United States: 2002

Hazardous Materials

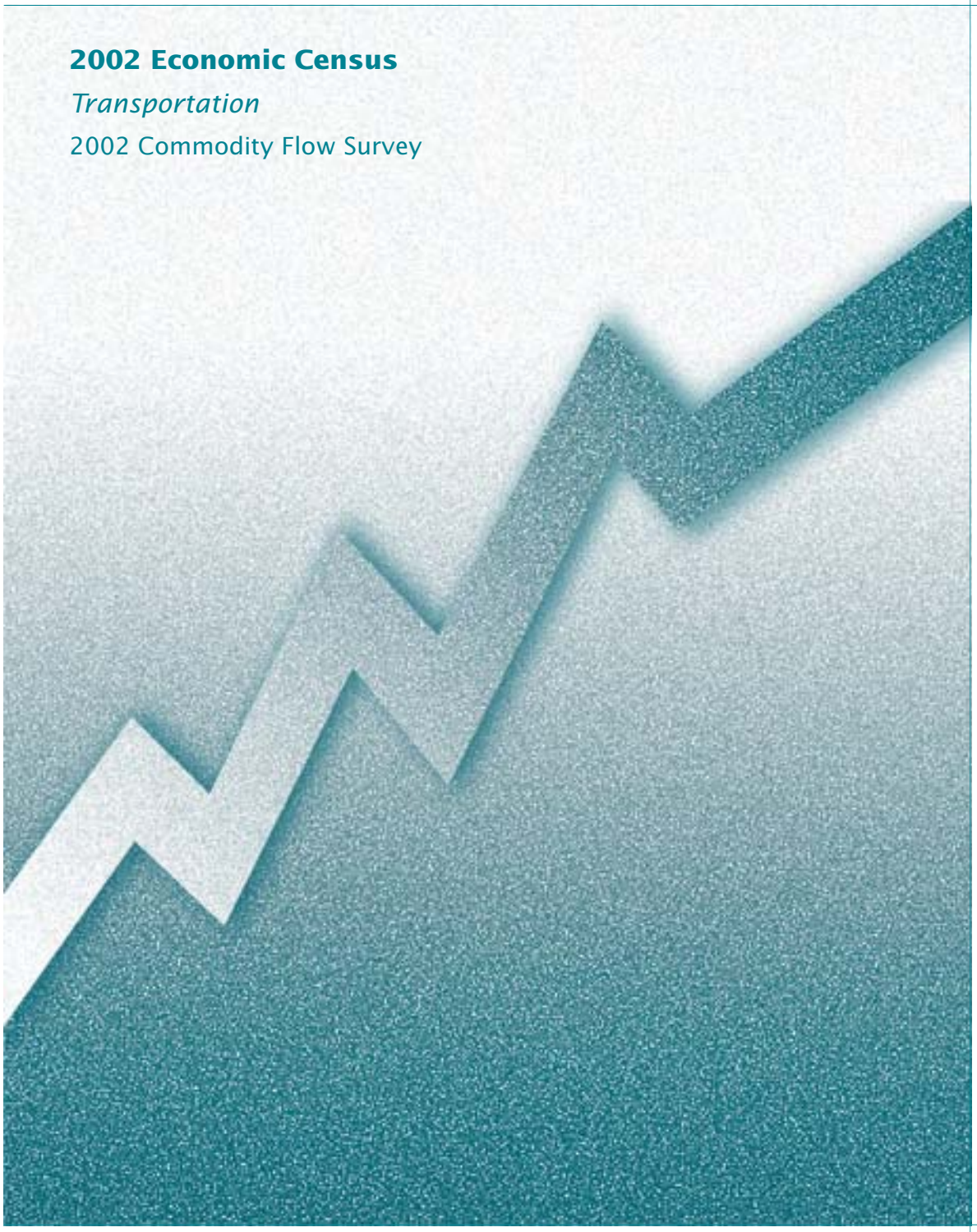
Issued December 2004

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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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 atypically 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.

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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.

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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.

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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.

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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 B–6c. **Estimated Standard Errors for 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		Tons		Ton-miles	
	2002	1997	2002	1997	2002	1997
HAZARD CLASS 1, EXPLOSIVES						
Total	**–**	**–**	**–**	**–**	**–**	**S**
Single modes	**1.8**	**1.7**	**.2**	**.6**	**.4**	**S**
Truck	2.5	4.4	3.2	9.0	5.5	15.1
For-hire truck	4.4	4.0	12.0	5.5	9.6	13.4
Private truck	3.9	3.4	S	7.5	5.6	S
Rail	1.8	4.3	3.1	S	5.6	S
Water	–	–	–	–	–	–
Air (includes truck and air)	S	1.1	–	–	.6	.1
Pipeline	–	–	–	–	S	S
Multiple modes	**1.8**	**1.6**	**S**	**.4**	**S**	**1.1**
Parcel, U.S. Postal Service or courier	1.8	1.6	S	.3	S	1.1
Other multiple modes	–	S	–	S	–	S
Other and unknown modes	**S**	**S**	**S**	**S**	**S**	**S**
HAZARD CLASS 2, GASES						
Total	**–**	**–**	**–**	**–**	**–**	**–**
Single modes	**.5**	**.8**	**.1**	**1.2**	**.3**	**.7**
Truck	4.4	1.8	5.9	1.5	4.5	2.0
For-hire truck	3.6	1.5	2.9	2.0	3.7	1.6
Private truck	4.0	2.9	5.7	1.9	5.1	1.8
Rail	1.8	1.8	2.4	1.3	4.7	3.4
Water	.6	.5	1.6	.9	1.5	3.6
Air (includes truck and air)	.1	.3	S	–	S	–
Pipeline	3.6	2.3	5.8	2.3	S	S
Multiple modes	**.4**	**.2**	**.1**	**.1**	**.3**	**.2**
Parcel, U.S. Postal Service or courier	.4	.1	S	S	–	S
Other multiple modes	–	.1	.1	.1	.3	.2
Other and unknown modes	**.2**	**.8**	**–**	**S**	**–**	**.7**
HAZARD CLASS 3, FLAMMABLE LIQUIDS						
Total	**–**	**–**	**–**	**–**	**–**	**–**
Single modes	**.2**	**.3**	**.2**	**.3**	**1.3**	**4.2**
Truck	1.4	2.0	1.1	2.1	2.8	3.7
For-hire truck	1.4	1.1	.8	1.3	3.0	2.2
Private truck	1.6	1.4	1.3	1.3	1.1	1.8
Rail	.2	.3	.1	.2	1.8	1.9
Water	1.2	.8	1.7	1.1	2.9	2.9
Air (includes truck and air)	–	S	S	–	S	–
Pipeline	1.4	1.2	1.6	1.8	S	S
Multiple modes	**.3**	**.2**	**.2**	**.2**	**1.3**	**S**
Parcel, U.S. Postal Service or courier	.1	–	–	–	–	–
Other multiple modes	.2	.2	.2	.2	1.3	S
Other and unknown modes	**.2**	**.2**	**.1**	**.1**	**S**	**.1**
HAZARD CLASS 4, FLAMMABLE SOLIDS						
Total	**–**	**–**	**–**	**–**	**–**	**–**
Single modes	**5.4**	**1.3**	**.3**	**.8**	**.8**	**1.3**
Truck	7.6	2.4	5.7	6.8	6.4	4.3
For-hire truck	7.8	4.0	6.3	5.3	6.9	3.6
Private truck	7.1	3.7	4.0	S	1.8	1.5
Rail	4.3	2.9	3.7	6.8	6.2	4.6
Water	.4	S	5.1	S	S	S
Air (includes truck and air)	S	.2	S	S	S	S
Pipeline	S	S	S	1.5	S	S
Multiple modes	**S**	**1.4**	**S**	**S**	**S**	**S**
Parcel, U.S. Postal Service or courier	1.3	S	–	–	S	–
Other multiple modes	S	S	S	S	S	S
Other and unknown modes	**S**	**.6**	**S**	**S**	**S**	**.1**

See footnotes at end of table.

Table B–6c. **Estimated Standard Errors for 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		Tons		Ton-miles	
	2002	1997	2002	1997	2002	1997
HAZARD CLASS 5, OXIDIZERS AND ORGANIC PEROXIDES						
Total	–	–	–	–	–	–
Single modes	**1.4**	**.6**	**1.3**	**1.0**	**1.9**	**.7**
Truck	4.6	5.4	6.7	4.5	8.6	6.0
For-hire truck	6.4	4.3	7.7	3.8	9.5	5.3
Private truck	5.4	2.6	5.1	3.1	2.1	1.2
Rail	4.9	5.4	6.7	4.5	9.1	5.9
Water	–	S	–	S	–	S
Air (includes truck and air)	S	–	–	S	S	S
Pipeline	–	–	–	–	S	S
Multiple modes	**1.2**	**.5**	**S**	**S**	**S**	**S**
Parcel, U.S. Postal Service or courier	S	S	S	–	S	–
Other multiple modes	1.2	.4	S	S	S	S
Other and unknown modes	**S**	**.5**	**S**	**S**	**S**	**S**
HAZARD CLASS 6, TOXIC (POISON)						
Total	–	–	–	–	–	–
Single modes	**2.8**	**1.3**	**2.7**	**.7**	**1.9**	**1.4**
Truck	2.9	2.6	5.2	3.4	6.1	2.4
For-hire truck	3.7	3.0	3.6	3.1	5.2	2.3
Private truck	3.5	4.8	2.5	3.0	1.0	1.1
Rail	2.4	1.4	5.6	2.9	6.0	3.9
Water	4.0	S	8.5	S	S	S
Air (includes truck and air)	S	.3	S	S	S	S
Pipeline	S	.5	6.5	1.6	S	S
Multiple modes	**S**	**1.3**	**S**	**.6**	**S**	**S**
Parcel, U.S. Postal Service or courier	1.2	1.0	S	–	S	–
Other multiple modes	S	.3	S	.6	S	S
Other and unknown modes	**S**	**.6**	**S**	**.5**	**1.0**	**.2**
HAZARD CLASS 7, RADIOACTIVE MATERIALS						
Total	–	–	–	–	–	–
Single modes	**5.3**	**3.5**	**2.4**	**3.1**	**5.0**	**8.1**
Truck	8.5	7.4	2.1	4.9	6.8	13.6
For-hire truck	11.1	4.3	12.6	7.0	9.0	12.2
Private truck	8.7	7.0	11.7	6.4	S	S
Rail	–	S	–	S	–	S
Water	–	–	–	–	–	–
Air (includes truck and air)	7.6	5.2	1.7	2.1	7.0	5.4
Pipeline	–	S	–	S	S	S
Multiple modes	**5.3**	**4.0**	**2.5**	**3.4**	**5.0**	**8.5**
Parcel, U.S. Postal Service or courier	5.3	4.0	2.5	3.4	5.0	8.5
Other multiple modes	–	–	–	–	–	–
Other and unknown modes	**S**	**S**	**S**	**S**	**S**	**S**
HAZARD CLASS 8, CORROSIVE MATERIALS						
Total	–	–	–	–	–	–
Single modes	**.8**	**1.0**	**.5**	**1.1**	**1.1**	**.8**
Truck	1.4	2.3	1.8	3.7	3.9	3.6
For-hire truck	3.3	2.6	2.8	3.0	4.6	3.3
Private truck	3.1	2.8	1.3	2.8	1.0	1.4
Rail	1.1	1.7	2.5	3.0	4.4	4.6
Water	.7	2.5	2.0	5.0	2.8	7.0
Air (includes truck and air)	.1	.1	S	–	S	–
Pipeline	.2	S	1.4	.5	S	S
Multiple modes	**.4**	**.6**	**.3**	**.2**	**1.1**	**.4**
Parcel, U.S. Postal Service or courier	.4	.5	S	–	S	–
Other multiple modes	.2	.3	.3	.2	1.1	.4
Other and unknown modes	**S**	**.7**	**.3**	**.9**	**.2**	**S**

See footnotes at end of table.

Table B–6c. Estimated Standard Errors for 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		Tons		Ton-miles	
	2002	1997	2002	1997	2002	1997
HAZARD CLASS 9, MISCELLANEOUS DANGEROUS GOODS						
Total	**–**	**–**	**–**	**–**	**–**	**–**
Single modes	**1.9**	**1.9**	**.9**	**.4**	**1.6**	**.8**
Truck	4.6	3.5	6.5	4.5	4.5	5.7
For-hire truck	5.3	3.2	4.8	4.4	2.5	5.3
Private truck	5.8	2.8	4.7	3.4	3.8	1.5
Rail	2.3	3.7	3.5	3.9	5.4	5.5
Water	2.3	S	5.3	S	6.3	S
Air (includes truck and air)	1.2	.4	S	–	S	–
Pipeline	S	S	S	S	S	S
Multiple modes	**1.8**	**1.3**	**S**	**.3**	**1.6**	**.8**
Parcel, U.S. Postal Service or courier	1.0	1.0	–	–	–	–
Other multiple modes	1.1	.5	S	.3	1.6	.8
Other and unknown modes	**.3**	**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.

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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.

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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.

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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.

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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.

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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

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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

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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.

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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

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S Estimate does not meet publication standards because of high sampling variability or poor response quality.

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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

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S Estimate does not meet publication standards because of high sampling variability or poor response quality.

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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.