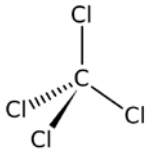
Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal:

Carbon Tetrachloride

CASRN: 56-23-5



February 2017

Support document
for Docket EPA-HQ-OPPT-2016-0733

This document provides a preliminary public summary of available information collected by EPA's Office of Pollution Prevention and Toxics (OPPT) in the Office of Chemical Safety and Pollution Prevention (OCSPP) on the manufacturing (including importing), processing, distribution in commerce, use, and disposal of this chemical. This is based on existing data available to EPA, including information collected under the Chemical Data Reporting rule, Toxics Release Inventory, information from other Agency databases, other U.S. Government agencies, publicly available information from states, and a review of published literature. In addition, the document includes information reported to EPA by producers and users of the chemical in the United States and in other countries.

This preliminary use information and any additional use information received in the docket by March 15, 2017 will inform efforts to develop the scope of the chemical risk evaluation required under section 6(b)(4) of the Toxic Substances Control Act, and will inform any risk management efforts following risk evaluation.

Mention of trade names in this document does not constitute endorsement by EPA. To verify products or articles containing this chemical currently in commerce, EPA has identified several examples. Any lists are provided for informational purposes only. EPA and its employees do not endorse any of the products or companies.

This document does not contain confidential business information (CBI).

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CONTACT

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Docket: EPA-HQ-OPPT-2016-0733

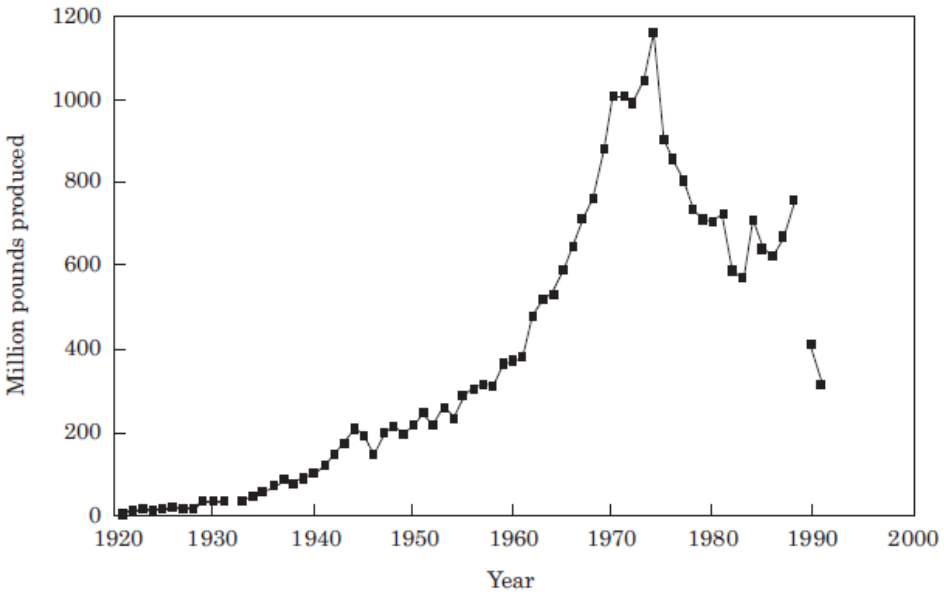
MANUFACTURING, PROCESSING, DISTRIBUTION, USE AND DISPOSAL

1. Manufacturing (Including Importing)

Carbon tetrachloride was a popular aerosol propellant in the 1950's and 1960's, which contributed to a growth rate of 10.7% per year from 1960-1970 for the manufacture of carbon tetrachloride. This rate decreased to 7.2% per year from 1970-1974, when other forms of propellants became commercially available (Holbrook 1991). Annual production at this time exceeded one billion lbs. From 1974 to 1994, manufacture of carbon tetrachloride decreased at approximately 8% a year (Chem Mark Rep 1995; Holbrook 1991). This decline is attributed to the adoption of the Montreal Protocol to reduce environmental concentrations of ozone-depleting substances (ODS) (including carbon tetrachloride), and to the provisions of Title VI of the Clean Air Act Amendments of 1990 addressing these chemicals. The regulation called for reduction to 15% of 1989 production levels by 1995 and a complete phase-out of carbon tetrachloride production for non-feedstock uses by 2000. EPA allocated a baseline production allowance of about 138 million pounds (63,000 metric tons) of carbon tetrachloride, apportioned among the eight U.S. companies producing the chemical in 1989 (EPA 1991a). There has also been a drop-off in both imports and exports for carbon tetrachloride.

Figure 1 shows the production trend of carbon tetrachloride from the early 1900's until 1990, with a clear peak production in 1970.

Figure 1. United States Production of Carbon tetrachloride



Source: http://www.tandfonline.com/doi/abs/10.1006/enfo.2000.0010 (Doherty 2000)

For the 2012 Chemical Data Reporting (CDR) period, data reported indicate that nine sites manufacture (including import) carbon tetrachloride in the United States[1],[2]. The total volume (in lbs.) of carbon tetrachloride manufactured (including imported) in the United States in 2010 was 138,835,158; in 2011: 149,927,241.

For the 2016 CDR period, 9 sites reported domestic manufacture or import of carbon tetrachloride. The total volume (in lbs.) of carbon tetrachloride manufactured (including imported) in the United States in 2012 was 129,145,698; in 2013: 116,658,281; in 2014: 138,951,153; in 2015: 142,582,067.

This trend indicates that production of carbon tetrachloride in the United States has remained constant over the past 6 years.

For the 2015 Toxics Release Inventory (TRI), 47 sites reported releases of carbon tetrachloride [3]. Of these, 28 sites reported production, 3 reported import, and 8 reported processing of carbon tetrachloride[4]. A total of 12,671 pounds of carbon tetrachloride were transferred offsite to landfills and/or other treatment/disposal facilities and 139,943 pounds were released to air, water, and land.

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[1] Manufacturers (including importers) are required to report under CDR if they meet certain production volume thresholds, generally 25,000 lb or more of a chemical substance at any single site. Reporting is triggered if the annual reporting threshold is met during any of the calendar years since the last principal reporting year. In general, the reporting threshold remains 25,000 lb per site. However, a reduced reporting threshold (2,500 lb) now applies to chemical substances subject to certain TSCA actions. https://www.epa.gov/chemical-data-reporting/how-report-under-chemical-data-reporting

[2] Manufacture in the context of CDR means to manufacture, produce, or import for commercial purposes. Manufacture includes the extraction, for commercial purposes, of a component chemical substance from a previously existing chemical substance or complex combination of chemical substances. (40 CFR 711.3)
https://www.epa.gov/sites/production/files/2015-12/documents/cdr_fact_sheet_importers_final_dec2015_0.pdf

Similarly, the term “manufacture” in the context of TRI means to produce, prepare, compound, or import an EPCRA Section 313 chemical. The term “manufacture” also includes coincidental production of an EPCRA Section 313 chemical (e.g., as a byproduct or impurity) as a result of the manufacture, processing, otherwise use or disposal of another chemical or mixture of chemicals. https://www.epa.gov/sites/production/files/documents/ry2012rfi.pdf

[3] A facility must report to the TRI program if it meets all three of the following criteria: 1) is in a specific industry sector, 2) employs 10 or more full-time equivalent employees, and 3) manufactures, processes, or otherwise uses a TRI-listed chemical in quantities above applicable threshold levels for a given chemical in a given year. https://www.epa.gov/toxics-release-inventory-tri-program/basics-tri-reporting

[4] The term "process" in the context of CDR and TRI means the preparation of a chemical substance or mixture, after its manufacture, for distribution in commerce—
(A) in the same form or physical state as, or in a different form or physical state from, that in which it was received by the person so preparing such substance or mixture, or
(B) as part of an article containing the chemical substance or mixture.
http://uscode.house.gov/view.xhtml?path=/prelim@title15/chapter53&edition=prelim

The term “otherwise use” under TRI means any use of an EPCRA Section 313 chemical, including an EPCRA Section 313 chemical contained in a mixture or other trade name product or waste, that is not covered by the terms manufacture or process. See the definition of “otherwise use” for additional details on applicability of otherwise use with regard to disposal, stabilization, and treatment for destruction. https://www.epa.gov/sites/production/files/2016-01/documents/ry_2015_tri_reporting_forms_and_instructions.pdf

Sources below are cited in https://www.atsdr.cdc.gov/toxprofiles/tp30-c5.pdf

Chem Mark Rep. 1981. Chemical profile: Carbon tetrachloride. October 12, 1981.

Chem Mark Rep. 1995. Chemical profile: Carbon tetrachloride. February 20, 1995.

EPA. 1991a. In-situ biotransformation of carbon tetrachloride under anoxic conditions. Ada, OK: U.S. Environmental Protection Agency, Robert S. Kerr Environmental Research Laboratory, EPA600290060.

Holbrook HT. 1991. Carbon tetrachloride. In: Kroschwitz JI, Howe-Grant M, eds. Kirk-Othmer encyclopedia of chemical technology. Vol 5. 4th edition. New York: John Wiley & Sons, 1062-1072.

Manufacturing Process

A majority of carbon tetrachloride produced in the United States is produced by the chlorination of a variety of low molecular weight hydrocarbons such as carbon disulfide, methane, ethane, propane, and ethylene dichloride (HSDB 2004). It is also produced by thermal chlorination of methyl chloride (HSDB 2004).

HSDB. 2004. Carbon tetrachloride. Environmental standards and regulations. Bethesda, MD: Hazardous Substances Data Bank. http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm. December 30, 2004, as cited in Doherty 2000 (http://www.tandfonline.com/doi/abs/10.1006/enfo.2000.0010)

According to TOXNET (A Toxicology Data Network within the National Institutes of Health), methods of manufacturing carbon tetrachloride include:

- Obtained from carbon disulfide and chlorine in the presence of a catalyst or by the chlorination of hydrocarbons.
- Pyrolysis of hexachloroethane
- Methyl chloride + chlorine (thermal chlorination; coproduced with chloroform/methylene chloride)
- Natural gas + hydrogen chloride, anhydrous/oxygen (Lummus oxychlorination process; coproduced with chloroform/methyl chloride/methylene chloride)
- Ethane/propane + chlorine (chlorinolysis; coproduced with perchloroethylene)
- Reaction of sulfur monochloride with carbon disulfide produces carbon tetrachloride
- Interaction of carbon disulfide and chlorine in the presence of iron; (2) chlorination of methane or higher hydrocarbons at 250-400 /deg/ C.

Source: http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:@term+@DOCNO+53

2. Processing

Based on publicly available information reported to CDR, TRI, and other sources, carbon tetrachloride is primarily used as chemical feedstock in the synthesis of CFCs, HCFCs, and HFCs, which are often used as refrigerants. For adhesives, carbon tetrachloride is used as a process agent in the manufacture of chlorinate rubber resins. The resulting resins are thermoplastic, odorless, and non-toxic. Carbon tetrachloride is preferred in this process as it is the only solvent not attacked by chlorine.

Current processing of carbon tetrachloride in the United States includes:

- Chemical feedstock, such as for the following chemicals:
  - 1,1,2,2-tetrachloroethene (Perchloroethylene, CAS: 127-18-4)
  - HFC-245fa (1,1,1,3,3-pentafluoropropane, CAS: 460-73-1)
  - HFC-365mfc (1,1,1,3,3-pentafluorobutanebutane CAS: 406-58-6)
  - HFC-236fa (1,1,1,3,3,3-hexafluoropropane CAS: 690-39-1)
    Source: http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP_Progress_Report_June2016.pdf
  - Feedstock for chlorofluorocarbon gases (dichlorodifluoromethane (F-12) and trichlorofluoromethane (F-11), which were used in the past as aerosol propellants (Holbrook 1991)

- Use as a processing agent:
  - Elimination of NCl_3 in chlor-alkali production
  - Chlorine recovery by tail gas absorpotion in chlor-alkali production
  - Production of Chlorinated rubber
  - Production of chlorosulfonated polyolefin (CSM)
    Sources:http://ozone.unep.org/en/handbook-montreal-protocol-substances-deplete-ozone-layer/1138
    UNEP 1998 Report of the Solvents
  - All other basic organic chemical manufacturing
  - Industrial gas manufacturing

- Processing as a formulation component or repackaging
  - Plastics Material and Resin Manufacturing

Source: https://java.epa.gov/chemview

3. Products and Articles

EPA has identified the following examples. This list is provided for informational purposes only. EPA and its employees do not endorse any of the products or companies.

Table 1. List of Products

Trade name	Use of the Product (If Known)	% by weight of chemical	Link to references, SDS or industry information
3M(TM) Scotch-Weld(TM) Structural Adhesive SA30 (formerly sold as Rite-Lok™Structural Adhesive SA30-300)	Industrial Adhesives and Tapes	<1%	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjh0NelkcrRAhWEZCYKHQ2GDOUQFggiMAE&url=https%3A%2F%2Fimages.ewins.com%2Fdigital_asset_manager%2Ffile_download.php%3Fvi%3D2140378&usg=AFQjCNHyx_LzFuDJJ0MUeqS_M6JHecumpg
AAT-197 Adhesive Remover (non-flammable)	Adhesive remover	<.45%	http://www.aatglue.com/197-Adhesive-Remover.html
AT-4020 (COMPONENT A)	Adhesive	<1%	http://www.jamestowndistributors.com/userportal/pdfs/MSDS/Weld%20Mount/AT-4020%20Part%20A%20&%20B%20MSDS%20Sheet.pdf
Saf-T-Solv™	Carpet Spot Remover	<.45%	http://www.baneclene.com/msds/saftsolv.pdf
Carbon Tetrachloride	NA	100%	http://cdn.chemservice.com/product/msdsnew/External/English/N-11407%20English%20SDS%20US.pdf
Draeger Tubes™	Used for the measurement of gas concentrations	NA	http://www.hazcat.com/MSDS/MSDSPDF/AllDraegers.pdf
"HYPALON" Synthetic Rubbers	Synthetic rubber	<.2%	http://docplayer.net/2682845-Dupont-performance-elastomers-l-l-c-page-1-material-safety-data-sheet.html
HYPALON Synthetic Rubbers	Synthetic rubber – used for insulation and jacketing of wire and cable	<.2%	http://www1.mscdirect.com/MSDS/MSDS00004/63415905-20150718.PDF https://corpapps.anixter.com/DocLib1/5ZEX7S2R/$file/DuPontDiscontinuingHyphalonJuneJuly09.pdf%3Fopenelement
UR51WP511 PRO 5 C/R White Solvent Paint-TT-P-115E, Type III	Traffic paint	<0.1%	http://msdsdigital.com/system/files/ENNIS-WPS-ENN-985191NAME-EN-2012072392128.pdf
Carbon Tetrachloride	NA	100%	https://www.elac.edu/academics/departments/chemistry/chemistrydocuments/docs/C/carbon%20tetrachloride.pdf
Prenol, from sea buckthorn (hippophae), 80 mg/ml solution in CCl4	NA	95%	https://www.fishersci.com/shop/msdsproxy?productName=AC290150500&productDescription=PRENOL%2CFROM+SEA+BUCKTHOR+50MG&catNo=AC290150500&vendorId=VN00032119&storeId=10652

Trade name	Use of the Product (If Known)	% by weight of chemical	Link to references, SDS or industry information
Chloracoat Rubber Based Paint	Coating compound/ Surface coating/ paint	<2.5%	https://goldenc.com/Documents/SDSsheets/Paint/Chloracoat_Chlorinated_Rubber_Paint.pdf
FOSTER 60-38	Coating	0.1-1%	http://www.fosterproducts.com/docHandler.aspx?docid=11d0c75d-4540-4795-826e-4b6698483866
LOCTITE AA H8600 A Structural Acrylic Adhesive known as H8600 SPEEDBONDER ADHESIVE/5 G	Adhesive	<1%	http://hybris.cms.henkel.com/henkel/msdspdf?matnr=579879&country=US&language=EN
LOCTITE® H4720/H4710™ Structural Adhesive Speedbonder Part A	Adhesive	<1%	http://www.rshughes.com/wm/p/wm-asis/e769b70dd3388fab28bce0693d18e75cd5c10c10.pdf?uf=
Loctite Plastix Bonder Epoxy - PART A	Plastic adhesive	<1%	https://www.whatsinproducts.com//brands/show_msds/1/10506
LOC PLASTIC BONDR SYR 8P PTA - resin	Plastic adhesive	<1%	https://www.whatsinproducts.com//brands/show_msds/1/15340
Depend(R) ODC-Free 330 Adhesive	Structural adhesive	<.1%	http://www.stiweb.com/downloadDataSheets/CMCP211msds.pdf
Chlorinated Rubber (surface coating paint)	Coating paint	<2.5%	http://www.hmgcoatings.com/pdfs/MSDS/topcoats%20and%20wood%20stains/Chlorinated%20Rubber%20Lead%20Free%20MSDS.pdf
Devcon High Strength Plastic Welder	Paste- arts and crafts (consumer use)	<1%	https://www.whatsinproducts.com//brands/show_msds/1/11641
Zip Patch Adhesive Spray Activator	Adhesive	<1%	http://www.chemical-concepts.com/media/downloads/1275/11500%20msds.pdf
Plastic Welder Adhesive, Plastic Welder Activator	Plastic adhesive	<1%	http://www.farnell.com/datasheets/1444695.pdf
MOTO-SEAL 1. Ultimate Gasket Maker Grey 80 ml	Adhesive	<1%	https://www.permatex.com/wp-content/uploads/tech_docs/sds/01_USA-English/29132.pdf
MA 310 Adhesive	Adhesive	<1%	http://www.jamestowndistributors.com/userportal/pdfs/MSDS/Plexus/MSDS_MA-310_301146.pdf
18 oz Brake Sav (red/blue)	Brake cleaner	0.1-1%	http://www.kaylinecompany.com/sds/K40.pdf
Ramuc Pro 2000 - 328 Dawn Blue	Pool paint	Impurity	http://www.ramucpoolpaint.com/media/24443/sds-pro2000-dawnblue-0915.pdf
Disinfection By-products and Chlorinated Solvent Mixture	Reference material for laboratory use	<1%	https://us.lgcstandards.com/medias/sys_master/pdfs/pdfs/hd9/h58/9008490938398/U-HCM-551D-1-ST-WB-MSDS-1989859-1-1-1.pdf
Epoxy Plastic Bonder-Old Product	Arts & Crafts	0.1-1 (Part A)	http://173.236.248.140/cpid/brands/show_msds/1/10506 Reference: https://hpd.nlm.nih.gov/cgi-bin/household/search?queryx=56-23-5&tbl=TblChemicals&prodcat=all
Epoxy Plastic bonder – 2014	NA	0.1-1.0 (Resin)	http://173.236.248.140/cpid/brands/show_msds/1/15340 Reference: https://hpd.nlm.nih.gov/cgi-bin/household/search?queryx=56-23-5&tbl=TblChemicals&prodcat=all

Trade name	Use of the Product (If Known)	% by weight of chemical	Link to references, SDS or industry information
Standard reference Material	Intended for the calibration of instrumentation and validation of methods for VOC determinations	1%	https://www-s.nist.gov/m-srmors/msds/3006-MSDS.pdf
Perchloroethylene All Grades	"Petroleum industry, Refrigerant manufacturing, metal cleaning, paint stripping, Aerosol carrier" -Carbon tetrachloride is used as a feedstock chemical to produce PERC	<0.45%	http://www.ppe.com/msds/MRS-3.PDF
Parks PRO STRIPPER	Paint remover	<1 ppm	https://www.menards.com/msds/101357_001.pdf
DYNA-BRAKE	Solvent Mixture	0.1-1%	https://pass.partsmaster.com/MSDS/6228.pdf
Trim/Detail Adhesive (Kit with Activator)	Auto Products	0.01-0.1	Reference: https://hpd.nlm.nih.gov/cgi-bin/household/search?queryx=56-23-5&tbl=TblChemicals&prodcat=all
CR PREMIUM LINE PAINT YELLOW	Solvent-borne, line-marking paint	<1%	https://www.seton.co.uk/media/cms/files/stuk/DMEU_TDS_00162_std.lang.all.pdf
Plastic Bonder	NA	<0.05	Reference: https://hpd.nlm.nih.gov/cgi-bin/household/search?queryx=56-23-5&tbl=TblChemicals&prodcat=all
RAMUC PRO 2000 Chlorinated Rubber Pool Paint	Impurity	<0.5%	http://www.bluewaterproducts.com/customer/blwapr/msds/Rebublic%20metals%20Ramuc%20paint/pro%202000%20rubber%20base.pdf
30024 / TCLP VOA Mix	NA	0%	http://www.restek.com/documentation/msds/30024_ukeng.pdf
30259 / Carbon tetrachloride Standard	NA	0%	http://www.restek.com/documentation/msds/30259_useng.pdf
Class 1 Residual Solvent Mixture	NA	2%	http://www.restek.com/documentation/msds/36279_useng.pdf
Carbon Tetrachloride	NA	>99%	http://datasheets.scbt.com/sc-239479.pdf
Static Dissipative Polyvinyl Chloride Sheet	NA	Impurity? Unclear	http://www.sctech.com/MSDS-FM-4910-PVC-Sheets
Carbon Tetrachloride	NA	100%	http://www.sciencelab.com/msds.php?msdsId=9927342
39537 Weld Bond Adhesive	Adhesive	<2.5%	http://images.myautoproducts.com/images/Product_Media/MSDS/SEM/SEM-39537_MSDS.pdf
CHROMASOLV	Used for HPLC	>99.9%	http://www.nfc.umn.edu/assets/pdf/msds/carbon_tetrachloride.pdf
Carbon Tetrachloride	NA	100%	https://www.nwmissouri.edu/naturalsciences/sds/c/Carbon%20tetrachloride.pdf

Trade name	Use of the Product (If Known)	% by weight of chemical	Link to references, SDS or industry information
Carbon tetrachloride, reagent	Recommended uses: Refrigerant. Petrol additives. Agricultural fumigant. Production of semiconductors. Cleaning agent for machinery and electrical equipment.	100%	https://www.spectrumchemical.com/MSDS/C1981-AGHS.pdf
CHLORINATED BRAKE PARTS CLEANER	Brake cleaner	0.1-1%	http://www.spraywayinc.com/sites/all/themes/theme687/msds/sw073.pdf
Tetrachloromethane	NA	100%	http://www.synquestlabs.com/msds/1100-4-01.pdf
Zinc Rich Primer	Paint	<1%	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0ahUKEwjzusaTksrRAhXD4CYKHWdNDdwQFggrMAM&url=http%3A%2F%2Fwww.clearcoproducts.com%2Fpdf%2Fmsds%2F3%2Fmsds-ZRP.pdf&usg=AFQjCNF8fxgUX9OHbLuWoY_V_uJSi3vuvg&bvm=bv.144224172,d.eWE
CHLORINATED RUBBER BLACK + DARK COLOURS	Swimming Pool Paint	<1%	http://www.molevalleyfarmers.com/mvf-static/reports/product/pdf/03551.pdf
DOWPER solvent	Dry-cleaning	25 ppm	http://www.nortonsupply.com/msds/Dow/Dowper_msds.pdf
(Tough Acrylic Adhesive)	Adhesive	<1%	http://www-public.tnb.com/shared/msds/sds-00037-tb2.pdf
Primer No 1	Sealant	<1.5%	http://www.tremcosealants.com/fileshare/msds/00000000002521481164_C.PDF
Hysunite Color Coating	Coating paint	<.09%	http://www.buildsite.com/pdf/versico/Hysunite-Color-Coating-SDS-291955.pdf
Adhesive 100	Adhesive	0%	http://www.sfm.state.or.us/CR2K_SubDB/MSDS/REILLY_ADHESIVE_100.PDF

No reports of articles containing carbon tetrachloride were found.

4. Distribution (Includes Retailers)

Distribution of carbon tetrachloride is limited, as the majority of the chemical is used as a feedstock to make other chemicals, and therefore is used almost entirely on site rather than being re-distributed into commerce.

The table below provides examples of products containing carbon tetrachloride that are available for purchase online.

Table 2. Products Containing Carbon Tetrachloride Available for Purchase Online

Product	Description and price	References
Saf-T-Solv	Solvent Carpet Spot Remover (1 quart for $13.35)	http://www.baneclene.com/catalog/sts.html
Devcon 14385 Straw Plastic Welder Adhesive	Plastic Welder Adhesive 400 mL (pack of 12) $616.71	https://www.amazon.com/Devcon-Plastic-Welder-Adhesive-Cartridge/dp/B005YSSFBO#feature-bullets-btf
Loctite Epoxy Plastic bonder	Adhesive for plastics bonding (.85 oz. for $7.29, $7.88) Note: Is unclear whether the new or old formulas are for sale	https://www.amazon.com/Loctite-Plastic-0-85-Fluid-Syringe-1363118/dp/B0044FBB8C https://www.menards.com/main/home-decor/craft-supplies/glue/epoxy-glue/loctite-20-min-plastic-bonder-epoxy-0-85-oz/p-1444432303984.htm
RAMUC PRO 2000 Chlorinated Rubber Pool Paint	Rubber Pool Paint (1 gallon for $84.95, $196.00) Note: Only listed as an impurity	https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=RAMUC+PRO+2000+Chlorinated+Rubber+Pool+Paint https://www.walmart.com/ip/Pro-2000-Chlorinated-Rubber-Pool-Coating-Dawn-Blue-5-Gallon-Pail-per-Pail/160687567?wmlspartner=wlpa&selectedSellerId=1293&adid=22222222227000000000&wl0=&wl1=g&wl2=c&wl3=42423897272&wl4=pla-51320962143&wl5=9061285&wl6=&wl7=&wl8=&wl9=pla&wl10=113137480&wl11=online&wl12=160687567&wl13=&veh=sem
MOTO-SEAL 1 ULTIMATE GASKET MAKER GREY 80 ML	Sealant (2.7 oz. tube for $4.61, $8.74)	http://www.autopartsandstuff.com/permatex-ptx-29132-motoseal1ultimategasketmakergrey27oztube.aspx?gclid=CObVkambl9ECFY5WDQodUXkMHA http://www.ebay.com/itm/like/172439663876?lpid=82&chn=ps&ul_noapp=true
Carbon Tetrachloride	200 L Steel Drums of Industrial Grade Carbon Tetrachloride ($400-$500/ton)	https://www.alibaba.com/productdetail/CCL4_60023332226.html?spm=a2700.7724838.0.0.h1buQj

5. Use

Since production of carbon tetrachloride for most uses has been phased-out due to the Montreal Protocol and Clean Air Act, the chemical is only available for those uses for which no effective substitute has been found, such as chemical feedstock use, use as a processing agent, and laboratory or analytical use.

Uses of carbon tetrachloride includes non-incorporative activities in the following sectors, as reported to CDR:

- All other basic organic chemical manufacturing
- Pesticide, fertilizer, and other agricultural chemical manufacturing

Laboratory and analytical uses of carbon tetrachloride include:

- Equipment calibration
- Solvent - based extraction
- Chemical analyses as a carrier
- ODS (Ozone Depleting Substance) monitoring
- Detection of volatile organic compounds
- Assessment of iodine value of fats and oils & viscosity coefficient
- Tests for toxicity characteristics / leaching
- Analysis of oil mist
- Detection of heavy metals and pesticides
- Nuclear magnetic resonance
- Infrared spectroscopy

Source: http://www.uneptie.org/ozonaction/information/mmcfiles/4766-e-26AlternativesCTC.pdf

Use at Industrial Sites

Industrial Sectors and Function Categories that reported to CDR for carbon tetrachloride include:

- Basic organic chemical manufacturing
  - Intermediate
  - Process Regulator
- Pesticide, fertilizer, and other agricultural chemical manufacturing
- Laboratory Chemicals

Source: https://java.epa.gov/chemview

Facilities reporting to TRI in 2015 for carbon tetrachloride use include facilities in the following sectors.

Table 3: Facilities Reporting to TRI for Use in Facilities

NAICS Code	NAICS Classification
325180	Other Basic Inorganic Chemical Manufacturing
325199	All Other Basic Organic Chemical Manufacturing
325120	Industrial Gas Manufacturing
327310	Cement Manufacturing
327992	Ground or Treated Mineral and Earth Manufacturing

According to the HSDB TOXNET database, uses of carbon tetrachloride include:

- Recovery of tin-in-tin plating waste
- In formulation of petrol additives
- Solvent for rubber cement; cleaning agent for machinery and electrical equipment; in synthesis of nylon-7 and other organic chlorination processes.
- Use in polymer technology as reaction medium, catalyst; in organic synthesis for chlorination of organic compounds.
- Industrial solvent for cable and semiconductor manufacture.
- Metal recovery and catalyst regeneration.
- Chemical intermediate for tetrabromomethane and pyrosulfuryl chloride
- Solvent for asphalt, benzyl resin, bitumens, chlorinated rubber, ethylcellulose, gums, and rosin.

As described by the NESHAP for Certain Source Categories, industrial uses of carbon tetrachloride include as a diluent for nitrogen trichloride or as a scrubbing liquid to recover chlorine from the liquefaction of tail gas (59 FR 19402, April 22,1994).

Carbon tetrachloride is used in reactive ion etching (RIE) which involves ion bombardment to achieve directional etching and a chemically reactive gas (such as carbon tetrachloride) to maintain etched layer selectivity. Another source claims to use carbon tetrachloride to dope gallium arsenide and indium-gallium arsenide films with carbon during metalorganic vapor-phase epitaxy (MOVPE) (OSHA).

Sources: https://www.osha.gov/SLTC/semiconductors/metallization_metaletch.html
http://www.seas.ucla.edu/prosurf/Publications/paper57-JCG.pdf

Commercial Uses

Commercial use of carbon tetrachloride in an academic or other laboratory setting includes as a solvent, reagent or reference material.

Based on products identified in Table 1, the following are potential commercial uses of carbon tetrachloride:

- Adhesives
- Brake Cleaner

- Dry cleaning and other textile cleaning
- Paints (pools, traffic, other coatings)
- Paint Remover
- Synthetic Rubber

Consumer Uses

Carbon tetrachloride and mixtures containing it (with the exception of chemicals containing unavoidable residues of carbon tetrachloride that do not result in atmospheric concentrations of carbon tetrachloride greater than 10 ppm) were banned in 1970 by the Consumer Product Safety Commission (CPSC), under the Federal Hazardous Substance Act (FHSA) 16 CFR 1500.17 Although banned in consumer products, a number of products containing carbon tetrachloride are available from online sources and could foreseeably be purchased and used by consumers (See Table 2 for examples).

Past and Potential Uses

Discontinued Uses of Carbon Tetrachloride:

- Parks Adhesive Remover-09/04/1998
- Trim/Detail Adhesive (Kit with Activator) - Auto products
- Radio Shack Plastic Bonder
- Spark-Fas Adhesive (non-flammable brush), Foster 85-20
- Fire Extinguishers
- Waterless shampoo
- Solvent
- Dry-cleaning agent
- Grain fumigant
- Manufacture of Freon refrigerants

Sources: https://www.cdc.gov/niosh/pdfs/76-133b.pdf
https://www.whatsinproducts.com/chemicals/view/1/309
https://www.atsdr.cdc.gov/toxprofiles/tp30-c5.pdf
https://druginfo.nlm.nih.gov/drugportal/rn/56-23-5

Current International Uses of Carbon Tetrachloride:

- Fuel Additive, based on 2009 Patent http://www.google.ch/patents/US20110107657
- Article 5(1) Countries: the 2002 Montreal Report found that there are many users of small quantities of carbon tetrachloride for open-tank cold cleaning, involving thousands of Ozone Depleting (OD) tonnes of the substance. In 2000, the estimated global about of OD tonnes in Article 5(1) countries was 15,400.
  Source: UNEP. *2002 Report of the Solvents, Coatings and Adhesives Technical Options Committee: 2002 Assessment*. Nairobi, Kenya: United Nations Environment Programme, Ozone Secretariat, 2003 (UNEP 2003).

- In developing countries, carbon tetrachloride is still used in various cleaning processes, including fabric cleaning (UNEP 2003).
- China was granted an essential use exemption for 65 tonnes of carbon tetrachloride for the testing of oil, grease and total petroleum hydrocarbons in water for 2017.
  Source: http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP_Progress_Report_June2016.pdf

Additional use information on this chemical is available at: https://echa.europa.eu/substance-information//substanceinfo/100.000.763. It is copyrighted and cannot be reproduced here.

The table below is from the 2004 UNEP TEAP report of the Process Agent Task Force and presents the international uses of carbon tetrachloride.

Table 4: List of International Process Agents

Country	Process Name	Application	Date Presented	Chemical	Used As	Consumption (tonnes)	Alternatives
DPR Korea	Ascorbic Acid	Vitamin	12.19.03	Carbon Tetrachloride	Reaction Media	75.3	L-sorbose fermentation
DPR Korea	Ciproflaxin	Antibiotic	12.19.03	Carbon Tetrachloride	Reaction Media	16.3	Solventless chlorination
DPR Korea	Norfloxicin	Antibiotic	12.19.03	Carbon Tetrachloride	Reaction Media	60	Solventless chlorination
DPR Korea	Sodium dichloro-icocyanurate	Disinfectant	12.19.03	Carbon Tetrachloride	NCl_3 Removal	59.6	Reaction Control
Romania	2,4-D	Herbicide	01.14.04	Carbon Tetrachloride	Reaction Media	99.7	Perchloroethylene
Romania	DEHPC	Initiator	01.14.04	Carbon Tetrachloride	Reaction Media	73.3	PVA Dispersion
United Kingdom	Cyanocobalamin^{57}Co	Essay for Vitamin B12	02.13.04	Carbon Tetrachloride	Extraction Solvent	0.008	Needs Approval

Source: http://ozone.unep.org/en/Assessment_Panels/TEAP/Reports/PATF/PATF_Report2004.pdf

6. Disposal of Waste and Recycling/Recovery

According to information reported to TRI for 2015, of the 47 facilities who reported to TRI for carbon tetrachloride, 5 reported on-site releases and 4 reported off-site recycling. Of the 47, 44 reported some sort of release or other waste management. Overall, 12,671 lbs. of carbon tetrachloride were transferred offsite to landfills and/or other treatment/disposal facilities and 139,943 pounds were released to air, water, and land. Additionally, 5,951,403 pounds of carbon tetrachloride was recycled on-site, and 2,663 pounds was recycled off-site in 2015.

According to the 2016 CDR data, companies have reported recycling carbon tetrachloride. The number of companies is confidential business information (CBI).

Source: https://www.atsdr.cdc.gov/toxprofiles/tp30-c5.pdf
https://java.epa.gov/chemview

USEFUL TYPES OF INFORMATION

This document presents a summary of information currently available to EPA on this chemical. To more fully characterize the manufacturing, processing, distribution, disposal, and use of this chemical, and to inform the development of the scoping document for this chemical, EPA is interested in obtaining information on:

- the functional uses for this chemical;
- what types of products contain this chemical;
- which industry sectors use this chemical;
- what volume of the chemical is used;
- which uses have been discontinued or phased out;
- exposure scenarios for this chemical; and
- in which articles this chemical is found.

APPENDIX: SOURCES CONSULTED

- U.S. EPA *Chemical Inventory*
  https://www.epa.gov/tsca-inventory
- U.S. EPA *ChemView*
  https://java.epa.gov/chemview
- TRI P2 information
  https://www.epa.gov/toxics-release-inventory-tri-program/pollution-prevention-p2-and-tri
- U.S. EPA *HPV HC* (access through Chemical Data Access Tool – CDAT)
  https://java.epa.gov/oppt_chemical_search/
- U.S. EPA *HPVIS* and *HPV HC* (access through Chemical Data Access Tool – CDAT)
  https://java.epa.gov/oppt_chemical_search/
- DfE Alternatives Assessments
  https://www.epa.gov/saferchoice/design-environment-alternatives-assessments
- Safer Chemical Ingredients List
  https://www.epa.gov/saferchoice/safer-ingredients
- Green Chemistry awards
  https://www.epa.gov/greenchemistry/presidential-green-chemistry-challenge-winners
- Greener products and services
  https://www.epa.gov/greenerproducts/identify-greener-products-and-services
- Pollution Prevention
  https://www.epa.gov/p2/pollution-prevention-case-studies
  https://www.epa.gov/p2/grant-programs-pollution-prevention#sra
  https://www.epa.gov/p2/pollution-prevention-tools-and-calculators
- U.S. EPA *InertFinder*
  https://iaspub.epa.gov/apex/pesticides/f?p=101:1:
- U.S. EPA *Pesticide Chemical Search*
  https://iaspub.epa.gov/apex/pesticides/f?p=CHEMICALSEARCH:1:0::NO:1::
- U.S. EPA *Endocrine Disruptor Screening Program*
  https://www.epa.gov/ingredients-used-pesticide-products/endocrine-disruptor-screening-program-tier-1-assessments
- U.S. EPA *Hazardous Waste*
  https://www.epa.gov/hw/learn-basics-hazardous-waste#regulations
- U.S. EPA *Superfund chemical data matrix*
  https://www.epa.gov/superfund/superfund-chemical-data-matrix-scdm-query
- U.S. EPA *Hazardous Air Pollutants*
  https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications
- U.S. EPA *Significant New Alternatives Policy (SNAP)*
  https://www.epa.gov/snap
- U.S. EPA *Volatile Organic Compounds*
  https://www.epa.gov/indoor-air-quality-iaq/technical-overview-volatile-organic-compounds#definition
- U.S. EPA *Toxic and priority pollutants under the Clean Water Act*
  https://www.epa.gov/eg/toxic-and-priority-pollutants-under-clean-water-act#toxic

- U.S. EPA *Contaminant Candidate list under the Safe Drinking Water Act*
  https://www.epa.gov/ccl/contaminant-candidate-list-3-ccl-3#chemical-list
- U.S. EPA *IRIS Assessment*
  https://cfpub.epa.gov/ncea/iris2/atoz.cfm
- U.S. EPA *SRS*
  https://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/substancesearch/search.do
- U.S. EPA *Chemical and Product Categories (CPCat) Database*
  https://actor.epa.gov/cpcat/faces/home.xhtml
- U.S. National Library of Medicine *ChemIDplus*
  https://chem.sis.nlm.nih.gov/chemidplus/
- U.S. National Library of Medicine *Hazardous Substance Data Bank (HSBD)*
  https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- U.S. Department of Health & Human Services *Household Products Database*
  https://hpd.nlm.nih.gov/index.htm
- OSHA *Chemical Hazards and Toxic Substances*
  https://www.osha.gov/SLTC/hazardoustoxicsubstances/index.html
- NIOSH Workplace Safety and Health Topics *Chemicals*
  http://www.cdc.gov/niosh/topics/chemical.html
- NIOSH *Pocket Guide to Chemical Hazards*
  http://www.cdc.gov/niosh/npg/npgdcas.html
- CPSC *Chemicals*
  http://www.cpsc.gov/en/Research--Statistics/Chemicals/
- CPSC *FHSA*
  https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/FHSA-Requirements/
- Food and Drug Administration *List of Databases*
  http://www.fda.gov/ForIndustry/FDABasicsforIndustry/ucm234631.htm
- NTP (National Toxicology Program) *Substances studied by NTP*
  http://ntpsearch.niehs.nih.gov/?e=True&ContentType=Testing+Status
- Department of Energy *Protective Action Criteria Database*
  http://energy.gov/ehss/protective-action-criteria-pac-aegls-erpgs-teels-rev-29-chemicals-concern-may-2016
- California Department of Toxic Substances Control *Toxics in Products*
  http://www.dtsc.ca.gov/PollutionPrevention/ToxicsInProducts/index.cfm
  http://www.dtsc.ca.gov/SCP/CandidateChemicalsList.cfm
  http://www.dtsc.ca.gov/SCP/WhatIsAPriorityProduct.cfm
- California Office of Environmental Health Hazard Assessment *Proposition 65*
  http://oehha.ca.gov/proposition-65/chemicals
  http://oehha.ca.gov/proposition-65/proposition-65-list
- California Office of Environmental Health Hazard Assessment *Biomonitoring*
  http://biomonitoring.ca.gov/chemicals
- California *permissible exposure limits for chemical contaminants*
  https://www.dir.ca.gov/title8/5155table_ac1.html

- California *hazardous substance list*
  https://www.dir.ca.gov/title8/339.html
- California *Safe Cosmetics Program – list of chemical agents known or suspected to cause cancer or developmental or other reproductive harm.*
  http://www.cdph.ca.gov/programs/cosmetics/Pages/default.aspx
  https://safecosmetics.cdph.ca.gov/search/Default.aspx
- Maine *chemicals of high concern*
  http://www.maine.gov/dep/safechem/highconcern/
- Massachusetts *Toxics Use Reduction Act (TURA) (link includes a link to Higher hazard substances list)*
  http://www.mass.gov/eea/waste-mgnt-recycling/toxics/toxic-use-reduction/toxics-use-reduction-act/
- Massachusetts *Complete list of TURA chemicals*
  http://www.mass.gov/eea/agencies/massdep/toxics/tur/toxics-use-reduction-act-tura-reporting-and-fees.html
- Lowell Center for Sustainable Production *Chemical, Policy and Science Initiative*
  http://www.chemicalspolicy.org/chemicalspolicy.us.state.database.php
- Minnesota Department of Health *Toxic Free Kids Act Chemicals of High Concern*
  http://www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/highconcern.html
- Michigan *Environmental Health Topics*
  http://www.michigan.gov/mdhhs/0,5885,7-339-71548_54783_54784_74881-13050--,00.html
- New Hampshire *Regulated Toxic Air Pollutants*
  http://des.nh.gov/organization/commissioner/legal/rules/documents/env-a1400.pdf
- New Jersey *Right to Know Hazardous Substances*
  http://web.doh.state.nj.us/rtkhsfs/rtkhsl.aspx
- Oregon *Priority Persistent Pollutants (in water)*
  http://www.deq.state.or.us/wq/SB737/
- Oregon *Pollutant Profiles*
  http://www.deq.state.or.us/wq/SB737/docs/LegRpAtt420100601.pdf
- Oregon *Reducing Toxics in Oregon*
  http://www.oregon.gov/deq/Pages/ToxicsReduction.aspx
- Oregon *Chemicals of Concern for Children's Health*
  http://public.health.oregon.gov/HealthyEnvironments/HealthyNeighborhoods/ToxicSubstances/Pages/childrens-chemicals-of-concern.aspx
- Pennsylvania Department of Labor and Industry *Hazardous Substance List*
  http://www.pacode.com/secure/data/034/chapter323/chap323toc.html
- Rhode Island *Air Resources – Air Toxics*
  http://www.dem.ri.gov/pubs/regs/regs/air/air22_08.pdf
- Vermont *Chemical Disclosure Program for Children's Products*
  http://www.healthvermont.gov/enviro/chemical/cdp.aspx
- Washington *Chemicals of High Concern to Children*
  http://www.ecy.wa.gov/programs/hwtr/rtt/cspa/chcc.html
- Washington *Children's Safe Products Act*
  http://apps.leg.wa.gov/RCW/default.aspx?cite=70.240

- Washington Department of Labor & Industries *SHARP Publications*
  http://www.lni.wa.gov/Safety/Research/Pubs/default.asp
- National Conference of State Legislatures
  http://www.ncsl.org/research/environment-and-natural-resources/state-chemical-statutes.aspx
- Canada *Chemicals Portal*
  http://chemicalsubstanceschimiques.gc.ca/index-eng.php
- EU *ECHA website*
  https://echa.europa.eu/
- Australia *NICNAS Chemical Information*
  https://www.nicnas.gov.au/chemical-information
- Japan *Chemical Risk Information Platform (CHIRP)*
  http://www.nite.go.jp/en/chem/chrip/chrip_search/systemTop
- OECD *eChemPortal*
  http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- Stockholm Convention on Persistent Organic Pollutants
  http://chm.pops.int/TheConvention/ThePOPs/ListingofPOPs/tabid/2509/Default.aspx
  http://chm.pops.int/TheConvention/ThePOPs/ChemicalsProposedforListing/tabid/2510/Default.aspx
- WHO IPCS (UN)
  http://www.who.int/ipcs/en/
- Other – worker protection information
  http://www.dguv.de/ifa/gestis/gestis-internationale-grenzwerte-fuer-chemische-substanzen-limit-values-for-chemical-agents/index-2.jsp
- DeLima Associates *Consumer Product Information Database (CPID)*
  https://www.whatsinproducts.com/chemicals/index/1
- SRC *FatePointers Search Module PHYSPROP*
  http://esc.syrres.com/fatepointer/search.asp
- Product and company websites