31.5** | **22.9** | **10.8** | **38.5** | **25.4** | **13.0** | **44.4** |
| Truck | 13.5 | 9.3 | 11.0 | 15.1 | 13.4 | 16.0 | 13.7 | 9.8 | 14.7 | 14.0 | 16.2 | 23.1 |
| For-hire truck | 18.8 | 10.5 | 18.0 | 14.1 | 11.3 | 17.0 | 14.0 | 10.6 | 16.4 | 14.5 | 7.8 | 17.2 |
| Private truck | 21.0 | 20.8 | 12.7 | 29.0 | 33.3 | 24.4 | 30.2 | 28.9 | 23.7 | 15.5 | 29.4 | 10.3 |
| Rail | 14.0 | 9.6 | 13.2 | 14.0 | 12.8 | 18.5 | 15.8 | 8.2 | 21.1 | 6.0 | 12.2 | 16.8 |
| Water | 42.0 | S | S | 43.5 | S | S | S | S | S | 23.8 | 24.6 | 81.6 |
| Air (includes truck and air) | S | 35.3 | S | S | S | S | S | S | S | 25.1 | 9.4 | 33.3 |
| Pipeline | S | 30.0 | S | 47.5 | 37.8 | 284.4 | S | S | S | S | S | S |
| **Multiple modes** | **S** | **27.8** | **S** | **S** | **39.0** | **S** | **S** | **S** | **S** | **16.9** | **22.0** | **43.8** |
| Parcel, U.S. Postal Service or courier | 48.7 | 30.6 | 16.4 | S | 21.7 | S | S | 21.6 | S | 19.3 | 22.4 | 46.9 |
| Other multiple modes | S | 35.9 | S | S | 40.2 | S | S | S | S | 25.2 | 24.9 | 30.9 |
| **Other and unknown modes** | **S** | **30.6** | **S** | **S** | **31.5** | **S** | **45.0** | **30.6** | **113.3** | **S** | **23.7** | **S** |
| **HAZARD CLASS 7, RADIOACTIVE MATERIALS** | | | | | | | | | | | | |
| **Total** | **39.0** | **20.9** | **95.2** | **31.2** | **24.0** | **25.6** | **31.7** | **26.7** | **37.7** | **S** | **27.7** | **S** |
| **Single modes** | **41.9** | **21.7** | **117.8** | **32.5** | **23.3** | **31.3** | **34.4** | **21.5** | **47.7** | **S** | **26.7** | **S** |
| Truck | 42.2 | 27.5 | 185.7 | 32.8 | 23.7 | 37.2 | 35.3 | 11.2 | 78.9 | S | 43.1 | S |
| For-hire truck | 47.4 | 19.3 | 286.9 | 34.4 | 23.0 | 28.4 | 30.4 | 15.2 | 58.2 | S | 49.1 | S |
| Private truck | 43.6 | 42.3 | 146.0 | 44.0 | 34.1 | 68.5 | S | S | S | S | 15.2 | S |
| Rail | – | S | S | – | S | S | – | S | S | – | 31.6 | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | 42.2 | 28.5 | 4.7 | 41.4 | 33.6 | 5.1 | 43.5 | 34.6 | 7.5 | 23.7 | 9.4 | 33.2 |
| Pipeline | – | S | S | – | S | S | S | S | S | S | S | S |
| **Multiple modes** | **45.5** | **37.5** | **73.7** | **42.5** | **43.5** | **22.2** | **42.0** | **48.9** | **22.6** | **23.6** | **20.8** | **34.3** |
| Parcel, U.S. Postal Service or courier | 45.5 | 37.5 | 73.7 | 42.5 | 43.5 | 22.2 | 42.0 | 48.9 | 22.6 | 23.6 | 20.8 | 34.3 |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 8, CORROSIVE MATERIALS** | | | | | | | | | | | | |
| **Total** | **6.9** | **20.3** | **19.9** | **9.7** | **8.1** | **11.7** | **10.1** | **17.2** | **16.9** | **14.9** | **18.6** | **34.9** |
| **Single modes** | **6.7** | **20.0** | **19.9** | **9.6** | **7.9** | **11.6** | **9.7** | **17.3** | **16.6** | **14.9** | **20.0** | **36.5** |
| Truck | 7.0 | 19.3 | 23.2 | 10.4 | 12.9 | 17.2 | 13.2 | 31.6 | 43.6 | 11.9 | 17.7 | 28.9 |
| For-hire truck | 11.1 | 28.7 | 30.6 | 12.8 | 18.6 | 25.1 | 15.7 | 38.3 | 52.4 | 8.4 | 7.0 | 12.4 |
| Private truck | 8.3 | 6.0 | 15.1 | 12.4 | 15.8 | 18.3 | 21.3 | 17.7 | 36.2 | 9.9 | 28.1 | 35.4 |
| Rail | 11.9 | 36.9 | 20.5 | 14.4 | 13.3 | 18.3 | 15.1 | 21.7 | 23.0 | 5.1 | 12.5 | 9.6 |
| Water | 32.0 | 35.3 | 11.9 | 18.9 | 26.3 | 17.0 | 31.2 | 37.1 | 13.9 | 25.6 | 45.7 | 28.4 |
| Air (includes truck and air) | 33.1 | 24.9 | 44.0 | S | 27.3 | S | S | 31.8 | S | 15.7 | 9.4 | 24.0 |
| Pipeline | 44.5 | S | S | 45.2 | 29.6 | 122.8 | S | S | S | S | S | S |
| **Multiple modes** | **19.1** | **19.9** | **28.0** | **31.1** | **32.3** | **74.6** | **38.4** | **37.9** | **91.1** | **22.7** | **17.5** | **35.1** |
| Parcel, U.S. Postal Service or courier | 23.8 | 22.3 | 33.5 | S | 26.2 | S | S | 23.1 | S | 22.4 | 18.0 | 35.5 |
| Other multiple modes | 31.6 | 32.1 | 44.4 | 32.6 | 35.1 | 80.7 | 39.4 | 38.7 | 93.0 | S | 32.4 | S |
| **Other and unknown modes** | **S** | **49.2** | **S** | **36.8** | **41.4** | **16.5** | **42.7** | **S** | **S** | **37.5** | **29.0** | **142.9** |

See footnotes at end of table.

## Table B–6b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: 2002 and 1997—Con.

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Hazard class and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **HAZARD CLASS 9, MISCELLANEOUS DANGEROUS GOODS** | | | | | | | | | | | | |
| **Total** | **13.4** | **7.6** | **15.2** | **20.6** | **14.1** | **23.3** | **11.8** | **12.7** | **15.4** | **9.3** | **8.8** | **14.6** |
| **Single modes** | **14.3** | **8.5** | **16.5** | **21.0** | **14.4** | **23.6** | **12.2** | **13.1** | **15.7** | **11.4** | **10.1** | **17.6** |
| Truck | 18.1 | 7.3 | 20.9 | 26.7 | 12.6 | 27.7 | 22.0 | 10.5 | 21.7 | 13.0 | 15.2 | 23.9 |
| For-hire truck | 17.4 | 9.3 | 18.7 | 25.0 | 15.3 | 25.2 | 16.1 | 13.9 | 14.9 | 21.0 | 7.6 | 20.5 |
| Private truck | 44.1 | 19.7 | 73.9 | 35.7 | 20.2 | 48.4 | 45.7 | 21.2 | 83.9 | 20.3 | 13.2 | 43.5 |
| Rail | 14.3 | 19.9 | 14.3 | 19.7 | 24.2 | 20.9 | 15.3 | 18.9 | 17.3 | 4.5 | 8.7 | 11.8 |
| Water | 26.4 | S | S | 30.4 | S | S | 38.8 | S | S | 26.8 | 28.2 | 46.1 |
| Air (includes truck and air) | 39.3 | 33.5 | 106.9 | S | 40.1 | S | S | 41.9 | S | 11.2 | 6.3 | 21.7 |
| Pipeline | S | S | S | S | S | S | S | S | S | S | S | S |
| **Multiple modes** | **19.7** | **25.6** | **33.2** | **S** | **22.0** | **S** | **38.1** | **19.9** | **72.2** | **33.5** | **16.9** | **40.4** |
| Parcel, U.S. Postal Service or courier | 21.6 | 36.2 | 49.4 | 24.2 | 28.9 | 25.7 | 20.1 | 31.9 | 51.5 | 39.1 | 18.0 | 45.9 |
| Other multiple modes | 32.4 | 28.9 | 36.9 | S | 22.0 | S | 38.3 | 19.9 | 72.5 | 23.9 | 12.4 | 20.0 |
| **Other and unknown modes** | **46.2** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **22.5** | **37.4** | **216.6** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs*.

# Table 6c. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **HAZARD CLASS 1, EXPLOSIVES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **S** |
| **Single modes** | **98.1** | **89.7** | **99.7** | **97.9** | **99.3** | **S** |
| Truck[1] | 95.8 | 73.6 | 92.6 | 73.8 | 77.0 | 39.1 |
| For-hire truck | 78.1 | 54.7 | 31.0 | 23.9 | 53.3 | 21.8 |
| Private truck | 17.7 | 18.8 | S | 49.9 | 23.7 | S |
| Rail | 1.2 | 12.6 | 7.0 | S | 22.1 | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | 3.6 | – | – | .1 | – |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **1.7** | **8.2** | **S** | **1.1** | **S** | **1.3** |
| Parcel, U.S. Postal Service or courier | 1.7 | 8.1 | S | 1.1 | S | 1.2 |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 2, GASES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **98.4** | **95.5** | **99.4** | **96.7** | **98.9** | **98.3** |
| Truck[1] | 63.6 | 52.0 | 45.4 | 45.6 | 36.3 | 28.1 |
| For-hire truck | 29.6 | 20.4 | 13.8 | 14.7 | 18.2 | 14.0 |
| Private truck | 34.0 | 31.2 | 31.5 | 30.5 | 17.6 | 13.8 |
| Rail | 12.1 | 12.6 | 13.7 | 13.1 | 44.6 | 47.8 |
| Water | 2.3 | 3.2 | 3.3 | 4.7 | 4.7 | 7.8 |
| Air (includes truck and air) | .3 | 1.0 | S | – | S | – |
| Pipeline[2] | 20.0 | 26.7 | 37.0 | 33.3 | S | S |
| **Multiple modes** | **.9** | **1.1** | **.3** | **.4** | **.9** | **.5** |
| Parcel, U.S. Postal Service or courier | .7 | .6 | S | S | – | S |
| Other multiple modes | .2 | .5 | .3 | .4 | .9 | .4 |
| **Other and unknown modes** | **.7** | **3.5** | **.3** | **S** | **.2** | **1.2** |
| **HAZARD CLASS 3, FLAMMABLE LIQUIDS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.9** | **97.7** | **98.4** | **98.4** | **94.6** | **90.0** |
| Truck[1] | 60.5 | 61.4 | 53.0 | 54.3 | 31.0 | 27.5 |
| For-hire truck | 24.4 | 23.7 | 19.4 | 19.4 | 16.3 | 14.1 |
| Private truck | 35.5 | 37.1 | 33.2 | 34.2 | 14.4 | 12.9 |
| Rail | 2.6 | 3.0 | 2.0 | 2.0 | 11.3 | 11.6 |
| Water | 8.4 | 6.9 | 11.1 | 9.5 | 27.7 | 26.0 |
| Air (includes truck and air) | – | S | S | – | S | – |
| Pipeline[2] | 26.4 | 24.6 | 32.2 | 32.7 | S | S |
| **Multiple modes** | **1.1** | **.9** | **.9** | **.7** | **4.5** | **S** |
| Parcel, U.S. Postal Service or courier | .4 | .1 | – | – | – | – |
| Other multiple modes | .8 | .8 | .9 | .7 | 4.5 | S |
| **Other and unknown modes** | **.9** | **1.3** | **.7** | **.8** | **S** | **.5** |
| **HAZARD CLASS 4, FLAMMABLE SOLIDS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **90.8** | **94.8** | **99.2** | **99.0** | **98.7** | **98.7** |
| Truck[1] | 78.4 | 73.2 | 59.4 | 52.5 | 31.6 | 9.6 |
| For-hire truck | 37.3 | 48.1 | 40.9 | 25.8 | 27.2 | 7.6 |
| Private truck | 41.0 | 24.8 | 18.4 | S | 4.4 | 1.9 |
| Rail | 9.5 | 20.2 | 27.9 | 43.7 | 56.2 | 88.7 |
| Water | .3 | S | 11.2 | S | S | S |
| Air (includes truck and air) | S | .3 | S | S | S | S |
| Pipeline[2] | S | S | S | 2.6 | S | S |
| **Multiple modes** | **S** | **3.5** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 2.3 | S | – | – | S | – |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **1.7** | **S** | **S** | **S** | **–** |

See footnotes at end of table.

# Table 6c. **Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: Percent of Total for 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **HAZARD CLASS 5, OXIDIZERS AND ORGANIC PEROXIDES** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **97.5** | **97.3** | **97.1** | **97.7** | **95.0** | **98.2** |
| Truck[1] | 83.8 | 72.4 | 77.9 | 63.2 | 64.2 | 35.1 |
| For-hire truck | 43.5 | 43.9 | 53.5 | 32.0 | 57.1 | 26.0 |
| Private truck | 40.2 | 28.0 | 24.0 | 31.1 | 6.6 | 8.8 |
| Rail | 13.6 | 24.9 | 19.2 | 34.4 | 30.8 | 63.1 |
| Water | – | S | – | S | – | S |
| Air (includes truck and air) | S | – | – | S | S | S |
| Pipeline[2] | – | – | – | – | S | S |
| **Multiple modes** | **1.5** | **.8** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | – | S | – |
| Other multiple modes | 1.3 | .4 | S | S | S | S |
| **Other and unknown modes** | **S** | **1.9** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 6, TOXIC (POISON)** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **93.1** | **93.2** | **97.4** | **97.8** | **97.0** | **96.0** |
| Truck[1] | 59.0 | 72.1 | 26.7 | 44.6 | 19.9 | 34.2 |
| For-hire truck | 44.7 | 43.9 | 20.8 | 29.4 | 18.2 | 29.3 |
| Private truck | 14.3 | 27.2 | 5.8 | 14.0 | 1.7 | 4.4 |
| Rail | 13.8 | 14.6 | 22.6 | 30.6 | 40.3 | 51.2 |
| Water | 11.6 | S | 27.5 | S | S | S |
| Air (includes truck and air) | S | .9 | S | S | S | S |
| Pipeline[2] | S | 1.8 | 20.7 | 5.9 | S | S |
| **Multiple modes** | **S** | **4.4** | **S** | **1.4** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 1.2 | 3.4 | S | – | S | – |
| Other multiple modes | S | 1.1 | S | 1.3 | S | S |
| **Other and unknown modes** | **S** | **2.4** | **S** | **.8** | **.9** | **.6** |
| **HAZARD CLASS 7, RADIOACTIVE MATERIALS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **92.5** | **79.7** | **92.3** | **76.5** | **87.7** | **68.0** |
| Truck[1] | 91.7 | 53.5 | 91.0 | 64.4 | 84.5 | 36.2 |
| For-hire truck | 55.9 | 21.4 | 39.1 | 37.0 | 55.1 | 29.3 |
| Private truck | 35.8 | 32.1 | 51.9 | 27.4 | S | S |
| Rail | – | S | – | S | – | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | .7 | 17.0 | 1.2 | 8.4 | 3.2 | 21.9 |
| Pipeline[2] | – | S | – | S | S | S |
| **Multiple modes** | **7.5** | **12.9** | **7.3** | **13.0** | **12.1** | **31.3** |
| Parcel, U.S. Postal Service or courier | 7.5 | 12.9 | 7.3 | 13.0 | 12.1 | 31.3 |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **HAZARD CLASS 8, CORROSIVE MATERIALS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **96.5** | **95.0** | **98.0** | **96.8** | **96.0** | **97.4** |
| Truck[1] | 83.0 | 68.0 | 56.7 | 50.4 | 43.6 | 28.9 |
| For-hire truck | 50.8 | 47.3 | 39.3 | 32.6 | 36.6 | 24.4 |
| Private truck | 31.8 | 19.9 | 17.3 | 17.6 | 6.9 | 4.5 |
| Rail | 10.3 | 18.1 | 26.4 | 26.1 | 43.0 | 41.8 |
| Water | 2.0 | 7.5 | 10.5 | 18.5 | 9.0 | 26.6 |
| Air (includes truck and air) | .4 | .4 | S | – | S | – |
| Pipeline[2] | .7 | S | 4.4 | 1.8 | S | S |
| **Multiple modes** | **2.3** | **2.1** | **1.2** | **.7** | **3.3** | **1.6** |
| Parcel, U.S. Postal Service or courier | 1.6 | 1.5 | S | – | S | – |
| Other multiple modes | .7 | .7 | 1.1 | .6 | 3.2 | 1.6 |
| **Other and unknown modes** | **S** | **2.9** | **.8** | **2.5** | **.7** | **S** |

See footnotes at end of table.

## Table 6c. Hazardous Material Shipment Characteristics by Hazard Class and Mode of Transportation: Percent of Total for 2002 and 1997—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class and mode of transportation | Value (percent) | | Tons (percent) | | Ton-miles (percent) | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **HAZARD CLASS 9, MISCELLANEOUS DANGEROUS GOODS** | | | | | | |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Single modes** | **95.6** | **95.0** | **98.4** | **99.0** | **96.5** | **97.5** |
| Truck[1] | 70.2 | 64.8 | 64.1 | 63.7 | 34.3 | 34.2 |
| For-hire truck | 46.4 | 48.5 | 37.6 | 40.9 | 21.3 | 27.0 |
| Private truck | 23.8 | 15.3 | 26.5 | 21.0 | 13.0 | 6.9 |
| Rail | 13.7 | 23.2 | 20.1 | 28.1 | 46.2 | 57.5 |
| Water | 8.3 | S | 14.1 | S | 15.9 | S |
| Air (includes truck and air) | 3.3 | 1.6 | S | – | S | – |
| Pipeline[2] | S | S | S | S | S | S |
| **Multiple modes** | **3.7** | **3.5** | **S** | **.6** | **3.4** | **1.8** |
| Parcel, U.S. Postal Service or courier | 2.3 | 1.9 | – | – | – | – |
| Other multiple modes | 1.4 | 1.6 | S | .6 | 3.4 | 1.8 |
| **Other and unknown modes** | **.7** | **S** | **S** | **S** | **S** | **S** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

[1]"Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
[2]Estimates for pipeline exclude shipments of crude petroleum.

# Table B–7a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002

[For explanation of terms and meaning of abbreviations and symbols, see introductory text]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **DIVISION 1.1, EXPLOSIVES WITH A MASS EXPLOSION HAZARD** | | | | | | | |
| **Total** | **33.9** | **–** | **S** | **S** | **S** | **S** | **S** |
| **Single modes** | **33.5** | **1.0** | **S** | **S** | **S** | **S** | **S** |
| Truck | 33.5 | 1.0 | S | S | S | S | S |
| For-hire truck | 44.3 | 13.4 | S | S | S | S | 27.1 |
| Private truck | S | S | S | S | S | S | 39.1 |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 31.6 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** |
| **DIVISION 1.2, EXPLOSIVES WITH A PROJECTION HAZARD** | | | | | | | |
| **Total** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** |
| **Single modes** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** |
| Truck | S | S | S | S | S | S | 31.6 |
| For-hire truck | S | S | S | S | S | S | 31.6 |
| Private truck | – | – | – | – | – | – | – |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| **DIVISION 1.3, EXPLOSIVES WITH PREDOMINANTLY A FIRE HAZARD** | | | | | | | |
| **Total** | **S** | **S** | **46.8** | **–** | **43.3** | **–** | **23.3** |
| **Single modes** | **S** | **S** | **46.8** | **–** | **43.3** | **–** | **23.3** |
| Truck | S | S | S | S | 47.9 | 5.2 | 23.5 |
| For-hire truck | S | S | S | S | S | S | 26.3 |
| Private truck | S | S | S | S | S | S | 40.0 |
| Rail | S | S | S | S | S | S | 31.6 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 31.6 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| **DIVISION 1.4, EXPLOSIVES WITH NO SIGNIFICANT BLAST HAZARD** | | | | | | | |
| **Total** | **27.0** | **–** | **34.4** | **–** | **26.7** | **–** | **8.4** |
| **Single modes** | **28.1** | **3.5** | **35.0** | **1.8** | **27.4** | **1.9** | **12.1** |
| Truck | 27.8 | 3.3 | 35.1 | 1.9 | 27.5 | 2.3 | 11.8 |
| For-hire truck | 25.2 | 3.9 | 36.6 | 2.7 | 27.9 | 2.7 | 8.4 |
| Private truck | S | S | 41.7 | 1.9 | S | S | 32.9 |
| Rail | S | S | S | S | S | S | 31.6 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | 49.7 | .3 | S | S | 16.3 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **38.3** | **3.5** | **S** | **S** | **S** | **S** | **10.8** |
| Parcel, U.S. Postal Service or courier | 38.3 | 3.5 | S | S | S | S | 10.8 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

Table B–7a. **Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002**—Con.

[For explanation of terms and meaning of abbreviations and symbols, see introductory text]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **DIVISION 1.5, VERY INSENSITIVE EXPLOSIVES, BLASTING AGENT** | | | | | | | |
| **Total** | **35.9** | **–** | **47.9** | **–** | **38.1** | **–** | **S** |
| **Single modes** | **35.9** | **.2** | **47.9** | **–** | **38.1** | **–** | **S** |
| Truck | 36.5 | 3.6 | 49.3 | 3.9 | 38.1 | 7.0 | 32.6 |
| For-hire truck | 48.5 | 5.5 | 45.7 | 9.2 | 46.2 | 9.3 | 15.4 |
| Private truck | 39.2 | 7.8 | S | S | 45.7 | 9.2 | 49.0 |
| Rail | 44.9 | 2.7 | 41.6 | 3.9 | 44.6 | 7.7 | 24.2 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 28.0 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **28.2** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 28.2 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **34.9** |
| **DIVISION 2.1, FLAMMABLE GASES** | | | | | | | |
| **Total** | **10.6** | **–** | **10.5** | **–** | **14.1** | **–** | **33.4** |
| **Single modes** | **10.7** | **.4** | **10.5** | **.2** | **13.9** | **.5** | **33.8** |
| Truck | 11.5 | 5.3 | 19.7 | 6.3 | 35.4 | 4.5 | 36.9 |
| For-hire truck | 24.9 | 3.1 | 29.7 | 3.4 | 49.5 | 4.6 | 20.3 |
| Private truck | 14.5 | 5.1 | 28.1 | 6.1 | 39.1 | 2.1 | 22.4 |
| Rail | 20.5 | 2.8 | 19.1 | 3.0 | 15.9 | 4.3 | 7.5 |
| Water | 43.1 | 1.1 | 37.8 | 2.3 | 32.7 | 2.2 | 32.4 |
| Air (includes truck and air) | S | S | S | S | S | S | 27.6 |
| Pipeline | 23.4 | 4.5 | 21.6 | 5.1 | S | S | S |
| **Multiple modes** | **33.8** | **.2** | **44.4** | **.2** | **49.3** | **.5** | **17.5** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 25.1 |
| Other multiple modes | 38.7 | – | 44.7 | .2 | 49.8 | .5 | S |
| **Other and unknown modes** | **S** | **S** | **32.7** | **–** | **38.7** | **–** | **S** |
| **DIVISION 2.2, NONFLAMMABLE, NONTOXIC COMPRESSED GASES** | | | | | | | |
| **Total** | **11.8** | **–** | **36.7** | **–** | **29.6** | **–** | **38.9** |
| **Single modes** | **12.1** | **1.2** | **36.8** | **.3** | **30.1** | **2.2** | **34.9** |
| Truck | 12.7 | 2.0 | 27.2 | 9.9 | 29.1 | 7.9 | 35.3 |
| For-hire truck | 24.3 | 8.2 | 43.9 | 6.8 | 31.3 | 9.8 | 13.2 |
| Private truck | 23.0 | 7.8 | 31.7 | 9.4 | 42.7 | 9.7 | 37.7 |
| Rail | 41.8 | .3 | 45.3 | .6 | S | S | 19.2 |
| Water | S | S | S | S | S | S | 31.7 |
| Air (includes truck and air) | 41.5 | .2 | S | S | S | S | 19.2 |
| Pipeline | S | S | S | S | S | S | S |
| **Multiple modes** | **29.4** | **1.2** | **40.2** | **.1** | **S** | **S** | **32.1** |
| Parcel, U.S. Postal Service or courier | 35.7 | 1.2 | S | S | 28.3 | – | 35.1 |
| Other multiple modes | 43.7 | .1 | S | S | S | S | 27.5 |
| **Other and unknown modes** | **37.0** | **.2** | **29.5** | **.1** | **S** | **S** | **S** |
| **DIVISION 2.3, GASES TOXIC BY INHALATION** | | | | | | | |
| **Total** | **11.8** | **–** | **13.9** | **–** | **11.3** | **–** | **27.3** |
| **Single modes** | **11.8** | **.4** | **13.9** | **.7** | **11.2** | **.2** | **27.4** |
| Truck | 18.0 | 7.4 | 22.6 | 6.2 | 26.3 | 6.1 | 32.1 |
| For-hire truck | 29.8 | 7.3 | 35.3 | 5.7 | 35.7 | 5.8 | 30.3 |
| Private truck | 23.2 | 7.0 | 26.4 | 4.5 | S | S | 31.0 |
| Rail | 17.9 | 4.9 | 11.5 | 5.9 | 12.7 | 7.9 | 9.7 |
| Water | S | S | S | S | S | S | 31.8 |
| Air (includes truck and air) | S | S | S | S | S | S | 25.8 |
| Pipeline | 43.5 | 5.5 | 40.4 | 6.1 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **41.9** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | 41.1 | – | 41.7 |
| Other multiple modes | S | S | S | S | S | S | 31.6 |
| **Other and unknown modes** | **44.1** | **.5** | **S** | **S** | **46.5** | **.2** | **S** |

See footnotes at end of table.

Table B–7a. **Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002**—Con.

[For explanation of terms and meaning of abbreviations and symbols, see introductory text]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **DIVISION 4.1, FLAMMABLE SOLIDS** | | | | | | | |
| **Total** | **30.0** | **–** | **9.7** | **–** | **16.8** | **–** | **43.3** |
| **Single modes** | **32.6** | **6.2** | **9.7** | **.2** | **16.9** | **.5** | **S** |
| Truck | 38.9 | 9.4 | 7.1 | 6.4 | 24.7 | 5.9 | S |
| For-hire truck | 21.6 | 6.3 | 12.3 | 6.7 | 32.9 | 4.2 | 28.1 |
| Private truck | 46.1 | 10.6 | 21.7 | 4.4 | 18.7 | 2.8 | S |
| Rail | S | S | 26.5 | 5.0 | 20.4 | 7.5 | 14.8 |
| Water | 44.1 | .7 | 49.9 | 5.4 | S | S | 30.1 |
| Air (includes truck and air) | S | S | S | S | S | S | 25.4 |
| Pipeline | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **44.0** |
| Parcel, U.S. Postal Service or courier | 39.7 | 2.2 | 46.8 | – | 48.5 | – | 20.7 |
| Other multiple modes | S | S | S | S | S | S | 31.1 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.2, SPONTANEOUSLY COMBUSTIBLE MATERIALS** | | | | | | | |
| **Total** | **36.3** | **–** | **35.4** | **–** | **39.4** | **–** | **19.4** |
| **Single modes** | **37.7** | **1.5** | **35.6** | **1.1** | **39.8** | **2.8** | **23.9** |
| Truck | 39.6 | 3.9 | 43.3 | 9.7 | S | S | 24.4 |
| For-hire truck | S | S | 45.6 | 10.8 | S | S | 19.0 |
| Private truck | 20.9 | 9.9 | 27.2 | 9.0 | S | S | 21.1 |
| Rail | 36.9 | 2.9 | S | S | 43.1 | 13.1 | 25.8 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 28.7 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **46.0** | **1.5** | **33.3** | **1.1** | **S** | **S** | **23.8** |
| Parcel, U.S. Postal Service or courier | 46.2 | 1.5 | 33.8 | 1.1 | S | S | 23.8 |
| Other multiple modes | S | S | S | S | S | S | 30.1 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.3, DANGEROUS WHEN WET MATERIALS** | | | | | | | |
| **Total** | **S** | **S** | **42.8** | **–** | **S** | **S** | **17.6** |
| **Single modes** | **S** | **S** | **45.2** | **5.8** | **S** | **S** | **21.5** |
| Truck | S | S | 48.0 | 7.0 | S | S | 22.6 |
| For-hire truck | S | S | S | S | S | S | 21.5 |
| Private truck | 41.1 | 9.1 | 36.4 | 10.8 | S | S | 37.0 |
| Rail | S | S | S | S | S | S | 29.8 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 28.0 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **46.0** | **3.3** | **S** | **S** | **S** | **S** | **29.9** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 25.6 |
| Other multiple modes | S | S | S | S | S | S | 27.3 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 5.1, OXIDIZERS** | | | | | | | |
| **Total** | **21.2** | **–** | **29.1** | **–** | **29.4** | **–** | **21.0** |
| **Single modes** | **21.8** | **2.0** | **29.1** | **1.7** | **30.0** | **2.4** | **17.3** |
| Truck | 25.3 | 5.2 | 37.0 | 6.6 | 47.2 | 8.5 | 19.3 |
| For-hire truck | 24.6 | 7.5 | 44.2 | 8.4 | S | S | 15.6 |
| Private truck | 40.5 | 7.7 | 32.2 | 6.2 | 21.5 | 2.7 | 19.4 |
| Rail | 41.0 | 5.2 | 24.2 | 6.5 | 22.1 | 8.8 | 16.8 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | 49.7 | – | S | S | 31.3 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **41.5** | **1.8** | **S** | **S** | **S** | **S** | **18.0** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 25.1 |
| Other multiple modes | 49.3 | 1.9 | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

Table B–7a. **Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002**—Con.

[For explanation of terms and meaning of abbreviations and symbols, see introductory text]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **DIVISION 5.2, ORGANIC PEROXIDES** | | | | | | | |
| **Total** | **49.4** | **–** | **S** | **S** | **S** | **S** | **16.4** |
| **Single modes** | **49.7** | **1.2** | **S** | **S** | **S** | **S** | **17.6** |
| Truck | S | S | S | S | S | S | 17.7 |
| For-hire truck | S | S | S | S | S | S | 16.0 |
| Private truck | S | S | 44.1 | 14.5 | 49.5 | 11.8 | 31.7 |
| Rail | S | S | S | S | S | S | 30.1 |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 31.6 |
| Pipeline | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **29.5** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 29.5 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs*.

# Table B–7b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **DIVISION 1.1, EXPLOSIVES WITH A MASS EXPLOSION HAZARD** | | | | | | | | | | | | |
| **Total** | **33.9** | **22.7** | **12.7** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **15.9** | **S** |
| **Single modes** | **33.5** | **22.8** | **12.3** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **16.0** | **S** |
| Truck | 33.5 | 22.7 | 17.5 | S | 38.3 | S | S | S | S | S | 16.4 | S |
| For-hire truck | 44.3 | 29.9 | 25.6 | S | 26.1 | S | S | 23.8 | S | 27.1 | 34.5 | 61.6 |
| Private truck | S | 16.0 | S | S | S | S | S | S | S | 39.1 | 21.4 | 16.6 |
| Rail | – | S | S | – | S | S | – | S | S | – | 27.6 | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | S | – | S | S | – | S | S | – | 31.6 | – |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | S | S | 31.6 | S | S |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** | **44.0** | **2.9** |
| **DIVISION 1.2, EXPLOSIVES WITH A PROJECTION HAZARD** | | | | | | | | | | | | |
| **Total** | **S** | **S** | **S** | **S** | **42.8** | **S** | **S** | **48.7** | **S** | **31.6** | **21.5** | **46.9** |
| **Single modes** | **S** | **S** | **S** | **S** | **42.8** | **S** | **S** | **48.7** | **S** | **31.6** | **21.6** | **47.8** |
| Truck | S | S | S | S | 43.0 | S | S | 49.0 | S | 31.6 | 21.5 | 47.7 |
| For-hire truck | S | S | S | S | 44.0 | S | S | 49.0 | S | 31.6 | 19.8 | 44.6 |
| Private truck | – | S | S | – | S | S | – | S | S | – | 31.6 | – |
| Rail | – | – | – | – | – | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | S | – | S | S | – | S | S | – | 31.6 | – |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **31.6** | **–** |
| **DIVISION 1.3, EXPLOSIVES WITH PREDOMINANTLY A FIRE HAZARD** | | | | | | | | | | | | |
| **Total** | **S** | **40.1** | **S** | **46.8** | **30.3** | **50.5** | **43.3** | **26.1** | **42.5** | **23.3** | **39.9** | **81.1** |
| **Single modes** | **S** | **44.2** | **S** | **46.8** | **30.5** | **66.4** | **43.3** | **28.2** | **52.4** | **23.3** | **19.5** | **32.8** |
| Truck | S | 44.4 | S | S | 30.5 | S | 47.9 | 28.2 | 50.4 | 23.5 | 20.4 | 34.4 |
| For-hire truck | S | 46.7 | S | S | 30.7 | S | S | 29.5 | S | 26.3 | 12.1 | 26.3 |
| Private truck | S | 41.7 | S | S | S | S | S | S | S | 40.0 | 27.4 | 34.8 |
| Rail | S | – | S | S | – | S | S | – | S | 31.6 | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 31.6 | 29.8 | 42.5 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | – | S | S | – | S | S | – | S | S | – | S | S |
| Other multiple modes | – | – | – | – | – | – | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **S** | **S** | **–** | **29.8** | **–** |
| **DIVISION 1.4, EXPLOSIVES WITH NO SIGNIFICANT BLAST HAZARD** | | | | | | | | | | | | |
| **Total** | **27.0** | **11.8** | **56.0** | **34.4** | **19.3** | **69.3** | **26.7** | **17.7** | **58.2** | **8.4** | **8.5** | **11.9** |
| **Single modes** | **28.1** | **12.5** | **69.7** | **35.0** | **19.8** | **74.5** | **27.4** | **18.1** | **63.0** | **12.1** | **17.0** | **29.0** |
| Truck | 27.8 | 7.2 | 79.9 | 35.1 | 18.3 | 80.6 | 27.5 | 17.7 | 75.2 | 11.8 | 22.1 | 42.1 |
| For-hire truck | 25.2 | 11.6 | 92.8 | 36.6 | 21.9 | 113.7 | 27.9 | 19.4 | 87.9 | 8.4 | 10.7 | 12.7 |
| Private truck | S | 26.6 | S | 41.7 | 28.4 | 14.6 | S | 38.4 | S | 32.9 | 18.1 | 47.0 |
| Rail | S | S | S | S | S | S | S | S | S | 31.6 | 25.9 | 13.1 |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | 35.5 | S | 49.7 | 32.1 | 27.6 | S | 29.9 | S | 16.3 | 10.0 | 22.2 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **38.3** | **17.2** | **12.6** | **S** | **13.3** | **S** | **S** | **17.5** | **S** | **10.8** | **7.9** | **12.1** |
| Parcel, U.S. Postal Service or courier | 38.3 | 17.4 | 12.7 | S | 13.2 | S | S | 16.8 | S | 10.8 | 7.9 | 12.1 |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 31.6 | – |
| **Other and unknown modes** | **S** | **47.8** | **S** | **S** | **49.8** | **S** | **S** | **S** | **S** | **S** | **33.6** | **S** |

See footnotes at end of table.

Table B–7b. **Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997**—Con.

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **DIVISION 1.5, VERY INSENSITIVE EXPLOSIVES, BLASTING AGENT** | | | | | | | | | | | | |
| **Total** | **35.9** | **13.4** | **138.8** | **47.9** | **18.8** | **359.3** | **38.1** | **41.6** | **641.9** | **S** | **11.7** | **S** |
| **Single modes** | **35.9** | **13.4** | **138.7** | **47.9** | **18.8** | **361.2** | **38.1** | **41.9** | **648.6** | **S** | **11.8** | **S** |
| Truck | 36.5 | 13.4 | 133.1 | 49.3 | 18.8 | 340.5 | 38.1 | 41.9 | 447.4 | 32.6 | 11.8 | 47.4 |
| For-hire truck | 48.5 | 34.8 | 426.5 | 45.7 | 40.9 | S | 46.2 | 37.8 | S | 15.4 | 30.2 | 41.2 |
| Private truck | 39.2 | 13.5 | 128.3 | S | 20.1 | S | 45.7 | S | S | 49.0 | 14.5 | 50.6 |
| Rail | 44.9 | – | – | 41.6 | – | – | 44.6 | – | – | 24.2 | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | – | S | S | – | S | S | – | S | 28.0 | – | – |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **28.2** | **31.6** | **50.3** |
| Parcel, U.S. Postal Service or courier | S | – | S | S | – | S | S | – | S | 28.2 | – | – |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 31.6 | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **34.9** | **31.6** | **3.5** |
| **DIVISION 2.1, FLAMMABLE GASES** | | | | | | | | | | | | |
| **Total** | **10.6** | **10.2** | **20.5** | **10.5** | **5.5** | **18.0** | **14.1** | **11.0** | **35.5** | **33.4** | **20.6** | **69.6** |
| **Single modes** | **10.7** | **9.0** | **20.2** | **10.5** | **5.5** | **18.2** | **13.9** | **11.6** | **36.2** | **33.8** | **22.0** | **75.1** |
| Truck | 11.5 | 18.1 | 31.4 | 19.7 | 11.2 | 37.2 | 35.4 | 10.9 | 75.0 | 36.9 | 17.8 | 75.5 |
| For-hire truck | 24.9 | 11.8 | 43.6 | 29.7 | 18.1 | 49.7 | 49.5 | 17.0 | 109.7 | 20.3 | 15.1 | 32.0 |
| Private truck | 14.5 | 28.1 | 45.2 | 28.1 | 12.1 | 57.6 | 39.1 | 14.9 | 80.4 | 22.4 | 10.2 | 30.3 |
| Rail | 20.5 | 9.6 | 57.8 | 19.1 | 10.6 | 57.8 | 15.9 | 21.3 | 64.3 | 7.5 | 16.1 | 19.4 |
| Water | 43.1 | 19.6 | 66.7 | 37.8 | 28.1 | 69.5 | 32.7 | 43.3 | 62.4 | 32.4 | 30.1 | 31.5 |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 27.6 | 30.3 | 22.6 |
| Pipeline | 23.4 | 9.7 | 28.8 | 21.6 | 6.0 | 27.6 | S | S | S | S | S | S |
| **Multiple modes** | **33.8** | **34.8** | **27.1** | **44.4** | **32.6** | **61.0** | **49.3** | **39.6** | **165.5** | **17.5** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | 30.2 | S | S | 31.6 | S | S | 48.9 | S | 25.1 | 31.1 | 47.4 |
| Other multiple modes | 38.7 | 39.4 | 21.5 | 44.7 | 32.7 | 61.2 | 49.8 | 40.0 | 167.9 | S | 30.9 | S |
| **Other and unknown modes** | **S** | **49.7** | **S** | **32.7** | **47.0** | **8.9** | **38.7** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 2.2, NONFLAMMABLE, NONTOXIC COMPRESSED GASES** | | | | | | | | | | | | |
| **Total** | **11.8** | **4.9** | **27.4** | **36.7** | **15.4** | **77.3** | **29.6** | **24.8** | **63.9** | **38.9** | **14.3** | **62.6** |
| **Single modes** | **12.1** | **5.2** | **29.0** | **36.8** | **14.5** | **79.5** | **30.1** | **25.5** | **66.4** | **34.9** | **18.7** | **65.1** |
| Truck | 12.7 | 6.4 | 33.7 | 27.2 | 13.1 | 43.1 | 29.1 | 13.9 | 62.8 | 35.3 | 18.3 | 68.5 |
| For-hire truck | 24.3 | 11.8 | 80.2 | 43.9 | 20.3 | 76.1 | 31.3 | 12.1 | 84.5 | 13.2 | 11.5 | 24.2 |
| Private truck | 23.0 | 8.5 | 47.5 | 31.7 | 13.7 | 48.5 | 42.7 | 16.4 | 78.4 | 37.7 | 11.9 | 55.9 |
| Rail | 41.8 | 29.9 | 44.3 | 45.3 | 26.0 | 44.4 | S | 29.3 | S | 19.2 | 17.4 | 32.4 |
| Water | S | S | S | S | S | S | S | S | S | 31.7 | 29.3 | 3.1 |
| Air (includes truck and air) | 41.5 | 25.3 | 19.1 | S | 36.1 | S | S | 31.4 | S | 19.2 | 11.7 | 23.9 |
| Pipeline | S | 35.0 | S | S | 42.8 | S | S | S | S | S | S | S |
| **Multiple modes** | **29.4** | **20.2** | **72.3** | **40.2** | **S** | **S** | **S** | **45.2** | **S** | **32.1** | **23.9** | **62.1** |
| Parcel, U.S. Postal Service or courier | 35.7 | 21.9 | 79.5 | S | S | S | 28.3 | S | S | 35.1 | 23.8 | 65.2 |
| Other multiple modes | 43.7 | 42.5 | 199.5 | S | S | S | S | S | S | 27.5 | S | S |
| **Other and unknown modes** | **37.0** | **26.4** | **26.8** | **29.5** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 2.3, GASES TOXIC BY INHALATION** | | | | | | | | | | | | |
| **Total** | **11.8** | **21.0** | **28.3** | **13.9** | **14.5** | **22.3** | **11.3** | **27.1** | **19.3** | **27.3** | **32.2** | **54.4** |
| **Single modes** | **11.8** | **21.8** | **29.8** | **13.9** | **15.8** | **24.7** | **11.2** | **27.4** | **19.5** | **27.4** | **24.3** | **34.3** |
| Truck | 18.0 | 19.3 | 54.3 | 22.6 | 23.9 | 55.3 | 26.3 | 44.0 | 65.9 | 32.1 | 15.4 | 51.7 |
| For-hire truck | 29.8 | 38.3 | 92.2 | 35.3 | 43.4 | 80.8 | 35.7 | S | S | 30.3 | 21.9 | 43.0 |
| Private truck | 23.2 | 14.2 | 61.6 | 26.4 | 18.5 | 65.9 | S | 16.5 | S | 31.0 | 15.7 | 45.1 |
| Rail | 17.9 | 33.3 | 16.0 | 11.5 | 18.4 | 14.9 | 12.7 | 30.6 | 15.9 | 9.7 | 8.7 | 9.4 |
| Water | S | 41.4 | S | S | 41.9 | S | S | 41.0 | S | 31.8 | 26.6 | 18.7 |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 25.8 | 32.6 | 23.0 |
| Pipeline | 43.5 | 34.2 | 107.1 | 40.4 | 41.1 | 127.4 | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **41.9** | **29.8** | **20.6** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | 37.9 | S | 41.1 | S | S | 41.7 | 29.8 | 20.6 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 31.6 | 31.6 | .1 |
| **Other and unknown modes** | **44.1** | **47.1** | **26.1** | **S** | **S** | **S** | **46.5** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

## Table B–7b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997—Con.

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **DIVISION 4.1, FLAMMABLE SOLIDS** | | | | | | | | | | | | |
| **Total** | **30.0** | **10.8** | **51.5** | **9.7** | **24.3** | **23.8** | **16.8** | **40.8** | **16.3** | **43.3** | **14.4** | **13.3** |
| **Single modes** | **32.6** | **12.2** | **52.1** | **9.7** | **24.6** | **24.2** | **16.9** | **41.5** | **16.7** | **S** | **15.3** | **S** |
| Truck | 38.9 | 15.0 | 62.6 | 7.1 | 4.9 | 11.7 | 24.7 | 18.9 | 32.8 | S | 19.5 | S |
| For-hire truck | 21.6 | 20.6 | 9.9 | 12.3 | 8.6 | 17.7 | 32.9 | 23.3 | 38.6 | 28.1 | 10.7 | 20.5 |
| Private truck | 46.1 | 22.5 | 177.2 | 21.7 | 25.4 | 89.8 | 18.7 | 30.8 | 62.1 | S | 28.2 | S |
| Rail | S | 41.3 | S | 26.5 | 40.6 | 23.0 | 20.4 | 43.8 | 13.1 | 14.8 | 18.8 | 14.8 |
| Water | 44.1 | S | S | 49.9 | S | S | S | S | S | 30.1 | 31.6 | 108.4 |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 25.4 | 26.8 | 51.8 |
| Pipeline | S | S | S | S | 46.4 | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **44.0** | **13.9** | **46.8** |
| Parcel, U.S. Postal Service or courier | 39.7 | S | S | 46.8 | 42.8 | 8.4 | 48.5 | 47.5 | 9.9 | 20.7 | 13.7 | 21.7 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 31.1 | 32.7 | 132.3 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **37.4** | **S** |
| **DIVISION 4.2, SPONTANEOUSLY COMBUSTIBLE MATERIALS** | | | | | | | | | | | | |
| **Total** | **36.3** | **13.3** | **65.1** | **35.4** | **13.5** | **36.7** | **39.4** | **10.0** | **27.3** | **19.4** | **22.6** | **19.5** |
| **Single modes** | **37.7** | **13.5** | **64.5** | **35.6** | **13.7** | **36.8** | **39.8** | **9.9** | **26.9** | **23.9** | **37.5** | **21.7** |
| Truck | 39.6 | 20.6 | 116.2 | 43.3 | 25.2 | 55.2 | S | 18.3 | S | 24.4 | 39.1 | 27.8 |
| For-hire truck | S | 20.0 | S | 45.6 | 29.4 | 77.5 | S | 19.2 | S | 19.0 | 26.0 | 18.4 |
| Private truck | 20.9 | 37.5 | 103.9 | 27.2 | 21.3 | 12.8 | S | 24.6 | S | 21.1 | 44.4 | 32.5 |
| Rail | 36.9 | 16.6 | 16.1 | S | 13.5 | S | 43.1 | 13.9 | 18.5 | 25.8 | 4.8 | 13.8 |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | 45.3 | S | S | 48.5 | S | 28.7 | 27.4 | 68.1 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **46.0** | **S** | **S** | **33.3** | **S** | **S** | **S** | **S** | **S** | **23.8** | **36.4** | **36.4** |
| Parcel, U.S. Postal Service or courier | 46.2 | S | S | 33.8 | S | S | S | S | S | 23.8 | 35.6 | 41.2 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 30.1 | 29.0 | 44.2 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **31.1** | **S** |
| **DIVISION 4.3, DANGEROUS WHEN WET MATERIALS** | | | | | | | | | | | | |
| **Total** | **S** | **24.7** | **S** | **42.8** | **S** | **S** | **S** | **23.8** | **S** | **17.6** | **15.5** | **18.1** |
| **Single modes** | **S** | **23.1** | **S** | **45.2** | **S** | **S** | **S** | **23.4** | **S** | **21.5** | **10.7** | **25.7** |
| Truck | S | 25.3 | S | 48.0 | S | S | S | 26.4 | S | 22.6 | 11.4 | 27.6 |
| For-hire truck | S | 21.0 | S | S | 22.4 | S | S | 26.4 | S | 21.5 | 7.7 | 27.6 |
| Private truck | 41.1 | 47.3 | 40.2 | 36.4 | S | S | S | S | S | 37.0 | 24.7 | 14.7 |
| Rail | S | 21.4 | S | S | 40.9 | S | S | 32.2 | S | 29.8 | 28.8 | 66.5 |
| Water | – | S | S | – | S | S | – | S | S | – | 30.8 | – |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 28.0 | 29.7 | 75.4 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **46.0** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **29.9** | **24.0** | **12.7** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | S | S | 25.6 | 24.5 | 11.5 |
| Other multiple modes | S | S | S | S | S | S | S | S | S | 27.3 | 27.6 | 29.3 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **44.8** | **S** |
| **DIVISION 5.1, OXIDIZERS** | | | | | | | | | | | | |
| **Total** | **21.2** | **13.7** | **28.0** | **29.1** | **12.2** | **40.6** | **29.4** | **18.9** | **30.2** | **21.0** | **15.0** | **55.4** |
| **Single modes** | **21.8** | **14.0** | **28.7** | **29.1** | **12.1** | **40.2** | **30.0** | **19.0** | **29.5** | **17.3** | **16.0** | **49.3** |
| Truck | 25.3 | 14.5 | 37.3 | 37.0 | 14.2 | 61.9 | 47.2 | 19.3 | 77.8 | 19.3 | 16.3 | 56.2 |
| For-hire truck | 24.6 | 17.1 | 28.1 | 44.2 | 20.8 | 99.5 | S | 23.0 | S | 15.6 | 8.1 | 19.5 |
| Private truck | 40.5 | 13.8 | 77.7 | 32.2 | 12.8 | 36.9 | 21.5 | 16.1 | 19.4 | 19.4 | 20.4 | 34.4 |
| Rail | 41.0 | 40.2 | 37.9 | 24.2 | 21.2 | 24.5 | 22.1 | 26.1 | 15.7 | 16.8 | 11.4 | 14.6 |
| Water | – | S | S | – | S | S | – | S | S | – | S | S |
| Air (includes truck and air) | S | S | S | 49.7 | 45.4 | S | S | S | S | 31.3 | 30.9 | 57.9 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **41.5** | **39.7** | **137.1** | **S** | **S** | **S** | **S** | **S** | **S** | **18.0** | **11.0** | **56.4** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | 40.2 | S | 25.1 | 11.7 | 78.8 |
| Other multiple modes | 49.3 | S | S | S | S | S | S | S | S | S | 25.3 | S |
| **Other and unknown modes** | **S** | **35.8** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **44.2** | **S** |

See footnotes at end of table.

## Table B–7b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: 2002 and 1997—Con.

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Hazard class division and mode of transportation | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| **DIVISION 5.2, ORGANIC PEROXIDES** | | | | | | | | | | | | |
| **Total** | **49.4** | **23.8** | **142.1** | **S** | **19.9** | **S** | **S** | **23.7** | **S** | **16.4** | **18.9** | **39.5** |
| **Single modes** | **49.7** | **24.5** | **146.6** | **S** | **20.0** | **S** | **S** | **24.7** | **S** | **17.6** | **16.4** | **35.4** |
| Truck | S | 24.5 | S | S | 20.0 | S | S | 24.7 | S | 17.7 | 21.3 | 46.3 |
| For-hire truck | S | 24.9 | S | S | 22.0 | S | S | 22.7 | S | 16.0 | 12.6 | 22.1 |
| Private truck | S | 43.4 | S | 44.1 | 41.2 | 31.3 | 49.5 | S | S | 31.7 | 13.7 | 16.7 |
| Rail | S | – | S | S | – | S | S | – | S | 30.1 | – | – |
| Water | – | – | – | – | – | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | S | S | S | 31.6 | 31.6 | 15.2 |
| Pipeline | – | – | – | – | – | – | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **29.5** | **46.9** | **99.4** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S | S | S | 29.5 | 41.3 | 93.4 |
| Other multiple modes | – | S | S | – | S | S | – | S | S | – | 31.6 | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **31.6** | **26.8** | **S** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–7c. Estimated Standard Errors for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 1.1, EXPLOSIVES WITH A MASS EXPLOSION HAZARD** | | | | | | |
| **Total** | **–** | **–** | **S** | **S** | **S** | **S** |
| **Single modes** | **1.0** | **.4** | **S** | **S** | **S** | **S** |
| Truck | 1.0 | 10.2 | S | 15.5 | S | S |
| For-hire truck | 13.4 | 9.4 | S | 12.3 | S | 16.6 |
| Private truck | S | 8.9 | S | S | S | S |
| Rail | – | S | – | S | – | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | – | S | – | S |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 1.2, EXPLOSIVES WITH A PROJECTION HAZARD** | | | | | | |
| **Total** | **S** | **S** | **S** | **–** | **S** | **–** |
| **Single modes** | **S** | **S** | **S** | **–** | **S** | **–** |
| Truck | S | S | S | 3.8 | S | 4.5 |
| For-hire truck | S | S | S | 11.5 | S | 11.4 |
| Private truck | – | S | – | S | – | S |
| Rail | – | – | – | – | – | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | – | S | – | S | – | S |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **–** | **–** | **–** | **–** | **–** | **–** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **–** | **S** | **–** | **S** |
| **DIVISION 1.3, EXPLOSIVES WITH PREDOMINANTLY A FIRE HAZARD** | | | | | | |
| **Total** | **S** | **–** | **–** | **–** | **–** | **–** |
| **Single modes** | **S** | **6.4** | **–** | **9.9** | **–** | **8.2** |
| Truck | S | 7.0 | S | 9.9 | 5.2 | 8.2 |
| For-hire truck | S | 10.3 | S | 11.4 | S | 9.3 |
| Private truck | S | 8.2 | S | S | S | S |
| Rail | S | – | S | – | S | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **–** | **S** | **–** | **S** | **–** | **S** |
| Parcel, U.S. Postal Service or courier | – | S | – | S | – | S |
| Other multiple modes | – | – | – | – | – | – |
| **Other and unknown modes** | **–** | **S** | **–** | **S** | **–** | **S** |
| **DIVISION 1.4, EXPLOSIVES WITH NO SIGNIFICANT BLAST HAZARD** | | | | | | |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| **Single modes** | **3.5** | **2.0** | **1.8** | **.8** | **1.9** | **1.1** |
| Truck | 3.3 | 3.8 | 1.9 | 2.5 | 2.3 | 5.8 |
| For-hire truck | 3.9 | 4.9 | 2.7 | 5.7 | 2.7 | 7.6 |
| Private truck | S | 4.6 | 1.9 | 4.8 | S | 3.5 |
| Rail | S | S | S | S | S | S |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | 1.9 | .3 | .1 | S | .2 |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **3.5** | **2.2** | **S** | **.9** | **S** | **1.2** |
| Parcel, U.S. Postal Service or courier | 3.5 | 2.3 | S | 1.0 | S | 1.2 |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **.7** | **S** | **.4** | **S** | **S** |

See footnotes at end of table.

Table B–7c. **Estimated Standard Errors for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 1.5, VERY INSENSITIVE EXPLOSIVES, BLASTING AGENT** | | | | | | |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| **Single modes** | **.2** | **.3** | **–** | **.4** | **–** | **1.4** |
| Truck | 3.6 | .3 | 3.9 | .4 | 7.0 | 1.4 |
| For-hire truck | 5.5 | 2.2 | 9.2 | 2.9 | 9.3 | 9.1 |
| Private truck | 7.8 | 2.3 | S | 3.1 | 9.2 | S |
| Rail | 2.7 | – | 3.9 | – | 7.7 | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | – | S | – | S | – |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | – | S | – | S | – |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 2.1, FLAMMABLE GASES** | | | | | | |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| **Single modes** | **.4** | **1.3** | **.2** | **.7** | **.5** | **1.1** |
| Truck | 5.3 | 3.1 | 6.3 | 2.4 | 4.5 | 3.3 |
| For-hire truck | 3.1 | 1.7 | 3.4 | 2.3 | 4.6 | 3.1 |
| Private truck | 5.1 | 4.0 | 6.1 | 1.7 | 2.1 | 1.3 |
| Rail | 2.8 | 1.2 | 3.0 | 1.2 | 4.3 | 5.9 |
| Water | 1.1 | .8 | 2.3 | 1.3 | 2.2 | 4.4 |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline | 4.5 | 3.4 | 5.1 | 2.6 | S | S |
| **Multiple modes** | **.2** | **.2** | **.2** | **.2** | **.5** | **.5** |
| Parcel, U.S. Postal Service or courier | S | – | S | – | S | – |
| Other multiple modes | – | .2 | .2 | .2 | .5 | .5 |
| **Other and unknown modes** | **S** | **1.3** | **–** | **.7** | **–** | **S** |
| **DIVISION 2.2, NONFLAMMABLE, NONTOXIC COMPRESSED GASES** | | | | | | |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| **Single modes** | **1.2** | **1.0** | **.3** | **1.6** | **2.2** | **1.4** |
| Truck | 2.0 | 2.4 | 9.9 | 2.8 | 7.9 | 8.7 |
| For-hire truck | 8.2 | 3.5 | 6.8 | 1.3 | 9.8 | 3.3 |
| Private truck | 7.8 | 2.9 | 9.4 | 3.4 | 9.7 | 6.4 |
| Rail | .3 | .5 | .6 | .2 | S | 2.1 |
| Water | S | S | S | S | S | S |
| Air (includes truck and air) | .2 | 1.0 | S | – | S | – |
| Pipeline | S | 1.1 | S | 3.0 | S | S |
| **Multiple modes** | **1.2** | **.4** | **.1** | **S** | **S** | **.2** |
| Parcel, U.S. Postal Service or courier | 1.2 | .4 | S | S | – | S |
| Other multiple modes | .1 | – | S | S | S | S |
| **Other and unknown modes** | **.2** | **.9** | **.1** | **S** | **S** | **S** |
| **DIVISION 2.3, GASES TOXIC BY INHALATION** | | | | | | |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| **Single modes** | **.4** | **2.0** | **.7** | **4.6** | **.2** | **.5** |
| Truck | 7.4 | 3.2 | 6.2 | 3.9 | 6.1 | 1.7 |
| For-hire truck | 7.3 | 3.6 | 5.7 | 4.2 | 5.8 | S |
| Private truck | 7.0 | 4.2 | 4.5 | 3.8 | S | 1.2 |
| Rail | 4.9 | 3.6 | 5.9 | 3.1 | 7.9 | 5.1 |
| Water | S | 2.2 | S | 4.4 | S | 4.7 |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline | 5.5 | 2.8 | 6.1 | 4.4 | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | – | – | S |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **.5** | **1.9** | **S** | **S** | **.2** | **S** |

See footnotes at end of table.

## Table B–7c. **Estimated Standard Errors for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 4.1, FLAMMABLE SOLIDS** | | | | | | |
| **Total** | – | – | – | – | – | – |
| **Single modes** | **6.2** | **3.3** | **.2** | **.9** | **.5** | **1.5** |
| Truck | 9.4 | 4.6 | 6.4 | 7.0 | 5.9 | 4.6 |
| For-hire truck | 6.3 | 5.4 | 6.7 | 5.2 | 4.2 | 3.7 |
| Private truck | 10.6 | 5.4 | 4.4 | 3.3 | 2.8 | 1.5 |
| Rail | S | 4.1 | 5.0 | 7.2 | 7.5 | 4.9 |
| Water | .7 | S | 5.4 | S | S | S |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline | S | S | S | 2.1 | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 2.2 | S | – | – | – | – |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.2, SPONTANEOUSLY COMBUSTIBLE MATERIALS** | | | | | | |
| **Total** | – | – | – | – | – | – |
| **Single modes** | **1.5** | **.8** | **1.1** | **.5** | **2.8** | **.3** |
| Truck | 3.9 | 7.7 | 9.7 | 7.4 | S | 7.9 |
| For-hire truck | S | 6.8 | 10.8 | 7.4 | S | 6.9 |
| Private truck | 9.9 | 4.5 | 9.0 | 2.1 | S | 1.2 |
| Rail | 2.9 | 7.7 | S | 7.5 | 13.1 | 7.8 |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | – | S | – |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **1.5** | **S** | **1.1** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 1.5 | S | 1.1 | S | S | S |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 4.3, DANGEROUS WHEN WET MATERIALS** | | | | | | |
| **Total** | **S** | – | – | **S** | **S** | – |
| **Single modes** | **S** | **1.8** | **5.8** | **S** | **S** | **.8** |
| Truck | S | 3.5 | 7.0 | S | S | 6.2 |
| For-hire truck | S | 5.4 | S | 15.6 | S | 7.0 |
| Private truck | 9.1 | 4.9 | 10.8 | S | S | S |
| Rail | S | 3.9 | S | 5.9 | S | 6.2 |
| Water | – | S | – | S | – | S |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **3.3** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S |
| Other multiple modes | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| **DIVISION 5.1, OXIDIZERS** | | | | | | |
| **Total** | – | – | – | – | – | – |
| **Single modes** | **2.0** | **.7** | **1.7** | **1.0** | **2.4** | **.7** |
| Truck | 5.2 | 5.6 | 6.6 | 4.5 | 8.5 | 6.0 |
| For-hire truck | 7.5 | 4.5 | 8.4 | 3.9 | S | 5.3 |
| Private truck | 7.7 | 3.0 | 6.2 | 3.2 | 2.7 | 1.3 |
| Rail | 5.2 | 5.6 | 6.5 | 4.6 | 8.8 | 5.9 |
| Water | – | S | – | S | – | S |
| Air (includes truck and air) | S | S | – | – | S | S |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **1.8** | **.5** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | – |
| Other multiple modes | 1.9 | S | S | S | S | S |
| **Other and unknown modes** | **S** | **.5** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

## Table B–7c. **Estimated Standard Errors for Hazardous Material Shipment Characteristics by Hazard Class Division and Mode of Transportation: Percent of Total for 2002 and 1997**—Con.

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

| Hazard class division and mode of transportation | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **DIVISION 5.2, ORGANIC PEROXIDES** | | | | | | |
| **Total** | **–** | **–** | **S** | **–** | **S** | **–** |
| **Single modes** | **1.2** | **2.0** | **S** | **1.3** | **S** | **3.6** |
| Truck | S | 2.0 | S | 1.3 | S | 3.6 |
| For-hire truck | S | 6.6 | S | 6.8 | S | 8.4 |
| Private truck | S | 7.0 | 14.5 | 7.3 | 11.8 | S |
| Rail | S | – | S | – | S | – |
| Water | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S |
| Pipeline | – | – | – | – | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S |
| Other multiple modes | – | S | – | S | – | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs*.

# Table B–8. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Selected UN Numbers and Mode of Transportation: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number, description, and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **UN 1066, NITROGEN, COMPRESSED** | | | | | | | |
| **Total** | **33.9** | **–** | **42.1** | **–** | **S** | **S** | **20.8** |
| **Single modes** | **34.0** | **.3** | **42.1** | **–** | **S** | **S** | **22.3** |
| Truck[2] | 35.2 | 4.0 | 37.3 | 7.3 | 49.7 | 1.6 | 22.4 |
| For-hire truck | S | S | S | S | S | S | 38.6 |
| Private truck | 34.4 | 12.3 | 41.2 | 10.4 | S | S | 26.3 |
| Rail | S | S | S | S | S | S | 31.6 |
| Water | S | S | S | S | S | S | 31.6 |
| Air (includes truck and air) | S | S | S | S | S | S | 29.8 |
| Pipeline[3] | S | S | S | S | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **29.8** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 29.8 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **29.1** |
| **UN 1072, OXYGEN, COMPRESSED** | | | | | | | |
| **Total** | **38.2** | **–** | **S** | **S** | **S** | **S** | **S** |
| **Single modes** | **38.6** | **.5** | **S** | **S** | **S** | **S** | **S** |
| Truck[2] | 42.6 | 6.2 | S | S | S | S | S |
| For-hire truck | S | S | S | S | 46.0 | 12.3 | 35.8 |
| Private truck | 17.9 | 14.8 | 33.1 | 18.0 | S | S | 36.2 |
| Rail | – | – | – | – | – | – | – |
| Water | – | – | – | – | – | – | – |
| Air (includes truck and air) | S | S | S | S | S | S | 29.8 |
| Pipeline[3] | S | S | S | S | S | S | S |
| **Multiple modes** | **45.0** | **–** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S |
| Other multiple modes | S | S | S | S | S | S | 32.6 |
| **Other and unknown modes** | **44.3** | **.6** | **S** | **S** | **S** | **S** | **28.2** |
| **UN 1075, PETROLEUM GASES** | | | | | | | |
| **Total** | **12.9** | **–** | **14.0** | **–** | **26.0** | **–** | **43.5** |
| **Single modes** | **12.8** | **.5** | **13.9** | **.3** | **26.2** | **1.2** | **40.8** |
| Truck[2] | 18.2 | 5.4 | 21.8 | 5.4 | 45.8 | 6.1 | 39.5 |
| For-hire truck | 37.9 | 4.4 | 35.7 | 5.3 | S | S | 19.0 |
| Private truck | 17.3 | 5.0 | 26.6 | 5.2 | 46.3 | 2.4 | 29.8 |
| Rail | 32.4 | 4.3 | 29.3 | 4.9 | 28.4 | 7.8 | 6.0 |
| Water | 35.8 | .3 | 33.7 | .3 | 44.8 | 1.0 | 28.4 |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | 21.5 | 5.4 | 20.7 | 5.8 | S | S | S |
| **Multiple modes** | **38.3** | **.1** | **44.7** | **.3** | **49.8** | **1.2** | **38.0** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S |
| Other multiple modes | 38.7 | .1 | 44.7 | .3 | 49.8 | 1.2 | S |
| **Other and unknown modes** | **S** | **S** | **49.6** | **–** | **44.5** | **–** | **S** |
| **UN 1202, GAS OIL, DIESEL FUEL, HEATING OIL, LIGHT** | | | | | | | |
| **Total** | **11.3** | **–** | **11.1** | **–** | **21.5** | **–** | **16.0** |
| **Single modes** | **12.1** | **1.0** | **11.8** | **1.0** | **26.2** | **9.3** | **19.1** |
| Truck[2] | 13.5 | 6.7 | 12.5 | 6.2 | 37.9 | 7.6 | 20.7 |
| For-hire truck | 9.5 | 2.8 | 10.4 | 2.8 | S | S | 49.2 |
| Private truck | 20.3 | 5.0 | 17.9 | 4.2 | 30.2 | 5.4 | 13.3 |
| Rail | S | S | S | S | S | S | 25.7 |
| Water | S | S | S | S | S | S | S |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | 22.8 | 6.8 | 20.2 | 6.4 | S | S | S |
| **Multiple modes** | **42.2** | **1.0** | **41.1** | **1.0** | **S** | **S** | **25.6** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 31.6 |
| Other multiple modes | 42.2 | 1.0 | 41.1 | 1.0 | S | S | 25.9 |
| **Other and unknown modes** | **S** | **S** | **46.4** | **.7** | **S** | **S** | **S** |

See footnotes at end of table.

## Table B–8. **Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Selected UN Numbers and Mode of Transportation: 2002**—Con.

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number, description, and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **UN 1203, GASOLINE** | | | | | | | |
| **Total** | **3.6** | **–** | **3.8** | **–** | **11.1** | **–** | **10.7** |
| **Single modes** | **3.5** | **.3** | **3.6** | **.2** | **11.5** | **1.6** | **14.3** |
| Truck[2] | 5.1 | 2.3 | 5.9 | 2.2 | 11.7 | 5.7 | 14.6 |
| For-hire truck | 7.5 | 1.3 | 9.7 | 1.6 | 21.9 | 4.5 | 21.6 |
| Private truck | 5.9 | 2.1 | 6.0 | 1.8 | 13.4 | 2.8 | 15.2 |
| Rail | 23.9 | – | 34.9 | .2 | 43.3 | 1.2 | 18.3 |
| Water | 24.3 | 1.3 | 24.6 | 1.8 | 19.0 | 3.5 | S |
| Air (includes truck and air) | S | S | S | S | S | S | 30.0 |
| Pipeline[3] | 8.1 | 1.9 | 8.0 | 2.0 | S | S | S |
| **Multiple modes** | **41.3** | **.2** | **38.5** | **.1** | **39.1** | **1.0** | **37.3** |
| Parcel, U.S. Postal Service or courier | 45.6 | .1 | 45.2 | – | 41.0 | – | 13.4 |
| Other multiple modes | 40.8 | .1 | 38.6 | .1 | 39.3 | 1.0 | 25.7 |
| **Other and unknown modes** | **37.2** | **.3** | **35.7** | **.2** | **S** | **S** | **S** |
| **UN 1824, SODIUM HYDROXIDE SOLUTION** | | | | | | | |
| **Total** | **20.2** | **–** | **15.3** | **–** | **15.9** | **–** | **19.7** |
| **Single modes** | **20.7** | **1.4** | **15.7** | **1.6** | **16.6** | **3.8** | **23.2** |
| Truck[2] | 25.9 | 4.6 | 25.6 | 4.2 | 43.7 | 4.7 | 25.2 |
| For-hire truck | 41.9 | 5.3 | 17.9 | 2.9 | 30.8 | 2.8 | 15.8 |
| Private truck | 20.2 | 5.0 | 40.3 | 3.1 | S | S | 24.2 |
| Rail | 24.9 | 4.8 | 14.4 | 5.3 | 15.9 | 7.5 | 5.4 |
| Water | 24.7 | 2.4 | 24.6 | 5.3 | 42.0 | 7.8 | 32.8 |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | 38.1 | .6 | 33.6 | 1.7 | S | S | S |
| **Multiple modes** | **40.2** | **.9** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | 44.4 | .5 | 48.7 | – | S | S | 30.6 |
| Other multiple modes | S | S | S | S | S | S | S |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **26.9** |
| **UN 1863, FUEL, AVIATION, TURBINE ENGINE** | | | | | | | |
| **Total** | **11.7** | **–** | **12.3** | **–** | **19.3** | **–** | **14.6** |
| **Single modes** | **12.0** | **.6** | **12.5** | **.6** | **19.3** | **.3** | **16.2** |
| Truck[2] | 9.2 | 2.4 | 11.4 | 2.9 | 23.5 | 7.1 | 19.8 |
| For-hire truck | 15.4 | 1.6 | 16.0 | 1.6 | 35.4 | 6.6 | 17.7 |
| Private truck | 21.5 | 2.2 | 28.0 | 2.8 | 25.9 | 1.3 | 32.3 |
| Rail | 39.4 | 2.6 | 39.1 | 2.7 | 40.4 | 8.1 | 23.5 |
| Water | 31.0 | 3.6 | 34.0 | 4.0 | 34.4 | 10.6 | 22.8 |
| Air (includes truck and air) | S | S | S | S | S | S | 31.6 |
| Pipeline[3] | 17.6 | 4.7 | 18.9 | 5.5 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | S |
| Other multiple modes | S | S | S | S | S | S | 30.6 |
| **Other and unknown modes** | **S** | **S** | **S** | **S** | **S** | **S** | **34.8** |
| **UN 1964,HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.** | | | | | | | |
| **Total** | **33.9** | **–** | **36.3** | **–** | **32.1** | **–** | **15.1** |
| **Single modes** | **34.2** | **.3** | **36.4** | **.5** | **32.2** | **.2** | **14.5** |
| Truck[2] | 40.7 | 8.9 | S | S | 38.8 | 7.0 | 20.4 |
| For-hire truck | 19.7 | 3.6 | 29.1 | 8.0 | S | S | S |
| Private truck | S | S | S | S | S | S | 19.6 |
| Rail | 19.4 | 7.2 | 31.4 | 7.2 | 30.9 | 6.3 | 8.6 |
| Water | S | S | S | S | S | S | 46.7 |
| Air (includes truck and air) | S | S | S | S | S | S | 31.6 |
| Pipeline[3] | 45.7 | 9.4 | 44.2 | 9.5 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **29.2** |
| Parcel, U.S. Postal Service or courier | S | S | S | S | S | S | 29.2 |
| Other multiple modes | – | – | – | – | – | – | – |
| **Other and unknown modes** | **32.7** | **.3** | **S** | **S** | **S** | **S** | **S** |

See footnotes at end of table.

## Table B–8. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Selected UN Numbers and Mode of Transportation: 2002—Con.

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number, description, and mode of transportation | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| **UN 1993, FLAMMABLE LIQUIDS, N.O.S.** | | | | | | | |
| **Total** | **8.7** | **–** | **8.4** | **–** | **9.6** | **–** | **19.2** |
| **Single modes** | **8.3** | **.8** | **8.1** | **.9** | **10.4** | **3.3** | **11.8** |
| Truck[2] | 7.4 | 2.0 | 6.4 | 1.5 | 12.4 | 3.4 | 13.9 |
| For-hire truck | 7.9 | 1.4 | 7.2 | 1.3 | 31.8 | 3.2 | 28.2 |
| Private truck | 9.1 | 1.4 | 8.3 | 1.3 | 12.0 | 3.4 | 12.7 |
| Rail | 21.8 | .4 | 21.1 | .4 | 25.8 | 2.0 | 10.0 |
| Water | 16.6 | 1.2 | 14.3 | 1.3 | 16.5 | 2.9 | S |
| Air (includes truck and air) | 44.8 | – | S | S | S | S | 20.5 |
| Pipeline[3] | 16.1 | 2.5 | 17.1 | 2.7 | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **20.5** |
| Parcel, U.S. Postal Service or courier | 31.2 | – | 26.5 | – | S | S | 22.3 |
| Other multiple modes | S | S | S | S | S | S | S |
| **Other and unknown modes** | **32.5** | **.2** | **42.7** | **.3** | **28.2** | **–** | **34.7** |
| **UN 3257, ELEVATED TEMPERATURE LIQUID, N.O.S.** | | | | | | | |
| **Total** | **25.4** | **–** | **25.6** | **–** | **17.8** | **–** | **22.9** |
| **Single modes** | **25.6** | **.6** | **26.0** | **1.1** | **18.0** | **1.0** | **23.0** |
| Truck[2] | 32.6 | 8.6 | 31.5 | 8.0 | 24.9 | 6.7 | 16.6 |
| For-hire truck | 31.6 | 8.2 | 31.4 | 7.5 | 28.3 | 4.4 | 14.1 |
| Private truck | 40.5 | 5.8 | 36.8 | 5.5 | 24.2 | 3.8 | 23.6 |
| Rail | 19.9 | 3.5 | 25.9 | 4.1 | 21.2 | 6.1 | 6.3 |
| Water | S | S | 46.7 | 7.5 | S | S | 28.1 |
| Air (includes truck and air) | – | – | – | – | – | – | – |
| Pipeline[3] | – | – | – | – | S | S | S |
| **Multiple modes** | **S** | **S** | **S** | **S** | **S** | **S** | **35.2** |
| Parcel, U.S. Postal Service or courier | – | – | – | – | – | – | – |
| Other multiple modes | S | S | S | S | S | S | 35.2 |
| **Other and unknown modes** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| **ALL OTHER** | | | | | | | |
| **Total** | **6.5** | **–** | **13.0** | **–** | **7.5** | **–** | **11.7** |
| **Single modes** | **6.8** | **.5** | **12.8** | **.3** | **7.2** | **1.1** | **8.8** |
| Truck[2] | 8.0 | 2.4 | 10.0 | 2.2 | 8.4 | 2.3 | 12.6 |
| For-hire truck | 9.9 | 2.8 | 8.1 | 2.1 | 10.4 | 3.0 | 7.2 |
| Private truck | 11.7 | 2.2 | 16.1 | 1.7 | 23.4 | 1.3 | 8.3 |
| Rail | 11.7 | 1.3 | 11.6 | 1.3 | 9.7 | 2.6 | 4.4 |
| Water | 15.4 | .7 | 19.1 | 1.7 | 16.7 | 1.9 | 20.7 |
| Air (includes truck and air) | 20.8 | .2 | 40.4 | – | 41.8 | – | 7.8 |
| Pipeline[3] | 24.3 | 1.4 | 27.0 | 2.2 | S | S | S |
| **Multiple modes** | **12.4** | **.4** | **34.8** | **.3** | **32.3** | **1.2** | **12.8** |
| Parcel, U.S. Postal Service or courier | 14.0 | .3 | 19.3 | – | 16.8 | – | 13.3 |
| Other multiple modes | 19.7 | .3 | 36.3 | .3 | 33.1 | 1.2 | 25.5 |
| **Other and unknown modes** | **29.7** | **.3** | **27.0** | **.1** | **26.6** | **.1** | **39.2** |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–9a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by For-Hire Truck for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **5.2** | **–** | **6.2** | **–** | **9.4** | **–** | **7.4** |
| 1005 | Ammonia, anhydrous | 48.1 | .2 | 46.8 | .5 | 49.2 | .6 | S |
| 1075 | Petroleum, gases | 37.9 | .8 | 35.7 | 1.1 | S | S | 19.0 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 9.5 | .2 | 10.4 | .4 | S | S | 49.2 |
| 1203 | Gasoline | 7.5 | 2.4 | 9.7 | 2.8 | 21.9 | 4.1 | 21.6 |
| 1263 | Paint including paint, lacquer, enamel, stain | 47.6 | 3.0 | 26.6 | .3 | 25.5 | 1.1 | 13.5 |
| 1268 | Petroleum distillates, n.o.s. | 31.3 | .4 | 41.1 | .4 | 21.1 | .2 | 27.3 |
| 1760 | Corrosive liquids, n.o.s. | 32.8 | .4 | 40.2 | .3 | 38.2 | .7 | 24.0 |
| 1824 | Sodium hydroxide solution | 41.9 | .3 | 17.9 | .2 | 30.8 | .9 | 15.8 |
| 1830 | Sulfuric acid | 43.3 | .1 | 16.9 | .2 | 33.0 | .5 | 16.1 |
| 1863 | Fuel, aviation, turbine engine | 15.4 | .1 | 16.0 | .2 | 35.4 | .2 | 17.7 |
| 1942 | Ammonium nitrate, with not more than 0.2 percent total | S | S | S | S | S | S | 17.3 |
| 1987 | Alcohols, n.o.s. | 15.5 | .2 | 14.8 | .1 | 17.6 | .2 | 27.6 |
| 1993 | Flammable liquids, n.o.s. | 7.9 | .7 | 7.2 | .9 | 31.8 | 2.4 | 28.2 |
| 1999 | Tars, liquid | 49.0 | .2 | 43.1 | .5 | S | S | 20.9 |
| 2448 | Sulfur, molten | 24.7 | – | 15.2 | .1 | 15.6 | – | 13.4 |
| 2794 | Batteries, wet, filled with acid, electric storage | 43.5 | .7 | 47.9 | .3 | S | S | 17.3 |
| 2924 | Flammable liquids, corrosive, n.o.s. | 38.8 | – | S | S | S | S | S |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 20.8 | .2 | 38.9 | .3 | 32.1 | .9 | 10.0 |
| 3257 | Elevated temperature liquid, n.o.s. | 31.6 | .5 | 31.4 | 1.2 | 28.3 | .9 | 14.1 |
| 3264 | Corrosive liquid, acidic, inorganic, n.o.s. | 27.2 | .3 | S | S | S | S | 17.0 |
| | All other | 3.9 | 1.9 | 9.2 | 1.1 | 11.2 | 3.2 | 7.8 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–9b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Private Truck for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **4.8** | **–** | **5.3** | **–** | **7.9** | **–** | **5.3** |
| 0332 | Explosive, blasting, type E or agent blasting, type E | 40.3 | .1 | S | S | 44.5 | .3 | 46.1 |
| 1005 | Ammonia, anhydrous | 27.0 | – | 25.9 | .1 | S | S | S |
| 1006 | Argon, compressed | 49.2 | .4 | 48.7 | .3 | S | S | S |
| 1013 | Carbon dioxide | 29.8 | .1 | S | S | S | S | 26.1 |
| 1017 | Chlorine | 48.3 | .3 | S | S | S | S | 17.8 |
| 1066 | Nitrogen, compressed | 34.4 | .1 | 41.2 | .7 | S | S | 26.3 |
| 1072 | Oxygen, compressed | 17.9 | – | 33.1 | .3 | S | S | 36.2 |
| 1075 | Petroleum gases | 17.3 | .6 | 26.6 | .6 | 46.3 | 1.6 | 29.8 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 20.3 | .8 | 17.9 | .8 | 30.2 | .6 | 13.3 |
| 1203 | Gasoline | 5.9 | 2.0 | 6.0 | 2.0 | 13.4 | 3.4 | 15.2 |
| 1223 | Kerosene | 26.6 | .1 | 31.5 | .2 | 42.5 | .2 | 23.2 |
| 1263 | Paint including paint, lacquer, enamel, stain | 25.9 | .9 | 22.6 | .1 | 19.5 | .2 | 17.9 |
| 1267 | Petorleum crude oil | S | S | S | S | S | S | 31.4 |
| 1789 | Hydrochloric acid | 23.7 | – | 46.9 | .2 | 40.5 | .2 | 16.8 |
| 1824 | Sodium hydroxide solution | 20.2 | .2 | 40.3 | .3 | S | S | 24.2 |
| 1863 | Fuel, aviation, turbine engine | 21.5 | .1 | 28.0 | .2 | 25.9 | .1 | 32.3 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | 19.6 |
| 1993 | Flammable liquids, n.o.s. | 9.1 | 1.2 | 8.3 | 1.4 | 12.0 | 2.6 | 12.7 |
| 3077 | Environmentally hazardous substance, solid, n.o.s. | S | S | S | S | S | S | 20.0 |
| 3257 | Elevated temperature liquid, n.o.s. | 40.5 | .2 | 36.8 | .5 | 24.2 | .8 | 23.6 |
| | All other | 8.5 | 1.1 | 7.7 | .4 | 12.7 | 1.4 | 19.3 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–9c. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Rail for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **7.7** | **–** | **6.6** | **–** | **5.8** | **–** | **2.6** |
| 1010 | Butadienes, stablilized | S | S | S | S | S | S | 17.4 |
| 1017 | Chlorine | 11.8 | .2 | 12.8 | .4 | 15.7 | .4 | 14.3 |
| 1055 | Isobutylene see also petroleum gases, liquefied | S | S | S | S | S | S | 30.0 |
| 1075 | Petroleum, gases | 32.4 | 3.7 | 29.3 | 2.9 | 28.4 | 2.3 | 6.0 |
| 1086 | Vinyl chloride, stablized | 17.2 | .3 | 17.1 | .3 | 16.0 | .3 | 12.6 |
| 1203 | Gasoline | 23.9 | .8 | 34.9 | 1.9 | 43.3 | 1.4 | 18.3 |
| 1230 | Methanol | S | S | S | S | S | S | 25.0 |
| 1268 | Petroleum distillates, n.o.s. | 24.0 | .4 | 29.0 | .5 | 28.5 | .5 | 11.0 |
| 1805 | Phosphoric acid, liquid | 30.4 | .7 | 35.3 | .6 | 41.5 | 1.1 | 6.5 |
| 1824 | Sodium hydroxide solution | 24.9 | .5 | 14.4 | .7 | 15.9 | .8 | 5.4 |
| 1830 | Sulfuric acid | 37.9 | .1 | S | S | S | S | 29.2 |
| 1863 | Fuel, aviation, turbine engine | 39.4 | 1.1 | 39.1 | 1.6 | 40.4 | 1.0 | 23.5 |
| 1910 | Calcium oxide | S | S | S | S | S | S | 29.8 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 19.4 | .5 | 31.4 | .7 | 30.9 | 1.1 | 8.6 |
| 1987 | Alcohols, n.o.s. | 25.3 | 1.5 | 26.1 | 1.1 | 28.9 | 1.3 | 15.5 |
| 1993 | Flammable liquids, n.o.s. | 21.8 | .8 | 21.1 | 1.1 | 25.8 | 1.3 | 10.0 |
| 1999 | Tars, liquid | 41.6 | .3 | 41.9 | .7 | S | S | 23.5 |
| 2448 | Sulfur, molten | S | S | 30.2 | .8 | 23.4 | .5 | 15.9 |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 31.1 | 1.2 | 23.7 | .4 | 22.9 | .5 | 7.7 |
| 3257 | Elevated temperature liquid, n.o.s. | 19.9 | 1.0 | 25.9 | 2.0 | 21.2 | 2.3 | 6.3 |
| | All other | 12.5 | 4.4 | 10.9 | 3.4 | 8.3 | 2.8 | 6.1 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–9d. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Water for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **12.5** | **–** | **14.3** | **–** | **12.0** | **–** | **S** |
| 1010 | Butadienes, stablilized | S | S | S | S | 41.4 | .5 | S |
| 1114 | Benzene | 41.9 | 2.1 | 39.8 | .8 | 36.8 | .5 | 27.8 |
| 1145 | Cyclohexane | S | S | S | S | S | S | 34.9 |
| 1202 | Gas oil, diesel fuel, heating oil, light | S | S | S | S | S | S | S |
| 1203 | Gasoline | 24.3 | 6.1 | 24.6 | 5.7 | 19.0 | 5.3 | S |
| 1223 | Kerosene | 45.7 | .6 | 41.1 | .7 | 40.6 | .5 | 30.4 |
| 1230 | Methanol | S | S | S | S | S | S | S |
| 1268 | Petroleum distillates, n.o.s. | 41.5 | .4 | 45.6 | .5 | S | S | S |
| 1270 | Petroleum oil | S | S | S | S | S | S | 31.6 |
| 1307 | Xylenes | 37.2 | .5 | 38.0 | .4 | S | S | S |
| 1824 | Sodium hydroxide solution | 24.7 | .2 | 24.6 | .6 | 42.0 | 1.2 | 32.8 |
| 1830 | Sulfuric acid | S | S | 38.8 | .4 | 43.4 | .3 | 34.9 |
| 1863 | Fuel, aviation, turbine engine | 31.0 | 1.1 | 34.0 | 1.2 | 34.4 | 1.6 | 22.8 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | 46.7 |
| 1993 | Flammable liquids, n.o.s. | 16.6 | 4.9 | 14.3 | 4.7 | 16.5 | 2.2 | S |
| 1999 | Tars, liquid | S | S | S | S | S | S | S |
| 2398 | Methyl tert-butyl ether | S | S | S | S | S | S | 30.4 |
| 2448 | Sulfur, molten | 44.1 | – | 49.9 | .2 | S | S | 30.1 |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 48.3 | 1.8 | 47.7 | 1.0 | S | S | 30.0 |
| 3257 | Elevated temperature liquid, n.o.s. | S | S | 46.7 | 1.2 | S | S | 28.1 |
| | All other | 14.2 | 2.0 | 12.9 | 1.4 | 18.5 | 2.6 | 22.7 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–9e. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Air (Includes Truck and Air) for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **20.7** | **–** | **38.0** | **–** | **39.2** | **–** | **8.2** |
| 0012 | Cartridges for weapons, inert projectile or cartridges, small arms | S | S | S | S | S | S | 24.3 |
| 0186 | Rocket motors | S | S | S | S | S | S | 31.6 |
| 1057 | Lighters or lighter refills containing flammable gas | S | S | S | S | S | S | 39.7 |
| 1072 | Oxygen, compressed | S | S | S | S | S | S | 29.8 |
| 1197 | Extracts, flavoring liquid | 49.8 | .2 | S | S | S | S | 26.7 |
| 1648 | Acetonitrile | S | S | S | S | S | S | 28.2 |
| 1760 | Corrosive liquids, n.o.s. | S | S | S | S | S | S | 25.0 |
| 1845 | Carbon dioxide, solid or dry ice | S | S | S | S | S | S | 25.0 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | 31.6 |
| 1993 | Flammable liquids, n.o.s. | 44.8 | .4 | S | S | S | S | 20.5 |
| 2047 | Dichloropropenes | S | S | S | S | S | S | 31.6 |
| 2283 | Isobutyl methacrylate, stabilized | S | S | S | S | S | S | 30.4 |
| 2794 | Batteries, wet, filled with acid, electric storage | S | S | S | S | S | S | 31.6 |
| 2811 | Toxic solids, organic, n.o.s. | S | S | S | S | S | S | 27.5 |
| 2915 | Radioactive material, type A package nonspecified | S | S | S | S | S | S | 27.9 |
| 3166 | Engines, internal combustion, flammable gas powered | S | S | S | S | S | S | 22.6 |
| 3178 | Flammable solid, inorganic, n.o.s. | S | S | S | S | S | S | 27.3 |
| 3268 | Air bag inflators, or air bag modules, seat-belt pretensioners | S | S | S | S | S | S | 26.5 |
| 3295 | Hydrocarbons, liquids, n.o.s. | S | S | S | S | S | S | 31.3 |
| 3316 | Chemical kits | S | S | S | S | S | S | 30.1 |
| | All other | 18.4 | 9.6 | 24.4 | 9.9 | 31.1 | 7.3 | 9.3 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–9f. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Pipeline for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **6.6** | **–** | **7.0** | **–** | **14.8** | **–** | **36.7** |
| 1005 | Ammonia, anhydrous | S | S | S | S | S | S | 34.8 |
| 1011 | Butane | 40.6 | .2 | 45.9 | .2 | S | S | 47.9 |
| 1013 | Carbon dioxide | S | S | S | S | S | S | S |
| 1066 | Nitrogen, compressed | S | S | S | S | S | S | 29.0 |
| 1072 | Oxygen, compressed | S | S | S | S | S | S | 31.6 |
| 1075 | Petroleum gases | 21.5 | .5 | 20.7 | .4 | 35.9 | .8 | S |
| 1077 | Propylene | 45.7 | .4 | 43.0 | .3 | 41.0 | – | S |
| 1114 | Benzene | S | S | S | S | S | S | S |
| 1202 | Gas oil, diesel fuel, heating oil, light | 22.8 | 1.3 | 20.2 | 1.4 | 23.8 | .9 | 27.3 |
| 1203 | Gasoline | 8.1 | 3.3 | 8.0 | 3.4 | 24.9 | 7.9 | 15.4 |
| 1223 | Kerosene | S | S | S | S | S | S | S |
| 1230 | Methanol | S | S | S | S | S | S | 26.2 |
| 1830 | Sulfuric acid | S | S | 33.7 | .1 | 29.1 | – | 19.6 |
| 1863 | Fuel, aviation, turbine engine | 17.6 | 1.5 | 18.9 | 1.6 | 34.1 | 2.4 | S |
| 1962 | Ethylene | 32.0 | 1.0 | 33.7 | .6 | 45.0 | .5 | 40.9 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 45.7 | .8 | 44.2 | .5 | S | S | S |
| 1965 | Hydrocarbon gas mixture, liquefied, n.o.s. | 43.3 | .1 | S | S | S | S | 23.6 |
| 1993 | Flammable liquids, n.o.s. | 16.1 | 1.8 | 17.1 | 2.2 | 17.4 | 3.9 | 35.8 |
| 2398 | Methyl tert-butyl ether | 41.2 | .2 | 41.2 | .1 | 41.2 | – | 25.8 |
| 3295 | Hydrocarbons, liquid, n.o.s. | S | S | S | S | S | S | 31.6 |
| | All other | 19.6 | .4 | 19.4 | .4 | S | S | 34.0 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–10. Estimated Measures of Reliability for Shipment Characteristics by Selected Commodities for Hazardous Materials for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| SCTG code | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Hazardous | | | Hazardous | | | Hazardous | |
| | | Coefficient of variation of number | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Coefficient of variation of number | Standard error of percentage |
| | **Total** | **1.5** | **3.0** | **.2** | **1.1** | **4.2** | **.7** | **3.2** | **4.4** | **.5** |
| 17 | Gasoline and aviation turbine fuel | 3.6 | 3.6 | – | 3.8 | 3.8 | – | 10.4 | 10.4 | – |
| 18 | Fuel oils | 8.1 | 8.1 | – | 8.1 | 8.1 | – | 9.5 | 9.5 | – |
| 19 | Coal and petroleum products, n.e.c. | 9.2 | 11.7 | 2.9 | 10.7 | 12.6 | 4.2 | 12.9 | 13.7 | 4.4 |
| 20 | Basic chemicals | 9.2 | 11.1 | 3.9 | 16.0 | 19.6 | 2.9 | 13.2 | 11.9 | 4.9 |
| 22 | Fertilizers | 14.3 | 23.5 | 3.5 | 28.9 | 21.8 | 2.7 | 22.0 | 16.1 | 2.2 |
| 23 | Chemical products and preparations, n.e.c. | 4.7 | 16.1 | 2.8 | 3.7 | 11.1 | 3.3 | 6.6 | 12.7 | 3.2 |
| | All other SCTG codes | 1.6 | 7.7 | – | 2.1 | 19.5 | – | 3.6 | 13.1 | .1 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–11a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Selected Commodities for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| SCTG code | Commodity description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** | **7.1** |
| 17 | Gasoline and aviation turbine fuel | 3.6 | 1.5 | 3.8 | 1.9 | 10.4 | 2.7 | 12.2 |
| 18 | Fuel oils | 8.1 | 1.1 | 8.1 | 1.4 | 9.5 | 1.8 | 7.6 |
| 19 | Coal and petroleum products, n.e.c. | 11.7 | .7 | 12.6 | 1.1 | 13.7 | 1.5 | 19.9 |
| 20 | Basic chemicals | 11.1 | 1.4 | 19.6 | 2.0 | 11.9 | 2.4 | 13.6 |
| 22 | Fertilizers | 23.5 | .2 | 21.8 | .3 | 16.1 | .5 | 35.2 |
| 23 | Chemical products and preparations, n.e.c. | 16.1 | 1.1 | 11.1 | .2 | 12.7 | .6 | 18.0 |
| | All other SCTG codes | 7.7 | .9 | 19.5 | .3 | 13.1 | .7 | 11.4 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–11b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Selected Commodities for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| SCTG code | Commodity description | Value | | | Tons | | | Ton-miles | | | Average miles per shipment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | | 2002 | 1997 | |
| | **Total** | **3.0** | **3.4** | **5.7** | **4.2** | **2.8** | **6.2** | **4.4** | **5.5** | **7.8** | **7.1** | **7.6** | **12.9** |
| 17 | Gasoline and aviation turbine fuel | 3.6 | 3.8 | 6.7 | 3.8 | 3.5 | 6.3 | 10.4 | 15.0 | 21.0 | 12.2 | 5.6 | 15.3 |
| 18 | Fuel oils | 8.1 | 4.3 | 11.4 | 8.1 | 5.4 | 11.3 | 9.5 | 15.1 | 20.4 | 7.6 | 5.7 | 10.6 |
| 19 | Coal and petroleum products, n.e.c. | 11.7 | 9.1 | 19.4 | 12.6 | 8.7 | 19.4 | 13.7 | 12.1 | 25.3 | 19.9 | 7.9 | 25.8 |
| 20 | Basic chemicals | 11.1 | 13.9 | 17.9 | 19.6 | 7.7 | 28.0 | 11.9 | 14.7 | 16.4 | 13.6 | 20.9 | 45.2 |
| 22 | Fertilizers | 23.5 | 14.6 | 29.6 | 21.8 | 14.8 | 28.6 | 16.1 | 11.8 | 17.0 | 35.2 | 11.8 | 41.1 |
| 23 | Chemical products and preparations, n.e.c. | 16.1 | 4.4 | 23.9 | 11.1 | 10.4 | 26.8 | 12.7 | 7.5 | 24.4 | 18.0 | 9.2 | 32.6 |
| | All other SCTG codes | 7.7 | 12.5 | 20.4 | 19.5 | 7.2 | 29.4 | 13.1 | 6.2 | 20.4 | 11.4 | 15.2 | 13.6 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–11c. Estimated Standard Errors for Hazardous Material Shipment Characteristics by Selected Commodities for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| SCTG code | Commodity description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|---|
| | | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| | **Total** | – | – | – | – | – | – |
| 17 | Gasoline and aviation turbine fuel | 1.5 | 1.4 | 1.9 | .9 | 2.7 | 4.1 |
| 18 | Fuel oils | 1.1 | .9 | 1.4 | 1.2 | 1.8 | 2.0 |
| 19 | Coal and petroleum products, n.e.c. | .7 | .6 | 1.1 | .7 | 1.5 | 1.2 |
| 20 | Basic chemicals | 1.4 | 1.6 | 2.0 | .8 | 2.4 | 3.5 |
| 22 | Fertilizers | .2 | .2 | .3 | .3 | .5 | .6 |
| 23 | Chemical products and preparations, n.e.c. | 1.1 | .4 | .2 | .1 | .6 | .3 |
| | All other SCTG codes | .9 | 1.0 | .3 | .1 | .7 | .5 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs*.

## Table B–12a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Truck for Intrastate Versus Interstate for Selected Commodities: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| SCTG code | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage |
| | **Total** | **3.7** | **1.5** | **1.5** | **4.6** | **1.5** | **1.5** | **7.0** | **3.2** | **3.2** |
| 17 | Gasoline and aviation turbine fuel | 5.2 | 2.2 | 2.2 | 5.9 | 2.2 | 2.2 | 11.8 | 7.1 | 7.1 |
| 18 | Fuel oils | 5.7 | 1.0 | 1.0 | 6.0 | 1.4 | 1.4 | 11.3 | 5.6 | 5.6 |
| 19 | Coal and petroleum products, n.e.c. | 15.6 | 3.5 | 3.5 | 19.0 | 3.5 | 3.5 | 22.6 | 5.3 | 5.3 |
| 20 | Basic chemicals | 11.4 | 4.5 | 4.5 | 17.6 | 3.1 | 3.1 | 12.6 | 2.6 | 2.6 |
| 22 | Fertilizers | 33.1 | 4.9 | 4.9 | 32.0 | 4.5 | 4.5 | 32.6 | S | 3.5 |
| 23 | Chemical products and preparations, n.e.c. | 17.5 | 4.4 | 4.4 | 13.1 | 5.1 | 5.1 | 16.7 | 2.1 | 2.1 |
| | All other SCTG codes | 8.5 | 2.1 | 2.1 | 18.6 | 3.7 | 3.7 | 14.9 | 1.3 | 1.3 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs*.

## Table B–12b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics For-Hire Truck for Intrastate Versus Interstate for Selected Commodities: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| SCTG code | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage |
| | **Total** | **5.2** | **1.9** | **1.9** | **6.2** | **1.9** | **1.9** | **9.4** | **2.8** | **2.8** |
| 17 | Gasoline and aviation turbine fuel | 7.5 | 1.4 | 1.4 | 9.5 | 1.5 | 1.5 | 22.1 | 9.6 | 9.6 |
| 18 | Fuel oils | 7.8 | 2.5 | 2.5 | 7.6 | 2.5 | 2.5 | 27.5 | 7.8 | 7.8 |
| 19 | Coal and petroleum products, n.e.c. | 24.2 | 3.4 | 3.4 | 23.4 | 3.1 | 3.1 | 30.8 | 4.5 | 4.5 |
| 20 | Basic chemicals | 14.4 | 5.9 | 5.9 | 18.3 | 5.3 | 5.3 | 14.6 | 2.8 | 2.8 |
| 22 | Fertilizers | 36.2 | 6.5 | 6.5 | 36.2 | 5.9 | 5.9 | 38.6 | S | 5.3 |
| 23 | Chemical products and preparations, n.e.c. | 24.5 | 3.0 | 3.0 | 16.1 | 4.8 | 4.8 | 18.9 | 1.4 | 1.4 |
| | All other SCTG codes | 10.1 | 1.7 | 1.7 | 7.4 | 2.4 | 2.4 | 19.7 | 1.3 | 1.3 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–12c. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Private Truck for Intrastate Versus Interstate for Selected Commodities: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| SCTG code | Commodity description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage |
| | **Total** | **4.8** | **1.8** | **1.8** | **5.3** | **1.7** | **1.7** | **7.9** | **4.5** | **4.5** |
| 17 | Gasoline and aviation turbine fuel | 5.7 | 2.6 | 2.6 | 5.8 | 2.7 | 2.7 | 13.4 | 6.1 | 6.1 |
| 18 | Fuel oils | 6.0 | 1.2 | 1.2 | 6.3 | 1.6 | 1.6 | 13.8 | 6.5 | 6.5 |
| 19 | Coal and petroleum products, n.e.c. | 15.0 | 3.2 | 3.2 | 24.7 | 3.1 | 3.1 | 19.1 | 6.2 | 6.2 |
| 20 | Basic chemicals | 15.1 | 3.0 | 3.0 | 22.7 | 3.5 | 3.5 | 29.6 | 4.3 | 4.3 |
| 22 | Fertilizers | 28.7 | 7.6 | 7.6 | 23.5 | 7.0 | 7.0 | 25.8 | 10.0 | 10.0 |
| 23 | Chemical products and preparations, n.e.c. | 17.5 | 6.6 | 6.6 | 21.6 | 4.5 | 4.5 | 23.7 | 4.0 | 4.0 |
| | All other SCTG codes | 12.5 | 3.9 | 3.9 | 32.8 | 7.2 | S | 36.9 | 6.4 | 6.4 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–13a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Truck for Intrastate Versus Interstate for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage |
| | **Total** | **3.7** | **1.5** | **1.5** | **4.6** | **1.5** | **1.5** | **7.0** | **3.2** | **3.2** |
| 1005 | Ammonia, anhydrous | 32.8 | 6.3 | 6.3 | 31.9 | 6.4 | 6.4 | 36.1 | S | 10.8 |
| 1006 | Argon, compressed | 40.4 | 7.6 | 7.6 | 44.1 | 5.3 | 5.3 | 49.7 | 10.0 | S |
| 1013 | Carbon dioxide | 28.2 | 8.4 | 8.4 | S | 8.1 | S | S | S | S |
| 1066 | Nitrogen, compressed | 35.2 | 10.2 | S | 37.3 | 7.9 | S | 49.7 | 9.1 | S |
| 1072 | Oxygen, compressed | 42.6 | 11.9 | S | 30.4 | 7.6 | S | 42.1 | 9.4 | S |
| 1075 | Petroleum gases | 18.2 | 3.6 | 3.6 | 21.8 | 5.3 | 5.3 | 45.8 | 7.2 | S |
| 1202 | Gas oil, diesel fuel, heating oil, light | 13.5 | 2.9 | 2.9 | 12.5 | 2.6 | 2.6 | 37.9 | 11.3 | S |
| 1203 | Gasoline | 5.1 | 2.1 | 2.1 | 5.9 | 2.1 | 2.1 | 11.7 | 6.9 | 6.9 |
| 1223 | Kerosene | 23.9 | 3.5 | S | 28.5 | 3.5 | S | 38.3 | 6.1 | 6.1 |
| 1263 | Paint including paint, lacquer, enamel stain | 30.9 | 6.2 | 6.2 | 17.1 | 6.0 | 6.0 | 21.9 | 2.9 | 2.9 |
| 1268 | Petroleum distillates, n.o.s. | 13.8 | 8.4 | 8.4 | 31.3 | 7.1 | 7.1 | 16.9 | 10.9 | 10.9 |
| 1824 | Sodium hydroxide solution | 25.9 | 8.1 | S | 25.6 | 3.7 | 3.7 | 43.7 | 4.8 | 4.8 |
| 1830 | Sulfuric acid | 35.8 | 7.2 | 7.2 | 15.4 | 3.6 | 3.6 | 30.6 | 9.5 | 9.5 |
| 1863 | Fuel, aviation, turbine engine | 9.2 | 4.5 | 4.5 | 11.4 | 5.3 | 5.3 | 23.5 | 9.6 | 9.6 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | 40.7 | 7.3 | 7.3 | S | S | S | 38.8 | 12.9 | S |
| 1993 | Flammable liquids, n.o.s. | 7.4 | 1.7 | 1.7 | 6.4 | 2.0 | 2.0 | 12.4 | 6.1 | 6.1 |
| 1999 | Tars, liquid | 45.1 | 11.8 | S | 40.6 | 11.1 | S | S | 15.8 | S |
| 3077 | Environmentally hazardous substance, solid, n.o.s. | S | 15.0 | S | S | 15.8 | S | S | 13.7 | S |
| 3257 | Elevated temperature liquid, n.o.s. | 32.6 | 5.5 | 5.5 | 31.5 | 6.1 | 6.1 | 24.9 | 5.7 | 5.7 |
| 3264 | Corrosive liquid, acidic, inorganic, n.o.s. | 26.5 | 6.6 | 6.6 | S | S | S | S | S | S |
| | All other | 4.2 | 2.7 | 2.7 | 11.4 | 4.7 | 4.7 | 10.2 | 2.2 | 2.2 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–13b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by For-Hire Truck for Intrastate Versus Interstate for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage |
| | **Total** | **5.2** | **1.9** | **1.9** | **6.2** | **1.9** | **1.9** | **9.4** | **2.8** | **2.8** |
| 1005 | Ammonia, anhydrous | 48.1 | S | 8.2 | 46.8 | S | 7.8 | 49.2 | S | 13.0 |
| 1075 | Petroleum gases | 37.9 | 9.1 | S | 35.7 | 8.3 | S | S | 10.7 | S |
| 1202 | Gas oil, diesel fuel, heating oil, light | 9.5 | 4.6 | 4.6 | 10.4 | 4.1 | 4.1 | S | 15.7 | S |
| 1203 | Gasoline | 7.5 | 1.6 | 1.6 | 9.7 | 1.5 | 1.5 | 21.9 | 9.4 | 9.4 |
| 1263 | Paint | 47.6 | S | 4.1 | 26.6 | S | 5.7 | 25.5 | S | 2.7 |
| 1268 | Petroleum distillates, n.o.s. | 31.3 | 10.9 | S | 41.1 | S | 12.1 | 21.1 | 12.7 | 12.7 |
| 1760 | Corrosive liquids, n.o.s. | 32.8 | 8.6 | 8.6 | 40.2 | 6.5 | 6.5 | 38.2 | 2.4 | 2.4 |
| 1824 | Sodium hydroxide solution | 41.9 | 9.9 | S | 17.9 | 6.2 | 6.2 | 30.8 | 5.4 | 5.4 |
| 1830 | Sulfuric acid | 43.3 | 9.0 | S | 16.9 | 3.2 | 3.2 | 33.0 | 10.1 | 10.1 |
| 1863 | Fuel, aviation, turbine engine | 15.4 | 2.9 | 2.9 | 16.0 | 3.0 | 3.0 | 35.4 | 11.6 | S |
| 1942 | Ammonium nitrate, with not more than 0.2 percent total | S | S | S | S | S | S | S | 11.4 | S |
| 1987 | Alcohols, n.o.s. | 15.5 | 7.1 | 7.1 | 14.8 | 5.4 | 5.4 | 17.6 | 7.9 | 7.9 |
| 1993 | Flammable liquids, n.o.s. | 7.9 | 2.6 | 2.6 | 7.2 | 2.7 | 2.7 | 31.8 | 5.9 | 5.9 |
| 1999 | Tars, liquids | 49.0 | 12.8 | S | 43.1 | 10.9 | S | S | 16.3 | S |
| 2448 | Sulfur, molten | 24.7 | 5.8 | 5.8 | 15.2 | 4.7 | 4.7 | 15.6 | 8.4 | 8.4 |
| 2794 | Batteries, wet, filled with acid | 43.5 | S | 9.1 | 47.9 | S | 11.1 | S | S | S |
| 2924 | Flammable liquids, corrosive, n.o.s. | 38.8 | S | 11.7 | S | S | 17.6 | S | S | 14.9 |
| 3082 | Environmentally hazardous substance, liquid, n.o.s. | 20.8 | 5.5 | 5.5 | 38.9 | 7.3 | 7.3 | 32.1 | 1.1 | 1.1 |
| 3257 | Elevated temperature liquid, n.o.s. | 31.6 | 5.8 | 5.8 | 31.4 | 6.3 | 6.3 | 28.3 | 7.7 | 7.7 |
| 3264 | Corrosive liquid, acidic, inorganic, n.o.s. | 27.2 | 6.5 | 6.5 | S | S | S | S | S | S |
| | All other | 3.9 | 3.1 | 3.1 | 9.2 | 5.4 | 5.4 | 11.2 | 1.4 | 1.4 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–13c. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics by Private Truck for Intrastate Versus Interstate for Selected UN Numbers for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| UN number | Description | Value | | | Tons | | | Ton-miles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage | Coefficient of variation of number | Intrastate—standard error of percentage | Interstate—standard error of percentage |
| | **Total** | **4.8** | **1.8** | **1.8** | **5.3** | **1.7** | **1.7** | **7.9** | **4.5** | **4.5** |
| 0332 | Explosive, blasting, type E or Agent blasting, Type E | 40.3 | 11.1 | 11.1 | S | S | 11.9 | 44.5 | 8.8 | 8.8 |
| 1005 | Ammonia, anhydrous | 27.0 | 10.0 | S | 25.9 | 10.8 | S | S | S | S |
| 1006 | Argon, compressed | 49.2 | 7.9 | 7.9 | 48.7 | 7.1 | 7.1 | S | S | S |
| 1013 | Carbon dioxide | 29.8 | 8.7 | 8.7 | S | 13.2 | S | S | S | S |
| 1017 | Chlorine | 48.3 | S | 7.5 | S | S | S | S | S | S |
| 1066 | Nitrogen, compressed | 34.4 | 5.8 | 5.8 | 41.2 | 7.7 | S | S | 8.3 | S |
| 1072 | Oxygen, compressed | 17.9 | 9.5 | 9.5 | 33.1 | 8.3 | S | S | 10.9 | S |
| 1075 | Petroleum gases | 17.3 | 4.2 | 4.2 | 26.6 | 3.0 | 3.0 | 46.3 | S | 7.4 |
| 1202 | Gas oil, diesel fuel, heating oil, light | 20.3 | 2.8 | 2.8 | 17.9 | 2.8 | 2.8 | 30.2 | 4.8 | 4.8 |
| 1203 | Gasoline | 5.9 | 2.5 | 2.5 | 6.0 | 2.5 | 2.5 | 13.4 | 6.0 | 6.0 |
| 1223 | Kerosene | 26.6 | 3.3 | S | 31.5 | 3.3 | S | 42.5 | 4.6 | S |
| 1263 | Paint including paint, lacquer, enamel, stain | 25.9 | 7.8 | S | 22.6 | 7.2 | S | 19.5 | 5.0 | 5.0 |
| 1267 | Petroleum crude oil | S | S | – | S | S | – | S | S | – |
| 1789 | Hydrochloric acid | 23.7 | 7.8 | 7.8 | 46.9 | S | 8.1 | 40.5 | S | 6.7 |
| 1824 | Sodium hydroxide solution | 20.2 | 5.3 | 5.3 | 40.3 | 4.3 | 4.3 | S | S | S |
| 1863 | Fuel, aviation, turbine engine | 21.5 | 7.5 | S | 28.0 | 8.0 | S | 25.9 | 14.1 | 14.1 |
| 1964 | Hydrocarbon gas mixture, compressed, n.o.s. | S | S | S | S | S | S | S | S | S |
| 1993 | Flammable liquids, n.o.s. | 9.1 | 1.8 | 1.8 | 8.3 | 2.2 | 2.2 | 12.0 | 7.2 | 7.2 |
| 3077 | Environmentally hazardous substance, solid, n.o.s. | S | S | S | S | 18.3 | S | S | S | S |
| 3257 | Elevated temperature liquid, n.o.s. | 40.5 | 5.4 | 5.4 | 36.8 | 5.8 | 5.8 | 24.2 | 5.1 | 5.1 |
| | All other | 8.5 | 3.9 | 3.9 | 7.7 | 3.1 | 3.1 | 12.7 | 3.9 | 3.9 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–14a. Estimated Measures of Reliablity for Hazardous Material Shipment Characteristics for Toxic by Inhalation (TIH) for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage |
| **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** |
| Toxic by inhalation | 8.5 | .1 | 11.2 | .1 | 11.0 | .2 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–14b. Estimated Standard Errors for Hazardous Material Shipment Characteristics Toxic by Inhalation (TIH) for the United States: Percent of Total for 2002 and 1997

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| Toxic by inhalation | .1 | .2 | .1 | .2 | .2 | .8 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–15a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics for Packing Group I for the United States: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage |
| **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** |
| Packing group I | 5.8 | .9 | 6.0 | 1.0 | 7.0 | 2.1 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–15b. Estimated Standard Errors for Hazardous Material Shipment Characteristics for Packing Group I for the United States: Percent of Total for 2002 and 1997

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Description | Value | | Tons | | Ton-miles | |
|---|---|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 |
| **Total** | **–** | **–** | **–** | **–** | **–** | **–** |
| Packing group I | .9 | 1.3 | 1.0 | 1.3 | 2.1 | 2.0 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–16a. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics for by Country of Destination: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Country of destination | Value | | Tons | |
|---|---|---|---|---|
| | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage |
| **Total** | **16.2** | **–** | **24.9** | **–** |
| Canada | 19.9 | 4.7 | 26.1 | 7.4 |
| Mexico | 28.5 | 3.3 | 29.9 | 7.5 |
| All others | 20.3 | 5.4 | 39.0 | 9.8 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–16b. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics for Export by Country of Destination: 2002 and 1997

[Estimates are shown as percents and are based on data from the 2002 and 1997 Commodity Flow Surveys]

| Country of destination | Value | | | Tons | | |
|---|---|---|---|---|---|---|
| | Coefficient of variation of number | | Standard error of percent change | Coefficient of variation of number | | Standard error of percent change |
| | 2002 | 1997 | | 2002 | 1997 | |
| **Total** | **16.2** | **35.7** | **32.9** | **24.9** | **28.5** | **35.4** |
| Canada | 19.9 | 43.7 | 32.1 | 26.1 | 35.7 | 26.7 |
| Mexico | 28.5 | 43.3 | 32.0 | 29.9 | S | S |
| All others | 20.3 | 35.8 | 40.1 | 39.0 | 36.6 | 90.9 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–16c. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics for by Country of Destination: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| Country of destination | Value | | Tons | |
|---|---|---|---|---|
| | 2002 | 1997 | 2002 | 1997 |
| **Total** | – | – | – | – |
| Canada | 4.7 | 4.2 | 7.4 | 7.2 |
| Mexico | 3.3 | 4.8 | 7.5 | S |
| All others | 5.4 | 3.5 | 9.8 | 7.6 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

## Table B–17. Estimated Measures of Reliability for Hazardous Material Shipment Characteristics for by Country of Destination: 2002

[Estimates are shown as percents and are based on data from the 2002 Commodity Flow Survey]

| NAICS code | Classification description | Value | | Tons | | Ton-miles | | Average miles per shipment—coefficient of variation of number |
|---|---|---|---|---|---|---|---|---|
| | | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | Coefficient of variation of number | Standard error of percentage | |
| | **Total** | **3.0** | **–** | **4.2** | **–** | **4.4** | **–** | **7.1** |
| 422700 | Petroleum and petroleum products wholesalers | 4.0 | 1.1 | 5.0 | 1.3 | 14.8 | 2.2 | 8.8 |
| 324000 | Petroleum and coal products manufacturing | 5.3 | 1.3 | 4.4 | 1.5 | 6.4 | 2.5 | 6.9 |
| 325000 | Chemical manufacturing | 9.8 | 1.5 | 20.6 | 2.1 | 11.1 | 2.8 | 14.3 |
| 551114 | Corporate, subsidiary, and regional managing offices | 20.8 | .9 | 27.1 | .9 | 19.4 | 1.3 | 30.3 |
| 422600 | Chemical and allied products wholesalers | 13.7 | .3 | 17.0 | .2 | 17.8 | .2 | 19.3 |
| | Others | 7.8 | 1.0 | 12.8 | .4 | 15.1 | .9 | 13.6 |

– Represents an estimate equal to zero or less than 1 unit of measure.
S Estimate does not meet publication standards because of high sampling variability or poor response quality.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at *www.census.gov/cfs.*

# Appendix C. Sample Design, Data Collection, and Estimation

## INTRODUCTION

The primary goal for the 2002 Commodity Flow Survey (CFS) is to estimate *shipping volumes* (value, tons, and ton-miles) by *commodity* and *mode of transportation* at varying levels of geographic detail. A secondary objective is to estimate the volume of shipments moving from one geographic area to another (i.e., flows of commodities between states, regions, etc.) by mode and commodity. A detailed description of the sample design for the 2002 CFS is provided below.

## SAMPLE DESIGN

The sample for the 2002 Commodity Flow Survey (CFS) was selected using a stratified three-stage design in which the first-stage sampling units were establishments, the second-stage sampling units were groups of four 1-week periods (reporting weeks) within the survey year, and the third-stage sampling units were shipments.

### First Stage

### Sampling frame

To create the first-stage sampling frame, we extracted a subset of establishment records from the Business Register (formerly the Standard Statistical Establishment List) as of September 2001. The Business Register is a database of all known establishments located in the United States or its territories. (An establishment is a single physical location where business transactions take place or services are performed.) Establishments located in the United States, having nonzero payroll in 2000, and classified in mining (except oil and gas extraction), manufacturing, wholesale, or electronic shopping and mail order retail industries, as defined by the 1997 North American Industry Classification System (NAICS), were included on the sampling frame. *Auxiliary establishments* (e.g. warehouses and central administrative offices) with shipping activity were also included on the sampling frame. Auxiliary establishments are establishments that are primarily involved in rendering support services for other establishments within the same company, instead of for the public, government, or other business firms. All other establishments included on the sampling frame are referred to as *nonauxiliary establishments*.

Some portion of establishments classified in the Retail Trade sector in the 1997 Economic Census was expected to be classified in the Wholesale Trade sector in the 2002 Economic Census. Because we wanted complete coverage of the Wholesale Trade sector as defined for the 2002 Economic Census, the 2002 CFS sampling frame also included establishments that were classified in particular retail industries (automotive parts and accessories, tires, floor coverings, building materials, nursery and garden, and office supplies) in the 1997 Economic Census and had characteristics indicating that they were likely to be classified as wholesale in the 2002 Economic Census. Of the establishments selected for the 2002 CFS from this set of establishments, only those that were classified as wholesale in the 2002 Economic Census were used in the production of estimates for this report.

Establishments classified in forestry, fishing, utilities, construction, transportation, services, and all other retail industries were not included on the sampling frame. Farms and government-owned entities (except government-owned liquor stores) were also excluded from the sampling frame. The resulting frame comprised approximately 760,000 establishments.

For each establishment we extracted sales, payroll, number of employees, a six-digit NAICS code, name and address, and a primary identifier. We also computed a measure of size for each establishment. The measure of size was designed to approximate an establishment's annual total value of shipments for the year 2000.

All of the establishments included on the sampling frame had state, county, and place geographic codes. We used these codes to assign each establishment to one of the 273 metropolitan areas (MAs) defined as a combination of the metropolitan statistical areas (MSAs) and consolidated metropolitan statistical areas (CMSAs). Establishments not located in an MA were assigned to MA 9999.

### Stratification

We stratified the sampling frame by geography and industry. Geographic strata were defined by a combination of the 50 states, the District of Columbia, and the top 50 metropolitan areas (MAs) based on their population in Census 2000. If a particular MA was not one of the 50 largest, then it was collapsed with the remaining MAs and non-MAs within the state in which the particular MA resided. We refer to these collapsed strata as Rest of State (ROS) strata. When an MA crossed state boundaries, we considered the size of each part of the MA relative to the MAs total measure of size when determining whether or not to create strata in each state in which the MA was defined. The industry strata were determined as follows. Within each of the geographic strata, we started with a total of 45 industry groups based on 1997 NAICS: three mining (four-digit NAICS); 21 manufacturing (three-digit NAICS); 18 wholesale (four-digit NAICS); 1 retail (NAICS 4541); and 2 auxiliary (NAICS 4931 and 5511). We then implemented a rule that states a particular industry stratum will be defined within a geographic stratum if it contributes at least 2 percent to its corresponding state total measure of size or it contributes at least 2 percent to the national total measure of size for the industry. Industry groups not meeting these criteria were combined into at most 12 new collapsed industry strata using a clustering algorithm. Because of potential differences in shipping patterns between auxiliary and nonauxiliary establishments, we created two industry strata of auxiliary establishments in every geographic stratum. We refer to a particular geographic-by-industry combination as a *primary stratum.* Also note that a separate stratum was created at the national level for those Retail Trade sector establishments that we included in our sample.

### Sample size and allocation

To reduce the sampling variability of the estimates, we used a stratified design with a certainty component. Within each primary stratum, a boundary (or cutoff) that divides the certainty establishments from the noncertainty establishments was determined using the Lavallee-Hidiroglou algorithm. If an establishment's measure of size was greater than the cutoff, the establishment was selected with certainty. Establishments selected with certainty were sure to be selected and represent only themselves (i.e., had a selection probability of one and a sampling weight of one).

Because the 2002 sample was about half the size of the 1997 CFS sample, we were concerned about the ability of the sample to capture less frequent types of shipments (e.g., air, water, rail, and hazardous materials). After considering several different alternatives, we felt the best approach was to identify those establishments which made the bulk of these types of shipments in 1997 and then select them with certainty. To identify these establishments, we proceeded as follows.

We identified all establishments in the 1997 CFS sample that reported shipments made by air, water, or rail. We also identified those establishments that reported shipments of hazardous materials. For each of these establishments, we computed the percentage of the establishment's total value and tonnage accounted for by each of these types of shipments. Next, we matched these establishments to the sampling frame for the 2002 CFS and identified each establishment with measure of size less than the certainty boundary. For both value and tons, we then looked to see what percent of the total volume of shipments for each type of shipment was captured by selecting with certainty the top 50, top 100, or all establishments. We considered the top 50 establishments as those establishments making the largest volume of each type of shipment (air, water, rail, hazardous). Once these establishments were identified, we grouped them into one file and unduplicated them. This procedure added a total of about 500 certainty establishments.

Establishments not selected with certainty made up the noncertainty frame. We further stratified the noncertainty establishments within each primary stratum using the measure of size previously described. We refer to these measure-of-size strata as *substrata* of the primary strata. The measure of size stratification increased the efficiency of the sample design. The Dalenius-Hodges

cumulative $\sqrt{f}$ rule was used to set the substratum boundaries. We then used optimum allocation to determine the sample size required within each substratum to meet a coefficient of variation constraint on an estimate of the total measure of size for the primary stratum. Within each substratum, a simple random sample of establishments was selected without replacement.

To arrive at the final sample size, we allocated additional establishments to some of the strata so that the minimum substratum sample size was two and the probability of selecting any establishment was no less than 1 in 100. In total, the first-stage sample comprised 51,005 establishments.

### Second Stage

The frame for the second stage of sampling consisted of 52-weeks from January 6, 2002 to January 4, 2003. Each establishment selected into the 2002 CFS sample was systematically assigned to report for four reporting weeks-one in each quarter of the reference year. Each of the 4-weeks was in the same relative position of the quarter. For example, an establishment might have been requested to report data for the 5th, 18th, 31st, and 44th weeks of the reference year. In this instance, each reporting week corresponds to the 5th week of each quarter. Prior to assignment of weeks to establishments, we sorted the selected sample by primary stratum (state x metropolitan area x industry) and measure-of-size.

### Third Stage

For each of the four reporting weeks in which an establishment was asked to report, we requested the respondent to construct a sampling frame consisting of all shipments made by the establishment in the reporting week. Each respondent was asked to count or estimate the total number of shipments comprising the sampling frame and to record this number on the questionnaire. For each assigned reporting week, if an establishment made *more than 40* shipments during that week, we asked the respondent to select a systematic sample of the establishment's shipments and to provide us with information only about the selected shipments. If an establishment made *40 or fewer* shipments during that week, we asked the respondent to provide information about *all* of the establishment's shipments made during that week; i.e., no sampling was required.

## DATA COLLECTION

Each establishment selected into the CFS sample was mailed a questionnaire for each of its four reporting weeks. We mailed each establishment a questionnaire once every quarter of 2002. For a given establishment, we requested that the respondent provide the following information about each of the establishment's reported shipments: shipment identification number, the date on which the shipment was made, value, weight, commodity, mode(s) of transportation, domestic destination or port of exit, an indication of whether the shipment was an export, and the United Nations or North America (UN/NA) number for hazardous material shipments. For a shipment that included more than one commodity, the respondent was instructed to report the commodity that made up the greatest percentage of the shipment's *weight*. For an export shipment, we also asked the respondent to provide the mode of export and the foreign destination city and country. See Appendix E for a copy of the questionnaire.

## IMPUTATION OF SHIPMENT VALUE OR WEIGHT

To correct for nonresponse to *either* the value *or* weight item for a given shipment reported in the CFS, the missing value or value that failed edit is replaced by a predicted value obtained from an appropriate model. Such a shipment is considered a "recipient" if its commodity code is valid and the other item is reported greater than zero and passed edit. The recipient's item that is missing or failed edit is imputed as follows. First, a "donor" shipment is randomly selected from shipments that were reported in the CFS with:

- The same commodity code as the recipient.
- Both value and weight items reported greater than zero and passed edit.
- Origin and value for the item reported by the recipient similar to those of the recipient.

Then, the donor's value and weight data are used to calculate a ratio, which is applied to the recipient's reported item, to impute the item that is missing or failed edit. If no donor is found, the median ratio for all shipments reported in the survey with the same commodity code as the recipient and with both value and weight items reported greater than zero is applied to the recipient's reported item. For either the value or weight item, about 3 percent of the shipment records input to the calculation of estimates have imputed data for the item.

## ESTIMATION

Estimated totals (e.g., value of shipments, tons, ton-miles) are produced as the sum of weighted shipment data (reported or imputed). Percent change and percent-of-total estimates are derived using the appropriate estimated totals. Estimates of average miles per shipment are computed by dividing an estimate of the total miles traveled by the estimated number of shipments. The annualized growth rate $\hat{A}$ for estimates from year $y_1$ to $y_2$ is computed as:

$$\hat{A} = 100 * \left( \left( \frac{\hat{X}_{y_2}}{\hat{X}_{y_1}} \right)^{1/(y_2 - y_1)} - 1 \right)$$

where $\hat{X}_{y_1}$ and $\hat{X}_{y_2}$ are estimates of the value of shipments, tons, ton-miles, or average miles per shipment for years $y_1$ and $y_2$, respectively. The annualized growth rate measures the annual rate of change between estimates from any 2 years by assuming a constant yearly rate of change.

Each *shipment* has associated with it a single *tabulation weight,* which was used in computing all estimates to which the shipment contributes. The tabulation weight is a product of seven different component weights. A description of each component weight follows.

CFS respondents provided data for a sample of shipments made by their respective establishments in the survey year. For each establishment, we produced an estimate of that establishment's total value of shipments for the entire survey year. To do this, we used four different weights, the *shipment weight,* the *shipment nonresponse weight,* the *quarter weight,* and the *quarter nonresponse weight.*

Like establishments, we identified shipments as either certainty or noncertainty. (See the Nonsampling Error section in Appendix B for a description of how certainty shipments were identified.) For noncertainty shipments, the *shipment weight* was defined as the ratio of the total number of shipments (as reported by the respondent) made by an establishment in a reporting week to the number of sampled shipments for the same week. This weight uses data from the sampled shipments to represent all the establishment's shipments made in the reporting week. However, a respondent may have failed to provide sufficient information about a particular sampled shipment. For example, a respondent may not have been able to provide value, weight, or a destination for one of the sampled shipments. If this data item could not be imputed, then this shipment did not contribute to tabulations and was deemed unusable. (A *usable shipment* is one that has valid entries for value, weight, and origin and destination ZIP Codes.) To account for these unusable shipments, we applied the *shipment nonresponse weight.* For noncertainty shipments from a particular establishment's reporting week, this weight is equal to the ratio of the number of sampled shipments for the reporting week to the number of usable shipments for the same week. The shipment weight for certainty shipments from a particular establishment's reporting week is equal to one.

The *quarter weight* inflates an establishment's estimate for a particular reporting week to an estimate for the corresponding quarter. For noncertainty shipments, the quarter weight is equal to 13. The quarter weight for most certainty shipments is also equal to 13. However, if a respondent was able to provide information about all large (or certainty) shipments made in the quarter containing the reporting week, then the quarter weight for each of these shipments was one. For each establishment, the quarterly estimates were added to produce an estimate of the establishment's value of shipments for the entire survey year. Whenever an establishment did not provide the Census Bureau with a response for each of its four reporting weeks, we computed a quarter nonresponse

weight. The *quarter nonresponse weight* for a particular establishment is defined as the ratio of the number of quarters for which the establishment was in business in the survey year to the total number of quarters (reporting weeks) for which we received usable shipment data from the establishment.

Using these four component weights, we computed an estimate of each establishment's value of shipments for the entire survey year. We then multiplied this estimate by a factor that adjusts the estimate using value of shipments and sales data obtained from other surveys and censuses conducted by the Census Bureau. This weight, the *establishment-level adjustment weight,* attempts to correct for any sampling or nonsampling errors that occur during the sampling of shipments by the respondent.

The adjusted value of shipments estimate for an establishment was then weighted by the *establishment weight*. This weight is equal to the reciprocal of the establishment's probability of being selected into the sample.

A final adjustment weight, the *industry-level adjustment weight,* uses information from other surveys and censuses conducted by the Census Bureau to account for establishments from which we did not receive a response (including establishments from which we did not receive any usable shipment data) and for changes in the population of establishments between the time the first-stage sampling frame was constructed (2001) and the year in which the data were collected (2002). Separate industry-level adjustment weights were determined for nonauxiliary and auxiliary establishments.

# Appendix D.
# Standard Classification of Transported Goods Code Information

The commodities shown in this report are classified using the Standard Classification of Transported Goods (SCTG) coding system. The SCTG coding system was created jointly by agencies of the United States and Canadian governments based on the Harmonized System of product classification that is used worldwide. The purpose of the SCTG coding system was to specifically address statistical needs in regard to products transported.

In 1993, Commodity Flow Survey (CFS) data were collected and reported using product classifications found in the Standard Transportation Commodity Classification (STCC) system. These classifications were developed in the early 1960s by the American Association of Railroads (AAR) to analyze commodity movements by rail. The original purpose of the STCC was for identification of commodities for purposes of assigning rates for Interstate Commerce Commission (ICC) regulated rail carriers. The STCC continues to be used by the AAR as a tariff mechanism.

At the time that the Commodity Transportation Survey (CTS) (the CTS—the predecessor of the CFS) was first conducted in 1963, STCC codes were still useful for analyzing most important aspects of the U.S. transportation system. Since then, many changes have taken place that have gradually made the STCC code less useful for tracking domestic product movements across all modes (although it remains perfectly functional for tracking rail-only movements). These include the deregulation of trucking, the enactment of North American Free Trade Agreement (NAFTA), changes in logistics practices, the emergence of plastics and composite materials to replace metals and glass, the obsolescence of many categories of wood products, and the very rapid recent development of high-tech electronic goods. Because the CFS is a shipper survey, the CFS collects information about shipments moving on all modes. As a consequence, STCC classifications frequently provide inadequate detail for identifying products that are significant for modes, such as truck and air. It is for these reasons that the Bureau of Transportation Statistics (BTS) has sponsored the development of a new product code to collect and report CFS data.

In 1997 and 2002, the CFS provided respondents with a listing of SCTG codes and descriptions at the five-digit level to use in assigning a commodity code for each shipment. For shipments of more than one commodity, we instructed respondents to use the five-digit code for the major commodity, defined as the commodity of greatest total weight in the shipment. For the data presented on this report, we aggregated the SCTG codes to the two-digit level.